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SANITARY ECONOMY.

SANITARY ECONOMY:

ITS PRINCIPLES AND PRACTICE;

AND

ITS MORAL INFLUENCE ON THE PROGRESS OF CIVILISATION.

EDINBURGH:
PUBLISHED BY WILLIAM AND ROBERT CHAMBERS.
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EDINBURGH:
PRINTED BY W. AND R. CHAMBERS.

TO

EDWIN CHADWICK, Esq., C. B.

&c. &c. &c.

TO WHOSE

SUGGESTIVE GENIUS, ENLIGHTENED ZEAL, AND UNTIRING ENERGY,

HIS COUNTRY IS INDEBTED

FOR THE INVESTIGATION OF MANY EVILS CONNECTED WITH

ITS SOCIAL AND SANITARY ECONOMY,

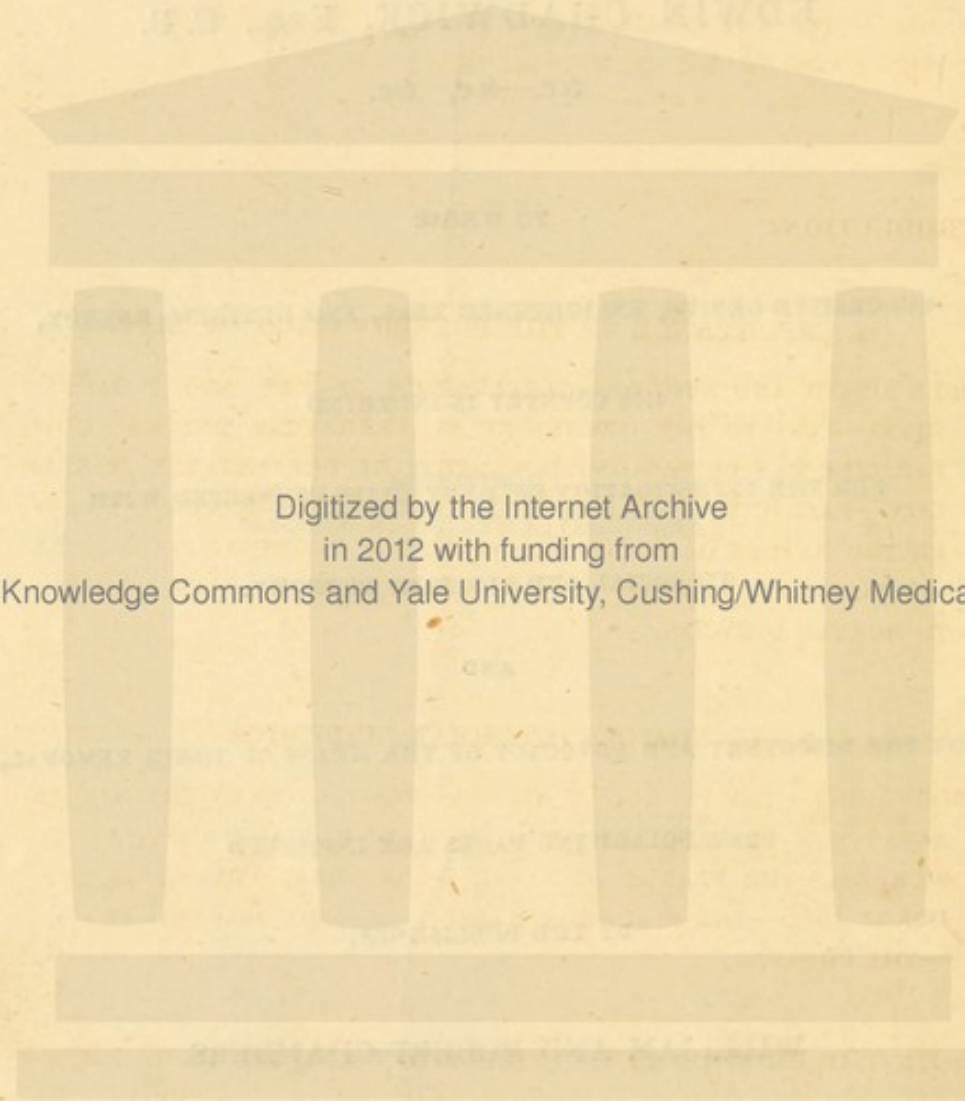
AND

FOR THE DISCOVERY AND ADVOCACY OF THE MEANS OF THEIR REMOVAL,

THE FOLLOWING PAGES ARE INSCRIBED

BY THE PUBLISHERS,

WILLLIAM AND ROBERT CHAMBERS.



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SANITARY ECONOMY.

INTRODUCTION.

THE object of the present publication may be explained in a few words. The importance of the matters to which it refers is universally admitted, and at the present moment they justly occupy a large share of the public attention. The sources of information on sanitary matters are, however, widely dispersed through numerous reports and other documents that have been laid before parliament, and a variety of published volumes and pamphlets. In the greater portion of these sources the subject is viewed more or less in parts; and as the official documents at least have rather had in view materials for legislation and the transaction of business than the provision of interesting and instructive reading for the public, they are necessarily filled with scientific details, and with minute statistical computations, which, though important and indeed essential to those who have immediately to deal with the public interests, become tedious and uninteresting to ordinary readers desirous of possessing a general knowledge of the whole question.

On the present occasion, the most comprehensive and striking results brought out by the various inquiries which have from time to time been lately made, as well as those derived from old sources of information, have been grouped together in a manner which it is hoped the reader will find interesting and instructive. The greater portion of the quoted matter is naturally taken from the results of the prolific labours of Mr Chadwick, who has been the moving and controlling spirit of Sanitary Reform. The first part is devoted to the importance, both in a moral and an economical sense, of everything that has a tendency to preserve human life—

a doctrine which it might have been unnecessary to promulgate, had not opinions for some time been taking root in society leading to the view that, however much the loss of individuals may be felt in their own circle, the public at large have a compensation in the removal of consumers; the second part is devoted to a history of celebrated epidemics, as being the most striking instances of the operation of those causes of mortality which sanitary regulations are calculated to remove; the next department embraces a view of the improvement which the progress of civilisation has already made in the value of human life among the upper classes; and the ensuing part is devoted to an inquiry how far precautionary arrangements for the safety of life may be improved and extended over the poorer classes. The fifth part gives an account of the chief practical measures of sanitary reform; and the sixth relates to the wide subject of the moral influence likely to be exercised over society at large by such arrangements.

PART I.

IMPORTANCE OF THE PRESERVATION OF LIFE.

SUDDEN DEATH AND SUICIDE—CARELESSNESS OF LIFE AMONG BARBARIANS—LOSS TO THE COMMUNITY BY PREMATURE DEATHS—HOW FAR LIFE MAY BE PROLONGED—EXTENT OF PREVENTABLE MORTALITY—FALLACIES ON THE EFFECT OF PREMATURE DEATHS—UNEXPECTED NATURE OF THE VITAL STATISTICS PRODUCED BY INQUIRY—PRACTICAL TYRANNY IN THE SUBJECTION OF HUMAN BEINGS TO MORTAL AGENCIES.

SUDDEN DEATH AND SUICIDE.

The preservation of human life is the strongest test by which we can measure the efficacy of all institutions devoted to the accomplishment of the temporal aid of mankind. Freedom, security, property, and general happiness and wellbeing, may be the immediate objects of these institutions, but the general state of the duration of life will be the most expressive testimony to the success with which they accomplish these objects. If we examine two communities, and find that in the one human life is one-fifth longer than in the other, we may safely conclude that the long-lived people have at *least* a fifth more of all those elements of happiness and wellbeing which it is the object of human institutions to procure. It may be that, in individual instances, we shall find a short life so full of happiness and success, that in itself it might be infinitely preferable to a long existence dragged out through misery and misfortune. But human beings are never wholly isolated. More or less the influence of their lot in life ramifies through the rest of their species; and though you might name individual after individual, running up to countless numbers, whose happiness it was to die young before the griefs and sorrows that have awaited on the later sojourners in the vale of tears had overtaken them, still it would not militate against the great truth, to be shown more fully in the ensuing pages, that shortness of life among individuals is a heavy calamity to the community at large. When you take your single instances, and show that the individuals were happy in their short lives, and that death came on them unawares, so that they suffered not the long miseries of sickness and uncertainty, who shall tell what sufferings the early and sudden death may have caused to others—to those others who go to make up the sum of the community whose happiness is at stake? Here

we have an only child, the promise of his family, the tie that binds the parents to the world, and sweetens to them all the bitter elements in the cup of life; there is the accomplished wife, the beloved object of many affections, dearer to all around her than anything with which the whole world could replace her. The third is the father of a young offspring, himself in the prime of life, with talents, virtue, energy, good esteem, and every quality that is required to erect an edifice of fame and fortune to his family. To weigh against the scale of happiness unmixed, which the departed has enjoyed, how terrible an amount of misery is piled up on the other side! Nor is it to relations and personal friends alone that the evil extends. As we shall afterwards have more fully to show, the community whose lives are short suffers in the removal of its members at the valuable time of life. To put the statement in a simple form, *a parish where life is precarious pays more poor-rates than its neighbours.*

The prayer to deliver us from plague-pestilence and famine, from battle and murder, and from sudden death, applies not merely to the fate of those who may be stricken, but to that of the survivors. The great men of antiquity—Cato, Brutus, Cassius, Antony, and Otho—forgot that they had obligations to their race as well as to themselves, when, in the selfish spirit of a pagan philosophy, they considered themselves entitled to put an end to their existence, and remove themselves from the world. A philosopher of modern days, whose noble works make one grieve that such an aberration should be found in them, vindicated suicide under the false impression that it was a matter which concerned the self-slayer alone. 'Does not,' he says, 'age, sickness, or misfortune, sometimes render life a burthen? I believe no man ever threw away life while it was worth keeping; for such is our natural horror of death, that small motives will never be able to reconcile us to it; and though perhaps the situation of a man's health or fortune did not seem to require this remedy, we may at least be assured that any one who, without apparent reason, has had recourse to it, was cursed with such an incurable depravity or gloominess of temper as must have poisoned all his enjoyments, and rendered him equally miserable as if he had been loaded with the most grievous misfortunes;' and again, when considering whether one's duty to his neighbour forbids the crime, he says—'A man who retires from life does no harm to society, he only ceases to do good, which, if it *is* an injury, is one of the lowest kind: all our obligations to society to do good seem to imply something reciprocal. I receive the benefits of society, and therefore ought to promote its interests. I am not obliged to do a small good to society at the expense of a great harm to myself. If I may law-

fully resign my office on account of infirmities, and employ my time in fencing against those calamities, why may I not cut short those miseries at once?'

To give any vitality to this reasoning, it is necessary to grant the truth of the strange statement with which it begins—that 'the life of man is of no greater importance than an oyster.' It is scarcely worth while to argue against any fabric of reasoning built on such a proposition. The whole history of lamentation, and mourning, and wo, from the beginning of the world—the funeral ceremonies in which the living symbolise the intensity of their grief—the monuments they rear to tell the world for centuries to come of the calamity they have suffered from the stroke of death —are enduring attestations that it is not so much in the removal of one sentient and living being off the earth, as in the change—the calamitous change to the survivors—that death is truly the King of Terrors. There is ever an understratum of sound principle in the actions of the ordinary run of mankind; and even among the ancients it appears to have been rather among the philosophers and heroes—who, in their self-conceit, chose new walks, severing them from the common instincts of mankind—that suicide was practised, than among the ordinary citizens, whose actions were less under the eye of a wondering public. At all events, in modern times the pressure of the real and physical calamities of life seems rather to awaken the solemn and true principles of duty to the rest of the world, than to drive the sufferer to this harsh solution of the great problem of life. Suicide is a rare thing among the working-classes, however much they suffer from misfortunes and privations.

'Whatever crazy sorrow saith,
No life that breathes with human breath
Has ever truly longed for death.

'Tis life whereof our nerves are scant:
Oh life, not death, for which we pant;
More life, and fuller, that we want.'

Thus so mercifully are hope and endeavour made constituent elements of the human mental constitution, that none of the calamities of life seem of themselves strong enough to drive man to that dreadful act, which must in almost every case be to the survivors the very greatest calamity they could endure. It would be increasing the misery of misfortune, of poverty, of disgrace, a hundredfold to the human race if this were the natural and general consummation of it. But it appears to be by fantastic minds—crazed rather than subdued, and nearly as likely to act under the

impulse of good as of bad fortune—that it is generally practised. Voltaire tells us, with the light irony which he extended to the most solemn subjects—'Philip Mordaunt, cousin-german to the famous Earl of Peterborough, who was so well known in all the courts of Europe, and who had made his boast that he had seen more postilions and more crowned heads than any other man in the world—this Philip Mordaunt, I say, was a young man of about twenty-seven, handsome, well-made, rich, of an illustrious family, and one who might pretend to anything; and, what was more than all the rest, he was passionately beloved by his mistress. However, this man took a distaste to life, discharged all he owed, wrote to his friends to take leave of them, and even composed some verses on the occasion, which concluded thus—"Though opium might be some relief to a wise man, if disgusted with the world, yet in his opinion a pistol, with a little resolution, were much more effectual remedies." His behaviour was suitable to his principles; and he despatched himself with a pistol, without giving any other reason for it than that his soul was weary of his body, and that when we dislike our house we ought to quit it . . . .

'The Earl of Scarborough has lately quitted life with the same indifference as he did his place of master-of-the-horse. Having been told in the House of Lords that he sided with the court on account of the profitable post he held in it, "My lords," said he, "to convince you that my opinion is not influenced by any such consideration, I will instantly resign." He afterwards found himself perplexed between a mistress he was fond of, but to whom he was under no engagements, and a woman whom he esteemed, and to whom he had made a promise of marriage. My Lord Scarborough, therefore, killed himself to get rid of a difficulty.'

This subject has been dwelt upon, because of all the methods by which human life is shortened of its proper span, it is the most dreadful to the survivors—in other words, to the world at large—and the consideration of it serves to bring out in their strongest light all the evils of a state of society in which there are agencies at work shortening life. The philosophical vindicator of suicide was an admirer of sudden death, as a thing to be desired in preference to the lingering illnesses, and the oscillations of hope and fear, by which the departure of the soul is usually preceded. It may be perhaps fairly viewed in such a light, if we consider it with reference to nothing but the physical sensations of the individuals who have been removed: but even in their case the balance of advantage can only arise when sudden deaths are of such rare occurrence as not to be anticipated; for there are few tortures so terrible—and this the bravest men who have encountered the risk

of secret assassination have in their conduct testified—as that of being haunted by the fear of sudden death.

But the suffering to relatives and dear friends by these sudden bereavements is infinitely beyond that endured in the usual course of natural deaths. There are, it is true, great sufferings in the lingering bed of death, and in the hearts of those around it; but would the sufferers exchange all this for a sudden departure in the midst of the joys, the pursuits, perhaps the follies of life? Nor will the Christian philosopher forget that the sick chamber is the place where the most angelic virtues of the human race have ever been called into action. The meek patience of the sufferer—the endurance and the active benevolence of those who would not barter that sick room, with its gloom and silence, for all the glitter and the grandeur that human ambition displays beyond its walls—are among the finest objects that the philosophic eye can look on. So in every well-regulated household, each deathbed, if it carry with it the memory of broken ties and deserted seats at the social board, calls up also the recollection of duties fulfilled, of charities administered, of overflowing affection, ashamed to speak its strength, showing itself in strong deeds of unwearied assiduity.

That would be a dreadful state of society in which each man, when he comes home from his day's labour, may expect, as a matter of common occurrence, in accordance with what is daily happening around him, that he may find his wife or his children lying dead upon his hearth. Britain, as being on the whole the most civilised country in the world, is that in which human life is most highly valued; yet when a general system of registration was established in England, the public were somewhat startled by being told that the average number of deaths by violence—including, of course, unintentional as well as criminal—amounted to 12,000 in a year. Remembering that Ireland, less civilised, is likely to have more than this proportion, the number of deaths by violence occurring in a year in the United Kingdom cannot well be less than 24,000! A large mass of suffering and misery is involved in the facts indicated by such a statement. How great a blessing would it be to the community were the number reduced to one-quarter or one-half by precautionary measures; and, on the other hand, how much more wretched would the country be, were the number by recklessness greatly increased!

CARELESSNESS OF LIFE AMONG BARBARIANS.

When we look from the civilised to the uncivilised world, we shall find that the further we recede into barbarism, the less respect is paid to human life, and the more numerous are the

operative causes of death. The Turk, when he tries a new gun, fires across a public street, or into the bay thronged with shipping. When he digs a well for water, he leaves it unprotected. If any one be in the way of the bullet, or stumble into the well in the dark, it is the will of Allah, and no one troubles himself about the matter! But in still more barbarous countries deaths are occasioned not only by negligence, but by the selfish prejudices of the living. 'When their parents and other relations,' says Dr Robertson, speaking of the Americans, 'become old, or labour under any distemper which their slender knowledge of the healing art cannot remove, they cut short their days with a violent hand, in order to be relieved from the burthen of supporting and tending them. This practice prevailed among the ruder tribes in every part of the continent, from Hudson's Bay to the River de la Plata; and however shocking it may be to those sentiments of tenderness and attachment which in civilised life we are apt to consider congenial with our frame, the condition of man in the savage state leads and reconciles him to it. The same hardships and difficulty of procuring subsistence which deter savages in some cases from rearing their children, prompt them to destroy the aged and infirm. The declining state of the one is as helpless as the infancy of the other. The former are no less unable than the latter to perform the functions that belong to a warrior or hunter, or to endure those various disasters in which savages are often involved by their own want of foresight and industry. Their relations feel this; and, incapable of attending to the wants or weaknesses of others, their impatience under an additional burthen prompts them to extinguish that life which they find it difficult to sustain. This is not regarded as a deed of cruelty, but as an act of mercy. An American broken with years and infirmities, conscious that he can no longer depend on the aid of those around him, places himself contentedly in his grave; and it is by the hands of his children or nearest relations that the thong is pulled or the blow inflicted which releases him for ever from the sorrows of life.' *

The practice of exposing children, or putting them to death, when the parents, in their selfishness or poverty, anticipate difficulty or need, is often mentioned by travellers as common in very barbarous countries. It was practised by the poor among the ancients, and in modern times it is a peculiar scandal of China. We are apt to think that country civilised, because it sends to us ornamental and costly produce; but it is in many things essentially barbarous. The wealth and luxuries of the country are for a few; the great bulk of the people are on the verge of starvation, struggling every day for life, without the possession of those

* History of America, book iv.

skilled industrial occupations which lift a great portion of the people of this and other highly-civilised communities to a considerable distance from the boundaries of want. Where infant life is not only neglected, but wilfully sacrificed, there can be no great care taken of adult life. Indifference and cruelty will there creep gradually upwards, like liquids led by capillary attraction, until they diffuse themselves through the whole body of the people. Indifference to life, and indifference to the purity and amenity that sweeten existence, must necessarily go together. If the Chinese parents have left half of their offspring to perish, it is not likely that their affection for the other half, who have been saved more by chance than design, will be sufficient to induce them to make those sacrifices and incur those labours through which the respectable parent in Holland or Britain makes provision for helping his children forward, and smoothening their path in life. So long as infanticide, and any other equally powerful development of indifference to the value of human life and to the infliction of human suffering, exists in China, so long will the people be barbarous and degraded.

LOSS TO THE COMMUNITY BY PREMATURE DEATHS.

The remarks made in the preceding pages have generally had reference to deaths from violence or intentional neglect, a subject which is intimately connected with, and is naturally preparatory to, that of sanitary legislation, as it gives an opportunity for showing how far the preservation of life in every shape is a creation of civilisation, and introduces us to the view that the more we can prolong the average duration of life, the more fully have we accomplished the main temporal purpose of the institutions of civilisation. The prevention of deaths by violence belongs to other departments of legislation—to the criminal code, which punishes murder, and to those laws which subject men to restraints and regulations in the pursuit of occupations which may be dangerous to the community—such as railways, the driving of vehicles, the manufacture and sale of gunpowder, and the like.

If we had achieved perfection in the regulation of human affairs, our preventive and sanitary regulations would be so skilfully devised and applied, that no human being should die of any other cause than old age—the wearing out, as it were, of the human machine. This is a consummation which is not likely to be accomplished; nay, which we may safely predict never will be accomplished. Yet abstract perfection should always be the direction aimed at by human efforts, however imperfect they may be; and the success of sanitary legislation will be indicated by the nearness or the distance of its actual results from this perfect idea.

It is a sad mistake to suppose that the evil of premature deaths has some compensating advantage, in removing a portion of surplus population. In the general case, it is not the surplus, but the valuable portion of life that is thus lost. If a boy dies at some period between ten and sixteen, his existence has been an absolute cost to the community, and he was but just approaching the period when he might have become a productive member of it. If a husband dies in the early years of his married life, he leaves as burthens on the world a widow or children, for whom, in the general case, if he had lived, he would have worked.

The facts, indeed, connected with this gloomy department of statistics show that the most valuable period of human life—that in which a man is producing more than he is consuming—is that which provides the greatest number of victims. From an analysis of a number of cases, Dr Southwood Smith, in his evidence before the Commission on Large Towns, says—

'It appears that during the year 1825 there were attacked with fever, under twenty years of age, 109; between twenty and forty years of age, 443; and between forty and sixty years of age, 31. Further, it appears that in the five years from ten to fifteen the number attacked was 67; but in the five years from fifteen to twenty they increased to 172; in the succeeding five years, from twenty to twenty-five, they were 133; while in the five years from twenty-five to thirty, they sunk to 81; in the succeeding five years, from thirty to thirty-five, they still further diminished to 29; and in the five years from thirty-five to forty, they were only 28. In like manner, during the year 1826, the number attacked under twenty years of age was 114; but between twenty and forty years of age the number was 498, while between forty and sixty years of age the number was only 53. The results during the years 1827 and 1828 were perfectly similar. Taking the four years together, the total number attacked was 2537; of these the number attacked under twenty years of age was 429; between twenty and thirty years of age the number was 1188; between thirty and forty years of age the number was 531; and between forty and eighty years of age the number was 389; whence it follows that of the total number attacked, those between twenty and thirty years of age nearly equal the number attacked at all other ages put together, the number between twenty and thirty being 1188, and at all other ages only 1349. In the circulars sent by the Poor-Law Commissioners to the medical officers of the twenty metropolitan unions in the year 1839, I requested that a column might be made for the ages of those attacked with fever, with a view of testing the correctness of the data on which the preceding table was founded by a still larger observation, and the returns obtained afford analogous results. Two consequences follow of the highest interest and importance. First, it is clear from these tables that the period of human existence during

which fever can alone be said to be prevalent is from the age of twenty to forty; that is, the period of maturity, the most precious portion of the term of existence, that during which the individual is best fitted for all the duties and enjoyments of life, during which he is most capable of promoting the happiness of others, and of securing and appreciating his own. But of this period that portion which is incomparably the most subject to the ravages of this malady is the earliest portion. Now it must be borne in mind that the poorer classes usually marry and have families at earlier ages than the middle and higher, the great majority, at least of the women, being married at twenty. Of course it is during the succeeding ten years that they have young families, often very numerous ones, to support; but we have just seen that this is precisely the ten years in which fever is so prevalent as to furnish, in this comparatively short space of time, nearly as many cases as all the other periods of life put together. It follows not only that the heads of families are more subject to the ravages of fever than any other class of persons, but that these persons are peculiarly liable to be attacked precisely at that period of life when they have the greatest number of young children entirely dependent on their daily labour for support. This is deserving of consideration, viewing the subject merely with reference to the pressure on the poor-rates; but viewing it in its larger relation to the wellbeing of the humbler classes, it appears to me to deserve great attention.'

But the shortening of the duration of life is far from indicating any gain to the world even when death strikes only the worthless members of society; for the operating cause of early death—namely, recklessness, or a subjection to some social evil—will have first, in driving them to an early tomb, have made them the victims which the destroyer finds them. The following observations and statistics by Mr Chadwick in his general Sanitary Report throw a powerful and distinct light on this subject:—

'The more closely the subject of the evils affecting the sanitary condition of the labouring population is investigated, the more widely do their effects appear to be ramified. The pecuniary cost of noxious agencies is measured by data within the province of the actuary, by the charges attendant on the reduced duration of life and the reduction of the periods of working ability or production by sickness; the cost would include also much of the public charge of attendant vice and crime which come within the province of the police, as well as the destitution which comes within the province of the administrators of relief. Of the pecuniary effects, including the cost of maintenance during the preventable sickness, any estimate approximating to exactness could only be obtained by very great labour, which does not appear to be necessary.

'To whatever extent the probable duration of the life of the working-man is diminished by noxious agencies, I repeat a truism in

stating that to some extent so much productive power is lost; and in the case of destitute widowhood and orphanage, burthens are created and cast either on the industrious survivors belonging to the family, or on the contributors to the poor's-rates, during the whole of the period of the failure of such ability. With the view to judge of the extent to which such burthens are at present cast upon the poor's-rates, I have endeavoured to ascertain the average age at which death befell the heads of those families of children who with the mothers have been relieved on the ground of destitution, in eight of the unions where the average age of the mortality prevalent amongst the several classes of the community has been ascertained.

'The workmen who belong to sick clubs and benefit-societies generally fix the period of their own superannuation allowances at from sixty to sixty-five years of age. I see no reason to doubt that by the removal of noxious agencies not essential to their trades, by sanitary measures affecting their dwellings, combined with improvements in their own habits, the period of ability for productive labour might be extended to the whole of the labouring-class.

'The actual duration of the ability for labour will vary with the nature of the work, though there can be little doubt that the variations, under proper precautions, would be much less than those which now take place. From the information received in respect to the employment of tailors in large numbers, it is evident that the average period of the working ability of that class might be extended at least ten years by improvements as to the places of work alone. The experience which might serve to indicate the extent of practicable improvement is at present narrow and scattered. The chief English insurance tables, such as the Northampton and Carlisle Tables, are made up apparently from the experience of a population, subject probably to a greater or less extent to the noxious influences which are shown to be removable. By the Carlisle Table, however, the probability of life to every person who has attained the age of twenty-one—the age for marriage—would be 40 years, or 40·75. By the Swedish Tables, which are frequently applied to the insurance of the labouring-classes, it would be 38·0. The observations that have been made on the subject show that marriage improves rather than diminishes the probability of life. Where the duration of life is reduced by the nature of the employment below the usual average, by so much the widowhood may be considered as increased, as also the orphanage of their children. As labouring men generally marry early in life, their wives have ceased to bear children before they have reached fifty, so that the great mass of orphanage may be assigned to the consequence of premature death. The following table shows the average ages at which the deaths occurred of the fathers of the widows' orphan children who are in receipt of relief in the following unions. The average includes the cases of all who died at whatever ages, whether above or below sixty :—

Unions.	Number of Husbands dying under 60.	Average Age at Death.	Number of Husbands dying above 60.	Average Age at Death.	Total Deaths.	Average Age.
Manchester, -	718	42	432	69	1150	52
Whitechapel,	351	44	239	69	590	54
Bethnal-Green,	250	44	195	69	445	55
Strand, -	157	42	63	66	220	49
Oakham and Uppingham,	136	45	118	71	257	57
Alston-with-Garrigill,	69	45	20	66	89	50
Bath, -	66	33	1	60	67	39

'This premature widowhood and orphanage is the source of the most painful descriptions of pauperism—the most difficult to deal with; it is the source of a constant influx of the independent into the pauperised and permanently-dependent classes. The widow, where there are children, generally remains a permanent charge; re-marriages amongst those who have children are very rare; in some unions they do not exceed one case in twenty or thirty. By the time the children are fit for labour, and cease to require the parents' attention, the mothers frequently become unfit for earning their own livelihood, or habituated to dependence, and without care to emerge from it. Even where the children are, by good training and education, fitted for productive industry, when they marry, the early familiarity with the parochial relief makes them improvident, and they fall back upon the poor's-rates on the lying-in of their wives, on their sickness, and for aid on every emergency. In every district the poor's rolls form the pedigrees of generations of families thus pauperised. The total number of orphan children on account of whose destitution relief was given from the poor's-rates in the year ended Lady-day, 1840, was 112,000.

'The numbers of widows chargeable to the poor's-rates was in those unions at that period 43,000.'

A table is then given, applicable to eight unions, in which the total number of deaths of the husband and parent had been 2815, and that of the children consequently thrown on the parish 4985. Applicable to this table are the following remarks:—

'Of the whole number, it appears that upwards of 1764 became chargeable by premature deaths. If the same rule obtains in the other unions, which could only be ascertained by a very long and expensive inquiry, then nearly 27,000 cases of premature widowhood, and more than 100,000 cases of orphanage, may be ascribed to removable causes.'

Views having the same general tendency are expressed in a different form in the following observations made by Mr Toynbee to the commissioners on the state of large towns:—

'It is my opinion that the diseases which are produced secondarily, and which have hitherto been supposed to have no connection with the causes specified, would be influenced or prevented to a very great extent—the habit of drinking, stimulated, if not produced, by nervous depression, would be abated—the diseases which are rendered more fatal, and are modified by the habit, would be diminished. From what I have seen, I am disposed to expect that very beneficial effects would arise from the influence on the general spirits, the relief from the depression giving greater spirit and energy to them. I am disposed to believe, on a careful consideration of all the effects producible by such alterations, that a reduction of one-half the existing amount of sickness and mortality might be produced by them. I can corroborate by my own observations of particular cases within the sphere of the charity, that the excessive mortality arising from the depressing causes specified does not diminish the numbers of the population, and that it only produces a weaker and more wretched population. I find that the worse the condition of the people, the earlier are they married; and the greater the mortality amongst the children, the more rapid the births. Amongst the scrofulous and even the consumptive patients whom I have attended are remarkably numerous families.'

These general views may be realised from the instances adduced in evidence before the same commission. Mr Taylor, a surgeon, said—

'Amongst the families will be found the family of a policeman whom I attended. When he applied for relief, the observation which occurred was, "You have, as a policeman, 20s. a week regular wages, and other advantages; you are never out of work, and cannot be considered a proper object of relief from the funds of a dispensary intended for the poorest class?" His reply was, that he paid for his miserable one room, divided into two, 5s. a week; that he had 1s. 8d. weekly to pay for keeping up his clothes, which reduced the money he had for his family of four children and his wife to 13s. 4d.; that he had had all his children ill, and lost two; that he had during three years paid six doctors' bills, principally for medicine, at the rate of 2s. 6d. a bottle, amounting to between £30 and £40; that two of the children had died, the funerals of which, performed in the cheapest manner he could get it done, had cost him £7: the wife and his four children were now ill. They were so depressed and debilitated, as to render them very great objects for the dispensary and the Samaritan Fund. All this misery was traceable to preventable causes. Take another case in the list before me. A porter, in regular employment, at wages producing £1 a week: he paid 3s. 6d. for a most miserable and unwholesome room, in which himself and six other people, four children and three adults, slept; the children were shoeless, extremely filthy, and badly clad; the wife ill in bed of a diseased knee, for which I attended her; two children had been still-born, and he had lost three others; the sickness of

one of these children, which had died at fourteen of consumption, had cost him in doctors' bills 16 guineas; the sickness of the one which died eleven months old, of water on the brain, had cost him £6; the third had died fourteen days old. The expenses in the three cases had so impoverished him, that he was compelled to apply to the parish for aid for their burial. I will submit a third case—that of a cook, in receipt of 25s. per week regular wages. He was living with his wife and three children in a small, close, ill-conditioned room, for which he paid 5s. per week rent. He complained that the water was always "thick," and very disagreeable to the taste, and the smells from the sewers and the drains in the house were very bad; he had five children, of whom two had died; that he had paid doctors' bills for his wife's confinements £5 each; and for one child, which died of scarlet fever, at four years of age, the doctor's bill was £4, 18s.; the one which died of debility, at the age of ten weeks, cost him £1, 10s.; the funeral of the eldest child cost him £3; and the one at ten weeks, £1, 10s. He showed that the expenses of confinements, the doctors' bills, and the undertakers' bills, and the illness of his wife, arising from five miscarriages, had so impoverished him, that having now two children ill with scrofula, he was obliged, though reluctantly, to apply to the dispensary for relief. The last case I will submit to the commissioners is that of a shoemaker, a good workman, who earns 20s. a week: he pays 5s. a week for one small, miserable room, in a narrow court; he has had seven children, of whom he has lost five, for which he has paid in doctors' bills between £2 and £3 each; the expense of his wife's confinements amounted to £3, 15s. each; the expenses of the funerals of the five children were between £3 and £4 each: his wife's age was thirty-two, his own age thirty-seven, and at this age of thirty-seven he continually suffered from nervous depression; and having one of his two other children with a lingering disease—a scrofulous affection of the hip—he was compelled to come to the dispensary: he complained that the water of the house was never clear, and never sweet. A man in receipt of 30s. per week's wages, considering his amount of rent, which was 5s. 6d. for one room, for himself, wife, and three children; having had four deaths after lingering consumptions, and a wife and children never well, I felt that he also was a proper object of the charity. At the time I visited these 100 families, no less than 212 of the members were suffering under disease, manifest in various stages. They had already had no less than 251 deaths and funerals, and a corresponding amount of sickness. It was only in a late stage of my investigations that I began to see the very serious amount of miscarriages they have had, and which in many instances exceed the deaths. Three hundred and fifty of the members of these 100 families were dependent children, whose average age was little more than ten years.'

When any evil agency which could be abolished is left at work on the human race at large, it is difficult to predict into how many

channels its deleterious current may run. When men are cut off in the prime of life, and their widows and children are left to be provided for, it might be thought that the expense and the pauperism, with all its own natural growth of evils, represented the full extent of the calamity suffered by society. But it seems that it goes farther, and in a direction that might not be anticipated. The working-classes require leaders and wise heads from their own body—patriarchs, in the old acceptation of the term—to keep them right in moments of excitement. The causes of early death prevent the existence of such a class of men, sobered and wise from experience, in sufficient numbers to discipline the youthful and fiery spirits who, confident in their ignorance, plunge themselves and those depending on their exertions into ruin.

It is said in the Sanitary Report—

'Whenever the adult population of a physically-depressed district, such as Manchester, is brought out on any public occasion, the preponderance of youth in the crowd, and the small proportion of aged, or even of the middle aged, amongst them, is apt to strike those who have seen assemblages of the working population of other districts more favourably situated.

'In the course of some inquiries under the Constabulary Force Commission as to the proportions of a paid force that would apparently be requisite for the protection of the peace in the manufacturing districts, reference was made to the meetings held by torch-light in the neighbourhood of Manchester. It was reported to us, on close observation by peace-officers, that the bulk of the assemblages consisted of mere boys, and that there were scarcely any men of mature age to be seen amongst them. Those of mature age and experience, it was stated, generally disapproved of the proceedings of the meetings as injurious to the working-classes themselves. These older men, we were assured by their employers, were intelligent, and perceived that capital, and large capital, was not the means of their depression, but of their steady and abundant support. They were generally described as being above the influence of the anarchical fallacies which appeared to sway those wild and really dangerous assemblages. The inquiry which arose upon such statements was, how it happened that the men of mature age, feeling their own best interests injured by the proceedings of the younger portion of the working-classes—how they, the elders, did not exercise a restraining influence upon their less-experienced fellow-workmen? On inquiring of the owner of some extensive manufacturing property, on which between 1000 and 2000 persons were maintained at wages yielding 40s. per week per family, whether he could rely on the aid of the men of mature age for the protection of the capital which furnished them the means of subsistence? he stated he could rely on them confidently. But on ascertaining the numbers qualified for service as special constables, the gloomy fact became apparent, that

the proportion of men of strength and of mature age for such service were but as a small group against a large crowd, and that for any social influence they were equally weak. The disappearance by premature deaths of the heads of families and the older workmen at such ages as those recorded in the returns of dependent widowhood and orphanage, must to some extent practically involve the necessity of supplying the lapse of staid influence amidst a young population by one description or other of precautionary force.

'On expostulating on other occasions with middle-aged and experienced workmen on the folly as well as the injustice of their trade-unions, by which the public peace was compromised by the violences of strike after strike, without regard to the experiences of the suffering from the continued failures of their exertions for objects the attainment of which would have been most injurious to themselves, the workmen of the class remonstrated with invariably disclaimed connection with the proceedings, and showed that they abstained from attendance at the meetings. The common expression was, they would not attend to be borne down by "mere boys," who were furious, and knew not what they were about. The predominance of a young and violent majority was general.

'In the metropolis the experience is similar. The mobs against which the police have to guard come from the most depressed districts; and the constant report of the superintendents is, that scarcely any old men are to be seen amongst them. In general they appear to consist of persons between sixteen to twenty-five years of age. The mobs from such districts as Bethnal Green are proportionately conspicuous for a deficiency of bodily strength, without, however, being from that cause proportionately the less dangerously mischievous. I was informed by peace-officers that the great havoc at Bristol was committed by mere boys.

'The experience of the metropolitan police is also similar as to the comparatively small proportion of force available for public service from such depressed districts. It is corroborative also of the evidence as to the physical deterioration of their population, as well as the disproportion in respect to age. Two out of every three of the candidates for admission to the police force itself are found defective in the physical qualifications. It is rare that any one of the candidates from Spitalfields, Whitechapel, or the districts where the mean duration of life is low, is found to possess the requisite physical qualifications for the force, which is chiefly recruited from the open districts at the outskirts of the town, or from Norfolk and Suffolk, and other agricultural counties.

'In general, the juvenile delinquents, who come from the inferior districts of the towns, are conspicuously under size. In a recent examination of juvenile delinquents at Parkhurst by Mr Kay Shuttleworth, the great majority were found to be deficient in physical organisation. An impression is often prevalent that the criminal population consists of persons of the greatest physical strength. Instances of criminals of great strength certainly do occur; but speak-

ing from observation of the adult prisoners from the towns and the convicts in the hulks, they are in general below the average standard of height.'

In a civilised country the dead must be removed out of sight. If the immediate relations be too barbarous or too poor to do this, the rest of society must do it for its own sake. We have here an additional item of cost from a rapid mortality. Mr Chadwick, in the report on interments in towns, says—

'It is a prevalent popular error, not unsanctioned by doctrines held by several eminent public writers, that "as one disease disappears, so another springs up;" that the positive "amount of mortality, the common lot," is the same to all classes. But death, besides differing in the period to different individuals, differs widely in the numbers of burials, and in the consequent expenses to different families, classes, and districts. It is the *number*, as well as the separate expense of each of the funerals which occur during the year to each *class* of persons, or to different districts, which determines the total expense of burial to the class or district. Thus to the poorer classes living in wretched habitations, as those comprised in Bethnal-Green and Whitechapel, there is 1 burial to every 31 of the inhabitants, whilst in the contiguous district of Hackney there is only 1 burial to every 56 of the inhabitants yearly. In Liverpool there is 1 burial per annum to every 30 of the inhabitants, whilst in the county of Hereford there is 1 burial only to every 55 of the inhabitants. If the existing charge of burial, at the above rates of expense to each class of individuals, were commuted for an annual payment, commencing at birth, as a premium for the payment of £100, £50, and £5, payable at the under-mentioned periods respectively, it would in the metropolis and the county of Hereford be nearly as follows:—

Class.	Metropolis.		Herefordshire.	
	Average Age at Death.	Annual Payment for Burial to every Individual.	Average Age at Death.	Annual Payment for Burial to every Individual.
	Years.	£ s. d.	Years.	£ s. d.
Gentry, - - -	44	1 1 10	45	1 1 0
Tradesmen or Farmers,	25	1 6 8	47	0 9 9
Labourers, - -	22	0 3 2	39	0 2 9
Average of all Classes, -	27		39	

'Supposing each member of the family to have been assured at birth, a labourer's family in Herefordshire, consisting of five persons, would have to pay yearly 13s. 9d.; and there a farmer's family of the same number would have to pay £2, 8s. 9d. yearly: whilst in London,

for an artisan's family of five, the yearly payment would be 15s. 10d.; and for a tradesman's family it would be £6, 13s. 4d. per annum. To insure the payment of the average cost of funerals—£14, 7s. 5d. at the end of 27 years, on the metropolitan chances of life—the annual payment would be 7s.; whilst on the Herefordshire chances of life of 39 years to all born high or low, the sum would be only 4s. Or to take another form of displaying the comparative burthen: the general average cost of each burial being £14, 7s. 5d., and the annual *proportions* of deaths being different from the average duration of life—being 1 of every 40 in the metropolis—a poll-tax to defray the burial expenses must there be 7s. 2¼d.; whilst in Hereford, the proportions of deaths being 1 in every 55, the poll-tax on all of the inhabitants to meet the charge would be 5s. 3d. per head.

'It appears, therefore, that in considering the means of relief from the evils connected with the number and expenses of burial, it should at the same time be borne in mind that the primary means of abatement and relief of the misery of frequent funerals will be found in the means of the removal of the developed and removable causes of premature mortality. Had the annual mortality amongst the population in the high, open, and naturally-drained district of Hackney been the same proportionate amount of mortality as that in the contiguous, but low, ill-drained, ill-cleansed, and ill-ventilated district of Bethnal-Green and Whitechapel, instead of 759 deaths per annum, Hackney would have upwards of 1138 deaths, and an expense of £5448 more for funerals during the year than it has. So the county of Hereford, if it were afflicted with the same amount of mortality as that which prevails in Liverpool, would have 1488 more deaths annually, and an additional expenditure of £21,390 per annum in burials.'

HOW FAR LIFE MAY BE PROLONGED.

In the year 1838, the number of deaths in England and Wales, according to the Registrar-General's returns, was 342,529. Of these, 11,970 were from causes not specified, 282,940 were from diseases, and only 35,564 were deaths in the course of nature from old age. In the year 1841, the number of registered deaths was 343,847; and of these only 37,253 were entered as 'from old age,' all the others arising from causes more or less preventable. As there is no general registration system in Scotland, it is impossible to give the statistics of this matter applicable to the whole island; but from the habits of the people, and the extreme filth of the towns, there is every reason to believe that the mortality from disease is much greater in Scotland than in England. There cannot be a doubt that it is greatest of all in Ireland.

Here, then, we have the vast and precious field on which the labours of sanitary reformers may exert themselves; three hundred thousand deaths in a year, arising from causes which it is so

far within the compass of human ability to remove, that the number might be very greatly reduced; and thus the main cause of human calamity and grief might be mitigated, and the happiness of our afflicted race might receive a great addition; an addition from that source whence all that is most valuable in its possessions comes—the labour of man with the sweat of his brow.

It has been among the visions of some dreaming philosophers that human life is capable of almost indefinite extension. The great Condorcet was one of these. He thought that by the removal of the two causes of evil—poverty and superfluity—by destroying prejudices and superstitions, and by various other operations, which he considered the purification of mankind, but which other people would call their pollution, the approach of death would by degrees be farther and farther indefinitely protracted. It is desirable that the practical views entertained by sanitary reformers should be kept widely distinct from any such theories, the character of which has been well drawn by Malthus when he says—'With regard to the duration of human life, there does not appear to have existed, from the earliest ages of the world to the present moment, the smallest circumstance of indication of increasing prolongation. The observable effects of climate, habit, diet, and other causes, on length of life, have furnished the pretext for asserting its indefinite extension; and the sandy foundation on which the argument rests is, that because the limit of human life is undefined—because you cannot mark its precise term, and say, so far exactly shall it go, and no farther—therefore its extent may increase for ever, and be properly termed indefinite or unlimited. But the fallacy and absurdity of this argument will sufficiently appear from a slight examination of what M. Condorcet calls the organic perfectibility or degeneration of the race of plants and animals, which he says may be regarded as one of the general laws of nature. I have been told that it is a maxim among some of the improvers of cattle that you may breed to any degree of nicety you please; and they found this maxim upon another, which is, that some of the offspring will possess the desirable qualities of the parents in a greater degree. In the famous Leicester breed of sheep, the object is to procure them with small heads and small legs. Proceeding upon these breeding maxims, it is evident that we might go on till the heads and legs were evanescent quantities: but this is so palpable an absurdity, that we may be quite sure that the premises are not just, and that there really is a limit, though we cannot see it, or say exactly where it is. In this case the point of the greatest degree of improvement, or the smallest size of the head and legs, may be said to be undefined; but this is very different from unlimited or

indefinite in M. Condorcet's acceptation of the term. Though I may not be able, in the present instance, to mark the limit at which further improvement will stop, I can very easily mention a point at which it will not arrive. I should not scruple to assert that, were the breeding to continue for ever, the heads and legs of these sheep would never be so small as the head and legs of a rat.' *

It is of consequence, at the very outset, to keep in view that sanitary reformers stand entirely clear of such speculations, limiting their objects merely to the removal of those evils which occasion premature death. They work with nature only; they profess to introduce no artificial elements; they look to the capacities which the Deity has given to the human frame to exist and act; and they desire full freedom to be given to these natural powers, by the removal of those things which may tend to interrupt its progress. It is believed that seventy years is the natural duration of human life—that is to say, the average age at which people die who are not cut off by disease or violence. In most instances, affectionate relatives and kind friends would wish to prolong the existence of the individual who has reached that age; but if we look at the happiness of mankind in general, we shall find reason to believe that, like all the other general principles of nature, this one carries the impress of an all-wise and beneficent Creator; and that if man had it in his power to alter the arrangement, it may be questioned if he could improve it. At this age the great desires of life are generally accomplished, and the tired labourer in the hardest fields of exertion, which are those of the intellect, has had some years of quiet meditation on the long battle of life to which his days of energy and hope were devoted. The world has, in general, little more use for him; and should he—however meritorious his services, however honoured his gray hairs—too long remain an actual living man, seeming to fill a part of the arena in which younger and abler combatants are looking for places, the consciousness of being honoured and beloved may give way before the suspicion that he has become an encumbrance to the circle he once adorned. Very aged individuals are much and worthily honoured in every civilised community; yet it may be questioned if it would be an increase to the general happiness to have many people in the world above a century old; for a gradual detachment from even those who are nearest and dearest to them—their own offspring—must have been long in progress. The rise of each generation gives new ties towards the future, which insensibly dissolves those which bind us to the past; and the natural old age of the human race seems to have adjusted

* Principle of Population, ii. 14.

itself to that period beyond which the human being would feel isolated and desolate in the midst of the new objects of attachment which the progress of time brings into existence.

It is indeed a somewhat curious circumstance, which deserves to be noticed in connection with this subject, that the general improvement of human life does not always seem to be favourable to a great extension of the age of individuals. Geneva possesses vital statistics for 250 years. Towards the conclusion of the seventeenth century, it appears from these records that the average duration of life was not quite 20 years: a century afterwards it had exceeded 32 years: at the present day it exceeds 45 years. Such are the effects which civilisation and science have had on the value of life in that intelligent community. But it is a curious fact, that where the average duration of life had become doubled, the celebrated long-livers of the earlier period were no longer to be found. It is observed that the amelioration is chiefly confined to those under sixty years of age: that between 70 and 80 there is no decrease in the proportion of deaths in later times: that when we pass farther on, it is found that of a certain number of persons who had reached 80, a smaller portion survive till 90 than the old average. For many years there had not been a single centenarian, or person living beyond the age of a hundred, when the matter was examined by Mr Mallet, though the centenarians were numerous in the sixteenth and seventeenth centuries. It is remarkable that among the tailors of London, who are perhaps the least healthy, and, on the whole, the shortest-lived body in the community, there are individuals of great age.

The Rev. Mr Clay, in his report of the sanitary condition of Preston, gives the following curious instance:—

'In a cellar in King Street, a few yards from the end of Queen Street, a poor female has been living for about 14 years who is believed to be upwards of 102 years old. Her bodily and mental powers are, considering her age, remarkably vigorous: her activity of limb is equal to that of many women of 50, and especially as regards her arms: her sight scarcely requires the aid of spectacles, and her hearing is but little impaired: her hair is abundant, and black: her memory appears clear and prompt: and her disposition not merely cheerful, but full of humour. A daughter, aged 70, lives with her, who looks in her spectacles almost as old as her parent. The cellar in which they live appears dry and warm, faces the end of a tolerably wide street (Paradise Street), and is altogether free from the very noxious circumstances which beset Queen Street.'

'It is,' says Mr Chadwick, 'a singular fact, as yet unexplained, that the greatest proportion of centenarians are of the labouring-classes; and that instances of them have from time to time ap-

peared amidst the crowded populations in some of the worst neighbourhoods in London, where the average duration of life is the lowest.'

But may not the reason lie in this—that the very hardships which cut off multitudes in the germ, or in the prime of life, indurate those who are fortunate enough to pass through them uninjured, and fortify them towards all the avenues by which the great destroyer may approach them? If this should be so, it might open the way for new and discriminating views on the science of preserving health, probably applying a different rule of life to those hardy constitutions which can stand and become indurated by what to others would be a dangerous and deadly hardship.

EXTENT OF PREVENTABLE MORTALITY.

But it may be as well to recall attention to the leading fact, that 300,000 people die yearly in England alone of disease; and that, beyond all doubt, a great part of this mortality might be obviated by protective arrangements. Suppose we could, by increasing the average age, reduce the number to 250,000, how great would be the blessing conferred by removing the causes of disease which prematurely carry 50,000 people to the grave! Suppose it were but 30,000, 20,000, or even 10,000 that were thus saved, would it not be a gain to humanity worthy of a great effort? When an emigrant ship is lost with all its living cargo on the way to the land of hope and promise—when a theatre falls and crushes the careless audience in the midst of their gaiety—when the galleries, overcrowded by those who have rushed to hear a popular preacher, give way, and hurry them to the place where the sincerity of their devotional exercises will be tested, the neighbourhood is full of gloom and horror—the newspapers take up their solemn, funereal-like note, the people in distant towns stop each other on the street, and talk gravely and pitifully of the calamity, and even foreign lands could tell of a faint echoing of sympathetic sorrow on the occasion. The suddenness, the grouping together, the violence, the bleeding bodies, all give a species of dramatic interest to the event. Yet the accident will not have done its work of death so rapidly, but that in no longer a period of time will there have been as many deaths throughout the United Kingdom, in distant chambers, each the centre of a small circle of lamentation, or of the worst misery that makes people callous to misfortune. If we remember that in the United Kingdom the deaths from disease cannot be much fewer than 2000 in a day, or about 80 in an hour, it will be felt that few accidents on record are more rapid in their destruction. And yet, quite naturally, this

vast mortality carries on its ceaseless and uniform course without calling forth any thoughts or suggestions unless those connected with religious meditations. Surely, however, it would not in any degree derogate from the solemnity and the propriety of these thoughts, were people occasionally to ask how far the human race has been endowed with faculties for checking the destructive agencies indicated by this mortality, and lessening the extent to which human recklessness creates human misery. When a ship has sunk or a building has fallen, there is an immediate cry for the punishment of some individual whose selfishness or carelessness has led to the calamity, in order that all men may be warned against the like dereliction of duty in time to come. Yet how few remember, that besides these occasional droppings, which so startle the ear, there is a great stream of death and misery holding its onward course, as to which they have never asked the question whether or not the bulk of its dark waters may be lessened! Though there should be great doubts whether such a task is destined to be accomplished, yet surely the greatness of the aim is worthy of a trial. There have been desperate struggles made to accomplish objects far less worthy; nay, let us add, far less hopeful.

'Not the least striking result of the investigation,' says Dr Duncan in his paper on the high rate of mortality in Liverpool, 'is the very different rate of mortality which we have found going on in the various districts of the town; for while in Rodney Street and Abercromby Wards, with upwards of 30,000 inhabitants, the mortality is below that of Birmingham—the most favoured in this respect of the large towns of England—in Vauxhall Ward, with a nearly equal amount of population, the mortality exceeds that which prevails in tropical regions. In Rodney Street and Abercromby Wards 100 persons die annually out of 4162; in Vauxhall Ward 2350 persons are sufficient to furnish the same number of deaths, leaving an excess of 1812 persons engaged in furnishing additional deaths at this high rate of mortality. In other words, 177 persons die annually in Vauxhall Ward for every 100 dying out of an equal amount of population in Rodney Street and Abercromby Wards. Should not this simple fact be sufficient to arouse the attention and stimulate the exertions of the most indifferent? It is calculated that about 1500 lives are annually lost by shipwreck on the British coast, and not a single wreck occurs without exciting a large amount of public sympathy. These lives are lost by the decrees of Providence, by causes which perhaps no human foresight could avert; and yet we look idly on, while on a small spot of that coast, less than two square miles in extent, hundreds of our fellow-townsmen perish yearly, by causes which in a great measure it is within our power to remedy or remove.'

FALLACIES ON THE EFFECT OF PREMATURE DEATHS.

It must not be overlooked that the benefits to be derived from a saving of life, if sanitary legislation can accomplish it, are not only to the individuals, but to the community at large. It may seem strange that anything apparently so self-evident as that the saving of life is a benefit to the community, requires argument to support it. But there is no denying that there is a sort of philosophy deeply rooted in society, to this effect, that although each death is a matter of great pain and suffering to the immediate circle of the deceased, and is a thing which those more immediately concerned should use every effort to avert, yet, in the general case, it is a benefit to society at large, since it is the removal of one consumer of the common stock of the world's possessions. If the world were a common alms-house, in which all were unproductive, the efforts of mankind never increasing the amount of the necessaries and luxuries of life, to be distributed among the race, this might be true. But men who die cease to *produce* as well as to *consume*. It would have surely been a loss rather than a gain to the world had Watt died before he invented the steam-engine, or Stephenson before he saw the locomotive-engine glide along the Liverpool and Manchester Railway; and the same element of value more or less pervades the whole working-race of men. In the words of the Registrar-General of England in his report for 1843—

'Man does not pass through all the stages of his physiological and intellectual development in less than seventy years: yet it has been shown that in the most favourable circumstances in which large bodies of the English population are placed, the mean life attained is only forty-five years; and that other large bodies of the people fall short of this relatively low standard to the extent of nineteen years —years of childhood and youth principally—years of toil too, and poverty perhaps, but of life—years also of manhood in its prime, wisdom in its maturity, virtue in its height of usefulness and glory. The facts and calculations upon which these results rest will not be disputed by those who have studied the subject most deeply; I believe that they will be confirmed by the still more extended data which are every year accumulating under the present system of registration. In the meantime, enough has been advanced to direct public attention to the "hidden pitfalls," which had so long lain concealed, which destroy every year thousands of lives, and which it is believed admit to a considerable extent of removal by the judicious application of sanitary measures.'

Let us look at this matter still more minutely. If we could cut off the first fifteen or twenty years of existence, when the human being is generally a burthen to be supported, and leave the

productive years alone, we might imagine society the gainer rather than the loser. But premature deaths cut right into the centre of the period of greatest utility. It is true that those who live to extreme old age generally pass some non-productive years before they sink into the grave. Let us examine the bearings of this fact upon the question. These patriarchs will generally have had ample time to secure for themselves the means of passing their old age in comfort. The temperance and prudence which have enabled them to live so long, may be expected to accompany them in their ordinary walk in life, and to enable them to look forward to the smoothening of the pillow for their old age. If they should have had a less fortunate lot, they have in the usual case claims which those in the prime of life cannot boast of on the new race which they have started forward in life, armed through their care and attention to combat with its difficulties.

But at the same time it is certain that the proportion of uselessness in the green old age of hale healthy men is not nearly so great as the proportion accruing to those who are cut off in earlier years. Early deaths presuppose sickly, feeble lives, incapable at any time of hard exertion, and frequently interrupted by periods of debility. The man whose natural span of life is not destined to exceed forty years, will have had many periods of sickness and of inability to work before the final close arrives. We may safely conclude that in the ordinary run of cases the short-lived man has had more years of uselessness between the beginning and the end of his days than the long-lived; for if we look to the healthy classes of society, we find many men undertaking great labours in extreme old age. The portentous exertions of the statesman and the judge are often performed by men upwards of threescore-and-ten. The commander-in-chief of the forces is eighty years old: Lord Lyndhurst was more than seventy years old when on the woolsack he had to perform the hardest work that has to be done in the empire: Lord Brougham, ever panting for some great field of exertion, is seventy years old: the head of the law in Scotland is seventy-seven years old. But if we suppose that the useless years of the short-livers from bad health are just the same as those of the long-livers from natural decay, yet the benefit to society will greatly preponderate with the latter; for if we take two men starting in life together, and becoming productive members of society at twenty years old, if the one live to the age of forty, and the other to the age of seventy, and each has five years of inutility at the end of his life, here we shall have in the one case five years out of twenty, or 25 per cent., and in the other only five out of fifty, or 10 per cent. of unproductiveness.

UNEXPECTED NATURE OF THE VITAL STATISTICS PRODUCED BY INQUIRY.

The use and necessity of arrangements for investigating the causes which affect the public health are well proved by the unexpected nature of the facts already developed. No vague conclusions of any kind can be more inaccurate than popular statistics derived from impressions and opinions. They are always deeply steeped in the locality or the personality of the individual who expresses them. A person surrounded by pleasant sights, by flowery smells, and happy healthy faces, is hard to believe in the wan misery that stalks through unburied corruption down the alleys of the next street. The prosperous merchant or manufacturer cannot well believe how people can want food and clothing, as the French princess thought that though bread were wanting, pie-crust must still be abundant, and might prove a wholesome substitute. Those who are looking through the world to gratify their curiosity, and even to instruct themselves, find their way by a sort of natural instinct to whatever is great and beautiful. They see the squares, the gardens, the public buildings, the gentlemen's houses in the towns they visit, and the squalid homes of misery are overlooked. So the tourist recalls his impressions of Rome, Cologne, or Edinburgh, incapable of realising an idea of the amount of human suffering that lies heaped and sweltering in the dark corners of the landscape which is associated with the Coliseum, the Cathedral, or the Castle rock.

Hence the world was astonished beyond measure when two new characteristics which tourists and geographers had not dreamt of were found in Liverpool—excessive mortality, and excessive crime. These did not seem natural elements of such a place. The town was airy and healthy-looking, with no marsh-land near it, but pleasant heights behind, and the Atlantic in front; there were wide streets, not deficient in pleasure-grounds; and, above all, there was wealth, enterprise, and free scope for industry. Yet such a description as the following, provided by a local physician, is quite sufficient to account for all that has been said of disease and crime, at least down to a recent time, in Liverpool:—

'With regard to individual dwellings, it is in the "lodging-houses"—usually situated in the front streets, but sometimes in the courts—that the overcrowding of inmates is carried to the highest pitch. The worst description of houses of this kind are kept by Irishmen, and they are resorted to by the migratory Irish, among others, who may perhaps not remain more than a night or two in the town, as well as by vagrants and vagabonds of all descriptions. In every room of such houses, with the exception of the kitchen or cooking-room, the floor is usually covered with bedsteads, each of which receives at

night as many human beings as can be crowded into it; and this too often without distinction of sex or regard to decency. But there are cellars, usually the double cellars I have described, which are used for the same purpose; and here the overcrowding is carried still further, if that be possible, and is certainly even more prejudicial to the health of the inmates, from the still more defective ventilation of these dark and miserable abodes. At night the floor of these cellars—often the bare earth—is covered with straw, and there the lodgers—all who can afford to pay a penny for the accommodation—arrange themselves as best they may, until scarcely a single available inch of space is left unoccupied. In this way as many as thirty human beings or more are sometimes packed together underground, each inhaling the poison which his neighbour generates, and presenting a picture in miniature of the Black Hole of Calcutta. Each individual in the course of the night vitiates about 300 cubic feet of atmospheric air, rendering it quite unfit for the purposes of respiration; and if we suppose 30 pair of lungs engaged in this process, we shall have 9000 cubic feet of air rendered noxious during the period of sleep. But the cubic contents of the cellars in question do not, on the most liberal computation, exceed above 2100 feet; which is the same thing as to say that thirty individuals are furnished with a supply of air sufficient for the wants of only seven. The Inspectors of Prisons in England recommend "not less than 1000 cubic feet" for every prisoner "as being essential to health and ventilation;" and yet here we have free agents voluntarily immuring themselves within a space which limits them to a supply of seventy feet, or less than one-fourth of the minimum necessary for the purposes of healthy respiration. I speak of course with reference to the imperfect natural ventilation of the cellars, aided, as this source of mischief is, by the pains taken to exclude even a breath of air from without. I have described an extreme case, but it is one which every medical man who has practised extensively among the poor must have had an opportunity of witnessing; and I believe it may be said, without fear of contradiction, that there is scarcely a "lodging-house" or cellar in the town whose inmates are not, as a general rule, too numerous for the breathing space afforded them. The natural consequences follow. Fever breaks out from time to time, and spreads with rapidity among the inhabitants. Nor is this the worst; for, from the migrant character of their population, these dens become foci which radiate infection not only throughout the town, but to other towns, and to distant parts of the country. But the evil of overcrowding is not confined to the lodging-houses. The houses, both in streets and courts, are very generally sublet, each room being sometimes occupied by one or more families; so that it is not uncommon to see an apartment 10 or 12 feet square, and perhaps still more frequently a cellar of the same dimensions, inhabited by twelve or fourteen human beings, giving a ratio of condensation in the case of the cellar (which is lower in the roof) very nearly as high as in the case of the worst lodging-cellars just noticed. In some districts of the

town, inhabited chiefly by the lower Irish, whole courts and streets are densely crowded. Some instances of the latter will be afterwards mentioned; at present, I shall only notice a filthy, pent-up court (in Crosbie Street), containing 118 inhabitants on an area of 150 square yards, or about 1¼ square yards to each. The average breathing-room during the night for the entire population of the court would be little more than one-half of what it ought to be, supposing the inhabitants succeeded in their attempts to prevent the admission of fresh air to the houses. In this court fifty cases of fever (nearly one-half of the entire number of inhabitants) were attended by the dispensary in a single year, besides a considerable number of patients with other diseases. . . . . Liverpool appears to have a larger amount of cellar population than any other town. After a careful investigation of the cellar residences, both here and in Manchester, by the Statistical Society of the latter town, about seven years ago, they estimated the proportion of the working-classes inhabiting cellars in Liverpool at 20 per cent., in Manchester at 11¾ per cent., and in Salford at only 8 per cent. In Birmingham, the most healthy of all the large towns, it appears that there are no cellar-residents whatever. The Committee of Physicians and Surgeons who drew up the report on the sanitary condition of that town state:—"Our inquiries have not enabled us to discover a single example of a cellar used as a dwelling in Birmingham. We have requested some vigilant officers of police to discover if, in any part of the borough, cellars are used as dwellings; and the result of their inquiries has confirmed our own observations on this point." The cellars in Manchester, while they are not so numerous as in Liverpool, seem to be at the same time less obnoxious in their construction. Mr Riddall Wood, who examined them in both places, says, in his evidence before the Committee on the Health of Towns—"My impression is, that they are not nearly so numerous in Manchester as in Liverpool. Bad as they are, they are of a superior description, as far as light and ventilation go."*

PRACTICAL TYRANNY IN THE SUBJECTION TO MORTAL AGENCIES.

Even if powers created for the preservation of the public health may be abused, the evils arising from that very abuse cannot compete in despotic and cruel extent with those arising out of the freedom of every man to injure his neighbour. Those who are free to pursue their own business, or follow the dictates of their own interest, without regard to the health and to the lives that they may sacrifice, possess a power of evil which no government less tyrannical than some half-fabled Eastern despotism would dare to use. In the course of this volume innumerable illustrations necessarily occur of individuals seeking their own profit or gratification in proceedings that affect the comfort, the health, and the

* On the Physical Causes of the High Rate of Mortality in Liverpool, by W. H. Duncan, M.D.

very lives of their neighbours; and who, were there a proper and full sanitary control over them, would be obliged to account for their conduct. While city communities have been unable, for want of sufficient powers, to apply the public refuse to the lucrative purposes to which it may be made applicable without offence or danger, we shall hereafter have to show that a landed proprietor near Edinburgh was enabled to apply it to his own use, and enrich himself without even being subjected to proper precautions for rendering his operations safe and inoffensive. The Sanitary Report affords the following instances where selfish folly has been able to stand cruelly in the way of efforts towards salubrity:—

'About a mile and a-half distant from one of the towns in Scotland there is a moss about seven miles long, with a small stream running through it, with a fall of about 25 feet. At the outlet of this stream there is an old corn-mill, which yields a rental of about £25 per annum. By the water being dammed up to turn this mill, the whole run is impeded; and the consequent sluggishness of the stream occasions it to be choked up with weeds. Whenever a fall of rain takes place, the banks are overflowed, and not only is every improvement rendered impracticable, but on several harvests as much as £500 worth of hay has been destroyed at a time when a heavy fall of rain has occurred and occasioned an overflow.

'It so happens that the proprietor of the mill would himself clearly gain more than the value of the mill from the drainage that would be effected on his own lands by the removal of the dam. The other proprietors, however, offered to him for its removal the full rental that he now derives from the mill. The property is in the hands of a factor, who is ignorant and obstinate, and the offer was refused. Now the land which would be affected beneficially by the removal of the dam, is a tract of seven or eight miles long, with an average width of two miles and a-half. The expense of an act of parliament, if it were resisted, as it most probably would be, renders an appeal to the legislature valueless. Thus one individual is enabled to exercise a despotic caprice against the health and prosperity of the surrounding population, to inflict an extensive loss of labour and wages on the working-man, the loss of produce and profit to the occupiers, the loss of rent to the other owners, and at the same time to inflict on all who may live on the spot, or come within reach of the marsh, the ill health and hazards of disease from the miasma which it emits.

'The like despotic powers are found in every district in the way of the public health, as well as of the private advantage.

'The passenger who enters Birmingham from the London railway may perceive, just before the terminus, a black sluggish stream, which is the river Rea, made the receptacle of the sewers of the town. Mr Hodgson, and the committee of physicians of that town, state in their sanitary report, that—"The stream is sluggish, and

the quantity of water which it supplies is not sufficient to dilute and wash away the refuse which it receives in passing through the town; and in hot weather it is consequently very offensive, and in some situations in these seasons is covered with a thick scum of decomposing matters; and this filthy condition of the river near the railway station is a subject of constant and merited animadversions, and that it requires especial attention lest it should become a source of disease," &c.

'The fatally-dangerous sluggishness of this river is occasioned by the diversion and abstraction of its water to turn a mill, "a fact which will amply account for the deficiency and sluggishness of the current in the very places where the contrary condition is the most wanted." Captain Vetch, who has been engaged in engineering operations in that part of the country which have led him to observe the spot, states that—"The remedy is as easy as the evil is great; all obstruction being removed from the course of the brook, and the water restored to its original bed, the object would be effected; as to the value of the mill-power which would thus be subverted, it cannot be a matter of much amount in a place where coals and steam-engines are so cheap, and where the constant and regular work of the mill must be an object of some importance."

'After describing the means of the removal, he states—"In this manner, and by reserving the whole body of the water of the Rea for cleansing its own bed, I have no doubt that this main sewer of Birmingham would become as conspicuous for its wholesome and efficient action as it now is for the contrary."

'Birmingham presents an example such as indeed is common in most towns, of the stoppage of a main current of air by a private building carried across one end of a main street. The effects likely to result from the obstruction to the invisible current are not dissimilar to those which result from the obstruction to the stream of water, and the cost and difficulty of relief from them are perhaps much greater.'

PART II.

NOTICES OF GREAT EPIDEMICS.

INTRODUCTORY—THE PLAGUE OF ATHENS—PESTILENCES OF THE MIDDLE AGES—THE BLACK DEATH—THE DANCING MANIA—THE SWEATING SICKNESS—THE PLAGUE AT NAPLES—THE GREAT PLAGUE OF LONDON—THE PLAGUE AT MARSEILLES—THE ORIENTAL PLAGUE—THE CHOLERA.

INTRODUCTORY.

The history of great epidemics presents us, in the most marked and terrific forms, with those operative causes of disease and death which it is the object of sanitary measures to remove, so far as it may be consistent with the Deity's ordinances of the world, that they are capable of removal. On this consideration, while it would be presumption to argue farther than 'from what we know,' yet we have not yet seen the bounds beyond which human science cannot go in the direction of precautionary arrangements; and we have no right to consider it inconsistent with a beneficent and all-wise Providence to have so arranged the elements of the world, that wherever there is an evil arising irregularly, and forming an exception to the usual order of nature, man is endowed with the means, through exercises of wisdom and of virtue, wherewith to neutralise the evil, and through elementary agencies give room for the pure and beneficent course of nature. In this light the great pestilences that have desolated the earth become natural objects of study to the sanitary inquirer, as enabling him to trace through the history of mankind the main footsteps of the evil which he seeks to remedy. In a book like the present, which professes to provide a popular view of whatever is most interesting and comprehensible in connection with the subject, it seems consistent with the end to give a notice of some of the principal pestilences, or rather of those which have been most fully described; for many communities have been swept off without leaving recorders, or even surviving witnesses, of the catastrophe.

All will be familiar with the occasional and brief descriptions of the pestilences recorded in Scripture—especially that of the Egyptians, of the Children of Israel in the wilderness, and of the Philistines when they removed the Ark and set it in the

House of Dagon;* and we may proceed to other instances, the history of which has been preserved on a larger scale.

THE PLAGUE OF ATHENS.

The history of the plague of Athens, which occurred 430 years before Christ, is told by the great historian Thucydides in a manner such as those who read it in the original emphatic language in which it was written never forget. Even at this early period it seems to have been suspected that the disease came into existence in places where heat, damp, and filth were united together, and spread wherever kindred circumstances gave it a reception. It was said to have appeared at Ethiopia, and thence passed through Egypt; and Gibbon remarks that 'Ethiopia and Egypt have been stigmatised in all ages as the original source and seminary of the plague. In a damp, hot, stagnating air, the African fever is generated from the putrefaction of animal substances, and especially from the swarms of locusts, not less destructive to mankind in their death than in their lives.' Thucydides tells us how it first attacked *men* (anthropoi) suddenly, leaving to be inferred that it had been previously known to affect animals. The symptoms were quite different from those of the old London, or the modern Oriental plague; and yet they are so distinctly set forth by the Greek historian, that we must believe them to be accurate. People in perfect health were suddenly attacked with violent pain in the head, accompanied by redness and inflammation of the eyes. Then the tongue and palate became of a deep red, and emitted a fetid odour. Sneezing, hoarseness, and violent coughing followed with vomiting, hiccough, and spasms, and convulsions of the stomach. No mention is made of hard swellings, but it is said that the skin was covered with red spots, pimples, and sores—symptoms alluded to by Cowper in the lines:—

> ———'Bids a plague
> Kindle a fiery boil upon the skin,
> And putrefy the breath of blooming health.'

The patient felt such a burning internal heat, that he could not bear the slightest clothing, and many in their frenzy precipitated themselves into the water. Even those who recovered, it was said, bore marks of the disease in mutilations and personal defects, while some entirely lost all faculty of memory.

Athens was but a small place, yet when it once begun, the disease made such frightful progress, that the Greeks, a people naturally fond of ceremonial, neglected all decency to the dead, who

* Exodus, xii.; Numbers, xi.; 1 Sam. v. and vi.

lay on the streets and the fields. It was remarked that beasts of prey would not feed upon the tainted bodies, but all animals fled far away, leaving man the sole victim and witness of the destroyer. Those who were stricken sunk at once into despondency, scarcely making an effort to struggle with the enemy. The historian describes them as dropping dead like rotten sheep. In many cases, when a family was stricken, it was deserted, and never more heard of; for when the pestilence had passed over, and people made inquiry about their neighbours, nothing was found but the bones of what had once been a family of station and importance in the city. Except a few devoted people, those only would attend to the sick who had themselves passed through the ordeal, and recovered, for it never twice attacked the same person. Nay, those who had passed through it believed that they had been, as it were, consecrated to life, and that thenceforth disease would have no power over them. It appears that the population of Athens had then received a considerable increase from the country, and that the city was thence much overcrowded. Thus in the heat of summer it was but too well prepared to give food for the ravages of the pest, and the historian especially mentions the stifling huts in which the people were so densely crowded together, that sometimes the corpses lay in heaps, and the half dead would be seen tumbling about among the corrupting bodies. The temples and the streets were filled with corpses which lay unburied. Wherever life is precarious, a strange recklessness at once seizes on the human being; and, as in almost every other instance of the kind, the horrors of the city of the dead were aggravated by the frightful profligacy of the living, who revelled openly and audaciously in every description of vice. They neither feared, says the historian, the gods nor the laws of men. Industry ceased, for the rich spent what they had, and the poor pillaged the rich. Surrounded as the few who remained must have been by rotting corpses, more numerous than they the survivors, it is strange that any one should have lived to tell the tale.

PESTILENCES OF THE MIDDLE AGES—THE BLACK DEATH.

The history of all the epidemics which have desolated Europe alone, without reference to the more distant and barbarous regions of the earth, would form a long chronological narrative with but brief intervals of exemption. Only a few remarkable among the many others can be noticed in such a sketch as this. The middle of the sixth century was celebrated for a visitation of this kind, of which the early ecclesiastical historians give indications of the existence in separate parts of the globe—indications which, as applicable to known and remarkable places, would afford but a

feeble idea of its extent in the vast and remote regions which, though now peopled by the most civilised communities, were then remote wildernesses trodden by barbarians. The lives of the early saints—full as they are of course of fabulous matter—might form valuable materials for an industrious historian of the epidemics of these early centuries. Many of the miracles for which they obtained their places in the calendar were naturally associated with these appalling devastations; and where the miracle itself need not be believed, the calamities of which it was fondly believed to have prevented the continuation may not be entirely apocryphal.

The termination of the first thousand years of the Christian era was marked by great calamities throughout Europe, which are gloomily recorded by the annalists. Famine seems to have been the predominating misery; but pestilence, its frequent companion, appeared along with it; and it was a favourite idea to preach from throughout Christian Europe, that as the one thousand years came to an end, the end of the world was to accompany the completion of the term.

Perhaps the widest devastation which the world has ever incurred by a single epidemic arose from that one which swept from the south through Europe and Northern Asia during the five years from 1345 to 1350. It has been identified by physicians with the Oriental plague of modern times, being characterised by inflammatory boils and tumours in the glands. On this account, and from the black spots on the skin, indicative of putrid decomposition, it received in Germany, where it was chiefly noticed and recorded, the terrible name of the Schwarze Tod, or Black Death. Its appearance was said to have been preceded by remarkable celestial and terrestrial convulsions. When great calamities occur, it is the practice of the uneducated to look for some corresponding phenomena in the visible exterior of nature. Stagnant marshes, close, ill-ventilated houses, vermin, filthy clothes, and corrupting food, are objects too small for their notice; and they prefer the contemplation of comets, meteors, and earthquakes. Thus the annalists of all the plagues in the middle ages mix up their narratives with accounts of phenomena of this description on a large and terrible scale; and we are sure to find, as a preface to some national calamity, that the moon was seen the colour of blood; that a voice was heard calling in the heavens; that ensanguined showers fell from the sky; or that the sun was darkened by an unnatural eclipse. It is very necessary to keep this peculiarity in view in reading accounts of the physical circumstances which accompanied ancient epidemics; and this importance gives great value to the following curious statement by De Foe in his history of the Plague—a statement

which we may take as the views formed by a shrewd and practical observer of human nature on the manner in which rumours and beliefs of supernatural agencies arise:—

'I shall name but a few of these things; but sure they were so many, and so many wizards and cunning people propagating them, that I have often wondered there was any (women especially) left behind.

'In the first place, a blazing star or comet appeared for several months before the plague, as there did the year after another, a little before the fire; the old women, and the phlegmatic hypochondriac part of the other sex, whom I could almost call old women too, remarked, especially afterward, though not till both those judgments were over, that those two comets passed directly over the city, and that so very near the houses, that it was plain they imported something peculiar to the city alone. That the comet before the pestilence was of a faint, dull, languid colour, and its motion very heavy, solemn, and slow; but that the comet before the fire was bright and sparkling, or, as others said, flaming, and its motion swift and furious, and that, accordingly, one foretold a heavy judgment, slow but severe, terrible, and frightful, as was the plague. But the other foretold a stroke sudden, swift, and fiery, as was the conflagration; nay, so particular some people were, that as they looked upon that comet preceding the fire, they fancied that they not only saw it pass swiftly and fiercely, and could perceive the motion with their eye, but even they heard it, that it made a rushing mighty noise, fierce and terrible, though at a distance, and but just perceivable.

'I saw both these stars, and I must confess, had had so much of the common notion of such things in my head, that I was apt to look upon them as the forerunners and warnings of God's judgments, and especially when the plague had followed the first, I yet saw another of the like kind, I could not but say, God had not yet sufficiently scourged the city.

'The apprehensions of the people were likewise strangely increased by the error of the times, in which, I think, the people, from what principle I cannot imagine, were more addicted to prophecies and astrological conjurations, dreams and old wives' tales, than ever they were before or since: whether this unhappy temper was originally raised by the follies of some people who got money by it—that is to say, by printing predictions and prognostications—I know not; but certain it is, books frighted them terribly; such as "Lily's Almanac," "Gadbury's Astrological Predictions," "Poor Robin's Almanac," and the like; also several pretended religious books—one entitled, "Come out of Her, my People, lest ye be Partaker of her Plagues;" another, called "Fair Warning;" another, "Britain's Remembrancer," and many such; all or most part of which foretold, directly or covertly, the ruin of the city; nay, some were so enthusiastically bold as to run about the streets with their oral predictions, pretending they were sent to preach to the city; and one in

particular, who, like Jonah to Nineveh, cried in the streets, "Yet forty days, and London shall be destroyed." I will not be positive whether he said yet forty days, or yet a few days. Another ran about naked, except a pair of drawers about his waist, crying day and night, like a man that Josephus mentions, who cried, "Wo to Jerusalem!" a little before the destruction of that city: so this poor naked creature cried, "Oh, the great and the dreadful God!" and said no more, but repeated those words continually with a voice and countenance full of horror, a swift pace, and nobody could ever find him to stop or rest, or take any sustenance, at least that ever I could hear of. I met this poor creature several times in the streets, and would have spoke to him, but he would not enter into speech with me, or any one else, but kept on his dismal cries continually.

'These things terrified the people to the last degree; and especially when two or three times, as I have mentioned already, they found one or two in the bills dead of the plague at St Giles's.

'Next to these public things were the dreams of old women, or, I should say, the interpretation of old women upon other people's dreams; and these put abundance of people even out of their wits. Some heard voices warning them to be gone, for that there would be such a plague in London so that the living would not be able to bury the dead; others saw apparitions in the air, and I must be allowed to say of both, I hope without breach of charity, that they heard voices that never spake, and saw sights that never appeared; but the imagination of the people was really turned wayward and possessed; and no wonder if they who were poring continually at the clouds saw shapes and figures, representations and appearances, which had nothing in them but air and vapour. Here they told us they saw a flaming sword held in a hand, coming out of a cloud, with a point hanging directly over the city; there they saw hearses and coffins in the air carrying to be buried; and there, again, heaps of dead bodies lying unburied, and the like, just as the imagination of the poor terrified people furnished them with matter to work upon.

> "So hypochondriac fancies represent
> Ships, armies, battles, in the firmament;
> Till steady eyes the exhalations solve,
> And all to its first matter, cloud, resolve."

'I could fill this account with the strange relations such people give every day of what they have seen; and every one was so positive of their having seen what they pretended to see, that there was no contradicting them without breach of friendship, or being accounted rude and unmannerly on the one hand, and profane and impenetrable on the other. One time before the plague was begun, otherwise than as I have said in St Giles's, I think it was in March, seeing a crowd of people in the street, I joined with them to satisfy my curiosity, and found them all staring up into the air to see what a woman told them appeared plain to her, which was an angel clothed in white, with a fiery sword in his hand, waving it or

brandishing it over his head. She described every part of the figure to the life, showed them the motion and the form; and the poor people came into it so eagerly, and with so much readiness. "Yes! I see it all plainly," says one; "there's the sword as plain as can be;" another saw the angel; one saw his very face, and cried out, "What a glorious creature he was!" One saw one thing, and one another. I looked as earnestly as the rest, but perhaps not with so much willingness to be imposed upon; and I said indeed that I could see nothing but a white cloud, bright on one side by the shining of the sun upon the other part. The woman endeavoured to show it me, but could not make me confess that I saw it, which indeed if I had, I must have lied: but the woman, turning to me, looked me in the face, and fancied I laughed, in which her imagination deceived her too, for I really did not laugh, but was seriously reflecting how the poor people were terrified by the force of their own imagination. However, she turned to me, called me profane fellow, and a scoffer, told me that it was a time of God's anger, and dreadful judgments were approaching, and that despisers such as I should wander and perish.

'The people about her seemed disgusted as well as she, and I found there was no persuading them that I did not laugh at them, and that I should be rather mobbed by them than be able to undeceive them. So I left them, and this appearance passed for as real as the blazing star itself.

'Another encounter I had in the open day also, and this was in going through a narrow passage from Petty-France into Bishopsgate Churchyard, by a row of alms-houses; there are two churchyards to Bishopsgate Church or parish—one we go over to pass from the place called Petty-France into Bishopsgate Street, coming out just by the church door; the other is on the side of the narrow passage where the alms-houses are on the left, and a dwarf wall with a palisade on it on the right hand, and the city wall on the other side more to the right.

'In this narrow passage stands a man looking through the palisades into the burying-place, and as many people as the narrowness of the place would admit to stop without hindering the passage of others, and he was talking mighty eagerly to them, and pointing now to one place, then to another, and affirming that he saw a ghost walking upon such a gravestone there; he described the shape, the posture, and the movement of it so exactly, that it was the greatest amazement to him in the world that everybody did not see it as well as he. On a sudden he would cry, "There it is! Now it comes this way!" then, "'Tis turned back!" till at length he persuaded the people into so firm a belief of it, that one fancied he saw it; and thus he came every day making a strange hubbub, considering it was so narrow a passage, till Bishopsgate clock struck eleven, and then the ghost would seem to start, and, as if he were called away, disappeared on a sudden.

'I looked earnestly every way and at the very moment that this

man directed, but could not see the least appearance of anything; but so positive was this poor man, that he gave them vapours in abundance, and sent them away trembling and frightened, till at length few people that knew of it cared to go through that passage, and hardly anybody by night on any account whatever.

'This ghost, as the poor man affirmed, made signs to the houses, and to the ground, and to the people, plainly intimating, or else they so understanding it, that abundance of people should come to be buried in that churchyard, as indeed happened; but then he saw such aspects, I must acknowledge I never believed, nor could I see anything of it myself, though I looked most earnestly to see it if possible.' *

While such superstitions and imaginative creations will ever be associated with great calamities by ignorant people, yet there is no doubt that there may be unusual physical phenomena which have an effect on epidemics. The great earthquakes of the Peninsula and America have generally been followed by pestilence caused by the quantity of putrefying bodies lying unburied, by the stagnation of streams, and the like. Great inundations, the bursting of lakes through their boundaries, and the fall of masses of mountain, such as take place in the Alps, by interfering with watercourses, may create pestilential miasmas. Such circumstances must weigh with those who discredit the accounts of wonders in the sky and on the earth recorded by the old annalists as the precursors of epidemics. With this preface, the following accounts of the convulsions which preceded the great epidemics of the fourteenth century is given from the work of Hecker, who, it is evident, believes quite enough of what he has read:—

'The series of these great events began in the year 1333, fifteen years before the plague broke out in Europe: they first appeared in China. Here a parching drought, accompanied by famine, commenced in the tract of country watered by the rivers Kiang and Hoai. This was followed by such violent torrents of rain in and about Kingsai, at that time the capital of the empire, that, according to tradition, more than 400,000 people perished in the floods; finally, the mountain Tsincheou fell in, and vast clefts were formed in the earth. In the succeeding year (1334), passing over the fabulous traditions, the neighbourhood was visited by inundations; whilst in Tche, after an unexampled drought, a plague arose, which is said to have carried off about 5,000,000 people. A few months afterwards, an earthquake followed at or near Kingsai; and subsequent to the falling in of the mountains of Ki-ming-chan, a lake was formed of more than 100 leagues in circumference, where again thousands found their grave. In Hou-kouang and Ho-nan, a drought prevailed for five months; and innumerable swarms of locusts destroyed the

* History of the Plague, pp. 22-27.

vegetation, while famine and pestilence, as usual, followed in their train. Connected accounts of the condition of Europe before this great catastrophe are not to be expected from the writers of the fourteenth century. It is remarkable, however, that simultaneously with a drought and renewed floods in China in 1336, many uncommon atmospheric phenomena, and in the winter frequent thunder-storms, were observed in the north of France; and so early as the eventful year of 1333, an irruption of Etna took place. According to the Chinese annals, about 4,000,000 people perished of famine in the neighbourhood of Kiang in 1337; and deluges, swarms of locusts, and an earthquake which lasted six days, caused incredible devastation. In the same year the first swarms of locusts appeared in Franconia, which were succeeded in the following year by myriads of these insects. In 1338 Kingsai was visited by an earthquake of ten days' duration; at the same time France suffered from a failure in the harvest; and thenceforth, till the year 1342, there was in China a constant succession of inundations, earthquakes, and famines. In the same year great floods occurred in the vicinity of the Rhine and in France, which could not be attributed to rain alone; for everywhere, even on the tops of the mountains, springs were seen to burst forth, and dry tracts were laid under water in a most inexplicable manner. In the following year the mountain Hong-tchang in China fell in, and caused a destructive deluge; and in Pien-tcheou and Leang-tcheou, after three months' rain, there followed unheard-of inundations, which destroyed seven cities. In Egypt and Syria violent earthquakes took place; and in China from this time they became more and more frequent; for they recurred in 1344, in Ven-tcheon, where the sea overflowed in consequence, in 1345 in Ki-tcheou, and in both the following years in Canton, with subterraneous thunder. Meanwhile floods and famine devastated various districts until 1347, when the fury of the elements subsided in China.

'The signs of terrestrial commotions commenced in Europe in the year 1348, after the intervening districts of country in Asia had probably been visited in the same manner.

'On the island of Cyprus, the plague from the East had already broken out, when an earthquake shook the foundations of the island, and was accompanied by so frightful a hurricane, that the inhabitants, who had slain their Mohammedan slaves, that they might not themselves be subjugated by them, fled in dismay in all directions. The sea overflowed, the ships were dashed to pieces on the rocks, and few outlived the terrific event whereby this fertile and blooming island was converted into a desert. Before the earthquake, a pestiferous wind spread so poisonous an odour, that many, being overpowered by it, fell down suddenly, and expired in dreadful agonies.

'This phenomenon is one of the rarest that has ever been observed, for nothing is more constant than the composition of the air; and in no respect has nature been more careful in the preservation of organic life. Never have naturalists discovered in the atmosphere

foreign elements which, evident to the senses, and borne by the winds, spread from land to land, carrying disease over whole portions of the earth, as is recounted to have taken place in the year 1348. It is therefore the more to be regretted that in this extraordinary period, which, owing to the low condition of science, was very deficient in accurate observers, so little that can be depended on respecting those uncommon occurrences in the air should have been recorded. Yet German accounts say expressly that a thick, stinking mist advanced from the East, and spread itself over Italy, and there could be no deception in so remarkable a phenomenon. The credibility of unadorned traditions, however little they may satisfy physical research, can scarcely be called in question when we consider the connection of events; for just at this time earthquakes were more general than they had been within the range of history. In thousands of places chasms were formed, from whence arose noxious vapours; and as at that time natural occurrences were transformed into miracles, it was reported that a fiery meteor, which descended on the earth far in the East, had destroyed everything within a circumference of more than a hundred leagues, infecting the air far and wide. The consequences of innumerable floods contributed to the same effect—vast river districts had been converted into swamps; foul vapours arose everywhere, increased by the odour of putrefied locusts, which had never perhaps darkened the sun in thicker swarms, and of countless corpses, which, even in the well-regulated countries of Europe, they knew not how to remove quickly enough out of the sight of the living. It is probable, therefore, that the atmosphere contained foreign and sensible admixtures to a great extent, which, at least in the lower regions, could not be decomposed or rendered ineffective by separation.'*

Of the amount of devastation committed by this great pestilence, the following account is given from the same authority:—

'Cairo lost daily, when the plague was raging with its greatest violence, from 10,000 to 15,000; being as many as, in modern times, great plagues have carried off in their whole course. In China, more than 13,000,000 are said to have died; and this is in correspondence with the certainly exaggerated accounts from the rest of Asia. India was depopulated; Tartary, the Tartar kingdom of Kaptschak, Mesopotamia, Syria, Armenia, were covered with dead bodies: the Kurds fled in vain to the mountains. In Caramania and Cæsarea none were left alive—on the roads, in the camps, in the caravansaries, unburied bodies alone were to be seen; and a few cities only (Arabian historians name Maara-el-Nooman, Schisur, and Harem) remained in an unaccountable manner free. In Aleppo 500 died daily; 22,000 people and most of the animals were carried off in Gaza; within six weeks Cyprus lost almost all its inhabitants; and ships without crews were often seen in the Mediterranean, as afterwards

* Hecker's Epidemics of the Middle Ages, by Babington, pp. 12-15.

in the North Sea, driving about, and spreading the plague wherever they went on shore. It was reported to Pope Clement at Avignon, that throughout the East, probably with the exception of China, 23,840,000 people had fallen victims to the plague. Considering the occurrences of the fourteenth and fifteenth centuries, we might, on first view, suspect the accuracy of this statement. How, it might be asked, could such great wars have been carried on, such powerful efforts have been made; how could the Greek empire, only a hundred years later, have been overthrown, if the people really had been so utterly destroyed?

'This account is nevertheless rendered credible by the ascertained fact, that the palaces of princes are less accessible to contagious diseases than the dwellings of the multitude; and that, in places of importance, the influx from those districts which have suffered least soon repairs even the heaviest losses. We must remember also that we do not gather much more from mere numbers without an intimate knowledge of the state of society. We will therefore confine ourselves to exhibiting some of the more credible accounts relative to European cities:—

In Florence there died of the Black Plague,	60,000
In Venice,	100,000
In Marseilles, in one month,	16,000
In Siena,	70,000
In Paris,	50,000
In St Denys,	14,000
In Avignon,	60,000
In Strasburg,	16,000
In Lübeck,	9,000
In Basle,	14,000
In Erfurt, at least	16,000
In Weimar,	5,000
In Limburg,	2,500
In London, at least	100,000
In Norwich,	51,000
To which may be added Franciscan Friars in Germany,	124,434
Minorites in Italy,	30,000

'This short catalogue might, by a laborious and uncertain calculation, deduced from other sources, be easily further multiplied, but would still fail to give a true picture of the depopulation which took place. Lübeck, at that time the Venice of the North, which could no longer contain the multitudes that flocked to it, was thrown into such consternation on the irruption of the plague, that the citizens destroyed themselves, as if in frenzy.

'Merchants, whose earnings and possessions were unbounded, coldly and willingly renounced their earthly goods. They carried their treasures to monasteries and churches, and laid them at the foot of the altar; but gold had no charms for the monks, for it brought them death. They shut their gates, yet still it was cast to them over

the convent walls. People would brook no impediment to the last pious work, to which they were driven by despair. When the plague ceased, men thought they were still wandering among the dead, so appalling was the livid aspect of the survivors, in consequence of the anxiety they had undergone, and the unavoidable infection of the air. Many other cities probably presented a similar appearance, and it is ascertained that a great number of small country towns and villages, which have been estimated—and not too highly—at 200,000, were bereft of all their inhabitants.

'In many places in France not more than two out of twenty of the inhabitants were left alive, and the capital felt the fury of the plague alike in the palace and the cot.

'Two queens, one bishop, and great numbers of other distinguished persons, fell a sacrifice to it, and more than 500 a day died in the Hôtel-Dieu, under the faithful care of the Sisters of Charity, whose disinterested courage in this age of horror displayed the most beautiful traits of human virtue. For although they lost their lives evidently from contagion, and their numbers were several times renewed, there was still no want of fresh candidates, who, strangers to the unchristian fear of death, piously devoted themselves to their holy calling.

'The churchyards were soon unable to contain the dead, and many houses left without inhabitants fell to ruins.' *

Boccaccio has given an almost pleasing immortality to this pestilence, from its association with his stories of the ten days, told by luxurious citizens of Florence in their rural retreat, whence, in careless security, they contemplated the distant horrors. Yet the story-teller has left a sufficiently appalling picture of the moral effects of this great calamity in the following description:—

'When the evil had become universal, the hearts of all the inhabitants were closed to feelings of humanity. They fled from the sick and all that belonged to them, hoping by these means to save themselves; others shut themselves up in their houses with their wives, their children, and their households, living on the most costly food, but carefully avoiding all excess. None were allowed access to them, no intelligence of death or sickness was permitted to reach their ears, and they spent their time in singing and music, and other pastimes. Others, on the contrary, considered eating and drinking to excess, amusements of all descriptions, the indulgence of every gratification, and an indifference to what was passing around them, as the best medicine, and acted accordingly. They wandered day and night from one tavern to another, and feasted without moderation or bounds. In this way they endeavoured to avoid all contact with the sick, and abandoned their houses and property to chance, like men whose death-knell had already tolled.

'Amid this general lamentation and wo, the influence and autho-

* Hecker's Epidemics, pp. 22-25.

rity of every law human and divine vanished. Most of those who were in office had been carried off by the plague, or lay sick, or had lost so many members of their families, that they were unable to attend to their duties, so that thenceforth every one acted as he thought proper. Others in their mode of living chose a middle course—they ate and drank what they pleased, and walked abroad, carrying odoriferous flowers, herbs, or spices, which they smelt from time to time, in order to invigorate the brain, and to avert the baneful influence of the air infected by the sick, and by the innumerable corpses of those who had died of the plague. Others carried their precaution still farther, and thought the surest way was to escape death by flight; they therefore left the city, women as well as men, abandoning their houses and their relations, and retiring into the country; but of these also many were carried off, most of them alone, and deserted by all the world, themselves having previously set the example. Thus it was that one citizen fled from another, a neighbour from his neighbours, a relation from his relations; and in the end, so completely had terror extinguished every kindlier feeling, that the brother forsook the brother, the sister the sister, the wife her husband, and at last even the parent his own offspring, and abandoned them, unvisited and unsoothed, to their fate. Those, therefore, that stood in need of assistance fell a prey to greedy attendants, who, for an exorbitant recompense, merely handed the sick their food and medicine, remained with them in their last moments, and then not unfrequently became themselves victims to their avarice, and lived not to enjoy their extorted gain. Propriety and decorum were extinguished among the helpless sick. Females of rank seemed to forget their natural bashfulness, and committed the care of their persons indiscriminately to men and women of the lowest order. No longer were women, relatives or friends, found in the house of mourning to share the grief of the survivors—no longer was the corpse accompanied to the grave by neighbours and a numerous train of priests, carrying wax-tapers, and singing psalms; nor was it borne along by other citizens of equal rank. Many breathed their last without a friend to soothe their dying pillow, and few, indeed, were they who departed amid the lamentations and tears of their friends and kindred. Instead of sorrow and mourning, appeared indifference, frivolity, and mirth; this being considered, especially by the females, as conducive to health. Seldom was the body followed by even ten or twelve attendants; and instead of the usual bearers and sextons, mercenaries of the lowest of the populace undertook the office for the sake of gain; and accompanied by only a few priests, and often without a single taper, it was borne to the very nearest church, and lowered into the first grave that was not already too full to receive it. Among the middling classes, and especially among the poor, the misery was still greater. Poverty or negligence induced most of these to remain in their dwellings, or in the immediate neighbourhood, and thus they fell by thousands; and many ended their lives in the streets by day and by night. The stench of putrefying

corpses was often the first indication to their neighbours that more deaths had occurred. The survivors, to preserve themselves from infection, generally had the bodies taken out of the houses, and laid before the doors, where the early morn found them in heaps, exposed to the affrighted gaze of the passing stranger. It was no longer possible to have a bier for every corpse—three or four were generally laid together—husband and wife, father and mother, with two or three children, were frequently borne to the grave on the same bier; and it often happened that two priests would accompany a coffin bearing the cross before it, and be joined on the way by several other funerals, so that instead of one, there were five or six bodies for interment.'*

THE DANCING MANIA.

On the mysterious connection between bodily and mental diseases, those physicians who have made the fairest and the most profound researches have perhaps shown their wisdom in being the least dogmatic. As the physical evils from pestilential visitations have been on a vast and appalling scale, so have the mental; and both alike have baffled science to develop any more than their mere distant and comprehensive causes, being those which generally are known to affect the sanitary condition of the people. Besides the superstition and credulity already referred to, the great plague of the fourteenth century was followed by a scarcely less frightful epidemic, of which the physical manifestations were the immediate effect or representation of mental phenomena. It was called the Dancing Madness, and its progress has been thus described by Hecker:—

'When the disease was completely developed, the attack commenced with epileptic convulsions: those affected fell to the ground senseless, panting and labouring for breath. They foamed at the mouth, and, suddenly springing up, begun their dance amid strange contortions; yet the malady doubtless made its appearance very variously, and was modified by temporary or local circumstances, whereof non-medical contemporaries but imperfectly noted the essential particulars, accustomed as they were to confound their observation of natural events with their notions of the world of spirits.

'It was but a few months ere this demoniacal disease had spread from Aix-la-Chapelle, where it appeared in July, over the neighbouring Netherlands. In Liege, Utrecht, Tongres, and many other towns of Belgium, the dancers appeared with garlands in their hair, and their waists girt with cloths, that they might, as soon as the paroxysm was over, receive immediate relief on the attack of the tympany. This bandage was, by the insertion of a stick, easily twisted tight: many, however, obtained more relief from kicks and blows, which

* Boccaccio, from Hecker's Epidemics, pp. 47–49.

they found numbers of persons ready to administer; for wherever the dancers appeared, the people assembled in crowds to gratify their curiosity with the frightful spectacle. At length the increasing numbers of the affected excited no less anxiety than the attention that was paid to them. In towns and villages they took possession of the religious houses, processions were everywhere instituted on their account, and masses were said and hymns were sung, while the disease itself, of the demoniacal origin of which no one entertained the least doubt, excited everywhere astonishment and horror. In Liege the priests had recourse to exorcisms, and endeavoured by every means in their power to allay an evil which threatened so much danger to themselves; for the possessed, assembling in multitudes, frequently poured forth imprecations against them, and menaced their destruction. They intimidated the people also to such a degree, that there was an express ordinance issued that no one should make any but square-toed shoes, because those fanatics had manifested a morbid dislike to the pointed shoes, which had come into fashion immediately after the *great mortality* in 1350. They were still more irritated at the sight of red colours, the influence of which on the disordered nerves might lead us to imagine an extraordinary accordance between this spasmodic malady and the condition of infuriated animals; but in the St John's dancers this excitement was probably connected with apparitions consequent upon their convulsions. There were likewise some of them who were unable to endure the sight of people weeping. The clergy seemed to be daily more confirmed in their belief that those who were affected were a kind of sectarians, and on this account they hastened their exorcisms as much as possible, in order that the evil might not spread amongst the higher classes, for hitherto scarcely any but the poor had been attacked; and the few people among the laity and clergy who had been attacked were persons whose natural frivolity was unable to withstand the excitement of novelty, even though it proceeded from a demoniacal influence. Some of the affected had indeed themselves declared, when under the influence of priestly forms of exorcism, that if the demons had been allowed only a few weeks' more time, they would have entered the bodies of the nobility and princes, and through these have destroyed the clergy. Assertions of this sort, which those possessed uttered whilst in a state that may be compared with that of magnetic sleep, obtained general belief, and passed from mouth to mouth with wonderful additions. The priesthood were on this account so much the more zealous in their endeavours to anticipate every dangerous excitement of the people, as if the existing order of things could have been seriously threatened by such incoherent ravings. Their exertions were effectual, for exorcism was a powerful remedy in the fourteenth century; or it might perhaps be that this wild infatuation terminated in consequence of the exhaustion which naturally ensued from it; at all events, in the course of ten or twelve months, the St John's dancers were no longer to be found in any of the cities of

Belgium. The evil, however, was too deeply rooted to give way altogether to such feeble attacks.' *

THE SWEATING SICKNESS.

During the latter part of the fifteenth and the first quarter of the sixteenth century a new and peculiar disease made its appearance in Europe called the Sweating Sickness, which committed so much havoc in England, that it was called the English Sweat. With such pertinacity, indeed, did it persecute a community who are now less susceptible to epidemics than any other people in the world, that the chroniclers give marvellous instances of its singling out and attacking Englishmen abroad, and that in the presence of Scotsmen and Irishmen who were exempt. It made its first appearance early in the reign of Henry VII., and was supposed to have accompanied his army. The chronicler Grafton thus describes its first attack in 1485 :—

'In this same yeare a new kind of sickness came suddenly through the whole region, even after the first entering of the king into this isle, which was so sore, so painful and sharp, that the like was never heard of to any man's remembrance before that time. For sodanly a deadly and burning sweat envaded their bodies, and vexed their blood, and with a most ardent heat infested the stomach and the head grievously: by the tormenting and vexation of which sickness men were so sore handled and so painfully panged, that if they were laid in their bed, being not able to suffer the importunate heate, they cast away the sheets and all the clothes lying on the bed. If they were in their apparrel and vestures, they would put off all their garments even to their shirts. Others were so dry, that they drank the cold water to quench their importunate heat and unquenchable thirst. Others that could or at least would abide the heat and stintch (for indeed the sweat had a great and strong savour), caused clothes to be laid upon them as much as they could bear, to drive out the sweat if it might be. All in manner as soon as the sweat took them, or within a short space after, yielded up their ghost. So that of all them that sickened, there was not one amongst an hundredth that escaped: insomuch that, besides the great number which deceased within the city of London, two mayors successively died of the same disease within eight days, and six aldermen. And when any person had fully and completely sweat twenty-four hours (for so long did the strength of this plague hold them), he should be then clearly delivered of his disease ; yet not so clean rid of it, but that he might shortly relapse and fall again into the same evil fit ; yea, again, and twice again, as many a one indeed did, which after the third time died of the same.' †

* Epidemics of the Middle Ages, pp. 88–90.

† Grafton's Chronicle of England, ii. pp. 160, 161.

The unwelcome visitor returned in 1518, when, according to the same annalist—

'In the very end of May began in the city of London the sickness called the Sweating Sickness, and afterwards went through all the realm almost, of which many died within five or six hours. By reason of this sickness the terme was adjourned, and the circuits of assize also. The king was sore troubled with this plague, for divers died in the courte, of whom one was Sir Francis Paynes, which was ambassador in Spain, and other, so that the king for a space removed almost every day, till at last he came to Tytynhanger, a place of the abbot of St Albanes, and there he, with a few, determined to stand the chance which God would send him, which place was so purged daily with fires and other preservatives, that neither he nor the queen, nor none of their company, was infected with that disease—such was the pleasure of God. In this great plague died Sir William Compton, knight, and William Carey, Esq., which were of the king's privy chamber, and whom the king highly favoured, and many other worshipful men and women in England.

'By reason of this plague, the watches which were wont to be kept yearly in London on St John's Eve at Midsummer, and St Peter's Eve, were by the king and his counsell commanded to be left for that yeare, wherefore the armourers made great suit to the king, and declared their great hindrance, which was not so much considered as the mischief that might have ensued if that so great a number should have assembled together in that hot time, and the plague of sweating raging.' *

We see in another part of the present volume the remarks of Erasmus on this epidemic, and the circumstances which in his view tended to propagate it.† John Cay, or Canis, in 1552, published a pamphlet on the subject, which he called, 'A Boke or Counseill against the Disease commonly called the Sweate or Sweatyng Sicknesse.' It would give one a notion that, however filthily the people of England then lived, they were not without luxuries. The following passage, in which the spelling has been modernised, gives us the author's views as to a protective regimen:—

'I therefore go forth with my diet, wherein my counsel is, that the meats be healthful and wholesomely killed, sweetly served, and well prepared in roasting, baking, and so forth: the bread of sweet corn, well leavened, and so baked: the drink of sweet malt and good water kindly brewed, without other dross now-a-days used. No wine in all the time of sweating, except to such whose sickness require it for medicine, for fear of inflaming and opening, nor except the half be well sodden water. In other times old, pure, and small. Wishing for the better execution thereof, and oversight of good and

* Grafton's Chronicle of England, ii. p. 412. † See part iii.

healthsome victuals, there were appointed certain masters of health in every city and town, as there is in Italy, which for the good order in all things may be in all places an example. The meats I would to be—veal, mutton, kid, old lamb, chicken, capon, hen, cock, partridge, pheasant, fieldfare, small birds, pigeon, young peacocks, whose flesh, by a certain natural and secret property, never putrefieth, as hath been proved. Conies, pork of mean age, neither fat nor lean, the skin taken away, roast, and ate cold. Tarts of prunes, jellies of veal and capon; young beef in this case a little powdered is not to be dispraised, nor new eggs and good milk. Butter in a morning with sage and rue, fasting, in the sweating time, is a good preservative, beside that it nourisheth. Crabs, cravesses, pircel, perch, ruffe, gudgeon, lampreys out of gravelly rivers, smelts, dace, barbel, gonnerd, whiting, soles, flounders, plaice, millers' thumbs, minnows, with such others, sodden in water and vinegar, with rosemary, thyme, sage, and whole maces, served hot. Yea, sweet salt-fish and ling, for the salt's sake wasting the humours thereof, which in many fresh fishes remain, may be allowed well watered to tea, that have none other, and well like it. Nor all fishes, no more than all fleshes, be so evil as they be taken for: as is well declared in physic, and approved by the old and wise Romans, much in their fishes, lusty Carthusians never in fleshes; but we are now-a-days so unwisely fine and womanly delicate, that we may in nowise touch a fish. The old manly hardness, stout courage, and painfulness of England is utterly driven away: in the stead thereof, men now-a-days receive womanliness, and become mice, not able to withstand a blast of wind or resist a poor fish. And children be so brought up, that if they be not all day by the fire with a toast and butter, and in their furs, they be straight sick.'

His advice on air and temperature seems reasonable even at the present day:—

'I will advise and counsel how to keep the same pure for so much as may be, or less infected, and correct the same corrupt. The first is done in taking away the cause of infection; the second by doing in all points the contrary thereto. Take away the causes, we may, in damming ditches, avoiding carions, letting in open air, shunning such evil mists as before I spake of, not opening or stirring evil breathing-places, landing muddy and rotten grounds, burying dead bodies, keeping canals clean, sinks, &c. sweet, removing dunghills, box and evil savouring things, inhabiting high and open places close towards the south, shut towards the wind, as reason will.'

THE PLAGUE AT NAPLES.

Ten years afterwards, the world was startled by a calamity which made itself the more terribly notorious, that instead of so many peasants or burghers, it swept off the troops of a potent prince. Though it happened in Italy, the annalists of other coun-

tries mention it more fully than they do epidemics occurring at their own doors, for it was little the practice of these rude contemporaneous historians to dwell on events in which the people merely were concerned, and calamities were greatly magnified in importance if they approached a court or an army. Francis I., with his allies, had conducted a brilliant and conquering campaign in Italy. Naples alone, with a feeble and sickly garrison, stood out. It was besieged by the victorious prince in May 1528, and the reason why he did not immediately subdue the garrison, appears to have been rather from a desire to protract the pleasures of war, than from any chance of the defence being successful. The king had 30,000 tried soldiers under his command; among these the plague suddenly broke forth, and it did its work so rapidly, that in three weeks this gallant army was reduced to a handful of attenuated wretches, scarcely able to bear the weight of their arms:—'Around and within the tents, vacated by the death of their inmates, noxious weeds sprung up. Thousands perished without help, either in a state of stupor, or in the raging delirium of fever. In the intrenchments, in the tents, and wherever death had overtaken his victims, their unburied corpses lay, and the dead that were interred, swollen with putridity, burst their shallow graves, and spread a poisonous stench far and wide over the camp. There was no longer any thought of order or military discipline, and many of the commanders and captains were either sick themselves, or had fled to the neighbouring towns in order to avoid the contagion.'*

THE GREAT PLAGUE OF LONDON.

To the inhabitants of this country the plague of 1665, commonly called the Great Plague, possesses more tragic interest than any of the other celebrated epidemics that have visited the world. When it reached London, it fell upon the largest population which this disease has ever attacked in the Christian world. It was its most dreadful, and it was its last visit to this country, for the fire by which it was followed laid low its strongholds in the metropolis; and however liable they may still unfortunately be to minor, but very destructive forms of epidemic, the other cities of the country have not again given harbour to this the most appalling form of pestilence. It was the last instance in which Western Europe was visited with the plague on a great scale, since in later times Marseilles, attacked in 1720, is the largest town in which there is a record of such ravages. It is peculiar too in other respects. Despite the vast and sudden mortality

* Hecker, p. 231.

in the midst of the dense population, the English character held its ground—the survivors did not lose heart or neglect their duty, and all was bravely done that human skill or devotion could suggest to combat with the enemy after it had taken up its position. It made its first appearance in the month of May, alarming the swarming city with rumours of one or two individuals having died with the fatal marks of the poison on their bodies. It subsided for a short time, or its gradual progress was overlooked, but again it made its unwelcome presence perceptible, and ere the month of June had passed, 590 victims were buried. In July they amounted to 4129, in August to 20,046, and in September to 26,230. There are different estimates of the entire number who died of this visitation, but the deaths in London in that year exceeded 100,000, and must have constituted a fifth part of the whole population. Multitudes fled from the doomed city, leaving its population so reduced, that the dead appear to have been about as numerous as the living. Anything more horrible than to have lived in a great city thus devastated cannot well be conceived, and it is difficult to say whether the bare statistics of the event, or the minute accounts we possess of some of its particulars, be the more harrowing. The reflection on the vast amount of misery that was included within the space of that doomed city yet suggests another and a more pleasing consideration, that the later history of our cities has shown man to be provided with arms fitted to maintain a slow but effective combat with such enemies, in so far that we may now safely dismiss from our minds the dread of seeing London, with its two millions of inhabitants, subject to a devastation which, if on the same proportional scale, would involve a mass of human misery by so much greater as the London of 1850 is larger than that of 1665.

It is the fortune of this visitation to have been chronicled by an historian unrivalled for the expressive truthfulness of his descriptions. The 'History of the Plague in London in 1665, by Daniel Defoe,' is usually included among that author's fictions. It is so far fictitious, certainly, that it professes to be the narrative of an eye-witness, while Defoe himself was but a child when the calamity took place; but there is no doubt that the incidents narrated by him are taken from pretty authentic accounts by those who witnessed them, and that the narrative is, on the whole, more faithful than the majority of histories. From this work it is now proposed to make a few remarkable extracts, which may be found both interesting and instructive.

We have this account of the state of the city when the attack had reached its climax:—

'Sometimes a man or woman dropt down dead in the very markets: for many people that had the plague upon them knew nothing of it till the inward gangrene had affected their vitals, and they died in a few moments; this caused that many died frequently in that manner in the street suddenly, without any warning; others, perhaps, had time to go to the next bulk or stall, or to any door or porch, and just sit down and die, as I have said before.

'These objects were so frequent in the streets, that when the plague came to be very raging on one side, there was scarce any passing by the streets, but that several dead bodies would be lying here and there upon the ground; on the other hand it is observable, that though at first the people would stop as they went along, and call to the neighbours to come out on such an occasion, yet afterward no notice was taken of them; but that, if at any time we found a corpse lying, go across the way, and not come near it; or if in a narrow lane or passage, go back again, and seek some other way to go on the business we were upon; and in those cases the corpse was always left, till the officers had notice to come and take them away, or till night, when the bearers attending the dead-cart would take them up and carry them away. Nor did those undaunted creatures, who performed these offices, fail to search their pockets, and sometimes strip off their clothes if they were well-dressed, as sometimes they were, and carry off what they could get.'

It does not appear to be inconsistent with this terrible picture that the greatest efforts were made by the city authorities of the day, who, running all risks, and undergoing all privations, kept the horrors of the epidemic as much out of sight as they could be kept.

'It was indeed one admirable piece of conduct in the said magistrates that the streets were kept constantly clear and free from all manner of frightful objects, dead bodies, or any such things as were indecent or unpleasant; unless where anybody fell down suddenly, or died in the streets, as I have said above, and these were generally covered with some cloth or blanket, or removed into the next churchyard till night. All the needful works that carried terror with them, that were both dismal and dangerous, were done in the night: if any diseased bodies were removed, or dead bodies buried, or infected clothes burnt, it was done in the night; and all the bodies which were thrown into the great pits in the several churchyards or burying-grounds, as has been observed, were so removed in the night; and everything was covered and closed before day; so that in the daytime there was not the least signal of the calamity to be seen or heard of, except what was to be observed from the emptiness of the streets, and sometimes from the passionate cries and lamentations of the people out at their windows, and from the numbers of houses and shops shut up.'

It may be questioned if, now that the danger from such contact

is believed to be far less, there will be opportunities of showing in times of pestilence a conduct so heroic as that of the municipal officers of London during the great plague—

'The magistrates wisely caused the people to be encouraged, made very good by-laws for the regulating the citizens, keeping good order in the streets, and making everything as eligible as possible to all sorts of people. In the first place, the lord mayor and the sheriffs, the court of aldermen, and a certain number of the common-councilmen, or their deputies, came to a resolution, and published it—namely, that they would not quit the city themselves, but that they would be always at hand for the preserving good order in every place, and for doing justice on all occasions; as also for the distributing the public charity to the poor; and, in a word, for the doing the duty and discharging the trust reposed in them by the citizens to the utmost of their power. In pursuance of these orders, the lord mayor, sheriffs, &c. held councils every day, more or less, for making such dispositions as they found needful for preserving the civil peace; and though they used the people with all possible gentleness and clemency, yet all manner of presumptuous rogues, such as thieves, housebreakers, plunderers of the dead or of the sick, were duly punished, and several declarations were continually published by the lord mayor and court of aldermen against such. Also, all constables and churchwardens were enjoined to stay in the city upon severe penalties, or to depute such able and sufficient housekeepers as the deputy-aldermen, or common-councilmen of the precinct should approve, and for whom they should give security; and also security in case of mortality, that they would forthwith constitute other constables in their stead. These things re-established the minds of the people very much; especially in the first of their fright, when they talked of making so universal a flight, that the city would have been in danger of being entirely deserted of its inhabitants, except the poor, and the country of being plundered and laid waste by the multitude. Nor were the magistrates deficient in performing their part as boldly as they promised it; for my lord mayor and the sheriffs were continually in the streets, and at places of the greatest danger; and though they did not care for having too great a resort of people crowding upon them, yet, in emergent cases, they never denied the people access to them, and heard with patience all their grievances and complaints; my lord had a low gallery built on purpose in his hall, where he stood, a little removed from the crowd, when any complaint came to be heard, that he might appear with as much safety as possible.'

As the old principle that the way to stop the plague is by keeping a barrier between the infected and the healthy was of course in full operation, a great part of Defoe's book is occupied with accounts of the hardships which were thus suffered. When a house became infected, it was closed like a prison, watchmen

were set at the door of it to prevent escape, and the passenger, as he passed by, shuddered when he looked up and saw the fatal mark of isolation on the door—a red cross about a foot long, with this sentence written over it, 'Lord have mercy upon us!' Many have been the stricken hearts, who returning perhaps from some brief absence to their once happy home, have seen on it this sign of dead or living burial. The system of isolation appears to have been pursued with a rigid obduracy, engendered in the belief that this merciless imprisonment of some was the only means of averting death to others.

Defoe says of the shut up houses—'The misery of those families is not to be expressed; and it was generally in such houses that we heard the most dismal shrieks and outcries of the poor people, terrified and even frightened to death by the sight of the condition of their dearest relations, and by the terror of being imprisoned as they were.'

He narrates some incidents in a manner which shows that, even while he believed the plague to be contagious, and every species of contact, even of the slightest kind, likely to communicate it, he yet thought this rigid exclusion productive of more harm than good—

'This shutting up of houses was at first counted a very cruel and unchristian method, and the poor people so confined made bitter lamentations; complaints of the severity of it were also daily brought to my lord mayor, of houses causelessly and some maliciously shut up; I cannot say, but upon inquiry many that complained so loudly were found in a condition to be continued; and others again, inspection being made upon the sick person, and the sickness not appearing infectious; or if uncertain, yet, on his being content to be carried to the pesthouse, was released.

'As I went along Houndsditch one morning about eight o'clock there was a great noise; it is true, indeed, there was not much crowd, because the people were not very free to gather together, or to stay long together when they were there, nor did I stay long there; but the outcry was loud enough to prompt my curiosity, and I called to one who looked out of a window, and asked what was the matter? A watchman, it seems, had been employed to keep his post at the door of a house which was infected, or said to be infected, and was shut up; he had been there all night, for two nights together, as he told his story, and the day-watchman had been there one day, and was now come to relieve him: all this while no noise had been heard in the house, no light had been seen, they called for nothing, sent him of no errands, which used to be the chief business of the watchmen, neither had they given him any disturbance, as he said, from Monday afternoon, when he heard a great crying and screaming in the house, which, as he supposed, was occasioned by some of the family dying just at that time. It seems the night before, the

dead-cart, as it was called, had been stopped there, and a servant-maid had been brought down to the door dead, and the buriers or bearers, as they were called, put her into the cart, wrapped only in a green rug, and carried her away.

'The watchman had knocked at the door, it seems, when he heard that noise and crying, as above, and nobody answered a great while, but at last one looked out, and said, with an angry quick tone, and yet a kind of crying voice, or a voice of one that was crying, "What dy'e want, that you make such a knocking?" He answered, "I am the watchman, how do you do? What is the matter?" The person answered, "What is that to you? Stop the dead-cart." This it seems was about one o'clock; soon after, as the fellow said, he stopped the dead-cart, and then knocked again, but nobody answered; he continued knocking, and the bellman called out several times, "Bring out your dead;" but nobody answered, till the man that drove the cart being called to other houses, would stay no longer, and drove away.

'The watchman knew not what to make of all this, so he let them alone till the morning-man, or day-watchman, as they called him, came to relieve him. Giving him an account of the particulars, they knocked at the door a great while, but nobody answered; and they observed that the window or casement, at which the person looked out who had answered before, continued open, being up two pair of stairs. Upon this the two men, to satisfy their curiosity, got a long ladder, and one of them went up to the window, and looked into the room, where he saw a woman lying dead upon the floor, in a dismal manner, having no clothes on her but her shift; but though he called aloud, and putting in his long staff, knocked hard on the floor, yet nobody stirred or answered, neither could he hear any noise in the house. He came down again upon this, and acquainted his fellow, who went up also, and finding it just so, they resolved to acquaint either the lord mayor, or some other magistrate of it, but did not offer to go in at the window. The magistrate, it seems, upon the information of the two men, ordered the house to be broke open, a constable and other persons being appointed to be present, that nothing might be plundered; and accordingly it was so done, when nobody was found in the house but that young woman, who, having been infected, and past recovery, the rest had left her to die by herself, and every one gone, having found some way to delude the watchman, and to get open the door, or get out at some back-door, or over the tops of the houses, so that he knew nothing of it; and as to those cries and shrieks which he heard, it was supposed they were the passionate cries of the family at this bitter parting, which, to be sure, it was to them all, this being the sister to the mistress of the family. The man of the house, his wife, several children and servants, being all gone and fled, whether sick or sound, that I could never learn, nor, indeed, did I make much inquiry after it.

'At another house, as I was informed, in the street next within Aldgate, a whole family was shut up and locked in because the maid-

servant was taken sick; the master of the house had complained by his friends to the next alderman, and to the lord mayor, and had consented to have the maid carried to the pesthouse, but was refused; so the door was marked with a red cross, a padlock on the outside, as above, and a watchman set to keep the door, according to public order. After the master of the house found there was no remedy, but that he, his wife, and his children were locked up with this poor distempered servant, he called to the watchman, and told him he must go then and fetch a nurse for them to attend this poor girl, for that it would be certain death to them all to oblige them to nurse her, and told him plainly that if he would not do this, the maid would perish either of the distemper, or be starved for want of food, for he was resolved none of his family should go near her, and she lay in the garret, four storey high, where she could not cry out, or call to anybody for help. The watchman consented to that, and went and fetched a nurse, as he was appointed, and brought her to them the same evening; during this interval the master of the house took his opportunity to break a large hole through his shop into a bulk or stall, where formerly a cobbler had sat before or under his shop window; but the tenant, as may be supposed, at such a dismal time as that, was dead or removed, and so he had the key in his own keeping; having made his way into this stall, which he could not have done if the man had been at the door, the noise he was obliged to make being such as would have alarmed the watchman; I say, having made his way into this stall, he sat still till the watchman returned with the nurse, and all the next day also; but the night following, having contrived to send the watchman of another trifling errand, which, as I take it, was to an apothecary's for a plaster for the maid, which he was to stay for the making-up, or some other such errand, that might secure his staying some time; in that time he conveyed himself and all his family out of the house, and left the nurse and the watchman to bury the poor wench—that is, throw her into the cart, and take care of the house.

'Not far from the same place they blowed up a watchman with gunpowder, and burnt the poor fellow dreadfully; and while he made hideous cries, and nobody would venture to come near to help him, the whole family that were able to stir got out at the windows, one storey high, two that were left sick calling out for help. Care was taken to give them nurses to look after them, but the persons fled were never found, till after the plague was abated they returned; but as nothing could be proved, so nothing could be done to them.

'In other cases some had gardens and walls, or pales between them and their neighbours; or yards and back-houses; and these, by friendship and intreaties, would get leave to get over those walls or pales, and so go out at their neighbours' doors; or by giving money to their servants, get them to let them through in the night; so that, in short, the shutting up of houses was in nowise to be depended upon, neither did it answer the end at all; serving more to make

the people desperate, and drive them to such extremities as that they would break out at all adventures.

'And that which was still worse, those that did thus break out spread the infection farther by their wandering about with the distemper upon them, in their desperate circumstances, than they would otherwise have done: for whoever considers all the particulars in such cases, must acknowledge, and cannot doubt but the severity of those confinements made many people desperate, and made them run out of their houses at all hazards, and with the plague visibly upon them, not knowing either whither to go, or what to do, or, indeed, what they did; and many that did so were driven to dreadful exigencies and extremities, and perished in the streets or fields for mere want, or dropped down by the raging violence of the fever upon them. Others wandered into the country, and went forward any way, as their desperation guided them, not knowing whither they went or would go, till, faint and tired, and not getting any relief, the houses and villages on the road refusing to admit them to lodge, whether infected or no, they have perished by the roadside, or gotten into barns, and died there, none daring to come to them, or relieve them, though perhaps not infected, for nobody would believe them.

'On the other hand, when the plague at first seized a family—that is to say, when any one body of the family had gone out, and unwarily or otherwise catched the distemper, and brought it home, it was certainly known by the family before it was known to the officers, who, as you will see by the order, were appointed to examine into the circumstances of all sick persons when they heard of their being sick. In this interval, between their being taken sick and the examiners coming, the master of the house had leisure and liberty to remove himself, or all his family, if he knew whither to go; and many did so. But the great disaster was, that many did thus after they were really infected themselves, and so carried the disease into the houses of those who were so hospitable as to receive them, which, it must be confessed, was very cruel and ungrateful.'

Having been required, according to his narrative, to act as an examiner of infected houses, and so provide for their shutting up—'I alleged,' he says, 'that I was against shutting up of houses at all; and that it would be very hard to oblige me to be an instrument in that which was against my judgment, and which I did verily believe would not answer the end it was intended for.' And he ever now and then presents an illustration of the horrors of this isolation. So—

'A house in Whitechapel was shut up for the sake of one infected maid, who had only spots, not the tokens, come out upon her, and recovered; these people obtained no liberty to stir, neither for air nor exercise, for forty days; want of breath, fear, anger, vexation, and all the other griefs attending such an injurious treatment, cast the

mistress of the family into a fever; and visitors came into the house and said it was the plague, though the physicians declared it was not; however, the family were obliged to begin their quarantine anew, on the report of the visitor or examiner, though their former quarantine wanted but a few days of being finished. This oppressed them so with anger and grief, and, as before, straitened them also so much as to room, and for want of breathing and free air, that most of the family fell sick, one of one distemper, one of another, chiefly scorbutic ailments, only one a violent cholic, until after several prolongations of their confinement, some or other of those that came in with the visitors to inspect the persons that were ill, in hopes of releasing them, brought the distemper along with them, and infected the whole house, and all or most of them died, not of the plague as really upon them before, but of the plague that those people brought them, who should have been careful to have protected them from it; and this was a thing which frequently happened, and was indeed one of the worst consequences of shutting houses up.

'Another infected person came and knocked at the door of a citizen's house, where they knew him very well; the servant let him in, and being told the master of the house was above, he ran up, and came into the room to them as the whole family were at supper. They began to rise up a little surprised, not knowing what the matter was; but he bid them sit still, he only came to take his leave of them. They asked him, "Why, Mr ——, where are you going?" "Going," says he, "I have got the sickness, and shall die to-morrow night." It is easy to believe, though not to describe, the consternation they were all in: the women and the man's daughters, who were but little girls, were frightened almost to death, and got up, all running out, one at one door and one at another, some down stairs and some up stairs, and getting together as well as they could, locked themselves into their chambers, and screamed out at the window for help, as if they had been frighted out of their wits. The master, more composed than they, though both frighted and provoked, was going to lay hands on him, and throw him down stairs, being in a passion; but then considering a little the condition of the man, and the danger of touching him, horror seized his mind, and he stood still like one astonished. The poor distempered man, all this while being as well diseased in his brain as in his body, stood still like one amazed; at length he turns round, "Ay!" says he, with all the seeming calmness imaginable, "is it so with you all? Are you all disturbed at me? Why, then, I'll e'en go home and die there." And so he goes immediately down stairs. The servant that had let him in goes down after him with a candle, but was afraid to go past him and open the door, so he stood on the stairs to see what he would do; the man went and opened the door, and went out and flung the door after him. It was some while before the family recovered their fright; but as no ill consequence attended, they have had occasion since to speak of it, you may be sure, with great satisfaction; though the man was gone some time, nay, as I heard, some days, before they re-

covered themselves from the hurry they were in: nor did they go up and down the house with any assurance till they had burnt a great variety of fumes and perfumes in all the rooms, and made a great many smokes of pitch, of gunpowder, and of sulphur; all separately shifted, and washed their clothes, and the like. As to the poor man, whether he lived or died I do not remember.'

The intense dread which people felt of anything having the nature of actual contact with that which had been touched by the diseased, while the pestilence was in the air they breathed, is shown in the following incident:—

'It pleased God that I was still spared, and very hearty and sound in health, but very impatient of being pent up within doors without air, as I had been for fourteen days or thereabouts; and I could not restrain myself, but I would go and carry a letter for my brother to the post-house; then it was indeed that I observed a profound silence in the streets. When I came to the post-house, as I went to put in my letter, I saw a man stand in one corner of the yard, and talking to another at a window, and a third had opened a door belonging to the office. In the middle of the yard lay a small leathern purse, with two keys hanging at it, with money in it, but nobody would meddle with it. I asked how long it had lain there; the man at the window said it had lain almost an hour, but they had not meddled with it, because they did not know but the person who dropt it might come back to look for it. I had no such need of money, nor was the sum so big, that I had any inclination to meddle with it, or to get the money at the hazard it might be attended with; so I seemed to go away, when the man who had opened the door said he would take it up; but so, that if the right owner came for it he should be sure to have it. So he went in and fetched a pail of water, and set it down hard by the purse, then went again and fetched some gunpowder, and cast a good deal of powder upon the purse, and then made a train from that which he had thrown loose upon the purse—the train reached about two yards; after this he goes in a third time, and fetches out a pair of tongs red-hot, and which he had prepared, I suppose, on purpose; and first setting fire to the train of powder, that singed the purse, and also smoked the air sufficiently. But he was not content with that, but he then takes up the purse with the tongs, holding it so long till the tongs burnt through the purse, and then he shook the money out into the pail of water, so he carried it in. The money, as I remember, was about thirteen shillings, and some smooth groats and brass farthings.'

If we look at this question of isolation as one of mere practicability in a large city—if we suppose, for instance, on the one hand, that touch will pass the disease like the electric fluid; and on the other hand, that by preventing touch we can stop its progress, just as by the intervention of non-conductors we appear to stop a current of electric fluid—a little consideration would show

that if this be possible, as between two distant cities, say Constantinople and London, it is not possible as to the inhabitants of a crowded city. Food, raiment, money, animals, incidental personal contact, everything would combine to break the cordon. With the number of people attacked the chances would increase in geometrical progression. If they were as one only when one had the plague, they would be as ten times ten when ten had it, as a hundred times a hundred when there were a hundred victims. Though the non-conductor interrupt the apparent passage of the fluid caused by the restoration of the balance between positive and negative, yet not the less is all nature full of electricity. So, according to the views which modern inquiry has suggested when the epidemic has taken up its abode, it is not in special contact—in a circle of conductors that it is led about touching this and that as it passes—the whole atmosphere is full of it more or less. Where there is dense population, filth, misery, and previous attenuation from want or disease, there the impregnation is strongest: where there is free space, wealth, and health, there it is weakest and gentlest. But even holding the contact-principle to be the truth, the statements of Defoe show, as might have been anticipated on a reasonable general consideration of the matter, that the isolation system is impracticable; and thus he, too, promulgates that doctrine of humanity of which gregarious calamities are the great teachers—that it is not in isolation or exclusion, but in sympathy, and the making common cause against the common enemy, that safety is to be found. In the following passages there will be found a suggestion, which, in the late cholera visitations, has been extensively acted upon with the best effect—the removal of the inhabitants from the seats in which the disease has specially fastened itself. In the midst of disputes as to contagion and infection, and all the special methods by which the disease can be conveyed, it is universally admitted that the houses where plague or cholera actually exists are the houses in which the next victims are most likely to be found, and that the safety of all is concerned in their removal. Referring to his office of searcher he says:—

'In the execution of this office I could not refrain speaking my opinion among my neighbours, as to this shutting up the people in their houses; in which we saw most evidently the severities that were used, though grievous in themselves, had also this particular objection against them—namely, that they did not answer the end, as I have said, but that the distempered people went, day by day, about the streets; and it was our united opinion that a method to have removed the sound from the sick, in case of a particular house being visited, would have been much more reasonable, on many accounts, leaving nobody with the sick persons, but such as should, on such occasions,

request to stay, and declare themselves content to be shut up with them. Our scheme for removing those that were sound from those that were sick was only in such houses as were infected, and confining the sick was no confinement; those that could not stir would not complain while they were in their senses, and while they had the power of judging. Indeed when they came to be delirious and light-headed, then they would cry out of the cruelty of being confined; but for the removal of those that were well, we thought it highly reasonable and just, for their own sakes, they should be removed from the sick, and that, for other people's safety, they should keep retired for a while, to see that they were sound, and might not infect others; and we thought twenty or thirty days enough for this.

'Now certainly if houses had been provided on purpose for those that were sound, to perform this demi-quarantine in, they would have much less reason to think themselves injured in such a restraint, than in being confined with infected people in the houses where they lived.

'It is here, however, to be observed, that after the funerals became so many, that people could not toll the bell, mourn, or weep, or wear black for one another, as they did before, no, nor so much as make coffins for those that died, so, after a while, the fury of the infection appeared to be so increased, that, in short, they shut up no houses at all; it seemed enough that all the remedies of that kind had been used till they were found fruitless, and that the plague spread itself with an irresistible fury, so that as the fire the succeeding year spread itself and burnt with such violence, that the citizens in despair gave over their endeavours to extinguish it, so in the plague it came at last with such violence, that the people sat still looking at one another, and seemed quite abandoned to despair. Whole streets seemed to be desolated, and not to be shut up only, but to be emptied of their inhabitants; doors were left open, windows stood shattering with the wind in empty houses, for want of people to shut them; in a word, people began to give up themselves to their fears, and so think that all regulations and methods were in vain, and that there was nothing to be hoped for but a universal desolation; and it was even in the height of this general despair that it pleased God to stay his hand, and to slacken the fury of the contagion, in such a manner as was even surprising, like its beginning, and demonstrated it to be his own particular hand; and that above, if not without, the agency of means, as I shall take notice of in its proper place.

'Many houses were then left desolate, all the people being carried away dead, and especially in an alley further on the same side beyond the bars, going in at the sign of Moses and Aaron. There were several houses together, which they said had not one person left alive in them; and some that died last in several of those houses were left a little too long before they were fetched out to be buried; the reason of which was not, as some have written, very untruly, that the living were not sufficient to bury the dead, but that the mortality

was so great in the yard or alley, that there was nobody left to give notice to the buriers or sextons that there were any dead bodies there to be buried. It was said, how true I know not, that some of those bodies were so corrupted and so rotten, that it was with difficulty they were carried; and as the carts could not come any nearer than to the alley gate in the High Street, it was so much the more difficult to bring them along; but I am not certain how many bodies were then left; I am sure that ordinarily it was not so.'

Although a believer in the view that mere contact carried the plague from one living being to another as is carried electricity, yet Defoe states facts which show that those who lived in the pure wholesome air of the country could encounter this contact without suffering, and could come to the plague-stricken city and return in safety:—

'But now the fury of the distemper increased to such a degree, that even the markets were but very thinly furnished with provisions, or frequented with buyers, compared to what they were before; and the lord mayor caused the country-people who brought provisions to be stopped in the streets leading into the town, and to sit down there with their goods, where they sold what they brought, and went immediately away; and this encouraged the country people greatly to do so, for they sold their provisions at the very entrances into the town, and even in the fields; as, particularly, in the fields beyond Whitechapel in Spittalfields. Note, those streets now called Spittalfields were then indeed open fields; also, in St George's-fields, in Southwark, in Bunhill-fields, and in a great field called Wood's Close, near Islington; thither the lord mayor, aldermen, and magistrates sent their officers and servants to buy for their families, themselves keeping within doors as much as possible, and the like did many other people; and after this method was taken, the country people came with great cheerfulness, and brought provisions of all sorts, *and very seldom got any harm;* which I suppose added also to that report of their being miraculously preserved.'

As it was through mere contact with infected individuals, and not by the general sanitary condition of the city, that the plague was supposed to be propagated, it became a very puzzling matter to account for persons being attacked who felt the most thorough practical assurance that they had not come in contact with any one bearing on his person the marks of the disease, or with any article which such a person had touched. To account for this, it was necessary to have recourse to the following views:—

'Here also I ought to leave a further remark for the use of posterity, concerning the manner of people's infecting one another; namely, that it was not the sick people only from whom the plague was immediately received by others that were sound, but the well. To explain myself: by the sick people I mean those that were

known to be sick, had taken their beds, had been under cure, or had swellings or tumours upon them, and the like; these everybody could beware of—they were either in their beds, or in such condition as could not be concealed. By the well I mean such as had received the contagion, and had it really upon them, and in their blood, yet did not show the consequences of it in their countenances; nay, even were not sensible of it themselves, as many were not for several days. These breathed death in every place, and upon everybody who came near them; nay, their very clothes retained the infection, their hands would infect the things they touched, especially if they were warm and sweaty, and they were generally apt to sweat too. * * * *

'It is true hundreds, yea thousands of families fled away at this last plague; but then of them many fled too late, and not only died in their flight, but carried the distemper with them into the countries where they went, and infected those whom they went among for safety; which confounded the thing, and made that be a propagation of the distemper which was the best means to prevent it; and this, too, is evident of it, and brings me back to what I only hinted at before, but must speak more fully to here—namely, that men went about apparently well many days after they had the taint of the disease in their vitals, and after their spirits were so seized as that they could never escape it; and that all the while they did so they were dangerous to others: I say this proves that so it was; for such people infected the very towns they went through, as well as the families they went among. And it was by that means that almost all the great towns in England had the distemper among them more or less; and always they would tell you such a Londoner or such a Londoner brought it down.

'It must not be omitted, that when I speak of those people who were really thus dangerous, I suppose them to be utterly ignorant of their own condition; for if they really knew their circumstances to be such as indeed they were, they must have been a kind of wilful murderers if they would have gone abroad among healthy people; and it would have verified the suggestion which I mentioned above, and which I thought untrue—namely, that the infected people were utterly careless as to giving the infection to others, and rather forward to do it than not; and I believe it was partly from this very thing that they raised that suggestion, which I hope was not really true in fact. * * * *

'This infecting and being infected, without so much as its being known to either person, is evident from two sorts of cases which frequently happened at that time: and there is hardly anybody living, who was in London during the infection, but must have known several of the cases of both sorts:—1. Fathers and mothers have gone about as if they had been well, and have believed themselves to be so, till they have insensibly infected and been the destruction of their whole families; which they would have been far from doing if they had had the least apprehensions of their being dangerous

themselves. A family, whose story I have heard, was thus infected by the father, and the distemper began to appear upon some of them even before he found it upon himself; but searching more narrowly, it appeared he had been affected some time, and as soon as he found that his family had been poisoned by himself, he went distracted, and would have laid violent hands upon himself, but was kept from that by those who looked to him, and in a few days died. 2. The other particular is, that many people having been well to the best of their own judgment, or by the best observation which they could make of themselves for several days, and only finding a decay of appetite, or a light sickness upon their stomach, nay, some whose appetite has been strong, and even craving, and only a light pain in their heads, have sent for physicians to know what ailed them, and have been found, to their great surprise, at the brink of death, the tokens upon them, or the plague grown up to an incurable height.

'It was very sad to reflect how such a person as this last mentioned above had been a walking destroyer, perhaps for a week or fortnight before that; how he had ruined those that he would have hazarded his life to save; and had been breathing death upon them, even perhaps in his tender kissing and embracings of his own children. Yet thus certainly it was, and often has been, and I could give many particular cases where it has been so. If, then, the blow is thus insensibly striking—if the arrow flies thus unseen, and cannot be discovered—to what purpose are all the schemes for shutting up or removing the sick people? Those schemes cannot take place but upon those that appear to be sick, or to be infected; whereas there are among them at the same time thousands of people who seem to be well, but are all that while carrying death with them into all companies which they come into. This frequently puzzled our physicians, and especially the apothecaries and surgeons, who knew not how to discover the sick from the sound. They all allowed that it was really so; that many people had the plague in their very blood, and preying upon their spirits, and were in themselves but walking putrefied carcases, whose breath was infectious, and their sweat poison, and yet were as well to look on as other people, and even knew it not themselves; I say they all allowed that it was really true in fact, but they knew not how to propose a discovery.

'My friend Dr Heath was of opinion that it might be known by the smell of their breath; but then, as he said, who durst smell to that breath for his information? since to know it, he must draw the stench of the plague up into his own brain, in order to distinguish the smell! I have heard it was the opinion of others that it might be distinguished by the party's breathing upon a piece of glass, where, the breath condensing, there might living creatures be seen, by a microscope, of strange, monstrous, and frightful shapes, such as dragons, snakes, serpents, and devils, horrible to behold. But this I very much question the truth of; and we had no microscopes

at that time, as I remember, to make the experiment with. It was the opinion also of another learned man that the breath of such a person would poison and instantly kill a small bird; not only a small bird, but even a cock or hen; and that, if it did not immediately kill the latter, it would cause them to be roupy, as they call it; particularly that, if they had laid any eggs at that time, they would be all rotten. But those are opinions which I never found supported by any experiments, or heard of others that had seen it, so I leave them as I find them, only with this remark—namely, that I think the probabilities are very strong for them. Some have proposed that such persons should breathe hard upon warm water, and that they would leave an unusual scum upon it, or upon several other things, especially such as are of a glutinous substance, and are apt to receive a scum, and support it. But, from the whole, I found that the nature of this contagion was such that it was impossible to discover it at all, or to prevent it spreading from one to another by any human skill.

'Great were the confusions at that time upon this very account; and when people began to be convinced that the infection was received in this surprising manner from persons apparently well, they began to be exceeding shy and jealous of every one that came near them. Once, in a public day, whether a Sabbath-day or not, I do not remember, in Aldgate church, in a pew full of people, on a sudden one fancied she smelt an ill smell; immediately she fancies the plague was in the pew, whispers her notion or suspicion to the next, then rises and goes out of the pew; it immediately took with the next, and so with them all, and every one of them and of the two adjoining pews got up and went out of the church, nobody knowing what it was offended them, or from whom. This immediately filled everybody's mouth with one preparation or other, such as the old women directed, and some perhaps as physicians directed, in order to prevent infection by the breath of others; insomuch that if we came to go into a church when it was anything full of people, there would be such a mixture of smells at the entrance, that it was much more strong, though perhaps not so wholesome, than if you were going into an apothecary's or druggist's shop. In a word, the whole church was like a smelling bottle: in one corner it was all perfumes, in another aromatics, balsamics, and a variety of drugs and herbs; in another salts and spirits, as every one was furnished for their own preservation.'

Defoe's narrative bears unconscious testimony to the truth in political economy now becoming recognised—that, let us speak as we will of a surplus population, the people among whom disease is making its ravages is not so well off as that which is preserving its numbers to old age. This account of the idleness of the people, their dread of the free contact necessary to conduct trade and business, and the cordon round infected houses, naturally prepares his reader to believe that there must have been

much poverty among the thinned inhabitants of London in the year 1665, and that the plunder, extensively carried on as it was, cannot have made up, even to those who practised it, for the sudden stagnation of trade and stoppage of the natural sources of profitable occupation. So we find that, great as was the terror of the plague, the terror of starvation drove people to the performance of what were considered the most dangerous functions:—

'But the magistrates cannot be enough commended in this, that they kept such good order for the burying of the dead, that as fast as any of those they employed to carry off and bury the dead fell sick or died, as was many times the case, they immediately supplied the places with others, which, by reason of the great number of poor that was left out of business, as above, was not hard to do. This occasioned that, notwithstanding the infinite number of people which died, and were sick, almost all together, yet they were always cleared away, and carried off every night; so that it was never to be said of London that the living were not able to bury the dead.

'It was impossible to beat anything into the heads of the poor. They went on with the usual impetuosity of their tempers, full of outcries and lamentation when taken, but madly careless of themselves, foolhardy and obstinate, while they were well. Where they could get employment, they pushed into any kind of business, the most dangerous and the most liable to infection; and if they were spoken to, their answer would be, "I must trust to God for that; if I am taken, then I am provided for, and there is an end of me;" and the like. Or thus, "Why, what must I do? I cannot starve, I had as good have the plague as perish for want; I have no work; what could I do? I must do this or beg." Suppose it was burying the dead, or attending the sick, or watching infected houses, which were all terrible hazards; but their tale was generally the same. It is true necessity was a very justifiable, warrantable plea, and nothing could be better; but their way of talk was much the same where the necessities were not the same. This adventurous conduct of the poor was that which brought the plague among them in a most furious manner; and this, joined to the distress of their circumstances when taken, was the reason why they died so by heaps; for I cannot say I could observe one jot of better husbandry among them, I mean the labouring poor, while they were all well, and getting money, than there was before, but as lavish, as extravagant, and as thoughtless for to-morrow as ever; so that when they came to be taken sick, they were immediately in the utmost distress, as well for want as for sickness, as well for lack of food as lack of health.'

As fools rush in where angels fear to tread, the sweeping epidemic which astounds and almost paralyses the learned and experienced physician rouses the quack to greater confidence and insolence. He, with his infallible composition of ignorance and impudence, is as regular a phenomenon of such times as death

itself. Defoe did not fail to lash this vile class; and his exposure is far from being an exaggeration, or in anyway beyond the limits of nature:—

'It was incredible, and scarce to be imagined, how the posts of houses and corners of streets were plastered over with doctors' bills, and papers of ignorant fellows quacking and tampering in physic, and inviting people to come to them for remedies, which was generally set off with such flourishes as these—namely, "Infallible Preventative Pills against the Plague;" "Never-failing Preservatives against the Infection;" "Sovereign Cordials against the Corruption of Air;" "Exact Regulations for the Conduct of the Body in case of Infection;" "Antipestilential Pills;" "Incomparable Drink against the Plague, never found out before;" "A Universal Remedy for the Plague;" "The only True Plague Water;" "The Royal Antidote against all kinds of Infection;" and such a number more that I cannot reckon up, and if I could, would fill a book of themselves to set them down. Others set up bills to summon people to their lodgings for direction and advice in the case of infection; these had specious titles also, such as these:—

"An eminent High-Dutch physician, newly come over from Holland, where he resided during all the time of the great plague last year in Amsterdam, and cured multitudes of people that actually had the plague upon them." "An Italian gentlewoman just arrived from Naples, having a choice secret to prevent infection, which she found out by her great experience, and did wonderful cures with it in the late plague there, wherein there died 20,000 in one day." "An ancient gentlewoman having practised with great success in the late plague in this city, anno 1636, gives her advice only to the female sex. To be spoken with, &c." "An experienced physician, who has long studied the doctrine of antidotes against all sorts of poison and infection, has, after forty years' practice, arrived at such skill as may, with God's blessing, direct persons how to prevent being touched by any contagious distemper whatsoever. He directs the poor gratis."

'I take notice of these by way of specimen: I could give you two or three dozen of the like, and yet have abundance left behind. It is sufficient from these to apprise any one of the humour of those times, and how a set of thieves and pickpockets not only robbed and cheated the poor people of their money, but poisoned their bodies with odious and fatal preparations—some with mercury, and some with other things as bad, perfectly remote from the thing pretended to, and rather hurtful than serviceable to the body in case an infection followed. I cannot omit a subtlety of one of those quack operators with which he gulled the poor people to crowd about him, but did nothing for them without money. He had, it seems, added to his bills, which he gave out in the streets, this advertisement in capital letters—namely, "He gives Advice to the Poor for Nothing." Abundance of people came to him accordingly, to whom he made a

great many fine speeches, examined them of the state of their health, and of the constitution of their bodies, and told them many good things to do which were of no great moment; but the issue and conclusion of all was, that he had a preparation which, if they took such a quantity of every morning, he would pawn his life that they should never have the plague; no, though they lived in the house with people that were infected. This made the people all resolve to have it; but then the price of that was so much—I think it was half-a-crown. "But, sir," says one poor woman, "I am a poor almswoman, and am kept by the parish, and your bills say you give the poor your help for nothing." "Ay, good woman," says the doctor, "so I do—as I published there, I give my advice, but not my physic!" "Alas, sir," says she, "that is a snare laid for the poor then, for you give them your advice for nothing; that is to say, you advise them gratis to buy your physic for their money—so does every shopkeeper with his wares." Here the woman began to give him ill words, and stood at his door all that day telling her tale to all the people that came, till the doctor, finding she turned away his customers, was obliged to call her up stairs again and give her his box of physic for nothing, which perhaps, too, was good for nothing when she had it.

'But to return to the people, whose confusions fitted them to be imposed upon by all sorts of pretenders and by every mountebank. There is no doubt but these quacking sort of fellows raised great gains out of the miserable people, for we daily found the crowds that ran after them were infinitely greater, and their doors were more thronged, than those of Dr Brooks, Dr Upton, Dr Hodges, Dr Berwick, or any, though the most famous men of the time; and I was told that some of them got £5 a day by their physic.'

Such was the last visit of the plague in its great Oriental shape to our shores. It continued for many years afterwards to visit other parts of western Europe, to which it has now fortunately been for a century a stranger.

THE PLAGUE AT MARSEILLES.

In 1725 the Oriental plague appeared in this city with all the horrors of the pestilences of the middle ages. Its progress is thus briefly but emphatically described by a contemporary professional man:—

'The 25th of August the plague laid hold of all the four parts of the city, and continued to the end of September, during which time there died more than 1000 a day. About the 28th the plague increased insomuch that 2000 died in a day; the public markets all along the quays of the port, the play-house, and all the public places, were filled with piles of dead bodies: there were also not less than 10,000 dead dogs floating in the harbour, so that the regulator of the fishermen was ordered to draw them so far without the chain, that

the current of the water might not bring them in again. Probably these animals died partly by the famine, and partly by the disease, or by eating the flesh of the dead as they lay rotting in the streets. On the 31st of August the several hospitals, convents, and houses that were employed for receiving the sick were not sufficient to receive them. The plague also followed the deserters with great precipitation, despair, and confusion, spreading everywhere, insomuch that on the 1st of September a hundred slaves were granted to the sheriffs to bury the dead, the quantity being so great, that eleven carts were employed daily to carry them off.

'Every day 12,000 were by this method removed from the streets and public places; but notwithstanding this expeditious method, some, for want of further assistance, remained so long in their houses after they were dead, that their bodies rotted to so great a degree, that they could not be removed but by piecemeal. Amongst those that died were 5000 belonging to the Town-House—namely, thirty of the bandalier guards, all the guards of the civil government, all the guards of the city except one, all the lieutenants except two, almost all the captain-lieutenants, the guards of the privilege, *du Vin*, being five brigades; the sergeants of the watch, 350 of the company of guards, and all the valets of the city belonging to the magistrates. Amongst the divines who attended the sick the following received the contagion in performing their duties to the afflicted, and died—namely, forty-two Capuchins, twenty-one Jesuits, thirty-two Observatins, twenty-nine Franciscans, ten barefooted Carmelites, twenty-two Reformed Augustins, and every one of the Great Carmelites, the Great Trinitarians, the Reformed Trinitarians, the religious of Loretto, of Morey; likewise the Dominicans,* and the Great Augustins, although they had remained in their convents; besides a great number of secular priests, the vicar of the chapters and parishes; also most of Bishop Boromer's domestics, and the Sieur Bourgezal, canon of the Great Church, all perished. The hundred galley slaves which were lent to bury the dead all died, or were dying, in six days, for want of whose help there were lying in the streets on the 6th of September 2000 dead bodies, besides a number in the houses; therefore the magistrates petitioned the captains of the galleys for a hundred more slaves, forty soldiers, four corporals, and four boatswains, which were now granted them.

'On the esplanade called the Turret, which lies on the seaside between the houses and the rampart, all along St John's Fort to the Great Church, there were found upwards of a thousand more dead, the freshest of whom had lain near three weeks; for their bodies scarcely retained the least appearance of the human form; and the vapours which proceeded from them were offensive beyond expression, their limbs being full of worms and maggots, their bowels were burst out of their bellies, and limbs rotten and fallen asunder, so that it was

* 'These friars shut themselves close to prevent a contact, notwithstanding which, they were afflicted with the disease; but, please to observe, it could not be by contagion, but by infection, and that too from the air.'

impossible to remove them far off; therefore the two bastions of the rampart De la Tourette were broken, and the bodies thrown in them. A hundred more slaves were granted for this work. In short, the plague became so rife throughout the whole city and suburbs, that neither the new hospitals, with the additional plague-houses, were sufficient to receive the sick, nor the many large ditches opened in many places, though forty-four yards long and sixteen broad, were capable of holding the dead. The inhabitants were so weakened by fatigue, that they could scarce move; the several bodies of slaves granted from the galleys and the peasants were all destroyed; so that they had now none able to fetch in the corn granted by other provinces. All the apothecaries, druggists, and grocers were either dead or run away, and no medicines were to be found in the city. The notaries were gone off, so there was therefore nobody to make the wills of the sick. The women were brought to bed without any to assist them; those who were yet alive thought of nothing but death, famine, or despair, for all the sources of charity were stopped. Heaven seemed to them (according to the Scripture expression) as brass, and the earth as iron; every street was almost barricaded up with wearing apparel, household goods thrown out of the houses, dead bodies, and dying people gasping for breath; insomuch that there was no passing from one street to another. The confusion was so great, that neither officers, surgeons, nor servants could be persuaded to come into the city without an exorbitant price. Two thousand livres a month were offered to every master surgeon, 1000 to surgeons of villages, and to all apprentices and journeymen 300 livres a month, with their freedom of the city, lodgings, and provisions. This havoc and consternation lasted till the 7th of October, when it abated in the city, but still raged in its territories. However, two new hospitals being finished, the sick that were found in the streets and public places were removed, after which they set about cleansing the streets, and removing the rubbish, ordure, and filth. Of this there was so much to be done, that it took up a month's time, notwithstanding dung-carts were provided in great plenty, which carried the filth down to large barges, to be conveyed out of the port, and thrown into the sea. About the 20th the disease was so much abated, that the bell was tolled, and tattoo beat, which had not been done before; and now they looked after those who had robbed the houses and pillaged the sick, and gave orders to prevent robberies for the future.'*

THE ORIENTAL PLAGUE.

Repeatedly during the later years of the eighteenth century, although France, Germany, and Italy were exempt from its ravages, the Oriental Plague, as it is termed, revisited Constantinople, Russia, and Poland. It has uniformly, though gradually,

* Ingram on the Plague, pp. 9–14.

fallen back before the advance of civilisation; and while it still continues to ravage many distant and barbarous regions, the nearest place to the centre of European civilisation which it regularly frequents is Egypt, where it flourishes by the aid of the putrid emanations from the lakes left by the retiring waters of the swollen Nile, and the filthy barbarity of the wretched inhabitants.*

Volney was a witness of one of the plagues of Egypt—that of 1783.† He described the state of the country in a manner which all sanitary knowledge would point out as best suited to receive such a visitation with devastating effect. The people were crowded in close, little, damp dens, thick with the odours of their own impurities and those of the heated marshes. Their food was scanty and unwholesome, cooked on fires of dried manure. Ignorance, despotism, and poverty, combined to make them in every respect a degraded people. One good custom the practice of better-conditioned Oriental nations had communicated to them—this was the burial of their dead outside their towns. It was thus that, when the pestilence raged, the philosophic traveller could count the removal of 1500 corpses out of Cairo in a day. The attack was accompanied by a famine, from a deficient inundation of the Nile, and the European was shocked as he passed through the streets by the dead lying here and there, and the living, who had scarcely life enough to be distinguished from the dead, imploring the passer-by for relief.

THE CHOLERA.

For some years past the actual presence of another epidemic has neutralised our interest in the Oriental plague, which has been retreating and almost disappearing in the distant part of the world, while this new disease, less appalling perhaps, but still formidable in the extent of its depredations, has of new issued from the great workshop of epidemics, and travelled over civilised Europe. As the cholera made its first known appearance in territories subject to the sway of the British sceptre, it might have commanded the attention of the public from its first appearance; but it never occurred to the cloth-clad Englishman, sitting by his coal fire, that the disease which mowed down the swarthy children of the Ganges was a matter in which he should ever feel a personal interest, until its steady and uninterrupted march northwards aroused him from his apathy.

* See farther on the susceptibilities of barbarous hot countries to the Plague, Part III.

† Voyage en Syrie et en Egypte, i. 175.

The cholera has now become an object of so much personal interest and importance in this country, that it might seem useless to give any history of what all know so well. Its existence was first noticed near the mouth of the Ganges about the month of June 1817. By the end of 1819 it had crossed the Indian peninsula, not appearing in every town and village, but, according to one of its mysterious laws, which some day may be discovered, following a capricious-looking line of march, sometimes straight on, sometimes zig-zag, as a bar of iron may be seen to follow the movements of a magnet dragged before it. Before the year 1822 it had reached Arabia, Persia, and Syria, and closely threatened the frontiers of Europe. It took so long to travel through the gigantic territories of the czar, that while it appeared at their Asiatic extremity in 1823, it did not reach Moscow till 1830. In the following year it was at Warsaw, and served to increase the general interest of Europe in the struggle for Polish independence, then conducted under other depressing circumstances. Towards the end of 1831 it had made a lodgment in Sunderland, and 1832 is too well remembered as the great cholera year, to render it necessary to describe the progress of the disease. In this island its chief ravages were in Scotland, where, from causes elsewhere stated, the sanitary condition of the people is beneath its level in England. Both in its first and second visitation the disease attacked the town of Dumfries with peculiar bitterness. Of the precautionary measures by which the second attack was mitigated, an account will be found in another chapter. In the meantime, it may be interesting to peruse a history from a local authority of the ravages in Dumfries in 1832. It marks the utmost severity which the disease then reached in this country, and certainly does, in the desolating progress it describes, remind one of some of the accounts of the old plague as it visited our towns in the seventeenth century:—

'The first case occurred on the 15th of September, and terminated in a few hours. Two other similar cases occurred next day, although no personal communication had taken place with the individual first attacked. In the course of the ensuing week several others were seized, but still the inhabitants flattered themselves that the visitation would prove slight. On Sunday the 23d, however, the malady broke out so generally in the already infected districts of the town, and in the neighbouring burgh of Maxweltown, on the opposite bank of the river, as to convince the most sanguine that his hopes were ill-founded. From that day the disorder spread with increasing rapidity, attacking and carrying off not only the intemperate and the needy, but ultimately many of those whose regular habits and comfortable circumstances rendered them apparently less liable to be affected. From the limited nature of society in a provincial town

such as Dumfries, the danger appearing to be in the very midst of it, the alarm of the inhabitants was great.

'A cholera hospital had been provided, and the accommodations were scarcely finished, when its appliances and means were put in requisition, under the able and efficient superintendence of Dr Grieve and Mr Charles Bell. The patients were conveyed thither in palanquins and litters borne on men's shoulders. The hospital was crowded, but was not large enough to hold one-eighth part of the sick; and during the few dreadful days in which the disease raged with such uncontrollable fury, our own medical practitioners, although very numerous, were not sufficient for the emergency, so that the Board of Health was forced to call in assistance from Edinburgh and elsewhere. Almost every one of the medical men suffered more or less, either from the effects of extreme bodily and mental exertion, exhaustion, or from the attacks of the disease itself. Three of them, indeed, were cut off in their usefulness, two belonging to this town (much and deeply regretted); and the third, one of those who had been called from a distance. The disease now prevailed in almost every part of the town, but raged with the greatest severity in English Street, King Street, Queensberry Street, and the closes leading from the High Street. The practitioner, as he went his rounds, was often beset by several poor distracted creatures at once, eagerly seizing him by the clothes, and each imploring a preference in behalf of some suffering relative. Trade of every description was at a stand; and few shops remained open except those of apothecaries, and of some bakers and grocers—other men of business having for the most part retired from the scene of danger. Partly from this cause, and partly from the want of a sufficient number of hands to prepare the materials, many who had lost their nearest relations were obliged to dispense with the wearing of mourning. As no inhabitant of the country would willingly brave the influence of the tainted air, the market-day was undistinguished from the other days of the week, over all of which a more than Sabbatical stillness seemed to reign. Many families fled with the utmost precipitation to the country, and the houses in the streets occupied by the higher ranks were with few exceptions shut up. Flight, however, did not always insure safety. Many perished by the way, or on reaching their destination, far from medical aid and the comforts of home. The gentlemen of the faculty, worn out by incessant toil, were forced to ride even the shortest distances, and theirs were the only vehicles to be seen on the streets, with the exception of hearses, which, without the usual formality of a funeral, hurried the dead to the "ever-yawning and never-satisfied grave."

'As we have just hinted, the deceased, while the pestilence was at its height, were for the most part followed to the place of interment by none but their immediate relations, and were often conveyed thither without even a single attendant save the driver of the hearse. When, however, a funeral procession was to be formed, the mourners,

instead of entering the house of the deceased, were in the habit of assembling in the middle of the street, a few hours after the death was known to have taken place, and of proceeding to the churchyard in front of the hearse, or on the weatherside of it. Such families as possessed burying-grounds of their own made use of them; but for the rest, two rows of large pits were dug in the more unoccupied part of the cemetery, and in these the bodies were piled one upon another—every coffin being surrounded with a layer of quicklime. Each pit, when the coffins had reached to about two feet from the surface, was filled up with lime and earth; and finally, when all the pits had been closed, a fresh stratum of about a foot thick was laid over the whole.

'Owing to the absence of some, and the actual sickness or fear of others, public worship was for some time very scantily attended; but weekly prayer-meetings were held in the established churches, and in the different dissenting chapels, both for some time previous to the breaking out of the disease and during its prevalence. Many private meetings for a similar purpose were likewise constituted at this time, and one or two are still continued—a proof, we trust, that the awful dispensation has produced at least *some* permanent good effect.

'From an early period of the disease, by order of the Board of Health, pots of pitch and tar were kept continually burning in the streets and closes, which were profusely strewed with lime, in the hope of purifying the atmosphere; but all apparently without any good effect. It is worthy of remark, that up to this date Dumfries, whether as viewed from within, or looked down upon from any of the surrounding heights, appeared enveloped in a thick and impervious cloud, altogether distinct and different from the smoke, and which retained its station in spite of wind and rain. The inhabitants experienced a raw damp mist, and an atmosphere of a peculiarly-depressing nature.'

It is stated that there was no mitigation of the horrors of the epidemic until the 4th of October.

'That night a thunderstorm burst over the town, the peals being uncommonly long and loud, and the lightning vivid. The weather had previously been by no means such as to warrant the anticipation of a storm. Yet awful and unexpected as it was, the most timorous hailed it with joy, as a means of dispelling the poison with which the atmosphere was contaminated. From this date the number of cases continued to decrease, till, through the mercy of God, the disease entirely disappeared.' *

During the years 1847 and 1848, it was observed with alarm that this epidemic was again marching towards western Europe, not precisely in the same footsteps, or even by the same routes which it had formerly adopted, but with a like steadiness of pro-

* New Statistical Account of Scotland, Dumfries, vol. iv. pp. 6–9.

gress. Towards the end of September it touched the seaport of Hull, and its neighbour Sunderland, where the disease had first appeared in 1831. Passing over these and other towns lightly, it concentrated its virulence on Scotland, where it found a lower sanitary condition, and one more suitable for its development, than it encountered in England; and in the miserable wynds of Glasgow, elsewhere described, the devastation almost recalled the old days of the plague. It developed the usual epidemic statistics: where it affected but a few, they were uniformly in the most filthy portions of the towns, of the poorest class, and of the worst bodily habits; but where the deaths became numerous, no class was exempt, and a few victims were always selected from the affluent and the healthy.

Of a visitation still too closely under the notice of the country, it would be superfluous to offer an account on the present occasion. The chief interest of an instructive kind connected with the subject, is the new manner in which the visitation was received, and that is partly noticed in another department of this volume.* The public-health act for England had just passed, and a general Board of Health had been established. Towards the end of the session an act was passed, somewhat ambiguously prepared, from its having been carried in the hurry of a concluding session, the object of which was to give authority to the Board of Health to provide measures of protection against the epidemic over the whole of Britain, while a corresponding Board should have authority in Ireland. The experience of the previous visitation of cholera, and observations made during its late progress through Russia, afforded the principal sources of knowledge on which the Board proceeded. It was found that medical science had been enabled hitherto to do but little towards the cure of the disease when it had broken out in its fully-developed state, but that there was great reason for trusting to the efficacy of precautionary arrangements for reducing the amount of mortality by mitigating or obviating the attacks. It appeared that the districts in which the disease would set itself down could be easily pointed out, and were identical with those where other and minor epidemics were always to be found; while at the same time it was seen that the attack was not generally of the sudden character which popular belief attached to it, but gave preliminary warning by affections of the bowels, which were the prevalent complaints of a large part of the population when a per-centage became victims of the advanced disease. Hence there were two systems of precautionary measures suggested—one was the alteration of the condition of the depressed and offensive localities, so as to bring them as near as they could be

* See the latter portion of Part VI.

brought to the state of the better-conditioned districts; and the other was, the application of precautionary remedies where premonitory symptoms made their appearance. On these matters the Board of Health offered the following among other recommendations:—

'The chief predisposing causes of every epidemic, and especially of cholera, are damp, moisture, filth, animal and vegetable matters in a state of decomposition, and, in general, whatever produces atmospheric impurity; all of which have the effect of lowering the health and vigour of the system, and of increasing the susceptibility to disease, particularly among the young, the aged, and the feeble.

'The attacks of cholera are uniformly found to be most frequent and virulent in low-lying districts, on the banks of rivers, in the neighbourhood of sewer mouths, and wherever there are large collections of refuse, particularly amidst human dwellings. In a recent proclamation, issued for the protection of the population of the Russian empire, the important influence of these and similar causes has been recognised, and the practical recommendations founded thereon are, "to keep the person and the dwellingplace clean, to allow of no sinks close to the house, to admit of no poultry or animals within the house, to keep every apartment as airy as possible by ventilation, and to prevent crowding wherever there are sick."

'Householders of all classes should be warned that their first means of safety lies in the removal of dung-heaps and solid and liquid filth of every description from beneath or about their houses and premises. Though persons long familiarised to the presence of such refuse may not perceive its offensiveness, nor believe in its noxious properties, yet all who desire to secure themselves from danger should labour for the entire removal of filth and the thorough cleansing of their premises; which also the law will require of each person for the protection of his neighbours, as well as for his own safety.

'Next to the perfect cleansing of the premises, dryness ought to be carefully promoted, which will of course require the keeping up of sufficient fires, particularly in damp and unhealthy districts, where this means should be resorted to for the sake of ventilation as well as of warmth and dryness.'

These recommendations refer to general arrangements in anticipation of the disease; others refer to measures for giving relief to persons attacked by premonitory symptoms:—

'It will be indispensable, on the first outbreak of cholera, that the local authorities should immediately make arrangements for daily house-to-house inspections of the poorer localities in their respective districts; this being the only practical means by which, in the most dangerous situations, and among the most susceptible subjects, the existence of the premonitory symptom can be ascertained in time to

administer the proper remedies, so as to arrest the progress of the disorder.

'Heads of families, masters of schools and workhouses, proprietors of large establishments and works, such as factories, mines, warehouses, wharfs and docks, should either be their own inspectors, or employ some trustworthy agent to examine daily every person in their employment, and to give at once the proper remedy if the premonitory symptom should be present.

'Each member of the Visiting Committee should be provided with proper remedies, prepared in appropriate doses for administration on the spot, in every instance in which the premonitory symptom is found to exist; and should report every person so treated as requiring the instant attention of the medical officer.'

These quotations show the general tenor of the recommendations, the first of which had this conclusion:—

'In conclusion, the General Board of Health would again urge the consideration, that whatever is preventive of cholera is equally preventive of typhus and of every other epidemic and constantly-recurring disease; and would earnestly call the attention of all classes to the striking and consoling fact, that, formidable as this malady is in its intense form and developed stage, there is no disease against which it is in our power to take such effectual precaution, both as collective communities and private individuals, by vigilant attention to it in its first or premonitory stage, and by the removal of those agencies which are known to promote the spread of all epidemic diseases. Though, therefore, the issues of events are not in our hands, there is ground for hope and even confidence in the sustained and resolute employment of the means of protection which experience and science have now placed within our reach.'

The recommendations as to cleansing operations were precautionary, and intended to guard the country against the virulence of the disease's attack; not to remove or mitigate it after it had appeared. It is a peculiarity of operations for the removal of filth, that they can seldom be rapidly conducted without making the air for the moment more pestilent than it was before. When deep old cesspools have to be emptied, and garbage corrupting in cellars, or impurities collected in corners of alleys have to be removed, there is at least, unless where great skill and attention are applied to the operation, a spreading of the nuisance, and an increased corruption of the air for the time. Hence to be effective for its end, and to avoid positively increasing the calamity, the cleansing of our cities should have taken place before the epidemic made its appearance. Yet when the cholera presented itself in Edinburgh—the first large town where it made a serious settlement—though there had been long warning, such was the insufficiency of the sanitary machinery, that not a sensible particle

of the filth which festers in masses, or runs in thick disgusting streams through the city, had been removed. Indeed it was generally observed, probably because people's eyes and noses were more acutely sensitive on that occasion, that when the cholera arrived, the Old Town was more deeply steeped than it had usually been in loathsome filth. The Board of Health, in their Report, gently remarked—

'While, however, the preventive measures, when carried out with intelligence and energy, were attended with such results, yet, upon a review of the whole experience of the recent outbreak of cholera in Scotland, it appears to us to be requisite to state, that in this part of the kingdom, where the general sanitary condition is lower than in England, and where, indeed, the condition of the labouring population, particularly in the larger towns—such as Edinburgh, Glasgow, and others—is among the lowest in the empire, there was experienced peculiar difficulty in the practical working of preventive measures; and there is no reasonable ground for the expectation that those measures would, as a system, have been spontaneously adopted in a single town.'

The Board had to record some painful individual instances of the effect of neglect, or, as it sometimes came to be, an obstinate and conceited refusal to put in force recommendations which had been issued under the sanction of the highest scientific skill, and founded on information derived from all parts of the world. These instances deserve to be remembered as warnings, and in their calamitous results as negative evidence of the efficacy of skilled precautionary arrangements:—

'At a time when deaths had already occurred from cholera, under extremely painful circumstances, and when there was reason to apprehend a serious outbreak of the disease, the guardians of the Whitechapel Union entered on their minutes the following resolution:—"That it is the opinion of the guardians, that at present the order of the Board of Health, of the 18th of November last, need not be acted on in this Union."

'It appears that this deliberate act of disregard to the orders of the Board of Health was resolved upon on the same evening when the medical officers of the Union presented to the guardians a written statement to the effect that malignant cholera had broken out in some parts of the district. * * * *

'It further appears, that on the 21st of November the clerk of this Union, having, in conformity with the order of the Board of Health, laid before the guardians returns from the four medical officers, and from some of the Registrars of births and deaths, of those places in the Union where epidemic, endemic, and contagious diseases have of late been prevalent, the guardians came to the following resolution:—"That the clerk forward such particulars to

the various local Boards in the Union, but that the medical officers be *not* called upon to visit the places in question."

'It must be borne in mind that this resolution was adopted by the guardians at a time when cholera was not only actually prevailing in the district, but was spreading there under circumstances of so painful a nature as to attract the attention of one of the coroners of Middlesex, Mr Baker, who, on the 24th of November, addressed a letter of expostulation to them on the neglect of the measures which the circumstances of the time obviously required.

'On the 14th of December the coroner again addressed a letter to the clerk of the Union, in which he says:—

"My attention as coroner has this day been called to several cases of sudden death in the parish of St Mary, Whitechapel, of a most awful and appalling character, and I cannot but feel that a very heavy responsibility rests not only upon my own shoulders, but upon those also of the Board of Guardians of the Whitechapel Union, in reference to these and all such cases, it appearing that there have been no less than sixteen under the care of the medical officer lately.

"I have this day been engaged in an inquiry into some of the deaths, more particularly alluded to in that letter, in Hairbrain Court, Rosemary Lane, and have myself viewed this evening the dead bodies of no fewer than three persons, but have been witness also to the most agonizing and appalling situation of others in a dying state in the same locality (within a few yards of the former), who were found by me to be in a state of distress and misery which could not but be most afflicting to my mind, being surrounded by the most fetid and unwholesome vapours from privies and bad drainage, and filthiness, and much overcrowded; and allow me to say, in such a state as I could scarcely have deemed it possible to have existed after the publication of the documents to which I have above alluded."

'We believe that the lives of several of the persons who thus perished might have been saved if the guardians had carried into immediate effect the orders and regulations under the act, and after a protracted investigation of the circumstances connected with the death of several of those persons, the coroner's inquest brought in a verdict against the guardians of "Very great neglect."'

Another instance recorded by the Board is connected with a well-known tragedy, which in its day filled the newspapers:—

'When we first received information of the outbreak of cholera in the establishment at Tooting for pauper children, containing at that time 1395 children, we represented to the guardians the necessity of the immediate removal of every child not actually sick, and explained to them that universal experience has shown that for the suppression of this pestilence, especially where there is overcrowding, dispersion is the first and essential measure, without which all others are comparatively useless. We further stated to them that

the urgency of the occasion demanded prompt action on their part, as each hour's delay was adding to the number of children who were dying. Knowing the already overcrowded state of most of the metropolitan workhouses, their deficient ventilation, and their general bad sanitary condition, we pointed out the danger of removing any considerable number of the children to these establishments; we advised that separate houses or rooms should be engaged for their temporary reception, and we cautioned the guardians against congregating them anywhere in great numbers. Our representations were for the most part disregarded. Two of the Boards of Guardians persisted in refusing to remove the children from this poisoned atmosphere; the daily deaths, which ranged for several days together from 14 to 20, produced upon them no practical impression; invaluable time was lost, and when at length the great mortality (no less than 180 perished) induced them to follow the counsel they had so long neglected, it was too late; the poison had imbued the system of the children, and on their removal to the several workhouses (for a large number of them were removed to workhouses, notwithstanding our recommendation that they should not be so), considerably more than 300 became affected either with the choleric diarrhœa or with cholera itself!'

As a contrast to such charges of neglect, it may be interesting to preserve one distinct record of the effect of the preventive arrangements in a large town. It is contained in a letter from Mr Noble, one of the medical superintendents of the township of Manchester, to Dr Sutherland, medical inspector of the General Board of Health, and is dated 12th November 1849:—

'It is proper to premise that the statements have reference only to the township of Manchester, to the exclusion of Salford and the several townships comprising the union of Chorlton: it comprises a population of 163,667, according to the census of 1841; and, for the purposes of registration, is divided into five districts, as under:—

		Population in 1841.
The Market-Street	District,	27,832
... St George's	do.	31,576
... Deansgate	do.	33,093
... London Road	do.	28,912
... Ancoats	do.	42,254
	Total,	163,667

'The first fatal and unequivocal case of Asiatic cholera during the late visitation took place in the Market-Street district in the second week of June; sporadic instances were rumoured for the next week or two, but no other fatal case occurred till the last week of the month, when four cases of death from the disease were registered, three of which were in the Canal-Street Hospital, and had been removed from the St George's district. But slow progress, however,

was made by the disease, until the latter end of August, when it became decidedly epidemic, and continued to prevail with some severity until the early part of October, at which time a rapid decline took place, exactly coincident with the medical arrangements for combating the malady, organised by yourself during your visit of inspection at the end of September.

'The following table, showing the number of deaths registered in each week for the several districts and for the hospital, will exhibit the course of the epidemic to some extent; commencing with the week ending June 16th, and concluding with that ending November 3d:—

CHOLERA DEATHS REGISTERED IN THE TOWNSHIP OF MANCHESTER.

1849. Week ending	Market-Street.	St George's.	Deansgate.	London Road.	Ancoats.	Hospital.	Total.
June 16	1	0	0	0	0	0	1
... 23	0	0	0	0	0	0	0
... 30	0	0	0	0	1	3	4
July 7	0	1	0	0	1	0	2
... 14	0	0	0	0	0	0	0
... 21	0	0	0	0	0	1	1
... 28	1	0	0	1	3	3	8
Aug. 4	2	1	0	0	1	1	5
... 11	0	1	0	1	2	3	7
... 18	1	2	1	6	1	3	14
... 25	1	3	3	2	4	6	19
Sept. 1	3	4	13	4	9	8	41
... 8	8	8	42	21	18	14	111
... 15	11	17	32	31	44	32	167
... 22	9	11	30	35	39	20	144
... 29	12	24	12	24	42	30	144
Oct. 6	8	9	14	11	42	21	105
... 13	0	3	11	9	5	3	31
... 20	1	3	4	3	3	2	16
... 27	0	0	1	1	3	2	7
Nov. 3	0	1	0	0	0	0	1
Totals.	58	88	163	149	218	152	828

'In reference to the general characteristics of the five districts, it may be observed that the Market-Street district includes the principal business localities, the first-class shops, and, altogether, the best-conditioned places in a sanitary point of view; although, at its boundaries, it takes in some streets containing very low and objectionable dwellings. The St George's district is the chief resort of the Irish, and the neighbourhood where the low lodging-houses and cellar-residences are chiefly found, occupied largely by vagrants and persons pursuing petty employments, such as handloom weavers, mat-makers, hawkers, dealers in pedlars' wares, and so on. The Deansgate and London-Road districts are occupied for the most part by second-

rate shopkeepers, and by mechanics and factory people. The Ancoats district has a large factory population, and is inhabited considerably by the more substantial operatives and shopkeepers dependent upon them. All the districts, however, contain a great number of courts, alleys, and cellars, inhabited very much by paupers, who furnish the principal materials for the ravages of epidemic disease.

'To exhibit the relative proportion in which these districts contributed to the cholera mortality, it will be necessary, with reference to the foregoing table, to correct the totals by adding the hospital deaths to the numbers of each district, according to the proportion of the removals from the same. Thus, of the 152 deaths occurring in hospital, 17 were from the Market-Street district, 58 from St George's, 26 from Deansgate, 21 from London Road, and 30 from Ancoats: making the fatal cases in and from the several districts as subjoined:—

Market-Street,	75
St George's,	146
Deansgate,	189
London Road,	170
Ancoats,	248
Total,	828

'The fatal cases taken to the hospital, with the districts wherein they arose, are exhibited in detail in the subjoined table:—

CHOLERA DEATHS IN HOSPITAL.

1849. Week ending	Market-Street.	St George's.	Deans-gate.	London Road.	Ancoats.	Total.
June 30	1	2	0	0	0	3
July 7	0	0	0	0	0	0
... 14	0	0	0	0	0	0
... 21	0	0	0	0	0	0
... 28	1	1	0	0	0	2
Aug. 4	0	1	0	0	0	1
... 11	0	2	0	0	2	4
... 18	0	2	0	1	1	4
... 25	0	4	1	0	0	5
Sept. 1	0	3	0	1	0	9
... 8	2	5	4	6	1	18
... 15	6	6	7	2	8	29
... 22	3	3	5	4	2	22
... 29	3	11	5	3	6	28
Oct. 6	2	6	2	2	5	17
... 13	0	2	0	1	2	5
... 20	0	0	1	1	1	3
... 27	0	0	0	0	2	2
Totals.	18	58	25	21	30	152

'The total number of cholera patients treated in hospital from the

end of June to the commencement of November was 276. They were from the several districts as shown below: the last column represents the instances furnished by the Pauper Night Asylum in Tib Street, which is in the Market-Street district:—

HOSPITAL CHOLERA CASES ADMITTED.

1849. Week ending	Market-Street.	St George's.	Deansgate.	London Road.	Ancoats.	Tib St. Vagrant Ward.	Total.
June 30	0	4	0	0	0	1	5
July 7	0	0	0	0	0	0	0
... 14	0	0	0	0	0	0	0
... 21	0	2	0	0	0	2	4
... 28	0	1	0	0	0	1	2
Aug. 4	0	1	0	0	1	0	2
... 11	0	6	0	0	2	1	9
... 18	1	7	2	1	1	1	13
... 25	0	8	0	1	3	2	14
Sept. 1	1	8	2	2	1	0	14
... 8	9	11	8	5	5	2	40
... 15	8	10	14	2	10	1	45
... 22	4	8	10	8	1	3	34
... 29	5	23	5	6	8	4	51
Oct. 6	2	7	2	0	5	3	19
... 13	1	2	3	2	2	0	10
... 20	0	1	0	6	4	0	11
... 27	0	0	1	0	1	0	2
Nov. 3	0	0	0	0	1	0	1
Totals.	31	99	47	33	45	21	276

'You will perceive, from the whole of the foregoing figures, that prior to your operations in this locality, no indications of decline were observable in the epidemic. Your arrival in Manchester took place on Monday the 24th September; and in four days (on Friday the 28th September) the preventive organisation was partially in action. By Monday, October 1st, all the medical officers and visitors were at work; not, however, till Wednesday the 3d October was the machinery in complete operation, at which period superintendents, medical officers, visitors, and dispensaries, each fulfilled their respective parts as prescribed by the instructions issued under your sanction; and from this latter date the returns daily were punctually made.

'The following abstract from the general returns of each day displays, in a very interesting point of view, the impression that your measures made upon the epidemic. Each column exhibits the daily results as regards the discovery of new cases, and the issue of instances returned as cholera:—

ABSTRACT.

1849.	Cases of Diarrhœa.	Approaching Cholera.	Passed into Cholera.	Cases of Cholera.	Deaths.	Recoveries.	Sent to Hospital.
Oct. 3	213	28	7	26	14	10	1
... 4	242	20	4	21	5	6	3
... 5	223	34	3	17	4	8	0
... 6	211	20	2	9	6	11	1
... 7	129	14	1	8	3	3	0
... 8	258	9	1	5	2	10	0
... 9	209	9	0	5	3	8	0
... 10	193	13	0	10	4	3	1
... 11	138	8	0	2	2	5	0
... 12	116	12	0	1	0	7	0
... 13	95	1	1	1	2	0	1
... 14	80	6	0	3	1	1	2
... 15	125	5	0	5	2	2	0
... 16	115	11	1	2	1	0	0
... 17	121	5	3	6	3	0	2
... 18	118	8	0	1	2	0	0
... 19	109	2	0	0	1	2	0
... 20	75	2	0	2	0	0	3
... 21	45	7	0	1	0	0	0
... 22	91	4	0	0	1	4	0
... 23	70	5	0	1	1	0	0
... 24	73	2	0	3	1	0	1
... 25	49	3	0	1	0	0	0
... 26	66	1	0	1	0	0	0
... 27	45	3	0	0	1	2	0
... 28	22	0	0	2	2	1	0
... 29	53	4	0	0	0	0	0
... 30	50	3	0	1	1	0	0
... 31	36	1	0	0	0	0	0
Nov. 1	16	1	0	2	0	0	0
... 2	3	0	0	0	0	1	0
... 3	2	0	0	0	0	0	0
Totals.	3391	241	23	136	62	84	15

'The significance of the preceding table you will readily appreciate—cholera cases diminished at once and rapidly. If, as was thought by some persons, the result was attributable to diminished temperature, or to the natural decline of the epidemic, there should have been a simultaneous and proportionate diminution in the amount of diarrhœa; this, however, you will see, was not so: incipient cholera or diarrhœa raged for nearly three weeks after the measures were in operation, but confirmed cases had become of rare occurrence.'

PART III.

THE PROGRESS OF CIVILISATION AND ITS INFLUENCE ON HEALTH.

THE ROMANS AND THE BARBARIANS—HABITS AND HEALTH OF SAVAGES—WHAT IS PROGRESS IN CIVILISATION?—HABITS OF THE CONTINENT OF EUROPE—HABITS OF THE ENGLISH IN FORMER TIMES—PROGRESS OF HABITS IN SCOTLAND—DISEASES THAT HAVE DISAPPEARED IN THE PROGRESS OF CIVILISATION—EVILS OF PART OF THE POPULATION BEING LEFT IN BARBARISM WHILE THE OTHER IS ELEVATED ABOVE IT.

THE ROMANS AND THE BARBARIANS.

The most satisfactory evidence of the beneficial effect of removing noxious agencies, is in the extent to which they have already been beneficially removed from one considerable portion at all events of the population of modern times. Among ancient nations the Romans appear to have been fastidiously clean, both in their persons and their dwellings; and we may easily believe that among the horrors to which they were exposed in the inroads of the barbarians, not the least loathsome must have been the barbarous and revolting personal habits of their masters. In modern Europe, we are accustomed to hear the tone of haughty fastidiousness vent itself on the calamity of coming in contact with barbarous but subjected classes, the aboriginal natives of distant dependencies; but for those accustomed to the purity and nicety of a high state of civilisation to come under the rod and mastership of filthy barbarians, was so rare a fate in the later history of Europe, that the experience of it must have been almost limited to the few victims of the piratical cruisers of the Levant.

From the darkest ages after the fall of Rome down to the present time, the upper classes of society seem to have made a pretty steady progress onwards in the practice of sanitary precautions—a practice founded more on the gradual acquisition of fastidious tastes intolerant of whatever might offend the senses, than on any systematic philosophy relating to the preservation of life. No one can look at the Norman towers of our old feudal nobility without being convinced that they must have been places of darkness and dirt—undrained, unventilated, full of impurities and

noxious exhalations, and indeed in most respects too closely resembling the dingy ancient abodes in which the poorer classes are packed in our great cities. Whoever would desire to see how our aristocracy lived in 'the good old time,' will obtain the best practical information by visiting one of the ancient houses in the Edinburgh closes, permitted still to remain as destitute of those means for the introduction of supplies of water and fresh air, and for the removal of impurities, as when it was built for its lordly inhabitant in the days of Queen Mary or Charles I.

HABITS AND HEALTH OF SAVAGES.

That the terrible diseases which from time to time sweep away their thousands are created by generating causes which might be prevented, would doubtless receive its most startling confirmation in savage countries did we know as much of them as we do of our own. Filthy and miserable as are the lanes and narrow streets in the destitute parts of our large towns, we would find still more filth and misery in the teeming East, where the plague holds its horrible empire. We are accustomed to associate the lands nearest the sun with luxurious ease, with glossy silks, with jewels and the precious metals, with delicious fruits, rich liquors, and fragrant spices. These are indeed the commodities which we, the hard-workers of the hardy north, draw by the irresistible attraction of our commerce from the natural riches of the productive centre of the globe. But there are other teeming products of these hot territories impregnated with misery, disease, and death, which mostly the indolent, barbarous natives keep to themselves. Dr Mead, an eminent English physician, who in the year 1720 wrote 'A Short Discourse concerning Pestilential Contagion,' says in this work, when he is discussing the main dwellingplace and fortress of the Oriental plague—

'Cairo is crowded with vast numbers of inhabitants, who live poorly and nastily; the streets are narrow and close; the heat is stifling; a great canal passes through the city, which, at the overflowing of the Nile, is filled with water; on the decrease of the river this canal is gradually dried up, and the people throw into it all manner of filth, carrion, and offal; the stench which arises from this and the mud together is intolerably offensive, and from this source the plague, constantly springing up every year, preys upon the inhabitants, and is stopped only by the return of the Nile, the overflowing of which washes away this load of filth. In Ethiopia the swarms of locusts are so prodigious, that they sometimes cause a famine by devouring the fruits of the earth, and when they die, create a pestilence by the putrefaction of their bodies. The effluvia which arise from this immense quantity of putrefying animal sub-

stance, combined with so much heat and moisture, continually generate the plague in its intensest form; and the Egyptians of old were so sensible how much the putrefaction of dead animals contributed towards breeding the plague, that they worshipped the bird ibis from the services it did in devouring great numbers of serpents, which they observed injured by their stench when dead as much as by their bite when alive.'

But even this description sinks into the vagueness of generality when it is compared with the following distinct account of the way of life of the Fellah:—

'The Fellah,' says Dr Hamont in a communication presented in 1845 to the Academy of Medicine of Paris, 'constructs his hut with mud on the margin of stagnant water, where the bodies of numerous animals macerate and rot. Against it his neighbours erect a second, a third, so as to form a group of huts closely approximated one to the other, and to leave little or no interval for the circulation of air. In these miserable huts men, women, and children, half naked, lie mingled on the damp floor, from which, generally speaking, they are only separated by a rotten mat. Around these wretched habitations you tread on the recent excrements of men and cattle, on heaps of refuse, where famished dogs dispute the possession of the putrefying flesh of a cow, a camel, or an ox, frequently dragging the mangled intestines to the very threshold of the houses. As the Delta is a plain of a uniform level, in order to construct their habitations, the peasants are obliged to dig excavations, which they do in the immediate vicinity of their future residence. The pits thus formed are filled with water at each inundation of the Nile, which remains stagnant during the remainder of the year; millions of insects give life to them, and they soon become as repulsive to the smell as to the sight. Yet it is from these sinks of corruption that the peasants draw the water which they drink and use, and in them that they perform the daily ablutions enjoined by their religion. The Fellah himself, nearly naked, sows and works in the mud of the rice-grounds, near which he often sleeps. When his wife and children are not assisting him in the fields, they collect the excrements of men and cattle deposited near their dwellings, and mixing them with the muddy, fetid water, work the nauseous compound with their hands and feet into small, round, flat masses, which they stick against the walls of their habitations to dry, and which they use as fuel. The air which the Fellah and his family breathe is thus perpetually tainted and corrupted by the noxious emanations proceeding from vegetable and animal substances in a state of putrefaction. It would seem as if every act of his life was destined to be the very reverse of what it ought to be, hygienically speaking. Around his residence he creates a focus of corruption so horribly offensive, that its proximity becomes painfully evident to the traveller long before he reaches it. Nor is the contamination confined to his own dwelling. In order to purify himself before he offers his daily prayers in the mosque, he

visits an outer yard devoted to this purpose, and then washes himself in an adjacent tank of putrid water. The contents of these yards, where fifty or a hundred Mussulmen may be seen at a time, flow into an uncovered canal, which generally terminates in a large ditch in a public square near the habitations. This ditch is not closed, and never emptied. Its contents overflow, soak into the earth, and, like a black lava, penetrate everywhere into the roads and houses. It is easy to conceive how offensive the atmosphere must be in such a place during the hot months of July, August, and September; and wherever there is a mosque, such is the state of things. A stranger may always discover the mosque in Lower Egypt by attending to his sense of smell. The more fetid the air becomes, the nearer is the mosque.

'In order still further to concentrate the pestilential exhalations which he generates about him, the Egyptian surrounds his village, constructed in a low, damp soil, with a heap of rubbish of all kinds, thus rendering the ventilation of the locality in which he resides still more difficult, and making the refuse which might fertilise his land an additional source of disease to himself. Cooped up in this disgusting retreat, he seems as if he had done his utmost to create for his own use a focus of disease and corruption, and to poison the valley of the Nile, in which Providence has thrown with profusion elements of conservation. Infested with vermin, he seldom changes his linen; and, as if his nose and mouth were not enough to absorb the mephitic air which he "composes," he is generally clothed in rags, or in a linen tunic, which leaves the greater part of the skin exposed.'

In reference to this picture the Board of Health say in their Report on Quarantine:—

'We quote the following passage from the Report of the Academy of Medicine of Paris, in 1846, on Quarantine, to show the perfect unanimity of the most competent observers in different countries on the main points connected with this subject:—

"At the present moment, it is almost exclusively from Egypt that we have to fear the importation of plague. But if, in the view of health, we compare the different points of the globe acknowledged to give birth to the plague, we are amazed to see in Egypt, in spite of its fine climate, a miserable population inhabiting villages composed of filthy huts, unfit for human beings, living on spoiled seeds, unsound meat, and putrid fish; we are surprised to see even the towns, even Cairo, encumbered with cemeteries, and composed of houses built on sepulchral caves, where dead bodies lie mouldering. The same circumstances are to be met with at Erzeroum, a large town, having 50,000 inhabitants, built in a peninsula formed by the two northern sources of the Euphrates. This city, where the plague arises spontaneously, is traversed by filthy streets; dead animals lie in them unheeded; every description of filth is thrown into them; the butchers

kill animals in these streets, which are as unhealthy as they can possibly be.

"The same conditions are to be met with likewise on the banks of the Danube, and the want of rapidity in the current of that river produces the same effects as do marshes. On its banks the diseases which are common in all seasons frequently assume, after hot weather, a remarkably serious aspect. In the autumn of almost every year very dangerous intermittent fevers appear, and are soon followed by the plague, which is generally sporadic,* but which in some years assumes the epidemic form. It is thus ascertained that in all countries where this disease has been observed to be spontaneous, it may reasonably be considered as arising from determined causes acting on a great portion of the population: these causes are —living on a marshy soil near the Mediterranean Sea, near certain rivers, the Nile, the Euphrates, or the Danube; living in houses that are low, not well ventilated, and where there exists superabundant accumulation of inhabitants, hot and damp air; the action of animal and vegetable substances in a state of decomposition; and lastly, great moral and bodily misery.

"All these generating causes being united every year in Lower Egypt, the disease is endemic in that country, where it is observed to assume the sporadic form every year, and the epidemic about every ten years. Besides, if we consult history, we shall find that during the reign of the last of the Pharaohs, during the 194 years of the occupation of Egypt by the Persians, the 301 years during which lasted the dominion of Alexander, the dynasty of Ptolemeus, and a great portion of that of Rome, Egypt was free from the plague. This absence of any epidemic for the long space of time during which good administration and the sanitary police of the country conquered the producing causes of the plague, justifies the expectation that the same means will be followed by the same results."'

Not among the least of the heroic martyrdoms of travellers is the filth and abomination they must bear the sight of and even mingle in. Collins, in his 'New South Wales,' tells us how 'both men and women use the disgusting practice of rubbing fish-oil into their skins; but they are compelled to this as a guard against the effects of the air, and of mosquitoes and flies, some of which are large, and bite or sting with much severity. But the oil, together with the perspiration from their bodies, produces in hot weather a most horrible stench. I have seen some with the entrails of fish frying in the burning sun upon their heads, until the oil ran down over their foreheads.' He concludes the description of their wretched habitations by saying—'In their huts and in their caves they lie down indiscriminately mixed, men, women, and children together, and appear to possess under them much the same enjoyment as may be supposed to be found by the

* That is, affecting only particular classes.

brute beast in his den—shelter from the weather, and, if not disturbed by external enemies, the comfort of sleep.' When a child dies, it is the practice of the mother to carry about on her back the decomposing remains, sewed up in a leathern sack, so that her approach may be anticipated by the nose at a considerable distance. Collins mentions having fallen in with a native and his child on the banks of the Hawksbury; 'he launched his canoe, and got away as expeditiously as he could, leaving behind him a specimen of his food, and the delicacy of his stomach—a piece of water-soaked wood full of holes, the lodgment of a large worm, named by them *cah bro*, and which they extract and eat; but nothing could be more offensive to the smell than both the worm and its habitation. There is a tribe of natives dwelling inland, who, from the circumstance of their eating these loathsome worms, are called *cah bro-gal*.' In the ungenial rocks of Terra del Fuego, Cook's expedition found human beings attenuated and diseased, on the verge only of life as they were of humanity, and covered with filth and vermin. Even among the far more civilised barbarians of Nootka Sound, it is said—'As they rub their bodies constantly over with a red paint of a clayey or coarse ochrey substance mixed with oil, their garments by this means contract a rancid offensive smell, and a greasy nastiness, so that they make a very wretched, dirty appearance; and, what is still worse, their heads and their garments swarm with vermin, which, so depraved is their taste for cleanliness, we used to see them pick off with great composure and eat.'* While as to their habitations, 'the nastiness and stench of their houses are, however, at least equal to the confusion; for, as they dry their fish within doors, they also gut them there, which, with their bones and fragments thrown down at meals, and the addition of other sorts of filth, lie everywhere in heaps, and are, I believe, never carried away till it becomes troublesome from their size to walk over them. In a word, their houses are as filthy as hogsties: everything in and about them stinking of fish, train-oil, and smoke.'†

When Hans Egede, the worthy Danish missionary, began to acquire the good-will of the people of Greenland, he was invited to a feast, where a native of importance, to show him great courtesy, took a piece of blubber off the floor, and licking it clean, presented it to him as a choice morsel. 'They also eat,' says Egede, 'a sort of reddish sea-weed, and a kind of root which they call *tugloronet*, both dressed with fat or train-oil. The dung of the reindeer, taken out of the guts when they cleanse them, the entrails of partridges, and the like outcast, pass for dainties with them.

* Cook's Voyages, ii. 305. † * Ib. p. 316.

They make likewise pancakes of what they scrape off the insides of seal-skins when they dress them.'*

Kotzebue says of a spot which he visited about twenty miles from St Lawrence Island—'While our naturalists were strolling about the mountains, I entertained myself with our new acquaintances, who, as soon as they learned that I was the commander, invited me to their tent. A filthy piece of leather was spread on the floor for me to sit on, and then they came up to me one after the other. Each of them embraced me, rubbed his nose hard against mine, and ended his caresses by spitting in his hands, and wiping them several times over my face. Though these signs of friendship were not very agreeable to me, I bore all patiently. To suppress their further tenderness, I distributed some tobacco-leaves, which they received with much pleasure, and were going to repeat all their caresses again. I hastily took some knives, scissors, and beads, and thus happily prevented a second attack. An almost still greater misery awaited me: when, in order to refresh me, they brought forth a wooden trough of whale-blubber (a great delicacy among all the northern inhabitants of the sea-coasts), and I bravely took some of it, sickening and dangerous as this food is to a European stomach.'†

Malthus has set down the degraded and filthy habits of savage nations as one of the checks on population. He says, in carrying out his views:—

'In the vast plains of South America, a burning sun operating on the extensive swamps, and the inundations that succeed the rainy seasons, sometimes generates dreadful epidemics. The missionaries speak of contagious distempers as frequent among the Indians, and occasioning at times a great mortality in their villages. The small-pox everywhere makes great ravages, as, from want of care, and from confined habitations, very few that are attacked recover from it. The Indians of Paraguay are said to be extremely subject to contagious distempers, notwithstanding the care and attentions of the Jesuits. The small-pox and malignant fevers, which, from the ravages they make, are called plagues, frequently desolate these flourishing missions; and according to Ulloa, were the cause why they had not increased in proportion to the time of their establishment and the profound peace which they had enjoyed.

'These epidemics are not confined to the south. They are mentioned as if they were not uncommon among the more northern nations; and in a late voyage to the north-west coast of America, Captain Vancouver gives an account of a very extraordinary desolation apparently produced by some distemper of this kind. From New Dungeness he traversed a hundred and fifty miles of the coast

* Description of Greenland, p. 130.

† Kotzebue's Voyage of Discovery, i. 192.

without seeing the same number of inhabitants. Deserted villages were frequent, each of which was large enough to contain all the scattered savages that had been observed in that extent of country. In the different excursions which he made, particularly about Port Discovery, the skulls, limbs, ribs, and backbones, or some other vestiges of the human body, were scattered promiscuously in great numbers; and as no warlike scars were observed on the bodies of the remaining Indians, and no particular signs of fear and suspicion, the most probable conjecture seems to be, that this depopulation must have been occasioned by pestilential disease.'*

WHAT IS PROGRESS IN CIVILISATION?

The vulgar notion is, that there is great strength and vigour in barbarous people, and the luxury that appears to accompany civilisation is often lamented as the degeneracy of a hardy and powerful race. At all periods of history, and in all countries, popular writers refer to the simplicity, the health, and the enduring hardihood of the race of yore, 'alas! gone never to return;' and it would not be difficult to show in English literature how each century has looked back on its predecessor, as a degenerate child lamenting the departed excellencies of its predecessors, so that it would appear by this scale of descent that we have less of everything that makes a people great and valuable than our ancestors in the reign of George II. had; that they, in their turn, looked back with like regret on the days of Charles I.; while the Cavaliers and Roundheads felt themselves but the puny descendants of the great men of the Tudor dynasty; and the age of the Edwards, when victories were gained in France, and the king could not boast of a carpet or a pair of stockings, was looked back to even from the days of Henry VIII. as the true heroic age.†

There is such a thing as degeneracy in nations, but it is when they lose the civilisation they have acquired, not when it increases. We shall generally find that there is a true and fundamental kind of civilisation which must make progress, unless it be overturned or crushed by some exterior tyrannic force—as by the arms of some great conqueror; while there is a spurious kind of progress which often dies away—the excitement of some momentary stimulant, not the development of genuine health. When a country becomes great through the impulse of one mind, and not from the rising worth and capacity of the whole community, its greatness is generally of this hollow and ephemeral kind. Of such kind was the greatness which Asiatic conquerors, such as

* Essay on Population, i. 54-55.

† See a singular instance of this in a quotation given above, p. 57.

Cyrus, Narses, and Timour—such was the greatness which Charles V. gave to the Spaniards, and Louis the Great and Napoleon to the French. There is a tendency in what is now popularly termed hero-worship to overlook the fact, that men are as likely to be eminent from the littleness of those around them as from their own greatness, and a people are reproached with the want of great and leading minds, when the true interpretation of the reproach is, that they are collectively too high-spirited and capable for one man to be so greatly their superior either in ability or influence. In a community so much above the France of 1800 in ability, honesty, capacity for business, and steadiness of purpose as the Britain of 1850 is, there would be little room for a Napoleon to achieve so wild a greatness. It is one of the best symptoms of our far progress and high civilisation, that we have no heroes among us in the new popular acceptation of the term; that there is no room within the ordinary compass of human genius for one man to be so far above the thousands who have high talent well cultivated, as to be the objects of distant homage and worship. There is too much cultivation and real intellectual strength among us in the nineteenth century to afford room for a new Cromwell to recall the seventeenth century. This peculiarity—the want of great leaders—indicates that healthy element in our nature which separates us so widely from the hordes of barbarians among whom a mind above the dead-level of the ordinary semi-brutal population acquired such an influence, that its owner sometimes became a deity. Indeed our French neighbours seemed at one time to indicate that the age of deification was not quite over; and if Napoleon had returned from the Kremlin as master of Russia, it is scarcely too wild a supposition to imagine that the Parisians might have counted him a living deity until something occurred to show that he was mortal.

It would appear that with the progress of civilisation the bodily frame acquires the same sort of uniform elevation as the intellectual qualities. There are not giants in these days, but it is not from the depreciation of the race, but because all are too tall and strong to admit of high physical qualifications making their possessor transcendently remarkable. Those who are accustomed to inspect ancient armour, are familiar with the peculiarity that it is generally adapted to people of small stature. The handles of old Highland broadswords, as well as those of Oriental scimitars, are generally very small. The blows dealt by the swordsmen at Waterloo probably showed a degree of muscular strength which no battle of ancient times ever witnessed. In such trials of comparative strength as have been recorded by travellers and physiologists, the preponderance has been largely

in favour of civilised men over savages when taken in average numbers.

But the invigorating influence of civilisation and high culture seems to go farther than this into quarters where one would not readily expect to find it. It is naturally thought that long subjection to the influences of any particular kind of hardship indurates the human frame, so as to prepare it for better resisting any farther influences of the same character which it may have to endure. This may be the case, but at the same time there appears to be another preparation, that is a better support to the human frame through every kind of endurance, and a better hardener of it against every kind of attack, in a high physical development such as that of the civilised European, who has been reared in pure air with wholesome food, and has encountered sufficient hardships to brace, without breaking his constitution. Perhaps the Sepoy or the African slave, from their induration to heat, may respectively stand more of that kind of hardship than a European of no greater bodily strength; but the healthy muscular British soldier is their superior in standing the fatigues and debilitating influences even of their own burning suns and deadly swamps. This is certainly one great source of the perpetual superiority of the temperate over the torrid-zone; and one of the reasons why Europeans compete with and excel Orientals in everything they attempt, even on their own ground, and when the battle is against those influences with which the Orientals have been taught from infancy to contend. It is a superiority which this country has zealously kept up in the practice of those who are settled in Eastern countries sending their children to Britain at an early age, in order that they may approach manhood aided by the various strengthening influences of British training, and may not begin a degenerate race by the progressive relaxation of the constitution from generation to generation. Even in those diseases which sweep the Orientals away in thousands, the natural resistance offered by a sound constitution is visible in the British residents of plague-infested towns. In their Report on Quarantine, the Board of Health say—

'From a table drawn up by Dr Aubert Roche, and quoted by Dr Gavin Milroy, it appears that during the great plague at Alexandria, in 1835, the French, English, Russian, and German residents in that town, who were exposed to the epidemic influence in its full intensity, suffered in the proportion only of 5 per cent., whereas the Arab population suffered in the proportion of 55 per cent., the Malays in the proportion of 61 per cent., and the negroes and Nubians in the proportion of 84 per cent.—that is to say, falling upon the several populations in close proportion to their general sanitary condition—

the attacks being the lowest amongst the Europeans, who live in airy and better-conditioned houses; and the most severe upon the Nubians, whose condition has been described.'

HABITS OF THE CONTINENT OF EUROPE.

The progress which a regard for cleanliness has made in certain classes of the more civilised countries of Europe, deserves more attention than it has received from historians and economists. There are still great differences not only, as we shall find, between the state of different grades of society, but in the same social level in different countries. The Englishman and the Dutchman are still shocked by the habits of the German, and indeed there is as great a difference between adjacent villages, if the one lie within the frontier of Germany and the other within that of Holland, as we might expect to find in different countries, or far-separated regions of the globe. That the upper classes among so highly educated a people as the Germans should be found so practically unconscious of the true sources of health, is an anomaly not easily accounted for. Their houses are close and unventilated, and in cold weather a stove increases the noxious gases concentrated in the narrow space, so that an Englishman, accustomed to the well-aired clean chambers of a good house, wonders how the Germans can live in such an impure atmosphere, even more than he wonders at the poor of his own country living in one still more foul and deadly. No one, however, can see much of the Germans even of the better class, without observing the tokens of physical deterioration in their sallow, discoloured skin, bad teeth, and lustreless eyes. And in some measure it must be admitted that the same characteristics are to be found pervading the upper classes through many parts of the continent, as they did our own aristocracy a century or two ago.

The nations of Europe have, however, undergone considerable revolutions in connection with this as with other matters of action and opinion. Indeed, as we shall presently find, England, which now possesses the most fastidious upper class in the world, was certainly behind many other nations. The Netherlands, and especially Holland, seem, among the European nations, to have made the earliest progress in personal cleanliness, although not in purity of manners, as their pictures rather flagrantly tell us. The necessities of their situation probably drove this energetic and sagacious people to the early adoption of precautions, absolutely necessary to prevent a country so abounding in stagnant water and bogs from being a continual seat of pestilence. Hence there are many traces of an early fastidiousness about cleanliness unknown in other countries. The Dutch alchymist Helvetius, in

narrating a wonderful visit which he had in 1666 from a mysterious adept who had discovered the Philosopher's Stone, mentions this awful personage entering his back chamber without wiping his shoes. But Philip de Comines, mentioning a visit made full two centuries earlier by the Count Palatine of the Rhine to the Duke of Burgundy at Brussels, says—'The duke's servants upbraided the Germans for their nastiness and incivility in laying their dirty clothes and their boots upon these rich beds, and accusing them of want of neatness and consideration, and they never liked them afterwards so well as they had done before. The Germans being so much dissatisfied on the other side, reproached them for their pomp and extravagance; so that, in effect, they never loved nor did any good office for one another afterwards.'*

Far as the habits of her upper classes are behind those of England at the present day, it would appear that even Germany has made sanitary improvement with the passage of centuries. The habits even of her crowned heads not more than a century ago would now shock a merchant's clerk, a shopkeeper, or a petty farmer in this country. A clever Lady Frederica Sophia Wilhelmina, who held the rank of Margravine or Princess of Bareith, left some sketches of the manners of her own and the other small German courts behind her. It may serve as an introduction to some extracts from them to state that she was the sister of Frederick the Great, and the niece of our George I.

The following is her account of her first impressions of the palace in which she was to reside as a princess:—

'The margrave and the two princesses his daughters received me at the bottom of the stair with the court; he conducted me at once to my own apartment. It was so beautiful, that it is really requisite I should stop a moment to describe it. I was introduced into it through a long corridor hung with spider webs, and so filthy, that it made me sick at heart. I entered into a huge chamber, of which the ceiling, although ancient, was the greatest ornament. The tapestry hangings which were there had been, I believe, very beautiful in their time, but now they were so old and so tarnished, one could divine what they represented only with the aid of a microscope. The figures were designed large, and the faces so worn and full of holes, that they appeared like spectres. The adjoining cabinet was furnished with a sort of brocade the colour of nastiness, beside that there was a second, of which the furniture of green damask pricked had an admirable effect—I say pricked, for it was in tatters, the canvas appearing everywhere. I entered into my bedchamber, of which all the suite was of green damask with fringed golden eagles. My bed was so beautiful and so new, that in

* Memoirs of Philip de Comines, i. 169.

fifteen days' time the curtains disappeared, for if you touched them, they went to pieces. This magnificence, to which I was unaccustomed, surprised me extremely. * * *

'I was very ill satisfied with this court, and still more so with the bad fare which we had that evening. It was ragouts *a la diable*, seasoned with sharp wine, large grapes, and onions. I found myself ill at the close of the repast, and was obliged to retire. They had not the least consideration for me, my apartments had not been heated, the windows were in pieces, which caused an insupportable cold. I was sick to death all night, which was spent in suffering, and in making sad reflections upon my situation: I found myself in a new world, with people more like peasants than courtiers. Poverty reigned everywhere. I might well seek the wealth that had been so much vaunted to me. I saw not the least appearance of it.' *

HABITS OF THE ENGLISH IN FORMER TIMES.

It is not the least curious fact connected with the progress of improved habits, that formerly England, so far from being, as she is at present, beyond the greater part of the world in the fastidiousness of the upper classes, appears to have been considerably behind other countries in Europe. It has been already mentioned † that the Sweating Sickness was so peculiarly national to this island as to be called the English Sweat. Erasmus, who knew all existing knowledge, and was at the same time a very acute original observer, wrote, in the reign of Henry VIII., the following letter to Cardinal Wolsey's physician, Dr Francis. It contains views on the influence of household arrangements on health which would not discredit a sanitary philosopher of the present day. But Henry VIII. and his minister Wolsey were interested in matters which to them appeared of far too great importance to permit them to give attention to the health of the people :—

'I often wonder, and that not without concern, whence it comes to pass that England for so many years hath been continually afflicted with pestilence, and, above all, with the Sweating Sickness, which seems in a manner peculiar to that country. We read of a city which was delivered from a plague of long continuance by altering the buildings according to the advice of a certain philosopher.

'I am much mistaken if England, by the same method, might not find a cure. First of all, they are totally regardless concerning the aspect of their doors and windows to the east, north, &c.; then they build their chambers so that they admit not a thorough air, which yet, in Galen's opinion, is very necessary. They glaze a great part of the sides with small panes, designed to admit the light and exclude the wind; but these windows are full of chinks, through which

* Mémoires de Frédérique Sophie Wilhelmine de Prusse, vol. ii. pp. 13-14, 18-19.

† See above, p. 55.

enters a percolated air, which, stagnating in the room, is more noxious than the wind.

'As to the floors, *they are usually made of clay covered with rushes*, that grew in fens, which are so slightly removed now and then, that the lower part remains, *sometimes for twenty years together*, and in it a collection of spittle, vomit, urine of dogs and men, beer, scraps of fish, and other filthiness not to be named. Hence upon change of weather a vapour is exhaled very pernicious in my opinion to the human body. Add to this, that England is not only surrounded by the sea, but in many parts is fenny, and intersected with streams of a brackish water; and that salt-fish is the common and favourite food of the poor. I am persuaded that the island would be far more healthy if the use of these rushes were quite laid aside, and the chambers so built as to let in the air on two or three sides, with such glass windows as might be either thrown quite open, or kept quite shut, without small crevices to let in the wind. For as it is useful sometimes to admit a free air, so is it sometimes to exclude it. The common people laugh at a man who complains that he is affected by changeable and cloudy weather; but for my part, for these thirty years past, if I ever entered into a room which had been uninhabited for some months, immediately I grew feverish. It would also be of great benefit if the lower people could be persuaded to eat less of their salt-fish, and if public officers were appointed to see that the streets were kept free from mud and ——, and that not only in the city, but in the suburbs. You will smile perhaps, and think that my time lies upon my hands, since I employ it in such speculations; but I have a great affection for a country which received me so hospitably for a considerable time, and I shall be glad to end the remainder of my days in it if it be possible. Though I know you to be better skilled in these things than I pretend to be, yet I could not forbear from giving you my thoughts, that, if we are both of a mind, you may propose the project to men in authority, since even princes have not thought such regulations to be beneath their inspection.' *

London, and the English towns in general, contain very few ancient houses — much fewer than the towns of Scotland, France, the Low Countries, and Germany. The brick, or, as it anciently was, wooden material, of which they have been constructed, is temporary, and characterised by continuous decay and restoration, insomuch that, if ruin were overtaking London, as it has done the ancient cities, it would exhibit nothing to posterity but a heap of red dust, with here and there a fragment of a free-stone public building, and, possibly entire, a granite bridge. We can thus know the character of the old streets and houses of London only from contemporary notices; and perhaps, in the dearth of knowledge of the subject, the following remarks by Sir

* Malcolm's London, pp. 459–460.

William Davenant on the habits of London in the seventeenth century are interesting:—

'Sure your ancestors contrived your narrow streets in the days of wheelbarrows, before those greater engines *carts* were invented. Is your climate so *hot*, that, as you walk, you need umbrellas of tiles to intercept the sun? or are your shambles so empty that you are afraid to take in fresh air lest it should sharpen your stomachs? Oh the goodly landscape of old Fish Street! which, had it not had the ill-luck to be crooked, was narrow enough to have been your founder's perspective; and where the garrets (perhaps not from want of architecture, but through *abundance of amity*) are so made, that opposite neighbours may shake hands without stirring from home. Is unanimity of inhabitants in wise cities better expressed than by their coherence and uniformity of building, where streets begin, continue, and end in a like stature and shape? But yours (as if they were raised in a general insurrection, *where every man hath a several design*) differ in all things that can make distinction. Here stands one that aims to be a *palace*, and next it another that professes to be a *hovel;* here a giant, there a dwarf; here slender, there broad; and all most admirably different in their faces, as well as in their height and bulk. I was about to defy any Londoner who dares pretend there is so much ingenious correspondence in this city, as that he can show me one house like another. Yet your old houses seem to be reverend and formal, being compared to the fantastical works of the moderns, which have more ovals, niches, and angles than are in your custards, and are enclosed with pasteboard walls like those of malicious Turks, who, because themselves are not immortal, and cannot ever dwell where they build, therefore will not be at the charge to provide such lastingness as may entertain their children out of the rain; so slight and so prettily gaudy, that, if they could move, they would pass for pageants. It is your custom, where men vary often the mode of their habits, to term the nation fantastical; but where streets constantly change fashion, you should make haste to chain up the city, for it is certainly mad.

'You would think me a malicious traveller if I should still gaze on your misshapen streets and take no notice of the beauty of your river; therefore I will pass the importunate noise of your watermen (who snatch at fares as if they were to catch prisoners, plying the passengers so uncivilly, as if they had never rowed any other prisoners but Bearwards), and now step into one of your pease-cod boats, whose tills are not so sumptuous as the roofs of gondolas, nor, when you are within, are you at the ease of chaise-a-bras. The community and trade of your river belongs to yourselves; but give a stranger leave to share in the pleasures of it, which will hardly be in the prospect or freedom of air, unless prospect consisting of variety be made with here a palace, there a wood-yard, here a garden, there a brew-house. Here dwells a lord, there a dyer, and betwixt them both *duomo commune*. If freedom of air be inferred in the liberty of

the subject, where every private man hath authority for his own profit to smoke up a magistrate, then the air of your Thames is open enough, because it is equally free. I will forbear to visit your courtly neighbours at Wapping, not that it will make me giddy to shoot your bridge, but that I am loath to disturb the *civil silence* of Billingsgate, which is so great as if the mariners were always landing to storm the harbour: therefore, for brevity's sake, I will put to shore again, though I should be constrained even without my galoches to land at Puddle-Dock.

'I am now returned to visit your houses, where the roofs (ceilings) are so low, that I presume your ancestors were very mannerly, and stood bare to their wives (for I cannot discern how they could wear their high-crowned hats). Yet will I enter, and therefore oblige you much, when you know my aversion to the odour of a certain weed (tobacco) that governs amongst your coarser acquaintance, as much as lavender amongst your linen, to which, in my apprehension, your sea-coal smoke makes a very Portugal perfume. I should here hasten to a period for fear of suffocation, if I thought you so ungracious to use it in public assemblies; and yet I see it grow so much in fashion, that methinks your children begin to play with broken pipes instead of corals, to make way for the teeth. You will find my visit short: I cannot stay to eat with you, because your bread is too heavy, and you disdain the slight sustenance of herbs: your drink is too thick, and yet you are seldom over-curious in washing your glasses. Nor will I lodge with you, because your beds seem to our alcoves no bigger than coffins; and your curtains so short, as they will hardly serve to enclose your carriers in summer, and may be held, if Taffata, to have lined your grandsires' shirts. But though your houses are thin, yet are your kitchens well lined with beef; and the plentiful exercise of your chimneys makes up that canopy of smoke which covers your city, whilst we on the continent are well contented with a clear sky, entertain flesh as a regale; and we, your poor French frogs, are fain to sing to sallad. You boast that your servants feed better than masters at Paris, and we are satisfied when ours are better taught than fed. You allow their idleness and high nourishment to raise their mettle, which is to make them rude for the honour of old England; we inure ours to labour and temperance, that we may allay them, which is to make them civil for the quiet of France. Yours drink malt, and the strong broth of malt, which makes them bold, hot, and adventurous to be soon in command; ours are cooled with weak water, which doth quench their arrogance, and makes them fit to obey long. We plant the vineyard, and you drink the wine, by which you beget good spirits, and we get good money: you keep open houses for all that bring you in mirth till your estate run out of doors, and find new landlords; we shut our gates to all but those whose conversations bring in profit; and so, by the help of what you call ill-nature and parsimony, have the good-luck to keep our inheritance for our issue.

'Before I leave you in your houses (where your estates are

managed by your servants, and your persons educated by your wives), I will take a short survey of your children; to whom you are so terrible, that you seem to make use of authority while they are young, as if you knew it would not continue till their manhood: you begin with them in such rough discipline, as if they were born mad, and you meant to fright them into their wits again, before they had any to lose. When they increase in years, you make them strangers, keeping them at such a distance out of jealousy they should presume to be your companions, that, when they reach manhood, they use you as if they were none of your acquaintance. If you take pains to teach them anything, it is only what they should not learn—bashfulness, which you interpret to be their respect to you; but it rather shows they are in trouble, and afraid of you; and not only of you, but of all who are older than themselves; as if youth were a crime, or as if you had a greater quarrel to nature than to the devil. You seem to teach them to be ashamed of their persons, even when you are willing to excuse their faults. This education you give them at home; but though you have frequently the pride to disdain the behaviour of other nations, yet you have sometimes the discretion to send your sons abroad to learn it. To Paris they come, the school of Europe, where is taught the approaches and demeanours towards power; where they may learn honour, which is the generous honesty, which is the civil boldness of courts. But there they arrived not to converse with us, but themselves; to see the gates of the court, not to enter and frequent it; or to take a hasty survey of greatness as far as envy, but not to study it as far as imitation; at last return home, despising those necessary virtues which they did not take pains to acquire; and are only ill-altered in their dress and mind by making that a deformity, in seeming over-careful and forced, which we make graceful in being negligent and easy.

'I have now left your houses, and am passing through your streets; but not in a coach, for they are uneasily hung, and so narrow, that I took them for a sedan upon wheels: nor is it safe for a stranger to use them till the quarrel be decided whether six of your nobles sitting together shall stop and give place to as many barrels of beer. Your city is the only metropolis of Europe where there is a wonderful dignity belonging to carts. Master Londoner, be not so hot against coaches: take advice from one who eats much sorrel in his broth. Can you be too civil to such gentry as bravely scorn to be provident?—who, when they have no business here to employ them, nor public pleasures to divert them, yet even then kindly invent occasions to bring them thither, that at your own rates they may change their land for our wares, and have purposely avoided the coarse study of arithmetic, lest they should be able to affront you by examining your accounts.

'I wonder at your riches when I see you drink in a morning; but more at your confidence when I see graybeards come out of a tavern, and stay at the door to make the last debate of their business; and I am yet more amazed at your health when I taste your

wine; but most of all at your politics, in permitting such public poisoning, under the style of free mystery, to encourage trade and diligence. I would now make a safe retreat, but that, methinks, I am stopped by one of your heroic games called *foot-ball;* which I conceive (under your favour) not very conveniently civil in the streets, especially in such irregular and narrow roads as *crooked lane.* Yet it argues your courage much like your military pastime of throwing at cocks. But your mettle would be more magnified (since you have long allowed those violent exercises in the streets) to draw your archers from Finsbury, and during market let them shoot at butts in Cheapside. I have now no more to say but what refers to a few private notes, which I will give you in a whisper when we meet in Moorfields; from whence (because the place was for public pleasure, and to show the magnificence of your city) I shall desire you to banish the laundresses and bleachers, whose acres of old linen make a show like the fields of Carthagena when the five months' shifts of the whole fleet are washed and spread.'*

Some people, not without reason, have attributed that great start in sanitary improvement which at once put Britain beyond the reach of the old Oriental plague to the great fire of London in 1666. Though the pestilence ramified into other places, that immense mass of human beings collected together, without sewers, without water supply, without paved streets, without lamps, was the great corrupt heart where it fortified itself and gathered strength; and when a present calamity, fraught with future happiness to the land, reduced the rotting mass to dry unnoxious cinders, the awful epidemic, losing its place of strength and refuge, no longer devastated the country, leaving it with its minor nuisances to be the receipt of minor diseases, many of which, it is to be hoped, may be banished by like means after a new era in sanitary reform has fully opened on us. If the advice of that man of great sagacity and genius, Christopher Wren, had been adopted, London would have been the wonder of the world for openness, beauty, and healthfulness, and might have afforded to the rest of Europe an example that would have bequeathed less room for improvement to the present day. Ignorance, timidity, and selfishness, however, interfered with his noble design. But it was impossible to prevent the contrast being seen between his views and the architectural peculiarities under which the city had suffered so many dire calamities; and a great alteration appeared in the wide and straight streets, the paving, the supply of water, and the gradual adoption of sewerage. At the same time, all late metropolitan alterations have had a tendency to bring the city nearer, though by costly and difficult processes, to the magnificent simplicity of Wren's idea. In Swift's time, the description which he gives of

* Malcolm's London, pp. 455–458.

the termination of a city shower, shows that there was still abundant room for purification:—

'Now from all parts the swelling kennels flow,
And bear their trophies with them as they go;
Filths of all hues and odours seem to tell
What street they sailed from by their sight or smell;
They, as each torrent drives with rapid course,
From Smithfield to St 'Spulchre's shape their course,
And in huge confluence joined at Snowhill ridge,
Fall from the conduit prone to Holborn Bridge;
Sweepings from butchers' stalls, dung, guts, and blood,
Drowned puppies, stinking sprats, all drenched in mud,
Dead cats and turnip-tops come tumbling down the flood.'

It is believed that the comparatively airy streets and the handsome wholesome houses gradually tempted the Londoners, whom enterprise and industry were making rich, to desire new means of comfort and healthful enjoyment, and from being rather behind the rest of Europe in the outward marks of civilisation—a defect which would tell with the greater force, on account of the fast-rising bulk of the town—they came afterwards to be admired for the possession of cleanly substantial comforts unknown to their continental neighbours. M. de Grosley, writing about the middle of the last century, says with admiration that in London 'the plate, hearthstones, movables, apartments, doors, stairs, the very *street*-doors, their locks, and the large brass-knockers, are every day washed, scoured, or rubbed. Even in lodging-houses the middle of the stairs is often covered with carpeting, to prevent them from being soiled.'

PROGRESS OF HABITS IN SCOTLAND.

Scotland by no means kept pace with the progress thus made in the south; and though perhaps there may have been a good deal of similarity in the habits of the two monarchies in the sixteenth century, the Englishman of the eighteenth was disgusted by the filthiness of the people whenever he crossed the Border. Nothing affords better hope of future amendment than an internal consciousness of shortcoming; and the following curious act of the privy-council of Scotland, dated in the year 1619, seems to indicate that some effort had been even then made to remedy certainly very clamant abuses.

ACT ANENT THE BURGH OF EDINBURGH.

'Forsameikle as the burgh of Edinburgh, which is the chief and principal burgh of this kingdom, where the sovereign and high courts of parliment, his majestie's privy-council, and colledge of justice, and the courts of justiciarie and admiraltie are ordinarlie

huldin and kept, and whereunto the best pairt of the subjects of this kingdom, of all degrees, ranks, and qualities, has a common resort and repair, is now become so filthy and uncleane, and the streets, venallis, wynds, and closes thereof so overlaid and covered with middings and with the filth and excrement of man and beast, as the noblemen, counsellours, servitors, and others his majestie's subjects, who are lodged within the said burgh, cannot have a clean and free passage and entrie to their lodgings, wherethrow their lodgings are become so loathsome unto them, as they are resolved rather to make choice of lodgings in the Canongate and Leith, or some other parts about the town, nor to abide the sight of this shameful uncleanness and filthiness, whilk is so universall and abundant through all the parts of this burgh, as in the heat of summer it corrupts the air and gives great occasion of sickness. And further, this shameful and beastly filthiness is most detestable and odious in the sight of strangers, who, beholding the same, are constrained with reason to give out many disgraceful speeches against this burgh, calling it a most filthie puddle of filth and uncleanness, the like whereof is not to be seen in no part of the world, quhilk, being a great discredit to the whole kingdom, that the principal and head burgh thereof should be so void of police, civilitie, order, and good government, as the high streets of the same cannot be kept clean, and the lords of secret councill, understanding perfectly that the said burgh, and all the streets and venallis thereof may very easilie, and with little ado, be kept and halden clean, if the people themselves were well and civilly disposed, and if the magistrates took good care to cause them, and every one of them, keep the streets fornent their own bounds clean, as is done in other civil, handsome, and well-governed cities. Therefore the lords of secret councill commands and ordains, be thir presents, the provost and baillies of Edinburgh, to take and set down some settled and solid order and course, how the said burgh and clossis, wynds and streets thereof, may be halden and kept clean, the middingis and all other filth and uncleanness removed, and tane away, by appointing every neighbour of the town to keep the streets fornent his own dwelling clean, and that no neighbour lay their middingis, sweepings of their houses, or other filth, upon his neighbour's bounds and hie streets, under some reasonable paine to be imposed and exacted of the contraveners; and that the said provost and baillies appoint a constable for every class, to see their ordinance put in execution, and the contravenaris punished, by exacting of the said pains from them; certifying the said provost and baillies, if they be remiss or negligent therein, the said lords will take them to them, and accordinglie will take such order herein as they shall think expedient.'*

It is never natural for the human being to be in perfect and uncomplaining amity with filth. We thus find that, however obdurate a people may have become in their bad habits, scintillations

* Letters from the North; i. note, pp. 28–30.

of a disgust towards the existing, and a desire of a better system every now and then appear. In a volume of old pamphlets and placards, generally bearing date from the year 1710 to the year 1715, the following proposal, very rational and practical for its day, for cleansing the streets of Edinburgh, was discovered :—

OVERTURE FOR CLEANSING OF THE STREETS.

'Seeing the nobility and gentry of Scotland are, when they are abroad, esteemed by all nations to be the finest and most accomplished people in Europe, yet it is to be regretted that it is always casten up to them by strangers, who admire them for their singular qualifications, that they are born in a nation that has the nastiest cities in the world, especially the metropolitant. For remeid of which it is humbly proposed to his Grace his majesty's high commissioner, and the right honourable the estates of parliament, that if the magistrats of Edinburgh will give a tack of the whole muck of Edinburgh for a certain number of years, as they did some time ago at £500 sterling a year, this proposer will find sufficient caution that he will cause the whole streets, closes, courts, and turnpyks within Edinburgh to be paddeled and swept clean every morning, so that no nastiness nor glar shall be seen anywhere within the city, but shall be carried by carts without the city upon the undertaker's proper expenses, and that within an hour and a-half every morning before break of day, summer and winter, except Sunday; and such a course shall be taken that the streets upon Sunday shall be as clean then as on any other day in the week. And to convince your Grace and the honourable estates of parliament that the person who makes this overture is more concerned for removing the reproach that has for ever been upon our nation than for any private design of gain to himself, he is willing to pay £400 sterling a year, during the years of his tack, to the poor of Edinburgh.'

To show how far this, or any other effort to redeem the capital of Scotland from its scandal of filth was effective, the following characteristic details are given from the letters of Captain Burt, an English officer of engineers, who was employed in the construction of the military roads about the year 1725 :—

'According to your desire, I shall begin my account with the entertainment I met with after passing the Tweed at Kelso, but shall not trouble you with the exaction and intolerable insolence of the ferrymen, because I think you can match their impudence at your own horse ferry : I shall only say that I could obtain no redress, although I complained of them to the principal magistrate of the town.

'Having done with them, my horses were led to the stable, and myself conducted up one pair of stairs, where I was soon attended by a handsome genteel man, well-dressed, who gave me a kindly welcome to the house.

'This induced me to ask him what I could have to eat; to which he civilly answered, "The *good-wife* will be careful nothing shall be wanting; but that he never concerned himself about anything relating to the *public*" (as he called it)—that is, he would have me know he was a *gentleman*, and did not employ himself in anything so low as attendance, but left that to his wife. Thus he took his leave of me; and soon after came up my landlady, whose dress and appearance seemed to me to be so unfit for the wife of that gentleman, that I could hardly believe she was other than a servant; but she soon took care, in her turn, to let me know she was mistress of the house.

'I asked what was to be had, and she told me potted pigeons; and nothing I thought could be more agreeable, as requiring no waiting after a fatiguing day's journey, in which I had eaten nothing. The cloth was laid, but I was too unwilling to grease my fingers to touch it, and presently after the pot of pigeons was set on the table. When I came to examine my cates, there were two or three of the pigeons lay mangled in the pot, and behind were the furrows in the butter of those fingers that had raked them out of it: the butter itself needed no close application to discover its quality. My disgust at this sight was so great, and being a brand-new traveller in this country, I ate a crust of bread, and drank about a pint of good claret, and although the night was approaching, I called for my horses, and marched off, thinking to meet with something better. But I was benighted on a rough moor, and met with yet worse entertainment at a little house which was my next quarters. At my first entrance I perceived some things like shadows moving about before the fire, which was made with peats; and going nearer to them, I could just discern, and that was all, two small children in motion, stark naked, and a very old man sitting by the fireside. I soon went out, under pretence of care for my horses, but in reality to relieve my eyes and lungs of the smoke. At my return, I could perceive the old man's fingers to be in a very bad condition, and immediately I was seized with an apprehension that I should be put into his bed. Here I was told that I might have a breast of mutton done on the *brander* (or gridiron); but when it was brought me, it appeared to have been smoked and dried in the chimney-corner, and it looked like the glue that hangs up in an ironmonger's shop. This, you may believe, was very disgusting to the eye, and for the smell, it had no other that I could perceive than that of the butter wherewith it was greased in the dressing; but for my relief there were some new-laid eggs, which were my regale. And now methinks I hear one of this country say—"A true Englishman! he is already talking of eating."

'When I had been conducted to my lodging-room, I found the curtains of my bed very foul, by being handled by the dirty wenches; and the old man's fingers being present with me, I sat down by the fire, and asked for which of my sins I was sent into this country: but I have been something reconciled to it since

then, for we have here our pleasures and diversions, though not in such plenty and variety as you have in London.

'But to proceed: being tired and sleepy, at last I came to a resolution to see how my bed looked withinside, and to my joy I found exceeding good linen, white, well-aired, and hardened, and I think as good as in our best inns in England; so I slept very comfortably. And here I must take notice of what I have found almost everywhere, but chiefly in the Low Country—that is, good linen; for the spinning descends from mother to daughter by succession, till the stock becomes considerable, insomuch that even the ordinary people are generally much better furnished in that particular than those of the same rank in England: I am speaking chiefly of sheeting and table-linen.

'There happened nothing extraordinary between this place and Edinburgh, where I made no long stay. When I first came into the High Street of that city, I thought I had not seen anything of the kind more magnificent. The extreme height of the houses, which are for the most part built of stone, and well sashed; the breadth and length of the street, and (it being dry weather) a cleanness made by the high winds, I was extremely pleased to find everything look so unlike the descriptions of that town, which had been given me by some of my countrymen. Being a stranger, I was invited to sup at a tavern. The cook was too filthy an object to be described; only another English gentleman whispered me, and said he believed if the fellow was to be thrown against the wall he would stick to it. Twisting round and round his hand a greasy towel, he stood waiting to know what we would have for supper, and mentioned several things himself; among the rest a *duke*, a *fool*, or a *meer-fool*. This was nearly according to his pronunciation, but he meant a duck, a fowl, or a moorfowl, or grouse. We supped very plentifully, and drank good French claret, and were very merry till the clock struck ten, the hour when everybody is at liberty, by beat of drum, to throw their filth out at the windows. Then the company began to light pieces of paper, and to throw them on the table to smoke the room, and, as I thought, to mix one bad smell with another.

'Being in my retreat to pass through a long narrow wayside or alley, to go to my new lodgings, a guide was assigned me, who went before to prevent my disgrace, crying out all the way with a loud voice, "*Hud your haunde!*" The throwing up of a sash, or otherwise opening a window, made me tremble; while behind and before me, at some little distance, fell the terrible shower. Well, I escaped all the danger, and arrived not only safe and sound, but sweet and clean at my new quarters; but when I was in bed, I was forced to hide my head between the sheets, for the smell of the filth thrown out by the neighbours on the backside of the house came pouring into the room in such a degree I was almost poisoned with the stench.

'I shall here add to my letter, as I am making a copy of it, a few observations.

'When I was last in Edinburgh, I set myself to consider of this great annoyance, and in conclusion found it remediless. The city, it seems, was built up on that rock for protection by the castle in dangerous times, but the space was too narrow to contain a sufficient number of inhabitants, otherwise than by very high buildings, insomuch that there are hardly any back-yards. Eight, ten, and even twelve storeys have each a particular family, and perhaps a separate proprietor, and therefore anything so expensive as a conveyance down from the uppermost floor could never be agreed on; or could there be made within the building any receiver suitable to such numbers of people. There is, indeed, between the city and the sea a large flat space of land, with a rivulet running through it, which would be very commodious for a city; but great part of it has been made the property of the corporation, and the magistrates, for the time being, will not suffer any houses to be built on it; for if they did, the old city would soon be deserted, which would bring a very great loss upon some, and total ruin upon others of the proprietors in those buildings.

'I have said this much upon this uncleanly subject, only, as you may have heard some maliciously, or at best inconsiderately, say, that this evil proceeds from (what one would think nobody would believe) a love of nastiness, and not necessity. I shall only add, as it falls in my way, that the main street is cleaned by scavengers every morning early, except Sunday, which therefore is the most uncleanly day.'*

Another English traveller who passed through the country about twenty or thirty years later, though a less lively and discursive writer, has substantially the same features to describe. He says—

'Claret I found here in great plenty, and very cheap, and the best fish in abundance; but the cookery was so nasty, as also the women; and the towns, as is too generally the case throughout North Britain, so stinking with ——, that it was impossible to avoid loathing such jakes's as I found myself among.' And talking of Edinburgh, as built rather for defence than health, he says—'By this means the city lies under such inconveniences as are made a subject of reproach to some, as if the people delighted in stench and nastiness; whereas were any other people to live under the same unhappiness of a rocky and mountainous situation, a throng of buildings from eight to twelve storeys high, a difficulty of obtaining water (that little they have being to be carried up to the uppermost apartments), we should find a London or a Bristol as dirty as Edinburgh, and perhaps less able to make their dwellings tolerable, at least in so narrow a compass; for though many cities have more people in them, yet I believe there is none in the world where so many people live in so little room.

'But although I have made these excuses for the nastiness of this place, yet cannot the fact be denied. In a morning earlier than

* Letters from the North of Scotland, vol. i. pp. 12–20.

seven o'clock, before the —— are swept away from the doors, it stinks intolerably; for after ten at night you run a great risk if you walk the streets of having —— thrown upon your head; and it sounds very oddly in the ear of a stranger to hear all passers-by cry out, as loud as to be heard to the uppermost storeys of the houses, which are generally six or seven high in the front of the High Street, "Houd yare hoand;" that is, hold your hand, and throw not till I am past.' *

'I nose you, sir,' was the remark which Johnson made as he passed through the High Street in 1774. Even Smollett, with his national partialities, could not avoid a few regretful sarcasms on this subject. Young Melfort, in the expedition of Humphry Clinker, says on approaching Edinburgh, 'The first thing that strikes the nose of a stranger shall be nameless;' and his Uncle Bramble, with more practical distinctness, says—'You are no stranger to their method of discharging all their impurities from their windows at a certain hour of the night, as the custom is in Spain, Portugal, and some parts of France and Italy—a practice to which I can by no means be reconciled; for notwithstanding all the care which is taken by their scavengers to remove this nuisance every morning by break of day, enough still remains to offend the eyes as well as other organs of those whom youth has not hardened against all delicacy of sensation. The inhabitants seem insensible to these impressions, and are apt to imagine the disgust we avow is little better than affectation: but they ought to have some compassion for strangers, who have not been used to this kind of sufferance.' Nor does Mistress Winfred Jenkins, with her tidy English notions, forget to describe her own sensations. After lamenting the want of 'anything for poor servants but a barrel with a pair of tongs thrown across,' she has the horror to record, that 'at ten o'clock at night the whole cargo is flung out of a back window that looks into some street or lane, and the maid calls *Gardy loo!* to the passengers, which signifies *Lord have mercy upon you!* and this is done every night in every house in Hadinburgh; so you may guess, Mary Jones, what a sweet savour comes from such a number of profuming pans! But they say it is wholesome, and truly I believe it is; for being in the vapours, and thinking of Isabell and Mr Clinker, I was going into a fit of astericks, when this wiff, saving your presence, took me by the nose so powerfully, that I sneezed three times, and found myself wonderfully refreshed.'

National peculiarities so deeply seated are not easily eradicated. Although during the past sixty years there has been a greater amount of progress actually made on the north than on the south

* A Tour through Great Britain in 1769, iv. pp. 62, 87.

of the Border, neither the public arrangements for cleansing, nor the habits of the people themselves, are in Scotland nearly what they are in England. It is still the unfortunate peculiarity of the Scottish towns, and especially of Edinburgh and Glasgow, where the greater size magnifies the evil, that the revolting objects—elsewhere seen only in the most wretched and impoverished districts—are found closely nestling round comfort and easy circumstances. The High Street and the Cowgate of Edinburgh, rich in architecture and historical associations, are saturated with a mass of filth which completely taints the air, and makes the stranger, as he passes through it, reflect to himself if such be the odour which these houses cast into the open air, what must they be within! Horrible, indeed, are the poisoned gases with which they are filled—horrible the narrow closes, used for all disgusting purposes, by which entrance to them is found. But even in the magnificent squares and crescents which architectural ambition has raised in contrast with the gloomy dwellings of the old fighting Scots, there are remnants of the ancient spirit, and 'mine own romantic town' requires a thorough cleansing before it can accomplish its magnificent capabilities for purity and healthfulness. As an instance of the careless manner in which traditional indifference teaches the better classes even to overlook what in its nature is disgusting and offensive, strangers have been astonished to remark that many of the shopkeepers who supply articles of food in Edinburgh lay them out in the open street or pavement near their shop-door, that they may the more readily attract the notice of passengers. There may be often seen in a row cheeses, open barrels of herring, and kits of butter, with bags of figs, &c. Every dog that passes applies his nose, and then having satisfied himself, proceeds to do as Launce's dog did by the lady's farthingale. Nor does this seem to render the commodities unpopular. On the contrary, from the systematic manner in which the exposure is pursued, it might be inferred that the impregnation to which the articles are subjected is supposed to give them a desirable zest.

DISEASES THAT HAVE DISAPPEARED IN THE COURSE OF CIVILISATION.

Reverting to the improvement which the lapse of nearly two centuries has shown in the habits of the European people in general, but especially of the British, it is a circumstance full of hope to observe that that change has been accompanied not only with a reduction of the horrors of disease, but with the total disappearance of some dreaded disorders. It is said by Dr Laycock—

'The epidemics of the middle ages were in fact so fatal and destructive, almost solely in consequence of the deficient architectural

arrangements of the towns, and the want of cleanliness. The population of Europe was thus kept down by pestilence, as well as by war and famine, and its social progress retarded to an extent really incalculable. If, throughout England, the cholera of 1832 had been one-half only so fatal as the black death of 1349, or even as several of the later epidemics, the frameworks of society would have been loosened, and the empire in danger of being broken up. Those acquainted with the social effects of these scourges upon the thinly-scattered population of the middle ages, would anticipate no less than this, from the destruction of 5,000,000 or 6,000,000 of persons in England within a few months. The utter depreciation of property, terror, despair, and a total abandonment of all social ties, would have been the consequence. In 1348, the people in general thought the springs and wells were poisoned, and thousands of Jews were slain with fire and sword as the poisoners, in conjunction with hundreds of Christians, their supposed accomplices. During the cholera epidemic in Europe, similar suspicions were muttered against medical practitioners, as well in England as on the continent; and some were even murdered in the streets of continental cities by mobs. Indeed it is but too probable that if the deaths from cholera in England had increased, so as to equal the mortality from the black death, the popular frenzy would have wreaked itself in an irresistible paroxysm of national mania, first on the practitioners, and then on any class to which private malice might direct its malignant attention. It must be remembered, government was quite unprepared for results of this kind; the mortality only was thought of. In about forty-nine years, the population of England, already one of the most densely-populated countries in Europe, will have doubled; and as the political danger of destructive epidemics increases with the population, it becomes an imperative duty to ascertain whether we are quite safe from the recurrence of these scourges; and if not, whether we have the means of placing ourselves beyond their reach. The state of our large towns and villages sufficiently answers the first; we certainly are *not* safe. With respect to the second, the more researches into the history of epidemics are prosecuted, and their nature ascertained, the more clearly it will appear, that by an improved system of public hygiene, society may be so shielded from their ravages as almost in effect to disarm them.'*

The disease called the Black Death, of which an account will be found in the preceding part, has been unknown for centuries. The sweating sickness, once a terrible national peculiarity, has not visited the country since the reign of Henry VIII. The great plague of 1665 was the last occasion on which the pestilence—breaking out in fierce boils and gangrenes, which was a visitor during the last century in other parts of Christian Europe, and yet curses the East—has been known in our land. Hecker mentions two

* Laycock's Report on the Epidemics of York.

dreaded pestilences of the sixteenth century, unknown in later times, at least as epidemic diseases—the one the Hauptkrankheit, or head-malady, 'that brain fever which so often recurred in the central parts of Europe;' the other, an inflammation of the throat, 'so rapid in its course, that unless assistance were procured within the first eight hours, the patient was past all hope of recovery before the close of the day.'*

The disease of leprosy, or, as it is technically called, *tubercular elephantiasis*, was so widely prevalent all over Europe in the dark ages, that it seems, in its sweeping magnitude, to have obscured the mere existence of other diseases, unless the plague or the sweating sickness happened to be in its immediate neighbourhood. Almost every considerable town has the tradition of its leper or lazar-house, and extensive domains were dedicated to St Lazarus, the patron saint of lepers, to be applied to the benefit of the sick. 'This malady,' says Professor Simpson of Edinburgh, 'is now almost entirely, if not entirely, unknown as a native endemic disease in any part of the continent of Europe; and yet, from the tenth to the sixteenth century, it prevailed in nearly every district of it. Laws were enacted by princes and courts to arrest its diffusion; the pope issued bulls with regard to the ecclesiastical separation and rights of the infected; a particular order of knighthood was instituted to watch over the sick; and leper hospitals or lazar-houses were everywhere instituted to receive the victims of the disease.'† The order of knighthood here alluded to is that of the Hospitallers, known also as that of St Lazarus, though at one time these seem to have been a separate body. The centre of their establishment was at Jerusalem, and their name was derived from the Hospital for Pilgrims there dedicated to St John. Their original function was to tend and protect the sick and infirm generally, but the obligation of their vow came to be 'to exercise charity and works of mercy towards the poor, and particularly lepers;' and this class of sufferers seem to have finally absorbed all the attention of the order, insomuch that, though they became a haughty and imperious body of knights, with great possessions, it was a principle among them that they might lawfully elect a leper as their grand master.

It was a general creed that leprosy was incurable, and it was part of the indictment against a poor woman charged with witch-craft in Scotland that she had engaged to cure this disease, 'which the maist expert men in medicine are not able to do.'‡ Michael Scott of Balwearie, who lives in popular fame as a great

* Epidemics of the Middle Ages, pp. 223–224.

† Antiquarian Notices of Leprosy and Leper Hospitals.

‡ Pitcairn's Criminal Trials, ii. p. 29.

wizard, sententiously pronounces, however, that 'it ought to be known that the blood of dogs and of infants two years old or under, when diffused through a bath of heated water, dispels the leprosy without a doubt.' But a high practical authority confirms the doctrine of the witch's indictment in these words:—'At the present day tubercular leprosy is still regarded as a disease which sets at defiance all the powers of the medical art.'*

It is not to curative, but preventive remedies—to the circumstance that at least the greater part of the population of the European towns are not living in their old filth and misery—that we must attribute the absence of this scourge. In Leviticus we can plainly trace precautionary arrangements against the disease, resting on the removal of indications of dampness and vegetable decomposition, phenomena which, when appearing in connection with a dwelling-house in hot Eastern climes, indicate a deadly external poison:—

'And he [the priest] shall look on the plague, and behold, if the plague be in the walls of the house with hollow streaks, greenish or reddish, which in sight are lower than the wall, then the priest shall go out of the house to the door of the house, and shut up the house seven days: and the priest shall come again the seventh day, and shall look: and behold, if the plague be spread in the walls of the house, then the priest shall command that they take away the stones in which the plague is, and they shall cast them into an unclean place without the city: and he shall cause the house to be scraped within round about, and they shall pour out the dust that they scrape off without the city into an unclean place: and they shall take other stones and put them in the place of those stones; and he shall take other mortar, and shall plaster the house.' †

EVILS OF PART OF THE POPULATION BEING LEFT IN BARBARISM WHILE THE OTHER IS ELEVATED ABOVE IT.

There is much reason to believe that though improved habits, and the progress of civilisation, have thus put to flight some of the diseases with which the human race had to combat, yet that this fortunate consummation has not arisen so much from a general and uniform progress on the part of all classes of the people, as from great and material improvements confined to particular classes, which have raised the dead marshy level, as it were, of human degradation by some elevations here and there rising to the pure air. There are some diseases which appear in an aggravated and appalling form when they have the whole race as their prey, and which are interrupted and mitigated by coming in contact with conditions hostile to their operation. Physicians tell us

* Simpson's Antiquarian Notices, p. 13. † Leviticus, xiv. 37–42.

that though we no longer have the plague, yet that typhus fever is the same disease in a modified form—deadly enough in its smaller ravages, but not sweeping all society before it with so huge and devouring a flame. A writer who had seen much of the plague abroad, and of the state of our population about the middle of last century, then expressed the following views, which have been confirmed by enlightened physicians of the present day:—

'If in the sultry months we examine into the diseases of Newgate, the Savoy, or any of the jails in England, or those of other cities in Europe, we shall find a pestilential disease every year in them, though not so malignant as the pestilence in sultry climes, nor of so long continuance, yet sufficient to destroy many of the prisoners. And this disease is also contagious, because it takes its origin from putrid air. Mariners also, in long voyages, especially those belonging to the navy, frequently too have felt the experience, not so much from the coarse diet, as from the ships being crowded with such numbers of men, from whose breath and bodies arise hot steams, which shows the necessity of ventilators to draw forth the corrupted air, and at the same time to refresh them with better.

'The breaths of people confined a short time will destroy themselves; as, about nine years ago, in St Martin's prison, many being close shut up, some died in a few hours.

'Such like epidemical diseases are not confined to jails, navies, or camps, but they are almost yearly felt in many cities, and sometimes they are so virulent even as to be contagious, terminating in *carbuncles, one of the true symptoms of the plague;* so that we may affirm, that every year we are afflicted with the plague, in a more mild degree, than those cities which lie in the southern latitudes.' *

It is doubtless the case that the industrious and discreet portion of the working-classes have made great progress in wellbeing, comfort, and pure habits, but it does not follow, because many diseases are mitigated, and others are banished, that there is not still a portion of our population as degraded and as miserable as a larger portion were in the days of the great plagues or the sweating sickness. It is indeed just the circumstance that not only through their own fault, but through many adventitious causes, for which others are to blame, there *is* a part of our population which has not gone on with the rest, but remains in the old degradation of barbarism, that sanitary intervention is so imperiously called for. Many reflections connect themselves with the view here brought out, that what were once the habits and position of the higher, remain in many respects those of the humbler classes. When a man is in no respect better off than the

* Ingram on the Plague.

rest of his race, he feels his wants but imperfectly. The adjuncts of wealth and civilisation must appear existing in the possession of others before he experiences the want of them in his own person. Hence the old feudal baron who lived without light or air, with a few rotting rushes on his earthen floor instead of a carpet, who was surrounded, when he kept the shelter of his fortified roof, with offensive objects and noxious smells that poisoned his breath, could have little sensation of hardship in his fate, since general ignorance made it that of the wealthy and powerful as well as the lowly, and he beheld no more fortunate neighbour whose lot he might envy.

But it is otherwise with the poor of the present day. While steeped in physical degradation themselves, and subject to its deadly influences, they see the blessings of health, comfort, and purity profusely distributed around them. They have evidence all too strong that to be removed from the obnoxious influences under which they suffer is completely within the compass of human art. They see this often with a consciousness that their more fortunate fellow-creatures, instead of stretching forth a hand to help them out of their degradation, have selfishly and oppressively employed their power and influence, as owners of property, in increasing their own gains at the sacrifice of human health and life. Wherever the humble artisan finds that in the spot to which his labour calls him the avaricious owners of the soil, in their desire to make gain, have crowded human habitations together so densely, that he cannot find a place of shelter among them without injury to his health, he has to complain that the wealth of the wealthy, instead of being directed in a channel of kindness and mercy, has been employed to his direct detriment in the most vital interest which he has at stake. When asked by the commission on the state of large towns, 'Do not the humbler classes require even greater facilities for cleanliness than the wealthier?' Dr Southwood Smith had to say, 'Yes; it happens, unfortunately, that while the humbler classes naturally require in their localities and dwelling-houses greater helps to cleanliness than the classes above them, the former have invariably had less of these external aids than the latter. People in good circumstances, who live in good houses, in the more open and less densely-populated neighbourhoods, can maintain tolerable cleanliness with fewer facilities for that purpose than the poor who live in small houses, and in close and crowded localities. Yet, as a general rule, while the best class of streets are cleansed once a week, the second class are cleansed only once a fortnight, the third class only once a month, and the worst class never; though of course the worst—for the very reason that they are

the worst—ought to be cleansed daily. In like manner with regard to dwelling-houses, it is the smallest and the least-convenient that have no water laid on, that are without privies, and that are wholly destitute of every other means of removing excrementitious and noxious matter.'

A quantity of evil feelings are nourished by the inequality here alluded to. The sense of inferiority, and inferiority in a degrading shape, is itself noxious to the moral feelings and to the peace of society; and thus brutalising as it must have been to the higher classes of old to live as they did, it is far more so to the class that so continues to subsist and looks to another raised far above it in purity and moral dignity. But these evil agencies are greatly increased when to the feeling of inferiority there is added a sense of selfish oppression, and the result is the production of those terrible consequences to the peace and morality of society which are elsewhere more fully developed. We are retaught in these considerations the perpetual lesson of dependence on each other —the precept that we must not leave our brethren to sink unheeded in the great sea of worldly miseries and afflictions, unless we would incur the risk of being dragged down by them into the vortex. The progress which the upper classes have made shows us the standard to which the others ought to be elevated, so far as the work can be accomplished without invading their independence, or doing for them what it is right that they should do for themselves. Indeed when the efforts in favour of sanitary arrangements are properly directed, instead of interfering with the free-will and self-respect, or superseding the proper duties of the people to themselves, they remove impediments and noxious agencies which selfishness or barbarism have set in their way, and afford them free room for following those simple rules conducive to health, which but very little reason and knowledge are required to enable them to practise, if they are so fortunate as not to be surrounded by adverse and corrupting agencies.

PART IV.

THE PRACTICABILITY OF INCREASING THE DURATION OF LIFE, AND IMPROVING HEALTH.

DISEASES HAVE REMOVABLE CAUSES—DIFFERENCES IN HEALTH; COUNTRY AND TOWN; RICH AND POOR—REMOVAL OF THE CAUSES OF DIFFERENCE—INSTANCES WHERE IT HAS BEEN DONE—ILLUSTRATIONS OF THE EFFECT OF SANITARY ARRANGEMENTS IN PRISONS—ILLUSTRATIONS ON SHIPBOARD—ANSON AND COOK—DEDUCTIONS FROM THE EFFECTS OF SANITARY ARRANGEMENTS ON SHIPBOARD—APPLICATION TO MANUFACTURERS—APPLICATION TO HOUSE PROPRIETORS.

DISEASES HAVE REMOVABLE CAUSES.

Having considered the circumstances which show how great is the extent of mortality in this country by diseases cutting off the population before they would die by the natural operation of the decay of nature, let us look at those circumstances which indicate a probability of this evil being capable of alleviation by human means. All diseases must have their causes, proximate or remote; and if any one of these causes had been removed, it is rational to believe that the corresponding disease would not have occurred. What makes the physician's science so complicated and difficult, is the variety of causes that are all at work, and their unseen operation within the living body. The engineer, when his steam-engine goes wrong, can find out the precise cause—a valve is loose, a tooth is broken in a wheel, a band has given way, &c. A most satisfactory certainty attends on all his proceedings, and he can put his machine into working order at all times when he thinks fit. If he could not take it to pieces, but had merely to judge from the bad working that something was wrong, and had to guess at the nature of the defect from the experience of a number of cases where a certain operation put the machine into order again by remedying the defect, he would then be in much the same position as the physician whose remedies are founded on a sort of highly-skilful guess-work. The physician sees certain external symptoms of a disease. His knowledge, acquired by reading and experience, tells him that in very many instances where the same symptoms have appeared, some particular remedy has

removed them by affecting their causes, and he applies it. But the most skilful in the profession know how many chances there are of mistake and failure, and how likely they are to miscalculate the actual source of the disease among the many complex causes that, unseen to them, may be at work.

It cannot, however, be for a moment supposed that disease, which is the effect, is produced without a cause; and though we may not be able in each case to specify the exact agent that has been at work, yet we can guess at it so far as to know that there are such agents in abundance; and that, if we remove them in great masses, there will necessarily be a corresponding decrease in the effects which they produce, these effects being disease and death. To take a simple instance: although we might not be able to say whether a gunshot wound, received in a particular part of the body, would prove fatal or not, its fatality depending perhaps on the state of the blood, or of the respiratory organs of the person shot, and upon many other contingencies, yet every one knows, as a general fact, that gunshot wounds do produce death; and that, if a detachment of soldiers should be brought out to fire upon a mob, a revocation of the order to fire would in all human probability prevent some deaths taking place. In like manner the experience of physicians will show them that a certain gas is destructive to life; and though they cannot say perhaps how far any individual, by breathing a small portion of it, may be affected, yet if it enter the rooms where a large number of people sleep, it will kill some of them, and life will be saved if it or its producing cause can be removed.

DIFFERENCES IN HEALTH; COUNTRY AND TOWN; RICH AND POOR.

That human precaution can be the means of removing these noxious agencies, and thus preventing the loss of life, is practically proved by the circumstance, that it has already often removed them with that effect; that in places where they have been allowed to remain at work, the people have died in greater proportions, and at an earlier period of life, than in those which have been cleared of them. In the Registrar-General's Report already referred to, we find two districts compared with each other, one of twenty-five towns, another of seven counties. The number of deaths in the former from all causes whatever was 51,492, while in the county districts it was 33,039. Yet out of this smaller number, when we come to notice the deaths from old age, they amounted to 4699, while out of the much larger amount of deaths in the town districts, the number that had survived causes of premature disease to die of old age was only 3525. In round numbers, a seventh part of the country population has thus been allowed to run the natural course of

their days, while only a twelfth of the town population have had the same good fortune to avoid the snares which disease and accident have laid for them. The analysis of the different diseases in the table in question of course showed the converse of this in a very great increase of the numbers falling from disease in the town over the country districts; so the deaths from epidemic and contagious diseases were in the former 10,745, and in the latter 5460; the deaths from diseases of the respiratory organs were in the former 14,903, and in the latter 8865; and the deaths from diseases of the digestive organs were in the former 4394, and in the latter 1800. In the report from which these facts are taken, the Registrar-General, endeavouring to account for the greater mortality of town over country districts, proceeds to say—

'The atmosphere, besides oxygen and nitrogen, contains carbonic acid and aqueous vapour. The mean proportion of carbonic acid is 49 volumes in 100,000 volumes of air, according to the younger Saussure; who also states that it varies from 37 to 62 volumes. Mr Coathoupe has estimated the quantity of air which passes through the lungs of a man of ordinary size in 24 hours at 267 cubic feet, of which nearly 8 per cent. by volume, or 21 feet, are exchanged for carbonic acid;* the bulk would be equivalent to a cube of 6·4 feet. If, for a mere illustration, we assume that on an average 16 cubic feet of the gas are thrown off from the skin and lungs of each person, 30,000,000 cubic feet will be exhaled daily by the population of the metropolis, distributed over an area of about 1,951,000,000 square feet. Add the amount of the same gas formed by animals of every kind—fires, lamps—and multiply the sum by 100, inasmuch as respiration for several hours in air which contains 1 or 2 per cent. of carbonic acid has been found to produce alarming effects (Broughton), and it will be seen that, without effectual means of dispersion, the amount of air vitiated in the metropolis by this element alone would be by no means inconsiderable.

'Is the excessive mortality, then, in towns to be ascribed to the accumulation of carbonic acid, or of any similar gas, which is so rare as to be innoxious in open districts? It was natural, when it had been discovered that carbonic acid mixed in air destroyed animals, and after many accidents in mines and closed chambers had been traced to this agent, to ascribe the excessive mortality of towns to the same cause. Further investigation must show, I think, that it has but a small share in raising the mortality of towns, the provision for its dispersion is so complete.'

Enlarging, then, on a number of facts which tend to show that the mortality is not attributable to carbonic acid gas, he proceeds to say—

'Carbonic acid and other noxious gases can, as is well known, be

* Graham's Chemistry, p. 1016.

confined for a time in well-closed apartments, and oxygen can be excluded; but the dispersive force is so great, that chemists have seldom succeeded in detecting any difference in the proportions of the gases, even in the air of crowded hospitals. If any difference exist, it must be small, and might have a slight effect on health, but, as the experience of our collieries proves, would not raise the mortality to anything beyond a fraction of 40 per cent.; besides, the country is exposed as well as the town population to the influence of deleterious gases in the close chambers of small cottages.

'It is, then, to matters suspended in the atmosphere of cities that the excessive mortality must be referred. Smoke is heated gas, carrying with it unburnt particles in suspension; the carbonic acid is scattered immediately by its diffusive velocity, and the particles of solid matter, carried up by the heated air into the sky, disperse, become invisible, and fall around insensibly, in a clear atmosphere, or at a distance when there is any wind. If watery vesicles are also suspended in the air, the column of smoke ascends but a little, carbonic acid is absorbed, the carbon imbibes water and air, it mixes with the watery cloud, and all the phenomena of a London fog are produced. These fogs form apparently when the temperature of the Thames is higher than the temperature of the air,* which is calm (or if there be any wind, it is nearly saturated), the fogs generally disappearing as the temperature of the air is raised by the sun.

'That the smoke is irritating to the air-passages, injurious to health, and one of the causes of death, to which the inhabitants of towns are more exposed than the inhabitants of the country, is probable; but if the effect were very considerable, it would be most evident in the dense fogs, when the atmosphere is loaded with smoke, and is breathed for several consecutive hours by the population—men, women, and children. Now we have never observed any connection between the increase of the mortality and the London fogs. The diseases, again, caused by smoke must be of a mechanical nature, and affect the lungs and air-passages; it may increase the pulmonary diseases, but will assuredly not produce scarlatina, measles, typhus, and other diseases which prevail in towns.

'There is another class of agents. In a school-room, say there are 100 children: a child is brought in for a few hours in a state of scarlatina. The children have not had the disease before: 10 of them are affected. If 10 children with scarlatina were introduced,

* I believe that no comparative observations have hitherto been made in London on the temperature of the air and river; but Professor Fournet has shown, from the observations of four years at Lyons, on the confluence of the Rhone and Saône, that the temperature of the rivers from November to March is considerably higher than the mean temperature of the air. The fogs set in in November.—*Météorologie de Kaemtz.*—(Note by French translator, Ch. Martins, p. 111). Kaemtz remarks (p. 113) that '50 lbs. of incandescent carbon, exposed in the open air, will weigh from 105 to 107 lbs. in the course of a few days; a fact well known in powder-mills. Hence the particles of carbon in escaping from the chimney absorb air, and become heavier. Nevertheless the wind may carry them to a distance; but if the air be calm and humid, the specific gravity of the particles augments rapidly; they mingle in the fog, and spread over the neighbourhood.'

and the room were ill ventilated, 30 or 40 of the children might be affected. If the sick children had small-pox, measles, or hooping-cough, instead of scarlatina, those diseases would be communicated. If dysentry, cholera, typhus, and plague patients are frequently introduced into barracks or workhouses, a certain proportion of the inmates are affected. The numbers who are attacked by an infectious disease depend upon—1*st*, The susceptibility of the persons exposed (if the children in the school-room had previously had small-pox, or been vaccinated, a very small proportion of them would be infected by breathing the small-pox atmosphere); 2*dly*, On the strength of the zymotic matter, which varies in the stages and forms of the several diseases; and 3*dly*, On the density and ventilation of the room. If 100 healthy persons were placed in a room with 10 sick persons, and the room were small, the doors and windows closed, the greatest number possible would be infected; if they went through the disease in the same circumstances, the mortality would also be the greatest possible. So, if public buildings, in which crowds of people assemble, were well supplied with pure air, it would be quite safe to resort to them; but as opera-houses, theatres, concert-rooms, lecture-rooms, Exeter Hall, chapels, churches, and large workshops, are not yet provided with proper mechanical means of ventilation, and the air is not withdrawn with sufficient rapidity when they are filled with people, the walls reek with the breathed atmosphere; and if any epidemic, such as influenza, be rife, several persons affected with the complaint are present, and great numbers are infected; the headache and oppression which come on are the first and often not the last symptoms. This is literally "taking poison;" but it is generally called "taking cold," through the common prejudice of ascribing all our maladies to sensible causes. It is an error to suppose that rooms are healthy when they are not hot; but the heat which is generated may increase the effect of the zymotic matter.

'Certain substances, then, taken from the bodies of the sick, produce, when introduced into other bodies, a series of phenomena, developed according to a determined type: *Varioline* (small-pox matter) for instance, produces small-pox. These substances have the same relation to diseases as ferments have to well-known chemical processes. Several of them float in the air, and form an atmosphere, the density of which is in proportion to the proximity of the bodies by which it is given off, and to the greater or less facility for escape. The 267 cubic feet of air passing through the lungs daily, if charged with these particles, will bring them into contact with the blood.

'What are the physical properties and chemical nature of these morbific particles? Chemistry has left us much in the dark; but until English chemists enter seriously upon the investigation of this subject (which is of inconceivable importance), we may accept the well-supported hypothesis of Professor Graham:—

"Of the odoriferous principles of plants, the miasmata of marshes, and other matters of contagion, the presence, although sufficiently obvious to the sense of smell, or by their effects upon the human con-

stitution, cannot be detected by chemical tests. But it may be remarked, in regard to them, that few or none of the compound volatile bodies we perceive entering the atmosphere could long escape destruction from oxidation. The atmosphere contains, indeed, within itself, the means of its own purification, and slowly but certainly converts all organic substances exposed to it into simpler forms of matter, such as water, carbonic acid, nitric acid, and ammonia. Although the occasional presence of matters of contagion in the atmosphere is not to be disputed, still, it is an assumption without evidence that these substances are volatile or truly vaporous. Other matters of infection, with which we can compare them, such as the matter of cow-pox, may be dried in the air, and are not in the least degree volatile. Indeed volatility of a body implies a certain simplicity of constitution and limit to the number of atoms in its integrant particle, which true organic bodies appear not to possess. It is more probable that matters of contagion are highly organised particles of fixed matter, which may find its way into the atmosphere, notwithstanding, like the pollen of flowers, and remain for a time suspended in it; a condition which is consistent with the admitted difficulty of reaching and destroying those bodies by gaseous chlorine, and with the washing of walls and floors as an ordinary disinfecting practice."*

'It is quite certain that animal matter is exhaled from the pulmonary and cutaneous surfaces. The particles are small and rare; but, according to Graham, they are inelastic; they are without that diffusive force inherent in gases and vapours, and will therefore only spread through the air like vesicular water, or fine dust over smooth water. When the breath is expired in winter, it passes from the lungs with a certain force; but it soon separates into two portions: 1*st*, The carbonic acid which would fall to the ground if it were not dispersed in all directions by the diffusive force; and 2*dly*, The aqueous vapour which ascends with the heated air and particles of animal matter; the air to mix in air, the water to be condensed, fall, or be dispersed, and the animal matter to float, fall, or be decomposed in the air. In a crowded room, theatre, or church, the carbonic acid is dispersed through every aperture at a retarded velocity. The gas exhaled from the body does not ascend to the roof, as is sometimes supposed, when the temperature of the room is low, for the specific gravity of carbonic acid is 1·524; and as the density is inversely as the volume, and gases expand $\frac{1}{4}\frac{1}{5}\frac{1}{3}$ part (Rudberg) for every degree of Fahrenheit, it only becomes lighter than air when 258 degrees hotter. The carbonic acid emitted from the lungs at a temperature of 100 degrees is more than a third heavier than air at 40 degrees; its density is 1·359, air being 1·000. The carbonic acid emitted by the candles or gas of a room is more than as light again as air; but it soon cools, and grows heavier, and, if it were not for the diffusive force, would fall to the ground. Gases

* Graham's Elements of Chemistry, p. 281. Henry on Disinfection, Phil. Mag., second series, vol. x. p. 363; xi. p. 22, 207 (1832).

cannot remain permanently at the upper or lower parts of any apartment or edifice in other proportions than they exist in the atmosphere; it would be easier for a torrent to stand still on a mountain declivity. They disperse, and can only accumulate around their source when generated rapidly. But particles in suspension*—inelastic, smaller, lighter than motes in the sunbeam—stagnate in air, and can only fall to the ground, or be carried away with the fluid in which they float. Smoke and organic atoms are removed from a room in the same way—by replacing all its gaseous contents; and particles of both are left adherent to the exposed surfaces, but in quantities smaller in proportion to the velocity of displacement.

'Every population throws off insensibly an atmosphere of organic matter, excessively rare in country and town, but less rare in dense than in open districts; and this atmosphere hangs over cities like a light cloud, slowly spreading—driven about, falling—dispersed by the winds—washed down by showers. It is not *vitalis halitus*,† except by origin, but matter which *has lived*, is dead, has left the body, and is undergoing by oxidation decomposition into simpler than organic elements. The exhalations from sewers, churchyards, vaults, slaughter-houses, cesspools, commingle in this atmosphere, as polluted waters enter the Thames; and notwithstanding the wonderful provisions of nature for the speedy oxidation of organic matter in water and air, accumulate, and the density of the poison (for in the transition of decay it is a poison) is sufficient to impress its destructive action on the living—to receive and impart the processes of zymotic principles—to connect by a subtle, sickly, deadly medium, the people agglomerated in narrow streets and courts, down which no wind blows, and upon which the sun seldom shines.

'A small quantity of organic matter can only escape with the carbon and aqueous vapour (37½ ounces daily, according to Dalton) from the skin and lungs. The presence of a putrid atmosphere is perceived by the senses in parts of all towns; and Liebig, by operating on large masses of the atmosphere, has obtained ammonia, which is a product of the putrefaction of animal matter. The existence in the atmosphere of organic matter is therefore incontestable; and as it must be most dense in the densest districts, where it is produced in greatest quantities, and the facilities for decomposing it in the sunshine and sweeping it away by currents of wind are the least, its effects—disease and death—will be most evident in towns, and in the most crowded districts of towns.

'It is to this cause, it appears to me, that the high mortality of towns is to be ascribed; the people live in an atmosphere charged with decomposing matter of vegetable and animal origin; in the open country it is diluted, scattered by the winds, oxidised in the sun; vegetation incorporates its elements, so that, though it were formed, proportionally to the population, in greater quantities than in towns, it

* 'See some good remarks by Kaemtz on the suspension of clouds.—*Météorologie* (French translation), p. 121.'

† Pliny.

would have comparatively less effect. The means of removing impurities in towns exist partially, and have produced admirable effects; but the most casual observation must convince any one that our streets were built by persons ignorant as well of the nature of the atmosphere, as of the mortality which has been proved to exist, and is referable to causes which, though invisible, are sufficiently evident. The difference of the polluted and the pure atmospheres described by Milton is felt—

> "As one who long in populous city pent,
> *Where houses thick and sewers annoy the air*,
> Forth issuing on a summer's morn, to breathe
> Among the pleasant villages and farms
> Adjoined, from each thing met conceives delight."'

We have got this length, then—that there are certain ascertained causes shortening life in towns which are not found so actively at work or with the same destructive powers in the pure air of the country. If we could go no farther, we would leave the matter in this gloomy position—that those who require to seek their living in towns, forming so large a portion of our population, must at the same time resign their chances of a healthy old age, and voluntarily adopt a fate which exposes them to disease and early death. A young man desiring to enter on the profession of an attorney, without capital, and with nothing to trust to but his abilities and his character, solicited from an ancient and successful member of the profession some advice as to the best means of conducting himself in business. Among other articles of advice, the sage recommended him always to keep about ten thousand pounds to his credit with his banker—no one could calculate how useful it would turn out to be easy in this particular. If sanitary reformers had no better advice to give to the dwellers in towns than to bid them remove to the country, their services would have as chilling and hopeless a conclusion as this old attorney's advice. But fortunately the investigations which have lately taken place offer a more cheering solution of the difficulty. There are marked differences in the mortality of distinct classes of city population, and through the consideration of these differences we may find our way to the method of extending the circumstances of the more favoured portions over the others. The following separate tables, in Mr Chadwick's Sanitary Report, are here grouped together. They show the different value of life in the different classes of people in the same districts :—

No. of Deaths.	Whitechapel Union.	Average Age of Deceased.
37	Gentlemen and persons engaged in professions, and their families,	45 years.
387	Tradesmen and their families,	27 ...
1762	Mechanics, servants, and labourers, and their families,	22 ...

No. of Deaths.	Strand Union.	Average Age of Deceased.
86	Gentry and persons engaged in professions, and their families,	43 years.
221	Tradesmen and their families,	33 ...
674	Mechanics, labourers, servants, and their families,	24 ...
	Kensington Union.	
331	Gentlemen and persons engaged in professions, and their families,	44 ...
348	Tradesmen and their families,	29 ...
1258	Labourers, artisans, and others similarly circumstanced, and their families,	26 ...
	Unions in the County of Wilts.	
119	Gentlemen and persons engaged in professions, and their families,	50 ...
218	Farmers and their families,	48 ...
2061	Agricultural labourers and their families,	33 ...

The following table exhibits the mortality prevalent amongst the different classes, partly mining and manufacturing, and partly agricultural, returned by the clerk of the Kendal Union:—

No. of Deaths.	Kendal Union.	Average age of Deceased.
52	Gentlemen and persons engaged in professions, and their families,	45 years.
138	Tradesmen and their families,	39 ...
413	Operatives, labourers, servants, and their families,	34 ...

REMOVAL OF THE CAUSES OF DIFFERENCE.

We here find that in some communities—such as the Whitechapel Union—there will be differences so great between the average duration of life in the different classes, that those born in the large house of the professional man, or independent gentleman, live rather more than twice as long as those born in the crowded houses of the small alleys which ramify hither and thither round it. These numbers are set forth here rather for the sake of distinctness, than because they are necessary to prove any new assertion. It is a melancholy truth, resting on evidence only too strong and overwhelming, that the lives of the poorer classes who inhabit the crowded districts of large towns are liable to be shortened by a variety of causes; and that, when we contemplate the whole annual amount of premature mortality in this country, which reduces the average vitality of the population so far below what nature indicates as the proper duration of human life, it is among the poorer classes in our large towns that we find the great preponderance of devastation. Here, then, we have the great centre of the social disease with which sanitary reform has to struggle. The first interpretation which would naturally be made of these phe-

nomena is, that wealth, with its other blessings, brings health and long life; and that to suffer from disease, and to flee early from the world, of which they are counted encumbrances, is just that lot meted out to the poor, which they must bear with all their other grievances, until they press upon them with such relentless severity that they can be no longer endured; and then the mass rising, frantic and disorganised, will, if it cannot mitigate its own lot, at all events bring down the pampered children of wealth to the same level of misery and degradation. But let us see if the Creator of the world has not invested the human race with the elements of a more hopeful philosophy. It is not consistent with the general scheme of man's nature that the joys and sorrows of life should be so very unequally distributed. Wherever we see the dreariest outward misery, there are still to be found at man's own command some apparatus for a mitigation of his sufferings; and where there is a sunshine of prosperity and happiness that seems to be too great for mere mortal man's enjoyment, there intervenes to the happy man himself a shadow unseen, perhaps, but as sure to exist within his bosom as the damp haze to rise from the pellucid lake on which the hot sun shines.

It is not the nature of our human constitution that great evils should be scattered among us, utterly irremediable by any efforts we can make. If it were necessary that, for reaching the ordinary average of health and happiness, the poor should all be made rich, this would be a consummation which human nature is quite incapable of achieving: but there are other means of communicating to them some of the main elements of happiness, of which we need not thus despair. Subsistence, the main prop of health and life, must in the general case be provided by all men for themselves. If the poor required to be supported by the rich, neither poor nor rich would long exist: all that wealth can do towards the subsistence of the community at large, is to make provision for accidental and inevitable destitution by means of a poor-law. But the great want of mankind—subsistence—is provided for more effectually than any human organisation could supply it, by a law of nature which drives man to self-support. In the year 1841, when the deaths from diseases in England were, according to the Registrar-General's return, 324,196, those from starvation were, according to the same authority, 184. It is melancholy to reflect, that in a country so abounding in riches and the produce of industrial exertion, even so many should have died this miserable death, but when we remember the vastness of our population, and the chances of accidental neglect that must occur where such multitudes are all seeking their own ends, it might seem wonderful that between the effective energy of those who

provide for themselves, and the various efforts to relieve destitution, the number who thus, as it were, slip out of the world unnoticed and unaided, should be so small. It may be questioned if there be any other community of 16,000,000 of inhabitants where the most dreadful of human calamities is to so great an extent averted. And yet there is reason to think that this number is far above the average, for it will be remembered that 1841 was a year of manufacturing distress and intense suffering throughout the community. In the following year, when trade slightly revived, the number of persons falling victims to starvation was 108, and perhaps it might be found still further reduced in ensuing years, as to which the reports of the Registrar-General are unfortunately not made up with so full an analysis of the cause of death.

It is the peculiarity of this essential condition of the existence of a people—their being able to procure subsistence for themselves—that for the greater part it is performed by the operation of some natural impulses implanted in the human constitution, and a very small part only, making up for the petty deficiencies left by this natural operation, can be performed through artificial means, and by the aid of public institutions. It is fortunate that it is so, for no artificial provision, such as a poor-law, could combat with the difficulties of the case had it to provide subsistence for a very large proportion of the people. But it seems to be quite otherwise in measures for the preservation of the public health, where there is great room for public institutions performing what private individuals are quite unable to accomplish. The reason of the difference lies here: subsistence is created by positive production through industry, and the best motive to industry is each man's individual desire of subsistence. You cannot enforce it satisfactorily by public government authority. On the other hand, regulations for the protection of the public health are not of the nature of the enforcement of positive production. They are rather of a negative character, prohibiting each man from doing, for his own gain or convenience, that which may injure his neighbours or the community. Thus, while we cannot easily make the confirmed idler work, or the extravagant man keep his money, it is by no means so difficult to prevent the selfish house speculator from building edifices in a manufacturing town so close together, and so ill ventilated, that they will shorten the lives of those who must inhabit them; and we can prevent the lazy housewife from depositing the slops of her household in the common street to the injury of all the neighbourhood, when a suitable receptacle for them has been provided.

In short, it comes to this, that sanitary measures are protective

measures, protecting mankind at large from the injuries which each, in his selfish pursuit of his own ease or profit, would inflict on his neighbours. If we ask ourselves what classes of society most need protection, the smallest particle of knowledge of human nature at once teaches us that it is the feeble; and in a complicated and highly-civilised state of society, the feeble is another name for the poor. By two separate avenues of approach we now reach the same point. We start on a practical analysis of the health of the community, and we find that those who are least healthy among the congregated crowds of men are the poor. We consider theoretically who are the most likely to suffer from want of protection in a matter as to which protection is required, and the answer is the same—the poor.

It has been seen, however, and it will be found more fully brought out hereafter, that this is not the invariable lot of the poor—applying that term to the humbler grades of society generally—when they are by themselves, and not crowded together. The country labourers, when they are in tolerably good circumstances, are nearly as much healthier than the city labouring-classes as their rich fellow-citizens of the gentry and professional orders. It is when human beings are crowded together in great masses that the evil is prominent. It is then that they suffer most from each other's selfishness—the strong trampling, as it were, upon the weak. So it is that the working-classes in great towns are the main object of sanitary protection. The gentry are interested in the matter too. Independently of the claims of humanity and justice, it is becoming known, and will be elsewhere in these pages more fully shown, that men cannot live in the midst of physical and moral degradation without suffering from it.

But essentially the sanitary cause is the working-man's cause. It proposes to do for him what the rich man is enlightened enough and powerful enough to do for himself: it proposes to remove from around his feet that vile network of shame, impurity, disease, crime, and death, which the careless institutions of society have heretofore allowed to environ him. From this digression, as to the special reasons which call for a remedy of those causes of disease which play such havoc among the working-classes, we come back to the question of the probable practicability of successful intervention.

INSTANCES WHERE IT HAS BEEN DONE.

On the view that the diseases to which the working-classes are chiefly liable are not necessarily of city origin, but are propagated by those impurities which no doubt are most common in cities,

but may be found elsewhere, Mr Chadwick says in the Sanitary Report—

'An impression is often prevalent that a heavy mortality is an unavoidable condition of all large towns, and of a town population in general. It has, however, been shown that groups of cottages on a high hill, exposed to the most salubrious breezes, when cleanliness is neglected, are often the nests of fever and disease as intense as the most crowded districts. The mortuary returns of particular districts (in the essentials of drainage, cleansing, and ventilation, to which it is practicable to make other districts approximate, and that, too, with reductions of existing charges) prove that a high degree of mortality does not invariably belong to the population of all towns, and probably not necessarily to any, even where the population is engaged in manufactures. The proportion of deaths appears in some of the suburbs of the metropolis (as at Hackney), and of Manchester and Leeds, to be lower than amongst the highest classes in two of the agricultural counties.'

There is reason to believe, that where any attention has been paid to the sanitary condition of towns, we would find that, as their population increased, the average duration of life was enlarged, instead of being shortened, in conformity with the usual law which is believed to follow the increase of cities. In another chapter, an account will be found of the filth and degradation which have sometimes been characteristic of the higher classes, up even to sovereign princes.* There is little doubt that, notwithstanding their open air exercise, their lives were frequently cut short by disease, after the manner exhibited in the letter of Erasmus on the Sweating Sickness.† To have introduced a reformation of manners which would have saved health and life to the higher classes, would doubtless in those days have been considered fully as difficult a task as the performance of the same service to the working-classes can be in our day. From the town of Geneva a sufficient quantity of statistics have been obtained for showing, over a long period of time, the effect of improved civilisation in lengthening the duration of life, even while population increased in density. The author of the Sanitary Report says :—

'In illustration of the moral and social effects to be anticipated from measures for the removal of the causes of pestilence amongst the labouring-classes, and for the increase of their duration of life, concurrently with an increase of the population, I refer to the effects experienced in Geneva from the like improvements effected during the lapse of centuries. That city is, so far as I am aware, the only one in Europe in which there is an early and complete set

* See above, p. 104. † See above, p. 105.

of registers of marriages, births, and deaths. These registries were established in the year 1549, and are viewed as pre-appointed evidences to civil rights, and are kept with great care. This registration includes the name of the disease which has caused the death, entered by a district physician who is charged by the state with the inspection of every person who dies within his district. A second table is made up from certificates setting forth the nature of the disease, with a specification of the symptoms, and observations required to be made by the private physician who may have had the care of the deceased. These registries have been the subject of frequent careful examinations. It appears from them that the progress of the population *intra muros* of that city has been as follows:—

	Inhabitants.	Proportionate rate of Increase as compared with 1589.
In the year 1589,	13,000	100
... ... 1693,	16,111	124, or 24 per cent.
... ... 1698,	16,934	130, or 30 ...
... ... 1711,	18,500	142, or 42 ...
... ... 1721,	20,781	160, or 60 ...
... ... 1755,	21,816	168, or 68 ...
... ... 1781,	24,810	191, or 91 ...
... ... 1785,	25,500	196, or 96 ...
... ... 1789,	26,140	201, or 101 ...
... ... 1805,	22,300	171, or 71 ...
... ... 1812,	24,158	186, or 86 ...
... ... 1822,	24,886	191, or 91 ...
... ... 1828,	26,121	201, or 101 ...
... ... 1834,	27,177	209, or 109 ...

'It is proved in a report by Mr Edward Mallet, one of the most able that have been made from these registries, that this increase of the population has been followed by an increase in the probable duration of life in that city:—

	Years.	Months.	Days.	Proportionate rate of Increase as compared with the end of Sixteenth Century.
Towards the end of the 16th century, the probabilities of life were, to every individual born,	8	7	26	100
In the seventeenth century,	13	3	16	153, or 53 per cent.
1701–1750,	27	9	13	321, or 221 ...
1751–1800	31	3	5	361, or 261 ...
1801–1813,	40	8	0	470, or 370 ...
1814–1833,	45	0	29	521, or 421 ...

'The progression of the population and the increased duration of life had been attended by a progression in happiness; as prosperity advanced, marriages became fewer and later; the proportion of births were reduced, but greater numbers of the infants born were preserved; and the proportion of the population in manhood became greater. In the early and barbarous periods, the excessive mortality

was accompanied by a prodigious fecundity. In the ten last years of the seventeenth century, a marriage still produced five children and more; the probable duration of life attained was not 20 years, and Geneva had scarcely 17,000 inhabitants. Towards the end of the eighteenth century there were scarcely three children to a marriage, and the probabilities of life exceeded 32 years. At the present time a marriage only produces $2\frac{3}{4}$ children; the probability of life is 45 years; and Geneva, which exceeds 27,000 in population, has arrived at a high degree of civilisation and of "*prospérité matérielle*." In 1836 the population appeared to have attained its summit: the births rarely replaced the deaths.

'Mr Mallet observes that it is difficult, if not impossible, to distinguish the different causes, and the different degrees of intensity of each of the causes that have tended to produce this result. It is, however, attributed generally to the advance in the condition of all classes; to the medical science of the public health being better understood and applied; to larger, and better, and cleaner dwellings; more abundant and healthy food; the cessation of the great epidemics which from time to time decimated the population; the precautions taken against famine; and better regulated public and private life. As an instance of the effects of regimen in the preservation of life, he mentions that, in an establishment for the care of female orphans taken from the poorest classes, out of 86 reared in 24 years 1 only had died. These orphans were taken from the poor. The average mortality on the whole population would have been six times as great.'

It is often remarked that the luxuries of the rich and the privations of the poor equalise the scale of happiness by being alike deleterious to health. That sheer poverty is often a cause of disease and a shortener of life cannot be doubted. But when it is seen how very minute a proportion of the deaths in England are occasioned by actual starvation, we may infer that the number of those whose privations approach this point and occasion disease and the shortening of life cannot be large in proportion to the whole amount of deaths from removable causes. The country population is poorer than the city, yet it is healthier—a circumstance which, in itself, shows that this city population has many other enemies besides mere poverty. On this subject reference is again made to the Sanitary Report:—

'How erroneous the inferences are in their unrestrained generality, which assume that the poverty or the privation which is sometimes the consequence, is always the cause of the disease, will have been seen from such evidence as that adduced from Glasgow and Spitalfields, proving that the greater proportion of those attacked by disease are in full work at the time; and the evidence from the fever hospitals, that the greatest proportion of the patients are received in high bodily condition. If wages be taken as the test of

the means of subsistence, it may be asked how are such facts to be reconciled as these, that at a time when wages in Manchester were 10s. per head weekly on all employed in the manufactories, including children or young persons in the average, so that if three or four members of a family were employed, the wages of a family would be 30s. or 40s. weekly, the average chances of life to all of the labouring-classes were only 17 years; whilst in the whole of Rutlandshire, where the wages were certainly not one-half that amount, we find the mean chances of life to every individual of the lowest class were 37 years? Or, to take another instance, that whilst in Leeds, where, according to Mr Baker's Report, the wages of the families of the worst-conditioned workers were upwards of £1, 1s. per week, and the chances of life amongst the whole labouring population of the borough were only 19 years; whilst in the county of Wilts, where the labourer's family would not receive much more than half that amount of wages in money, and perhaps not two-thirds of money's worth in money and produce together, we find the average chances of life to the labouring-classes 32 years?'—(P. 177.)

And in another place the author of this celebrated paper says—

'On viewing the evidence, which shows that in most situations higher chances of life belong to the middle and higher classes of the population, an impression may be created that the higher standards of health are essentially connected with expensive modes of living. The highest medical authorities agree, however, that the more important means for the protection and advance of the health of those classes must be in still further reductions than those which it is the present tendency in the higher classes of society to make of the use of highly-stimulating food. The evidence already adduced with respect to the labouring-classes in the rural districts, and those living on high wages in towns, will have gone some way to remove the erroneous impression with respect to them, and it admits of proof that a higher standard of health and comfort is attainable for them even at a less expense than that in which they now live in disease and misery. The experience of the effect of sanitary measures in the royal navy may be adduced as evidence of the practicable standards of health consistent with great labour and exposure to weather obtained at a cost not higher than that within the wages of ordinary labourers. The experience of the effects of sanitary measures in banishing spontaneous disease from crowded prisons, offers further evidence of the health obtainable by simple means, under circumstances still more unfavourable.

'The prisons were formerly distinguished for their filth and their bad ventilation; but the descriptions given by Howard of the worst prisons he visited in England (which he states were amongst the worst he had seen in Europe) were exceeded in every wynd in Edinburgh and Glasgow, inspected by Dr Arnott and myself, in company with the municipal officers of those cities. More filth, worse physical suffering and moral disorder than Howard describes as

affecting the prisoners, are to be found amongst the cellar population of the working-people of Liverpool, Manchester, or Leeds, and in large portions of the metropolis.'—(Pp. 211–212.)

Among the many experiments which have shown beyond any doubt that the same class of people, deriving the same rate of income, and living generally with the same amount of comforts, in the same city district, will be unhealthy when it is neglected, and healthy when proper means for the removal of impurities are applied, the following may be held as an ordinary instance and example. It is in the form of a letter from Mr Crowfoot, surgeon at Beccles, to Mr Twisleton, the assistant Poor-Law Commissioner:—

'You are aware that these two towns (Bungay and Beccles), of nearly equal population, are nearly alike as to natural advantages of situation, &c. except that Bungay, having a larger proportion of rural population inhabiting the district called Bungay Uplands, ought to be more healthy than Beccles, which has nearly its whole population confined to the town. About thirty years since, Beccles began a system of drainage, which it has continued to improve, till at the present time every part of the town is well drained, and I am not aware of a single open drain in the place. Bungay, on the contrary, with equally convenient opportunities for drainage, has neglected its advantages in that respect, has one or two large reservoirs for filth in the town itself, and some of its principal drains are open ones. The result, you will see, is, that Bungay, with a smaller proportion of town inhabitants, has become of late years less healthy than Beccles. I have carefully taken the number of burials from the parish registers of each town for the last thirty years, and dividing them into decennial periods, I have calculated the proportion which the deaths bore to the mean population, between one census and the other, during each ten years; the only possible source of fallacy is the want of the census for 1841; but in its absence I have supposed the same rate of increase as took place between that of 1821 and that of 1831 for each place. Sinking fractions, the following has been the proportion of deaths to the population in the two towns:—

	Beccles.	Bungay.
Between the years 1811 and 1821, . .	1 in 67 . .	1 in 69
... ... 1821 and 1831, .	1 in 72 .	1 in 67
... ... 1831 and 1841, . .	1 in 71 . .	1 in 59

You will therefore see that the rate of mortality has gradually diminished in Beccles since it has been drained, whilst in Bungay, notwithstanding its larger proportion of rural population, it has considerably increased.'

It would be a cruelty and an injustice to attempt to underrate the effect of extreme privation on the health, the welfare, and the vitality of the people. But the authorities that can be adduced

on the subject render it no longer liable to be disputed, that in this country filth and degradation, allied with intemperance, are the great destroyers, and that inevitable virtuous poverty makes few victims. This leads us to a consoling doctrine, since it shows the chief causes of mortality to be of a kind which, within rational calculation, are capable of removal. What we have to deal with here, however, is the fact that, from peculiar circumstances, portions of the working-classes have been known to be healthiest when they were poorest. It will undoubtedly be rare to find this, since poverty is too apt to lead to filth and neglect; but when, from any adventitious circumstances, it does occur, it furnishes us with a valuable illustration of the efficacy of intervention for the protection of the public health. Dr Neil Arnott, a man of unquestionable veracity and benevolence, brought some instances of this kind before the Commission of 1843 on the state of large towns. He said—

'At the time when we made our inquiries, there was in the Spitalfields district an unusually severe epidemic, although there was comparatively full employment. Subsequently, the employment diminished to the extent of half the looms being out of work; and the medical officer of that district, who in times of full employment had as many as 800 fever cases to attend to in one year, then found the number fall to 250 cases. He states that—"The greatest number of fever cases we have is of persons who fall ill during the time they are in employment. I think they are more attacked when in work, when the windows are closed, and there is no ventilation. Many of them are obliged to work with closed windows, to keep out the moist air, and prevent the dust blowing upon their work. When they are out of work they are more out of doors looking after work —more in the open air; and that very exercise may be the means of keeping them in health. This observation applies to the weavers. I find that they have generally less fever when they are out of work. The reverse, I think, holds as respects out-door labourers, such as those who work at the docks. When they are out of work, they stand about waiting in the cold, and when cold, they generally take cheap gin, and no food: they catch cold, and on going to their close, filthy habitations, their cold is apt to generate fever."'

Being asked if similar results had been observed elsewhere, he gave instances where the physical condition of persons seized with typhus fever showed them to be well supplied with the necessaries of life, and consequently well off in the usual acceptation of the term:—

'Dr Davidson, the senior physician to the Glasgow Infirmary, in his prize essay, gives an account of the physical condition of the 429 persons admitted to the hospital under the following divisions:—

"1. Moderate: a person having an ordinary quantity of muscle and cellular substance: males, 116; females, 93. Total, 209.

"2. Full or plethoric: having an extra quantity of adipose texture, or of blood: males, 28; females, 73. Total, 101.

"3. Muscular: males, 44.

"4. Spare: males, 24; females, 41. Total, 65.

"5. Emaciated or unhealthy in appearance: males, 2; females, 8. Total, 10.

"The whole of these 429 cases were characterised by the typhoid eruption, and will therefore be considered as decided cases of typhus. It appears from this table that there were only ten cases in an emaciated or unhealthy condition; and almost all of them, as far as could be ascertained, were engaged in their ordinary occupations at the time of their seizure. The spare and unhealthy, when added together, form only about 17 per cent. of the whole number."'

The examination is thus continued:—

'Has there been any subsequent experience in the same part of the country?—Yes; in May 1832 there was an almost entire cessation of work at Paisley, so extensive, that extraordinary means were taken, by general subscriptions, and with the aid of the government, to relieve the distress. At that precise time the medical men having charge of the Fever Hospital were surprised by an extraordinary diminution in the number of cases of fever. There were during that month just one-eighth less than the average during the five preceding years. But the demand for goods and labour subsequently returned, so that the whole population was again employed, and warehouses were cleared of goods that had not been empty for ten years before. In this restored state of the labour market a new epidemic broke out.

'What are the later effects observed?—The district surgeons of Glasgow state in their report on the towns' hospital of that city, that "in 1841-2 the number of cases received in that hospital was 5296: but the number received in 1843 has been 19,085 cases, or an increase of 13,789 cases; of which 12,967 were cases of a peculiarly distressing epidemic fever, and 736 were cases of typhus fever. The mortality from typhus has been nearly double that of 1842. The number of cases of disease generally in 1843 has been greater than that for the whole of the four preceding years." The medical attendants stated that "it was the most severe amongst the labouring classes, 'even though the individuals were apparently somewhat robust, *if their habitations were dark, damp, filthy, and unventilated.*'"

'Has there been any subsequent experience in England?—Other confirmatory facts have arisen in the subsequent experience in Manchester. In the year 1840 the total deaths in that town were 1 in 28·36; but though distress increased, they were reduced in 1841 to 1 in 31·59. In the following year, when there was an increase of general distress, they still diminished to a rate of 1 in 33. They

diminished in Manchester, which was distressed in 1842, whilst in Liverpool, a commercial city, where the labouring population had suffered little comparatively from distress, the deaths increased to the number of 700 above the average.'

In this country we are familiar with accounts of the unhealthiness of the seats of yellow fever in the hot and swampy southern states of America. But we are not accustomed to expect that in the districts naturally healthy, the people, enjoying as they do the means of obtaining the necessaries of life in abundance, have surrounded themselves with the elements of disease. On this matter Dr Arnott, in the continuation of his evidence, said—

'The condition of the population of the American towns has been referred to as being a population amongst whom distress can be scarcely said to exist in such forms as in the British towns. The condition of the American town population has been referred to in parliament as an instance of what may be done independently of any sanitary regulations. Now it has recently been shown that in these towns the sanitary condition of a large proportion of the population of many districts is even lower than in England. From a report by Dr Griscom, the inspector of funerals in New York, it appears that the average age of death there does not exceed 20 years, judging from the returns of one year, which does not seem to be an extraordinary year. It appears—"That upwards of 33,000 of the population of that city live in cellars, courts, and alleys, of which 6618 are dwellers in cellars." "Many," he states, "of those back places are so constructed as to cut off all circulation of air, the line of houses being across the entrance, forming a *cul de sac*, while those in which the line is parallel with, and at one side of the entrance, are rather more favourably situated, but still excluded from any general visitation of air in currents. As to the influence of these localities upon the health and lives of the inmates, there is, and can be, no dispute; but few are aware of the dreadful extent of the disease and suffering to be found in them. In the damp, dark, and chilly cellars, fevers, rheumatism, contagious and inflammatory disorders, affections of the lungs, skin, and eyes, and numerous others, are rife, and too often successfully combat the skill of the physician and the benevolence of strangers. I speak now of the influence of the locality merely. The degraded habits of life, the filth, the degenerate morals, the confined and crowded apartments, and insufficient food of those who live in more elevated rooms, comparatively beyond the reach of the exhalations of the soil, engender a different train of diseases, sufficiently distressing to contemplate, but the addition to all these causes of the foul influences of the incessant moisture and more confined air of under-ground rooms, is productive of evils which humanity cannot regard without shuddering." He gives instances where the cellar population had been ravaged by fever, whilst the population occupying the upper apart-

ments of the same houses were untouched. In respect to the condition of these places, he cites the testimony of a physician, who states that "frequently, in searching for a patient living in some cellar, my attention has been attracted to the place by a peculiar and nauseous effluvium issuing from the door, indicative of the nature and condition of the inmates." By recent information obtained from Philadelphia, it appears, "that on the average of 12 years the mean age of death has not exceeded 20 years and 7 months. Half of those born there appear to die before the fifth year, and no less than 27 per cent. of the remainder die under 50 years of age, and the average age of death, of all who die there above 20 years of age, appears to be below 46 years, whilst in Bethnal Green, one of the worst districts in London, it is nearly 49 years, and the average in London appears to be 53 years."'

We have seen that towns are not necessarily insalubrious: it would be easy to show that people may live in the country in such a manner as to abbreviate life. The manners of some savage tribes alluded to in the fourth part of this volume are beyond doubt inimical to vitality, and make life even more precarious in the open prairie, or on the fresh sea-shore, than it is in the worst districts of Edinburgh or Liverpool. Dr Combe, in his treatise on the management of infancy, gives this statement from Mr Maclean's account of a visit to St Kilda in 1838:—

'After remarking that the population of St Kilda is diminishing rather than increasing, Mr Maclean states that this unusual result is partly owing to the prevalence of epidemics, but chiefly to the excessive mortality which is at all times going on in infancy. "Eight out of every ten children," he says, "die between the eighth and twelfth days of their existence!" On perusing this statement, the reader will naturally be disposed to wonder what poisonous quality can infect the air or soil of St Kilda to cause such a tremendous destruction of life, and will infer that here at least there must be some powerfully deleterious influence at work which human means cannot successfully cope with. So far, however, from this being the case, Mr Maclean expressly states that "the air of the island is good, and the water excellent;" that "there is no visible defect on the part of nature;" and that, on the contrary, "the great, if not the only cause, is the filth amidst which they live, and the noxious effluvia which pervade their houses." In proof of this, he refers to "the clergyman, who lives exactly as those around him do in every respect, except as regards the condition of his house, and who has a family of four children, the whole of whom are well and healthy;" whereas, according to the average mortality around him, at least three out of the four would have been dead within the first fortnight. When it is added that the huts of the natives are small, low-roofed, and without windows, and are used, during the winter, as stores for the collection of manure, which is carefully laid out upon the floor,

and trodden under foot till it accumulates to the depth of several feet, the reader will not hesitate to concur in opinion with Mr Maclean, and admit that, had the clergyman's children been subjected to the same mismanagement as those of the other islanders, the probability is, that not one of them would have survived.'—(P. 15.)

M. Baudelocque, in his 'Etudes sur la Maladie Scrofuleux,' says—

'Invariably it will be found, on examination, that a truly *scrofulous* disease is caused by a vitiated air, and it is not always necessary that there should have been a prolonged stay in such an atmosphere. Often a few hours each day is sufficient, and it is thus they may live in the most healthy country, pass the greater part of the day in the open air, and yet become scrofulous, because of sleeping in a confined place, where the air has not been renewed. This is the case with many shepherds. It is usual to attribute scrofula in their case to exposure to storms and atmospheric changes, and to humidity; but attention has not been paid to the circumstance that they pass the night in a confined hut, which they transport from place to place, and which guarantees them against humidity; this hut has only a small door, which is closed when they enter, and remains closed also during the day: six or eight hours passed daily in a vitiated air, and which no draught ever renews, is the true cause of their disease. I have spoken of the bad habit of sleeping with the head under the clothes, and the insalubrity of the *classes* where a number of children are assembled together. The repetition of these circumstances is often sufficient cause of scrofula, although they may last but for a few hours a-day.'

He gives the following instances:—

'At three leagues from Amiens lies the village of Oresmeaux; it is situated in a vast plain, open on every side, and elevated more than 100 feet above the neighbouring valleys. About sixty years ago, most of the houses were built of clay, and had no windows; they were lighted by one or two panes of glass fixed in the wall; none of the floors, sometimes many feet below the level of the street, were paved. The ceilings were low; the greater part of the inhabitants were engaged in weaving. A few holes in the wall, and which were closed at will by means of a plank, scarcely permitted the air and light to penetrate into the workshop. Humidity was thought necessary to keep the threads fresh. Nearly all the inhabitants were seized with scrofula, and many families, continually ravaged by that malady, became extinct; their last members, as they write me, died *rotten with scrofula.*

'A fire destroyed nearly a third of the village; the houses were rebuilt in a more salubrious manner, and by degrees scrofula became less common, and disappeared from that part. Twenty years later, another third of the village was also consumed; the same amelioration in building, with a like effect as to scrofula. The disease is

now confined to the inhabitants of the older houses, which retain the same causes of insalubrity. I ought to add that there is more wealth in the country; that the weaving of linen has been superseded by that of cotton, for which moisture would be hurtful, and darkness inconvenient; and that, in consequence of the division of landed property, many of the peasants possess a little land, which they cultivate between times. But all these advantages are common to the quarter which has not been burnt with the two others, and in the meanwhile there is always scrofula in the first, and never in the others. The difference seems to me to be clearly referable to the difference in the habitations. If, in the old quarter, the number of the scrofulous is less considerable than formerly, it is necessary to attribute it to the circumstance of the inhabitants being less sedentary, and their going more often to the fields—the purity of the air respired during the day diminishes the noxious effects of that which is breathed during the night.'

The general tenor and aim of the information and the observations which have been here brought together, cannot be more hopefully expressed than in the words of Dr Guy in his lecture delivered in Crosby Hall:—

'If the sanitary state of the entire country could be raised to the condition of the most healthy counties, so that instead of one death in forty-six inhabitants, there should be only one death in fifty-four, we should have an annual saving of no less than 49,349 lives, or about one-seventh of the whole number of deaths! At first sight, it may appear extravagant to represent such an improvement of our sanitary condition as possible; but when it is recollected that on the one hand even our most agricultural counties have not yet attained to their best sanitary state, and that our large towns have been hitherto almost entirely neglected, and admit of immense improvement, the attainment for the whole country of a sanitary condition represented by one death in fifty-four inhabitants is at least within the bounds of possibility.

'This possibility is raised to the level of a *strong probability* by the fact, that there are comparatively small agricultural districts, of less extent than our English counties, in which the mortality falls much below 1 in 54. In the Isle of Wight, for instance, it is less than 1 in 58, and in Anglesea little more than 1 in 62. The possibility of reducing the mortality to 1 in 50, or 2 per cent., is, as I have stated, generally admitted; and the opinion is strongly confirmed by the fact, that already in several rural districts it is less than 1 in 50; that in one mixed town and rural district (that of Huddersfield) it is 1 in 52, and in one town district (that of Yarmouth) 1 in 51. In one mining district, again (that of Chorlton and Worsley), it is 1 in 50, and in one manufacturing district (Kidderminster) less than 1 in 49. As, then, on the very reasonable assumption that, by proper sanitary measures, the mortality might be reduced to 1 in 50, we shall have a saving of upwards of 25,000 lives, it would require a very slight im-

provement beyond that point to make the amount what I have assumed it to be in our large towns—namely, 30,000. I have entered thus minutely into this part of my subject, because I am anxious to impress upon your minds the magnitude of the loss which a neglect of sanitary measures is constantly entailing upon us—a loss of which the extent may be judged by the aid of an expression so often quoted that it will soon pass into a proverb, that "*the annual slaughter in England and Wales, from preventible causes of typhus fever alone, which attacks persons in the vigour of life, is double the amount of what was suffered by the allied armies in the battle of Waterloo!*"'

ILLUSTRATIONS OF THE EFFECT OF SANITARY ARRANGEMENTS IN PRISONS.

There are many horrible details of the deadly state of the old prisons, but none is perhaps more striking than the incident which is mentioned by Baker the Chronicler as occurring in 1577, called the Black Assizes. In the assize court then held at Oxford, a sudden epidemic seized on those present in the court-room. 'About this time,' says Baker, 'when the judges sat at the assizes in Oxford, and one Rowland Jenks, a bookseller, was questioned for speaking opprobrious words against the queen, suddenly they were surprised with a pestilent savour, whether arising from the noisome smell of the prisoners, or from the damp of the ground, is uncertain; but all that were then present—almost every one—within forty hours died, except women and children.'* Modern science confirms the view, that the calamity was attributable to the presence of the prisoners from the jail, who brought with them so much of its pestilential atmosphere as thus to fill the court-room with death. Lord Bacon says that 'the most pernicious infection next the plague is the smell of a jail, when the prisoners have been long, close, and nastily kept; whereof we have had in our time experience twice or thrice, when both the judges that sat upon the jail, and numbers of those who attended the business, or were present, sickened and died.'

It may seem like a reproach to those who have the administration of affairs in their hands to show that the main improvement on health and vitality has been made with reference to those who have deservedly incurred the penalties of their crimes. But there is no doubt that there was a responsibility as to the proper treatment of those wretched persons individually, of a far more direct and specific character than any responsibility that the government can incur as to the individual members of the community at large. It is admitted throughout this volume that there ought to be a limit to sanitary regulation; that it must not interfere too

* Baker's Chronicle of the Kings of England, p. 353.

much with independence and self-respect to bring about immediate results, however desirable they may seem; and that its bias must be rather towards the preservation of the individual's freedom than the restriction and direction of his motions. But with regard to persons subjected to imprisonment there was no choice. Regulations had to take the place of free action, and it lay with those in authority whether the individual should be clean or dirty, and whether he should breathe pure air or foul. As it is not made part of the punishment of the prisoner that he should be subjected to the operation of a poisoned atmosphere, it became the duty of those who directed the system of prison-discipline to take proper measures for the preservation of health within the prison walls. We are thus furnished with valuable practical information on the influence which sanitary science, applied in the most unpromising circumstances, may have on health and life—an influence which it may be hoped will be fully equalled in completeness by that of the less rigid sanitary legislation which can be applied to, while it is aided by, the free community. In the Sanitary Report there are the following statements :—

'Since Howard succeeded in gaining national attention to the condition of prisoners, the evils of prison management have been removed. A large proportion of the prison population is taken from the worst-regulated and most confined neighbourhoods which have been the subject of examination; and, with the view to judge what might be effected by sanitary regulations, I have made frequent inquiries as to the effects of sanitary measures on the worst class of persons, the larger proportion of whom are taken from the worst neighbourhoods—that is, as to the effects of living in the same atmosphere, on a less expensive diet, than that of the general labouring population, but provided with clean and tolerably well-ventilated places of work and sleeping-rooms, and where they are required to be cleanly in their persons. * * *

'The medical practitioners, who were well acquainted with the general state of health of the population surrounding the prisons, concur in vouching to the fact, upon their own knowledge, that the health of the prisoners is in general much higher than the health almost of any part of the surrounding population; that the prisoners, as a class, are below the average of health when they enter the prisons; that they come from the worst neighbourhoods; that many of them come from the lodging-houses, which, to those towns, as will be shown, are the constant seats of disease; that they are mostly persons of intemperate habits; that many of them come in in a state of disease from intemperance and bad habits; and notwithstanding the depressing influence of imprisonment, the effect of cleanliness, dryness, better ventilation, temperance, and simple food, is almost sufficient to prevent disease arising within the prison, and to put the prisoners in a better working condition at the termination

than at the commencement of their imprisonment. At the Glasgow bridewell, the prisoners are weighed on their entrance and at their discharge, and it is found that, on the average, they gained in weight by their imprisonment. At Edinburgh there were instances of poor persons in a state of disease committed from motives of humanity to the prison, that they might be taken care of and cured.'—Pp. 214–215.

ILLUSTRATIONS ON SHIPBOARD—ANSON AND COOK.

There is another department in which persons in authority have so much to say in the direction of the personal habits of individuals in the humbler classes of life, that it is their duty to prescribe to them their whole course of conduct for the preservation of health: this is the case in the army and navy, and especially in the latter. Those who are within the timbers of a vessel are in this respect as much at the mercy of the persons entitled to regulate it as the prisoners in a jail are at the mercy of the turnkey. So much is this the case, that it is now a general feeling, that owing to a false analogy as to the free relations of master and servant on shore, there have never as yet been sufficiently strict regulations prepared as to the conduct to be applied to seamen and poor emigrant passengers in the vessels of the merchant navy. In the royal navy the changes which sanitary improvements have made have been greater even than those operated on the prisoners in jails. Dr Johnson said of a life at sea, 'As to the sailor, when you look down from the quarter-deck to the space below, you see the utmost extremity of human misery; such crowding, such filth, such stench! . . . A ship is a prison, with the chance of being drowned: it is worse—worse in every respect—worse air, worse food, worse company.' In the words of the sanitary report, 'So dreadful was once the condition of the navy, that in the year 1726, when Admiral Hosier sailed with seven ships of the line to the West Indies, he buried his ships' companies twice, and died himself of a broken heart.'

One of the most lamentable histories of human calamity on record is to be found in the account of 'Anson's Voyage Round the World from 1740 to 1744.' He had with him several veterans, whose knowledge of the horrors of foreign service at that time seems to have forewarned them of the fate they were to meet, for the historian of the expedition says—

'Instead of 500, there came on board no more than 259; for all those who had limbs and strength to walk out of Portsmouth deserted, leaving behind them only such as were literally invalids, most of them being sixty years of age, and some of them upwards of seventy. Indeed it is difficult to conceive a more moving scene than the embarkation of these unhappy veterans. They were

themselves extremely averse to the service they were engaged in, and fully apprised of all the disasters they were afterwards exposed to, the apprehensions of which were strongly marked by the concern that appeared in their countenances, which was mixed with no small degree of indignation, to be thus hurried from their repose into a fatiguing employ, to which neither the strength of their bodies nor the vigour of their minds were anyways proportioned, and where, without seeing the face of an enemy, or in the least promoting the success of the enterprise, they would in all probability uselessly perish by lingering and painful diseases, and this, too, after they had spent the activity and strength of their youth in their country's service.' *

The squadron consisted of five men-of-war, a sloop, and two victualling ships. Their complements of men were—for the *Centurion*, 400; the *Gloucester*, 300; the *Severn*, 300; the *Pearl*, 250; the *Wager*, 160, and the *Tryal* sloop, 100. There were at the same time land forces numbering nearly 500 men, which made the whole who embarked in the squadron about 2000. They sailed on the 18th September. About two months afterwards, we find the first accounts of the appearance of disease, accompanied by some remarks by the historian of the voyage, which might well apply to other places and later times. He says—

'On the 20th of November the captains of the squadron represented to the commodore that their ships' companies were very sickly, and that it was their own opinion, as well as their surgeons, that it would tend to the preservation of the men to let in more air between decks; but that their ships were so deep, they could not possibly open their lower ports. On the representation, the commodore ordered six air scuttles to be cut in each ship in such places where they would least weaken it.

'And on this occasion I cannot but observe how much it is the duty of all those who, either by office or authority, have any influence in the direction of our naval affairs, to attend to this important article—the preservation of the lives and health of our seamen. If it could be supposed that the motives of humanity were insufficient for this purpose, yet policy, and a regard to the success of our arms, and the interest and honour of each particular commander, should naturally lead us to a careful and impartial examination of every probable method proposed for maintaining a ship's crew in health and vigour. But hath this been always done? Have the late-invented, plain, and obvious methods of keeping our ships sweet and clean, by a constant supply of fresh air, been considered with that candour and temper which the great benefits promised hereby ought naturally to have inspired? On the contrary, have not these salutary schemes been often treated with neglect and contempt? and

* Anson's Voyage Round the World, p. 34.

have not some of those who have been intrusted with experimenting their effects been guilty of the most indefensible partiality in the accounts they have given of these trials? Indeed it must be confessed that many distinguished persons, both in the direction and command of our fleets, have exerted themselves on these occasions with a judicious and dispassionate examination becoming the interesting nature of the inquiry; but the wonder is, that any could be found irrational enough to act a contrary part, in despite of the strongest dictates of prudence and humanity. I must, however, own, that I do not believe this conduct to have arisen from motives so savage as the first reflection thereon does naturally suggest; but I rather impute it to an obstinate, and in some degree superstitious attachment to such practices as have been long established, and to a settled contempt and hatred of all kinds of innovations, especially such as are projected by landmen and persons residing on shore. But let us return from this, I hope not impertinent, digression.'

Henceforward the work becomes a gloomy and somewhat monotonous detail of perpetually-increasing sickness, which, on the approach of part of the squadron to the island of Juan Fernandez—celebrated in fiction as the abode of Selkirk, the prototype of Robinson Crusoe—had reached the terrible climax which is thus described:—

'Soon after our passing Streights le Maire, the scurvy began to make its appearance amongst us; and our long continuance at sea, the fatigue we underwent, and the various disappointments we met with, had occasioned its spreading to such a degree, that at the latter end of April there were but few on board who were not in some degree afflicted with it; and in that month no less than forty-three died of it on board the *Centurion*. But though we thought that the distemper had then risen to an extraordinary height, and were willing to hope that as we advanced to the northward its malignity would abate, yet we found, on the contrary, that in the month of May we lost near double that number; and as we did not get to land till the middle of June, the mortality went on increasing, and the disease extended itself so prodigiously, that after the loss of above two hundred men, we could not at last muster more than six foremastmen in a watch capable of duty.

'This disease so frequently attending long voyages, and so particularly destructive to us, is surely the most singular and unaccountable of any that affects the human body. Its symptoms are inconstant and innumerable, and its progress and effects extremely irregular: for scarcely any two persons have complaints exactly resembling each other; and where there have been found some conformity in the symptoms, the order of their appearance has been totally different. However, though it frequently puts on the form of many other diseases, and is therefore not to be described by any exclusive and infallible criterions, yet there are some symptoms which are

more general than the rest, and, occurring the oftenest, deserve a more particular enumeration. These common appearances are large discoloured spots, dispersed over the whole surface of the body, swelled legs, putrid gums, and, above all, an extraordinary lassitude of the whole body, especially after any exercise, however inconsiderable; and this lassitude at last degenerates into a proneness to swoon, and even die, on the least exertion of strength, or even on the least motion.

'This disease is likewise usually attended with a strange dejection of the spirits, and with shiverings, tremblings, and a disposition to be seized with the most dreadful terrors on the slightest accident. Indeed it was most remarkable, in all our reiterated experience of this malady, that whatever discouraged our people, or at any time damped their hopes, never failed to add new vigour to the distemper; for it usually killed those who were in the last stages of it, and confined those to their hammocks who were before capable of some kind of duty; so that it seemed as if alacrity of mind and sanguine thoughts were no contemptible preservatives from its fatal malignity.

'But it is not easy to complete the long roll of the various concomitants of this disease; for it often produced putrid fevers, pleurisies, the jaundice, and violent rheumatic pains; and sometimes it occasioned an obstinate costiveness, which was generally attended with a difficulty of breathing; and this was esteemed the most deadly of all the scorbutic symptoms. At other times the whole body, but more especially the legs, were subject to ulcers of the worst kind, attended with rotten bones, and such a luxuriancy of fungous flesh, as yielded to no remedy. But a most extraordinary circumstance, and what would be scarcely credible upon any single evidence, is, that the scars of wounds, which had been for many years healed, were forced open again by this virulent distemper. Of this there was a remarkable instance in one of the invalids on board the Centurion, who had been wounded above fifty years before at the battle of the Boyne; for though he was cured soon after, and had continued well for a great number of years past, yet on his being attacked by the scurvy, his wounds, in the progress of his disease, broke out afresh, and appeared as if they had never been healed; nay, what is still more astonishing, the callus of a broken bone, which had been completely formed for a long time, was found to be hereby dissolved, and the fracture seemed as if it had never been consolidated. Indeed the effects of this disease were, in almost every instance, wonderful; for many of our people, though confined to their hammocks, appeared to have no inconsiderable share of health; for they ate and drank heartily, were cheerful, and talked with much seeming vigour, and with a loud, strong tone of voice; and yet, on their being the least moved, though it was only from one part of the ship to the other, and that, too, in their hammocks, they have immediately expired; and others, who have confided in their seeming strength, and have resolved to get out of their hammocks, have

died before they could well reach the deck: nor was it an uncommon thing for those who were able to walk the deck, and to do some kind of duty, to drop down dead in an instant on any endeavours to act with their utmost effort, many of our people having perished in this manner during the course of this voyage.

'With this terrible disease we struggled the greatest part of the time of our beating round Cape Horn; and though it did not then rage with its utmost violence, yet we buried no less than forty-three men on board the Centurion in the month of April, as hath been already observed: however, we still entertained hopes that when we should have once secured our passage round the Cape, we should put a period to this and all the other evils which had so constantly pursued us. But it was our misfortune to find that the Pacific Ocean was to us less hospitable than the turbulent neighbourhood of Terra del Fuego and Cape Horn; for being arrived on the 8th of May off the island of Socoro, which was the first rendezvous appointed for the squadron, and where we hoped to have met with some of our companions, we cruised for them in that station several days. But here we were not only disappointed in our expectations of being joined by our friends, and were thereby induced to favour the gloomy suggestions of their having all perished, but we were likewise perpetually alarmed with the fears of being driven on shore upon this coast, which appeared too craggy and irregular to give us the least prospect that, in such a case, any of us could possibly escape immediate destruction. For the land had indeed a most tremendous aspect; the most distant part of it, and which appeared far within the country, being the mountains usually called the Andes or Cordilleras, was extremely high and covered with snow, and the coast itself seemed quite rocky and barren, and the water's edge skirted with precipices. In some places, indeed, we discerned several deep bays running into the land, but the entrance into them was generally blocked up by numbers of little islands; and though it was not improbable but there might be convenient shelter in some of these bays, and proper channels leading thereto, yet as we were utterly ignorant of the coast, had we been driven ashore by the western winds, which blew almost constantly there, we did not expect to have avoided the loss of our ship and of our lives.

'This continued peril, which lasted for above a fortnight, was greatly aggravated by the difficulties we found in working the ship, as the scurvy had by this time destroyed so great a part of our hands, and had in some degree affected almost the whole crew. Nor did we, as we hoped, find the winds less violent as we advanced to the northward; for we had often prodigious squalls, which split our sails, greatly damaged our rigging, and endangered our masts. Indeed during the greatest part of the time we were upon this coast the wind blew so hard, that in another situation where we had sufficient sea-room we should certainly have lain to; but in the present exigency we were necessitated to carry both our courses and

top-sails, in order to keep clear of this leeshore. In one of these squalls, which was attended by several violent claps of thunder, a sudden flash of fire darted along our decks, which dividing, exploded with a report like that of several pistols, and wounded many of our men and officers as it passed, marking them in different parts of the body; this flame was attended with a strong sulphureous stench, and was doubtless of the same nature with the larger and more violent blasts of lightning which then filled the air.'

After some narratives of those more common perils of the deep, against which man cannot always struggle with effect, the account of these far greater calamities arising from causes which a human foresight might have obviated is resumed:—

'On the 30th of May we had a view of the continent of Chili, distant about twelve or thirteen leagues; the land made exceeding high and uneven, and appeared quite white, what we saw being doubtless a part of the Cordilleras, which are always covered with snow. Though by this view of the land we ascertained our position, yet it gave us great uneasiness to find that we had so needlessly altered our course, when we were in all probability just upon the point of making the island; for the mortality amongst us was now increased to a most dreadful degree, and those who remained alive were utterly dispirited by this new disappointment, and the prospect of their longer continuance at sea; our water, too, began to grow scarce, so that a general dejection prevailed amongst us, which added much to the virulence of the disease, and destroyed numbers of our best men; and to all these calamities there was added this vexatious circumstance, that when, after having got a sight of the main, we tacked, and stood to the westward in quest of the island, we were so much delayed by calms and contrary winds, that it cost us nine days to regain the westing, which, when we stood to the eastward, we ran down in two. In this desponding condition, with a crazy ship, a great scarcity of fresh water, and a crew so universally diseased, that there were not above ten foremast-men in a watch capable of doing duty, and even some of these lame and unable to go aloft, under these disheartening circumstances we stood to the westward; and on the 9th of June, at daybreak, we at last discovered the long-wished-for island of Juan Fernandez. With this discovery I shall close this chapter, and the first book, after observing (which will furnish a very strong image of our unparalleled distresses) that, by our suspecting ourselves to be to the westward of the island on the 28th of May, and in consequence of this standing in on the main, we lost between seventy and eighty of our men, whom we should doubtless have saved had we made the island that day, which, had we kept on our course for a few hours longer, we could not have failed to have done.

'On the 9th of June, at daybreak, we first descried the island of Juan Fernandez, bearing north by east half east at eleven or twelve leagues' distance. And though, on this first view, it appeared to be

a very mountainous place, extremely ragged and irregular, yet as it was land, and the land we sought for, it was to us a most agreeable sight; because at this place only we could help to put a period to those terrible calamities we had so long struggled with, which had already swept away above half our crew, and which, had we continued a few days longer at sea, would inevitably have completed our destruction. For we were by this time reduced to so helpless a condition, that out of 200 and odd men which remained alive, we could not, taking all our watchers together, muster hands enough to work the ship in an emergency, though we included the officers, their servants, and the boys.

'The wind being northerly when we first made the island, we kept plying all that day, and the next night, in order to get in with the land; and wearing the ship in the middle watch, we had a melancholy instance of the almost incredible debility of our people; for the lieutenant could muster no more than two quarter-masters, and six foremast-men capable of working, so that, without the assistance of the officers, servants, and the boys, it might have proved impossible for us to have reached the island after we had got sight of it; and even with this assistance, they were two hours in trimming the sails: to so wretched a condition was a sixty-gun ship reduced, which had passed Streights le Maire but three months before with between 400 and 500 men, almost all of them in health and vigour.

'However, on the 10th, in the afternoon, we got under the lee of the island, and kept ranging along it at about two miles' distance, in order to look out for the proper anchorage, which was described to be in a bay on the north side. Being now nearer in with the shore, we could discover that the broken craggy precipices which had appeared so unpromising at a distance were far from barren, being in most places covered with woods, and that between them there were everywhere interspersed the finest valleys, clothed with a most beautiful verdure, and watered with numerous streams and cascades, no valley of any extent being unprovided of its proper rill. The water, too, as we afterwards found, was not inferior to any we had ever tasted, and was constantly clear. The aspect of this country thus diversified would at all times have been extremely delightful; but in our distressed situation, languishing as we were for the land and its vegetable productions (an inclination constantly attending every stage of the sea-scurvy), it is scarcely credible with what eagerness and transport we viewed the shore, and with how much impatience we longed for the greens, and other refreshments which were then in sight, and particularly the water; for of this we had been confined to a very sparing allowance a considerable time, and had then but five ton remaining on board. Those only who have endured a long series of thirst, and who can readily recall the desire and agitation which the ideas alone of springs and brooks have at that time raised in them, can judge of the emotion with which we eyed a large cascade of the most transparent water, which poured itself from a rock near a hundred feet high into the sea, at a small

distance from the ship. Even those amongst the diseased who were not in the very last stages of the distemper, though they had been long confined to their hammocks, exerted the small remains of strength that were left them, and crawled up to the deck to feast themselves with this reviving prospect. Thus we coasted the shore, fully employed in the contemplation of this enchanting landscape, which still improved upon us the farther we advanced. But at last the night closed upon us before we had satisfied ourselves which was the proper bay to anchor in, and therefore we resolved to keep in soundings all night (we having then from sixty-four to seventy fathom), and to send our boat next morning to discover the road: however, the current shifted in the night, and set us so near the land, that we were obliged to let go the best bower in fifty-six fathom, not half a mile from the shore. At four in the morning the cutter was despatched with our third lieutenant, to find out the bay we were in search of, who returned again at noon with the boat laden with seals and grass; for though the island abounded with better vegetables, yet the boat's crew, in their short stay, had not met with them; and they well knew that even grass would prove a dainty, as indeed it was all soon and eagerly devoured. The seals, too, were considered as fresh provision, but as yet were not much admired, though they grew afterwards into more repute: for what rendered them less valuable at this juncture was, the prodigious quantity of excellent fish which the people on board had taken during the absence of the boat.

'The cutter, in this expedition, had discovered the bay where we intended to anchor, which we found was to the westward of our present station; and the next morning, the weather proving favourable, we endeavoured to weigh, in order to proceed thither; but though on this occasion we mustered all the strength we could, obliging even the sick, who were scarce able to keep on their legs, to assist us, yet the capstan was so weakly manned, that it was near four hours before we hove the cable right up and down; after which, with our utmost efforts, and with many surges and some purchases we made use of to increase our power, we found ourselves incapable of starting the anchor from the ground. However, at noon, as a fresh gale blew towards the bay, we were induced to set the sails, which fortunately tripped the anchor, and then we steered along the shore till we came abreast of the point that forms the eastern part of the bay. On the opening of the bay, the wind that had befriended us thus far shifted, and blew from thence in squalls; but by means of the headway we had got, we loofed close in, till the anchor brought us up in fifty-six fathom. Soon after we had thus got to our new berth we discovered a sail, which we made no doubt was one of our squadron; and on its nearer approach we found it to be the Tryal sloop. We immediately sent some of our hands on board her, by whose assistance she was brought to an anchor between us and the land. We soon found that the sloop had not been exempted from the same calamities which we had so severely felt; for her com-

mander, Captain Saunders, waiting on the commodore, informed him that out of his small complement he had buried thirty-four of his men, and those that remained were so universally afflicted with the scurvy, that only himself, his lieutenant, and three of his men, were able to stand by the sails. The Tryal came to an anchor within us on the 12th about noon, and we carried our hawsers on board her, in order to moor ourselves nearer in shore; but the wind coming off the land in violent gusts, prevented our mooring in the birth we intended. Indeed our principal attention was employed in business rather of more importance: for we were now extremely occupied in sending on shore materials to raise tents for the reception of the sick, who died apace on board; and doubtless the distemper was considerably augmented by the stench and filthiness in which they lay; for the number of the diseased was so great, and so few could be spared from the necessary duty of the sails to look after them, that it was impossible to avoid a great relaxation in the article of cleanliness, which had rendered the ship extremely loathsome between decks. Notwithstanding our desire of freeing the sick from their hateful situation, and their own extreme impatience to get on shore, we had not hands enough to prepare the tents for their reception before the 16th; but on that and the two following days we sent them all on shore, amounting to 167 persons, besides twelve or fourteen that died in the boats, on their being exposed to the fresh air. The greatest part of our sick were so infirm, that we were obliged to carry them out of the ship in their hammocks, and to convey them afterwards in the same manner, from the water-side to their tents, over a stony beach. This was a work of considerable fatigue to the few who were healthy; and therefore the commodore, according to his accustomed humanity, not only assisted with his own labour, but obliged his officers, without distinction, to give their helping hand. The extreme weakness of our sick may in some measure be collected from the numbers who died after they had got on shore; for it had generally been found that the land, and the refreshments it produces, very soon recover most stages of the sea-scurvy; and we flattered ourselves that those who had not perished on this first exposure to the open air, but had lived to be placed in their tents, would have been speedily restored to their health and vigour: yet, to our great mortification, it was near twenty days after their landing before the mortality was tolerably ceased; and for the first ten or twelve days we buried rarely less than six each day, and many of those who survived recovered by very slow and insensible degrees. Indeed those who were well enough, at their first getting on shore, to creep out of their tents, and crawl about, were soon relieved, and recovered their health and strength in a very short time; but in the rest the disease seemed to have acquired a degree of inveteracy which was altogther without example.'

The narrative next enlarges on a matter which, however much more pleasing it may be, is foreign to the present subject—the

fertile salubrity of the island of Juan Fernandez, and the delightful contrast to their late horrors and hardships afforded to the remnant of the crews by a residence there from April to September. But it affords a curious illustration how much science, as well as good intention, is necessary for effectually serving our race, to find the commander of this hapless expedition, in the kindness of his heart—for he really was a benevolent man—making provision for such minute benefits to the human race as the following:—

'The excellence of the climate, and the looseness of the soil, render this place extremely proper for all kinds of vegetation; for if the ground be anywhere accidentally turned up, it is immediately overgrown with turnips and Sicilian radishes. Mr Anson, therefore, having with him garden-seeds of all kinds, and stones of different sorts of fruits, he, for the better accommodation of his countrymen who should hereafter touch here, sowed both lettuces, carrots, and other garden-plants, and set in the woods a great variety of plum, apricot, and peach-stones: and these last, he has been informed, have since thriven to a very remarkable degree: for some gentlemen, who in their passage from Lima to Old Spain were taken and brought to England, having procured leave to wait upon Mr Anson, to thank him for his generosity and humanity to his prisoners, some of whom were their relations, they, in casual discourse with him about his transactions in the South Seas, particularly asked him if he had not planted a great number of fruit-stones on the island of Juan Fernandez; for they told him their late navigators had discovered there numbers of peach-trees, and apricot-trees, which being fruits before unobserved in that place, they concluded them to have been produced from kernels set by him.'—P. 166.

And yet, while the worthy commodore was employing himself in these vague and minute services, there was another occupation not much more complicated, had he been acquainted with it, by which he might have saved the lives of 300 of his own devoted followers whom he had been daily committing to the bosom of the deep. When the portion of the expedition which was thus recruiting its strength left the island in September, the whole of the disasters then suffered were thus summed up by the narrator of the voyage:—

'Our people by this time were so far recovered of the scurvy, that there was little danger of burying any more at present; and therefore I shall now sum up the total of our loss since our departure from England, the better to convey some idea of our past sufferings and of our present strength. We had buried on board the Centurion, since our leaving St Helen's, 292, and had now remaining on board 214. This will doubtless appear a most extraordinary mortality; but yet on board the Gloucester it had been much greater; for out of a much smaller crew than ours they had lost the same number,

and had only eighty-two remaining alive. It might be expected that on board the Tryal the slaughter would have been the most terrible, as her decks were almost constantly knee-deep in water; but it happened otherwise, for she escaped more favourably than the rest, since she only buried forty-two, and had now thirty-nine remaining alive. The havoc of this disease had fallen still severer on the invalids and marines than on the sailors; for on board the Centurion, out of fifty invalids and seventy-nine marines, there remained only four invalids, including officers, and eleven marines; and on board the Gloucester every invalid perished, and out of forty-eight marines only two escaped. From this account it appears that the three ships together departed from England with 961 men on board, of whom 626 were dead before this time; so that the whole of our remaining crews, which were now to be distributed amongst three ships, amounted to no more than 335 men and boys; a number greatly insufficient for the manning the Centurion alone, and barely capable of navigating all the three with the utmost exertion of their strength and vigour. This prodigious reduction of our men was still the more terrifying, as we were hitherto uncertain of the fate of Pizarro's squadron, and had reason to suppose that some part of it at least had got round into these seas. Indeed we were satisfied, from our own experience, that they must have suffered greatly in their passage; but then every port in the South Seas was open to them, and the whole power of Chili and Peru would doubtless be united in refreshing and refitting them, and recruiting the numbers they had lost; besides, we had some obscure knowledge of a force to be sent out from Callao: and however contemptible the ships and sailors of this part of the world may have been generally esteemed, it was scarcely possible for anything bearing the name of a ship of force to be feebler or less considerable than ourselves. And had there been nothing to be apprehended from the naval power of the Spaniards in this part of the world, yet our enfeebled condition would nevertheless give us the greatest uneasiness, as we were incapable of attempting any of their considerable places; for the risking of twenty men, weak as we then were, was risking the safety of the whole: so that we conceived we should be necessitated to content ourselves with what few prizes we could pick up at sea before we were discovered; after which, we should in all probability be obliged to depart with precipitation, and esteem ourselves fortunate to regain our native country, leaving our enemies to triumph on the inconsiderable mischief they had received from a squadron whose equipment had filled them with such dreadful apprehensions. This was a subject on which we had reason to imagine the Spanish ostentation would remarkably exert itself, though the causes of our disappointment and their security were neither to be sought for in their valour nor our misconduct.'

After a variety of events and fluctuations in health, the disease came back again in all its strength and horror when the remains of

the squadron left the coast of Mexico. The inefficiency of anything that could be done to save the men, after the expedition had set out, was shown in the defeat of many zealous efforts. The narrator of the voyage, M. Walter, appears to have had a glimmering idea that proper methods of precaution in the structure and arrangement of the vessels might have had a more fortunate effect; but writing with so melancholy an array of disasters before him, and without the practical experience we now have of the resources of sanitary science, it is not wonderful that he should have thus expressed his belief that man's triumphs on the ocean were doomed, by natural and inexorable laws, to be paid for by such sacrifices:—

'The scurvy now began to make fresh havoc amongst our people; and we too well knew the effects of this disease by our former fatal experience, to suppose that anything except a speedy passage could secure the greater part of our crew from being destroyed thereby. But as, after being seven weeks at sea, there did not appear any reasons that could persuade us we were nearer the trade-wind than when we set out, there was no ground for us to imagine that our passage would not prove at least three times as long as we at first expected; and consequently we had the melancholy prospect either of dying by the scurvy, or of perishing with the ship for want of hands to navigate her. Indeed several amongst us were willing to believe that in this warm climate, so different from what we felt in passing round Cape Horn, the violence of this disease and its fatality might be in some degree mitigated, as it had not been unusual to suppose that its particular virulence during that passage was in a great measure owing to the severity of the weather; but the ravage of the distemper, in our present circumstances, soon convinced us of the falsity of this speculation, as it likewise exploded certain other opinions which usually pass current about the cause and nature of this disease; for it has been generally presumed that sufficient supplies of water and of fresh provisions are effectual preventives of this malady; but it happened that, in the present case, we had a considerable stock of fresh provisions on board, being the hogs and fowls which were taken at Paita: we besides almost daily caught great abundance of bonitoes, dolphins, and albicores; and the unsettled season, which deprived us of the benefit of the trade-wind, proved extremely rainy, so that we were enabled to fill up our water casks almost as fast as they were empty; and each man had five pints of water allowed him every day during the passage. But notwithstanding this plenty of water, notwithstanding that the fresh provisions were distributed amongst the sick, and the whole crew often fed upon fish, yet neither were the sick hereby relieved nor the progress or malignity of the disease at all abated. Nor was it in these instances only that we found the general maxims upon this head defective: for though it has been usually esteemed a necessary piece of management to keep all ships, where the crews are large, as

clean and airy between decks as possible, and it hath been believed by many that this particular alone, if well attended to, would prevent the appearance of the scurvy, or at least mitigate its virulence, yet we observed, during the latter part of our run, that though we kept all our ports open, and took uncommon pains in cleansing and sweetening the ships, the disease still raged with as much violence as ever, nor did its advancement seem to be thereby sensibly retarded.

'However, I would not be understood to assert that fresh provisions, plenty of water, and a constant supply of sweet air between decks, are matters of no moment; I am, on the contrary, well satisfied that they are, all of them, articles of great importance, and are doubtless extremely conducive to the health and vigour of a crew, and may in many cases prevent this fatal malady from taking place. All I have aimed at in what I have advanced, is only to evince that in some instances both the cure and prevention of this malady is impossible to be effected by any management, or by the application of any remedies, which can be made use of at sea. Indeed I am myself fully persuaded that when it has got to a certain head, there are no other means in nature for relieving the sick but carrying them on shore, or at least bringing them into the neighbourhood of the land. Perhaps a distinct and adequate knowledge of the source of this disease may never be discovered; but in general there is no difficulty in conceiving that as a continued supply of fresh air is necessary to all animal life, and as this air is so particular a fluid, that, without losing its elasticity, or any of its obvious properties, it may be rendered unfit for this purpose by the mixing with it some very subtle and otherwise imperceptible effluvia, it may be easily conceived, I say, that the steams arising from the ocean may have a tendency to render the air they are spread through less properly adapted to the support of the life of terrestrial animals, unless these steams are corrected by effluvia of another kind, which perhaps the land alone can afford.'—Pp. 127-128.

It was to Captain Cook that, along with many other inappreciable services, we are indebted for the great boon of having conquered this seemingly unconquerable evil, and practically shown that long voyages in ships full of men are not incompatible with the preservation of life, health, and strength. He was one of those many benefactors of their race who have sprung from the humbler ranks of the people, and what the first lord of the Admiralty, well born, and highly educated, was unable to accomplish, fell to the lot of him who had begun life as a man-before-the-mast. Before he applied his means of prevention, he had, however, his own melancholy experience of the calamities that had befallen his predecessors. In his first voyage, besides seven who died at Batavia, he lost twenty-three men in the run from the Straits of Sunda to the Cape of Good Hope. He set his

mind to discover how such calamities, even in this mitigated form, could be avoided, and the results of his exertions are thus described in the account of his second voyage:—

'Having been absent from England three years and eighteen days, in which time, and under all changes of climate, I lost but four men, and only one of them by sickness, it may not be amiss, at the conclusion of this journal, to enumerate the several causes to which, under the care of Providence, I conceive this uncommon good state of health experienced by my people was owing. In the introduction, mention has been made of the extraordinary attention paid by the Admiralty in causing such articles to be put on board as, either from experience or suggestion, it was judged would tend to preserve the health of the seamen; I shall not trespass upon the reader's time in mentioning them all, but confine myself to such as were found the most useful.

'We were furnished with a quantity of malt, of which was made *sweet wort*. To such of the men as showed the least symptoms of the scurvy, and also to such as were thought to be threatened with that disorder, this was given from one to two or three pints a day, each man, or in such proportion as the surgeon found necessary, which sometimes amounted to three quarts. This is without doubt one of the best antiscorbutic sea-medicines yet discovered, and if used in time, will, with proper attention to other things, I am persuaded, prevent the scurvy from making any great progress for a considerable while. But I am not altogether of opinion that it will cure it at sea. *Sour krout*, of which we had a large quantity, is not only a wholesome vegetable food, but in my judgment highly antiscorbutic, and it spoils not by keeping. A pound of this was served to each man when at sea twice a week, or oftener, as was thought necessary. *Portable broth* was another great article of which we had a large supply. An ounce of this to each man, or such other proportion as circumstances pointed out, was boiled in their peas three times in the week. And when we were in places where vegetables were to be got, it was boiled with them, and wheat or oatmeal every morning for breakfast, and also with peas or vegetables for dinner. It enabled us to make several nourishing and wholesome messes, and was the means of making the people eat a greater quantity of vegetables than they would otherwise have done. Rob of lemon and orange is an antiscorbutic we were not without; the surgeon made use of it in many cases with great success.

'Amongst the articles of victualling, we were supplied with sugar in the room of oil, and with wheat for a part of our oatmeal, and were certainly gainers by the exchange. Sugar, I apprehend, is a very good antiscorbutic, whereas oil (such as the navy is supplied with), I am of opinion, has the contrary effect. But the introduction of the most salutary articles, either as provisions or medicines, will generally prove unsuccessful unless supported by certain regulations. On this principle many years' experience, together with

some hints I have had from Sir Hugh Palliser, Captains Campbell, Wallis, and other intelligent officers, enabled me to lay a plan whereby all was to be governed. The crew were at three watches, except upon some extraordinary occasions. By this means they were not so much exposed to the weather as if they had been at watch and watch, and had generally dry clothes to shift themselves when they happened to get wet. Care was also taken to expose them as little to wet weather as possible.

'Proper methods were used to keep their persons, hammocks, bedding, clothes, &c. constantly clean and dry. Equal care was taken to keep the ship clean and dry betwixt decks. Once or twice a week she was aired with fires; and when this could not be done, she was smoked with gunpowder, mixed with vinegar and water: I had also frequently a fire made in an iron pot at the bottom of the well, which was of great use in purifying the air in the lower parts of the ship. To this, and to cleanliness, as well in the ship as amongst the people, too great attention cannot be paid; the least neglect occasions a putrid and disagreeable smell below, which nothing but fires will remove. Proper attention was paid to the ship's coppers, so that they were kept constantly clean. The fat which boiled out of the salt-beef and pork I never suffered to be given to the people, being of opinion that it promotes the scurvy.

'I was careful to take in water wherever it was to be got, because I look upon fresh water from the shore to be more wholesome than that which has been kept some time on board a ship. Of this essential article we were never at an allowance, but had always plenty for every necessary purpose. Navigators, in general, cannot indeed expect, nor would they wish to meet with such advantages in this respect as fell to my lot. The nature of our voyage carried us into very high latitudes. But the hardships and dangers inseparable from that situation were in some degree compensated by the singular felicity we enjoyed of extracting inexhaustible supplies of fresh water from an ocean strewed with ice.

'We came to few places where either the art of man or the bounty of nature had not provided some sort of refreshment or other, either in the animal or vegetable way. It was my first care to procure whatever of any kind could be met with, by every means in my power, and to oblige our people to make use thereof, both by my example and authority; but the benefits arising from refreshments of any kind soon become so obvious, that I had little occasion to recommend the one or to exert the other. It doth not become me to say how far the principal objects of our voyage have been obtained. Though it hath not abounded with remarkable events, nor been diversified by sudden transitions of fortune, though my relation of it hath been more employed in tracing our course by sea than in recording our operations on shore, this perhaps is a circumstance from which the curious reader may infer that the purposes for which we were sent into the southern hemisphere were diligently and effectually pursued. Had we found out a continent

there, we might have been better enabled to gratify our curiosity; but we hope our not having found it, after all our persevering search, will leave less room for future speculation about unknown worlds remaining to be explored.

'But whatever may be the public judgment about other matters, it is with real satisfaction, and without claiming any merit but that of attention to my duty, that I can conclude this account with an observation which facts enable me to make, that our having discovered the possibility of preserving health amongst a numerous ship's company, for such a length of time, in such varieties of climate, and amidst such continued hardships and fatigues, will make this voyage remarkable in the opinion of every benevolent person, when the disputes about a southern continent shall have ceased to engage the attention and to divide the judgment of philosophers.'*

DEDUCTIONS FROM THE EFFECTS OF SANITARY ARRANGEMENT ON SHIPBOARD.

Such were the facts published to the world in the year 1777. Upwards of seventy years have elapsed since this substantial evidence of the extent to which health may be promoted and misery and death averted by care and attention has been set before the world. Shipowners and shipmasters are not perhaps worse than other men at large—than manufacturers, farmers, or landlords. Yet, from the simple negative circumstance of neither duty nor interest appearing to appeal to them in the matter, the utter recklessness with which they have neglected the means at their disposal for promoting the health and safety of those through whose services they have made their wealth, or who have been committed to their care for transport from place to place, has been such as the following statements develop. They are taken from the evidence laid before the Board of Health:—

'Mr Grainger, with reference to vessels in the port of London, says—"In many vessels the wretched condition of the place in which the men are lodged is such as to be scarcely credible unless witnessed; without other light than that which enters by the hatchway, and therefore in darkness when that opening is closed; without any means of properly renewing the air; and frequently with the superadded evil, owing to the washing of the sea and the leakage of the decks, of wet and moisture, the forecastle, which, by due care, could be kept dry, and, by simple and inexpensive means, could be supplied with fresh air, is actually more unfavourable to the maintenance of health than many of the worst dwellings on land."

'Mr Bowie, also with reference to vessels in the port of London, states—"After a long acquaintance with the shipping of the port of London, and a special examination of a great number of vessels of

* Cook's Voyage, vol. ii. pp. 289–293.

all classes in the Thames which I have recently made in order to ascertain their condition as to cleanliness and ventilation, and particularly with a view to note the accommodation provided for the sailors, and the probable effect of the atmosphere of the ship upon their health, I find that the instances are extremely rare in which there is any special provision whatever for ventilating either the berths for the men or the hold for the cargo. These berths are for the most part dirty, close, and unwholesome; in numerous instances they are so to an extreme degree; and I am of opinion that the houses and rooms in the close courts of Whitechapel, which I habitually visit, do not, as a rule, exceed in the unhealthiness of their condition the forecastle of ships, in which the filth is often as great, the air as close, stifling, and offensive, and altogether as likely to generate fever, and to cause it to spread if it does break out."

'Dr Duncan, medical officer of health for Liverpool, says—"I have visited a number of vessels of all classes now in the Liverpool Docks, with reference to the accommodation afforded to their crews, and I find that in this respect considerable variety exists, the larger vessels, particularly the Indiamen, being on a better footing than those of smaller size; but in none that I examined was the breathing-space more than half what would be considered on shore as essential to health. In all the smaller vessels, and in the majority of those of every description, the sailors sleep in the forecastle, situate between decks, where the vessel tapers to the bows, and where the height is often not sufficient to enable a man to stand erect. The only opening for light and ventilation is the hatchway by which the sailors descend, and which in stormy weather must frequently be closed. These places might properly be termed floating cellars, although they are in no respect equal to the inhabited cellars of Liverpool. Such cellars on shore, indeed, would be condemned as unfit for habitation under the provisions of our Sanitary Act."

'Dr Sutherland, with reference to vessels in the port of Glasgow, says—"The best of the accommodation which is provided for the sailors is disgraceful to the mercantile character of the country, and I cordially concur in the observation of one of the gentlemen who accompanied me on the inspection, that no ship should be allowed to proceed to sea which could not afford sufficient space for the comfortable lodging of its crew. The bearing of this subject on the propagation of disease on board ship has not attracted sufficient attention, at least in our mercantile navy: while our war-ships have been undergoing continual improvements in their sanitary arrangements, and emigrant vessels are placed by law under inspection, ships exclusively engaged in commerce have been left entirely without regulation in these important matters, apparently from public attention not having been sufficiently directed to the subject. If we consider that ships are in reality floating buildings, and those of the mercantile class usually of a worse construction than any which exist in our towns; that they have no provision for

ventilation; that they are generally kept in a filthy condition; that, though requiring constant drainage, as much as any private dwelling does, there is no regulation whereby this is secured; that when in port, and especially in river harbours, which receive the drainage of towns, a portion of water already stagnant, or of diluted sewer-water, is sure to pass in by way of leakage, and evolve the usual unwholesome gases; and that even putrid mud has been found covering the bottoms of such vessels; in short, when we have sanitary conditions as bad, or even worse, than in the worst parts of our crowded cities and towns, we need not be surprised to find that merchant-ships are not exempt from the operation of those causes which engender disease on land, and that, when they happen to be placed in an epidemic centre, the disease, whatever it may be, obeys the usual laws of its propagation, and fastens on the ship just as it would do on any equally unhealthy spot on shore. A foul bill of health is the consequence, and the vessel is put in quarantine at the first port where its bad sanitary reputation happens to excite the fears of the government or people."

'The preceding observations have been expressed by competent observers who have examined these vessels in port, and they all concur in representing the condition of emigrant-ships as superior to that of ordinary merchant-vessels, because the former are under government inspection, the usefulness of which they state to be unequivocally marked. Yet an eye-witness, who, as we shall have occasion more fully to state hereafter, has had the magnanimity to make a voyage in the steerage, in order to ascertain, by personal observation and experience, the actual condition of the emigrant on his passage, gives the following description of one of those vessels at sea:—"Before the emigrant has been a week at sea," says Mr Stephen De Vere, "he is an altered man. How can he be otherwise? Hundreds of poor people, men, women, and children, of all ages, from the drivelling idiot of ninety to the babe just born, huddled together without light, without air, wallowing in filth, and breathing a fetid atmosphere, sick in body, dispirited in heart, the fevered patients lying between the sound in sleeping-places so narrow, as almost to deny them the power of indulging, by a change of position, the natural restlessness of the disease; by their agonized ravings disturbing those around, and predisposing them, through the effects of the imagination, to imbibe the contagion; living without food or medicine, except as administered by the hand of casual charity, dying without the voice of spiritual consolation, and buried in the deep without the rites of the church. The food is generally ill-selected, and seldom sufficiently cooked, in consequence of the insufficiency and bad construction of the cooking-places. The supply of water, hardly enough for cooking and drinking, does not allow washing. In many ships the filthy beds, teeming with all abominations, are never required to be brought on deck and aired; the narrow space between the sleeping-berths and the piles of boxes is never washed or scraped, but breathes up a damp and fetid stench, until the day before arrival

at quarantine, when all hands are required to 'scrub up,' and put on a fair face for the doctor and government inspector.

"No moral restraint is attempted; the voice of prayer is never heard. Drunkenness, with its consequent train of ruffianly debasement, is not discouraged, because it is profitable to the captain, who traffics in the grog. In the ship which brought me out from London last April, the passengers were found in provisions by the owners, according to a contract, and a furnished scale of dietary. The meat was of the worst quality. The supply of water shipped on board was abundant, but the quantity served out to the passengers was so scanty, that they were frequently obliged to throw overboard their salt provisions and rice (a most important article of their food) because they had not water enough both for the necessary cooking and the satisfying of their raging thirst afterwards. They could only afford water for washing by withdrawing it from the cooking of their food. I have known persons to remain for days together in their dark, close berths, because they thus suffered less from hunger, though compelled at the same time, by want of water, to heave overboard their salt provisions and rice. No cleanliness was enforced; the beds never aired; the master, during the whole voyage, never entered the steerage, and would listen to no complaints; the dietary contracted for was, with some exceptions, nominally supplied, though at irregular periods; but false measures were used (in which the water and several articles of dry food were served), the gallon measure containing but three quarts, which fact I proved in Quebec, and had the captain fined for. Once or twice a week ardent spirits were sold indiscriminately to the passengers, producing scenes of unchecked blackguardism beyond description; and lights were prohibited, because the ship—with her open fire-grates upon deck, with lucifer matches and lighted pipes used secretly in the sleeping-berths—was freighted with government powder for the garrison of Quebec. The case of this ship was not one of peculiar misconduct; on the contrary, I have the strongest reason to know, from information which I have received from very many emigrants well known to me, who came over this year in different vessels, that this ship was better regulated and more comfortable than many that reached Canada."

'The description given by the late Dr Andrew Combe, an eminent physiologist and able expositor—a description also derived from personal experience—as to the usual state of emigrant vessels, entirely corresponds with that of Mr De Vere.'

On the ground of these and other similar statements the Commissioners say—

'That disease should break out and spread under such circumstances is inevitable; but the description that has been given of the general condition of merchant-ships sufficiently accounts for the excess of disease and mortality prevalent, under ordinary circumstances, both among seamen and passengers. The evidence is con-

clusive that sickness prevails in proportion as the passengers and crew are confined to the berths below, as is shown, with regard to passengers, by the frequent occurrence of fever among them when, from stormy weather, they are compelled to breathe the poisoned atmosphere of the cabins and berths; and with reference to crews, the evidence of Mr Busk is decisive on this point, when he states the fact and assigns the reason why, of all the vessels in the river Thames, the collier ships are the most subject to typhus, certain named collier ports furnishing 14·5 per cent. of the whole. The crews of vessels arriving after long voyages are in general immediately discharged; but the crews of colliers, as a rule, live and sleep on board while the vessels lie in the river; at all events the apprentices, the class most subject to typhus, are invariably required to sleep on board. These vessels, it is well known, are detained a much longer period in port than any other class of merchantmen, owing to the circumstance that when they arrive within the limits of the port of London, they wait till their cargo is sold before coming up to discharge the coals. "During this interval," says Mr Grainger, "as only one man is required to keep watch, all the crew are sleeping at one time in the forecastle, whilst, when the ship is on the voyage, half the crew are always on deck; so that, after all, it is the common case of over-crowding with which we have to do on board these vessels as on shore. To estimate the force with which this cause operates, it is requisite to explain that colliers thus lie in the river on an average a week or ten days; but it often happens that they are detained much longer—three weeks, and sometimes even three months. In case of long detention, it is usual for the men to leave in order to find another ship; but the apprentices invariably remain."

'The evidence appears to us to be conclusive, that the sickness and loss of life produced by the present state of merchant-vessels might be prevented by ordinary care. A clean and well-ventilated ship is one of the most healthy of human abodes. "If proper measures are adopted," says Mr Grainger, "there is no reason why a single case of typhus should occur on shipboard. Sailors, with respect to disease, enjoy many advantages over the labouring-classes on shore: they for the most part breathe a perfectly pure air, sickly climates being of course excepted; they are well fed; they have a large amount of animal food; and they are for the most part, on entering on a seafaring life, a healthy and robust class." Mr Clark, a surgeon, who has made ten voyages to India in superior vessels, states that he has never had a single case of typhus fever on board; and the large experience of emigrant ships, when properly conducted, is similar.

'From a schedule which we have received from the Colonial Land and Emigration Commissioners, containing a list of the ships despatched under the authority of that Board in 1848, from which returns have as yet been received, and exhibiting a view of the numbers embarked and the mortality that occurred during the voyage,

together with the cause of death as supplied by the surgeon-superintendent of the vessel, it appears that there were seventy-five vessels sent out by the Commissioners to the Australian colonies and the Cape of Good Hope during the year 1848; that of this number reports have as yet reached the Board of thirty-one only; that the grand total of emigrants conveyed by these thirty-one ships amounts to 7902 souls; that out of this whole number the deaths from fever are only three; and that the per-centage of deaths from all causes was, in adults, 0·41; children, 4·08; total, 1·50; showing a greater exemption from disease on board these vessels than would be found among the same classes at the same ages on land.'

On the ground of these and other similar statements, the Commissioners say—

'From the information we have obtained from customhouse officers, whose duty it is to stay on board merchant-vessels—frequently a very severe one—it appears that the Dutch merchant-vessels are the least uncleanly; next to them the Belgian and some German vessels; next the American vessels; next the British; but that the most filthy of all are the Spanish and Portuguese, and the Italian vessels, particularly the Neapolitan; those nations having in their merchant-shipping the most dangerous fever nests and sickly crews, who have been taught to believe that plague and epidemics in general are propagated by contagion, and to look most zealously to protection, not from cleanliness and ventilation, but from quarantine. From the general statements made to us, however, it appears that a large proportion of the American vessels are in a better state with respect to ventilation, cleanliness, and provision for the health and comfort of the men, than the vessels of any other country.'

The call for regulation was certainly strongest in that quarter where regulation first appeared—the royal navy. If it might be said in other departments of sea science that sailors were free agents, who might, if they chose, select a life not only fraught with unpreventible perils of the sea without, but with sources of disease and death which the selfishness of their employers allowed to accumulate within, this could not be said of the service supplied by the pressgang. Next to the naval authorities, the duty of adopting protective arrangements would fall on shipowners engaging with passengers for long voyages. Ignorant of the usages of the sea, and of the natural effects of the peculiar structure and management of the ship, they trust themselves in the hands of people who are the absolute lords of their destiny from thenceforward until their lots are separated by the completion of the voyage. The law will not allow any man in this country to sell himself for a slave, or lend himself to arbitrary and indefinite servitude; and surely it is not an infringement on civil liberty, but a step in the

direction of its preservation, to take order that the power thus incidentally acquired by individuals over the comfort, the health, and the lives of others, is not abused. To how lamentable an extent it has been abused, however, the extracts just concluded testify. Yet it must be admitted, that for the case of emigrants the legislature has lately shown an inclination to make full provision. Acts have been passed from time to time for regulating the structure and management of emigrant ships, the proportional number of passengers whom they may convey according to the extent of the requisites, and the provision they must make for ventilation, and for the passengers obtaining wholesome food and medicines. The last of these acts was passed in the session of 1849.

But there seems to be no reason why sanitary rules should not be extended to all the mercantile navy. If we suppose that the sailor really is acquainted with the noxious agencies generated by filth and closeness, and with their probable effects on his constitution, and that he thus voluntarily chooses his lot, why should the employer be allowed to tempt men to destruction by holding out to them the prospect of employment on such terms, and on them only? We prohibit wagering, we prohibit dangerous amusements, though the danger be only to the persons engaged in them; why, then, not extend the rule, and prohibit men from hiring out others on the condition of risking their lives when the service, with a little trouble, could be accomplished on terms which give a much greater chance of safety?

APPLICATION TO MANUFACTURERS.

Passing from the prison and the ship to large manufactories and their occupants. The building is erected—the machinery is fitted in. The object of the owner is to make money—a justifiable and a praiseworthy object, since it is that which has filled this empire with the sources of the wealth and comfort of its millions. That the owner's object is not intentionally selfish, is shown by the conduct of the workmen who heartily join him, and are ready to take their chance of the state of ventilation of the building, and the state of the machinery and the materials to be manufactured. The owners of these establishments have had their minds set on their own proper objects. They have had to examine machinery—to look to the state of the market and the rate of wages—to organise their establishments—and calculate the income and expenditure. It was their duty to see that the books were balanced, but not that their workmen breathed pure air. It was necessary that the rooms should be large enough to hold the machinery, the workers, and the stock, but not necessary that they should be constructed to admit

the passage of fresh air. The same ignorance that made both parties—employers and employed—utterly neglect these arrangements, would have made them but coarsely and awkwardly fulfil the sanitary requisites if they undertook them. It is fit, then, that the legislature should step in to accomplish a matter to which the attention of the individuals concerned is not directed; and to require the manufacturer, before he invites the workmen into it, to make his edifice life-preserving, and to remove from it all causes of death by disease, just as he ought to keep it free of trap-doors and hidden pitfalls.

It would be a false analogy to compare such intervention with personal restriction or interference in relation to those matters which men can best adjust for themselves—as, for instance, with the hours of working, and with the price of provisions. Sanitary regulations apply not to *persons*, but to *things*. If the labourer will not bathe, or wash, or shave himself, or put on clean linen, legislation should not attempt to compel him to adopt better habits. If the compulsion should succeed, it would be at the sacrifice of that independence and freedom of action which are better still than personal cleanliness. All that the sanitary reformer can do towards the creation of improved habits, is to remove the causes which may have led to their deterioration, and to place the man in contact with outward cleanliness and purity. This is not interference; it is precaution and protection, leaving, indeed, the human being freer than he was, by the removal of the shackles and impediments that bind him, as it were, to the mire. If we dictate to him in the matter of wages, of hours of employment, of food or raiment, we do not take up a duty or a function which he has neglected, but we interfere with the most vital action of his self-liberty—with that which, instead of being neglected by him, forms the object of his most anxious thoughts and attention. If there be difficulties in these departments, yet he is himself a better solver of them than the legislature has ever been, or is likely to become. Centralisation and inquisitorial interference are always expressions of very offensive import in this free country, and, like other terms of reproach, they have frequently been used without reason or thought, and sometimes with an intention to mislead. But it should always be kept in view that the proper bounds of sanitary regulation apply to things, not to persons—and there is a great difference between the two. True, an interference with property is a very serious matter, and may be a source of grievous oppression, but it will scarcely be so when directed to an object of general benevolence; whereas interference with the person is a matter of so much delicacy and danger, that the best intentions will hardly prevent it from being an evil.

The intentions of those who desire to prohibit the labourer from working more than a fixed number of hours in the day are of the most unquestionable purity; but can they always know in which direction their operations may act, or feel secure that the restriction intended as a boon may not have the effect of the grossest tyranny? The restriction of the hours of labour would be in itself a valuable boon, but direct legislation is too clumsy an instrument for accomplishing it. It must arise out of the deeper and more complex sources through which the workman raises his condition, and increases the value of his hours of toil. The following passage from 'A Lecture on the Unhealthiness of Towns—its Causes and Remedies,' delivered by Dr Guy, in the old palace of Richard III., Crosby Hall, shows us how the employer may be poisoning his workmen with the best possible intentions for their safety and comfort. It would be a hardy opinion to hold that legislation which prohibits the blocking up of the vents, and the other mistakes which made the workshops a prison, to be any infringement in civil liberty:—

'Some time back I visited a printing-office, which, though by no means the worst I had seen, was still very bad—crowded, hot, dirty, close, and offensive. Like most similar establishments, it was not built for the purpose to which it was applied, but a number of low rooms had been thrown together, the chimneys had been blocked up, the windows were made air-proof, it was heated by stoves, and lighted by flaring gas lights. The atmosphere was as foul as you would expect to find it, not quite so hot as an oven, and not quite so offensive as a sewer, but partaking more than was pleasant of the properties of both. Of course I heard the usual story. The men sensible of the evil, and applying for remedy to the master; the master making an opening somewhere or other, and the men who were nearest to it shutting it up again because of the drafts. Well, I took the liberty of speaking to the master on the subject, and stated to him my opinion of the injury which the health of his men must suffer from such a state of things. He was aware of it, regretted it, but stated that he was soon about to move to more spacious and more airy premises, where he hoped to have everything as it should be. About a fortnight ago I visited these new premises. They were clean outside and in, the rooms were more lofty, and it was obvious that a large sum had been spent in fitting the premises for their new destination. The foreman was evidently not only pleased with the change, but not a little proud of it. Conceive my astonishment, I had almost said my horror, when I could not discover such a thing as an open fireplace in all the establishment! The chimneys had all been as snugly bricked up as if the escape of foul air was a positive evil; and as for fresh air, it was as carefully excluded as if it were a thief. The gas lights were burning in the open air as usual, without any vent to carry off the foul products

of their combustion, and the source of heat was a mischievous apparatus of hot-water tubes—mischievous, because it was to economise the heat from it that the wholesome chimneys had been bricked up. Here, then, was a monkey-house without the fireplaces and the openings in the skirting, and with the odious gas lights into the bargain.'

APPLICATION TO HOUSE-PROPRIETORS.

We pass from ships and workrooms, where the employed are under the influence of the arrangements made by their employers, to dwelling-houses, where tenants are more or less at the mercy of their landlords. That there should be a free trade in house as well as in other commodities, has remained so indisputable, that when all other things were regulated, this was left free. When the baker worked and sold under the assize, when the manufacturing labourer dared not combine with his fellow to keep up their wages, when the hand-labourer, both in town and country, was restricted by act of parliament in his wages, and was bound to work for these wages to every employer under fear of the stocks and the house of correction, no legislative authority ever professed to limit or rule the rent of land or of houses; and if there was any interference with the powers and privileges of the landlord, it was in the direction of prohibiting foreigners from competing with him—not of restricting the gains which the state of the market might bring to him.

So far as the pecuniary part of the bargain is concerned, we would wish to see the free-trade system continued. Let the landlord charge what he pleases, and what he can get for the occupation of his house and the produce of his field; but let him not be an exception to the rest of the community in being allowed to vend an unwholesome and deleterious article to an unenlightened public, which takes it for something wholesome and unexceptionable. The butcher who exposes blown meat, the fishmonger who sells putrid salmon, are amenable to police penalties. On a somewhat similar principle the stage-coach owner who endangers the lives of his passengers by the furious driving of those in his employment, the proprietor of a steamboat who sets agoing a like series of risks, and the railway company who have made insufficient provision for the safety of those committed to their powerful enginery, are respectively liable for the consequences of their selfishness, neglect, or ignorance. Why, then, should he who makes his living—or, as it more generally happens in this case, his fortune—by dealing in house-accommodation be exempt? Dr Arnott stated to the Commission on the state of large towns—'When I visited Glasgow with Mr Chadwick, there was described to us one vast lodging-house, in connection with a manufactory

there, in which formerly fever constantly prevailed, but where, by making an opening from the top of each room, through a channel of communication to an air-pump, common to all the channels, the disease had disappeared altogether. The supply of pure air obtained by that mode of ventilation was sufficient to dilute the cause of the disease, so that it became powerless.' Such is an illustration of the power which the house-owner exercises over the fate of his tenants—a power which, for the sake of the lives and health of the community, should be subject to a check. If it be said that the working-man who hires his pestiferous room in the middle of deposits of filth, open gutters, and putrid exhalations from his landlord's tanyard or glue manufactory, knows his fate, and chooses to submit to it, why may it not as well be said that he who buys poisoned food, or embarks in a ricketty steamboat, being in the same position of consciousness, excuses the person profiting by the risk?

It may happen that in some of these services there is a monopoly, and the purchaser can have no choice. The seller of butcher-meat and of fish will not generally be a monopolist, and the purchaser may have a protection in his ability to change his market. It is different with steam-vessels, coaches, and especially with railways. But most of all the landlord is a monopolist. He who is the owner of so many acres round the newly-built, tall chimneys of a fresh manufacturing town, can compel every comer to take of his commodity, or not live and work there. The case for protection against the reckless selfishness of such dealers is thus strengthened. Indeed in no age or country boasting of civilisation has it been denied that there must be some kind of police regulation for the protection of the public against the selfishness of individuals wherever men are gathered together in large numbers—it is only when it has been proposed to systematise this necessity, and subject it to the operations of scientific skill, that an outcry has been raised about tyranny and interference with the rights of property. In their ignorance of means to combat with the difficulty, the legislators of the seventeenth century, seeing the corrupt and insalubrious growth of London, proposed to prohibit the indefinite increase of cities. This would have been an interference with property and liberty of the most offensive kind. It would have been saying to the house-speculator, 'You shall not build within so many miles of St Paul's Church.' It would have been saying to the rest of the community, 'You shall not come and live where your interest and pleasure draw you.' The sanitary reformer allows each man to build and live where he pleases, only insisting that the house shall be so built in regard to drainage and ventilation that a human being can safely occupy it.

PART V.

MAIN OBJECTS TO BE ACCOMPLISHED.

GENERAL VIEWS—REMOVAL OF NUISANCES—SEWERS AND DRAINS—SUPPLY OF WATER—LIGHT AND AIR—DISPOSAL OF THE DEAD—OVERCROWDED GRAVEYARDS—THE LABOURING-CLASSES AND PLACES OF WORK—CONSIDERATIONS AS TO UNHEALTHY OCCUPATIONS—INTERESTS LIKELY TO OPPOSE AMENDMENTS—DISCOVERIES—MEANS OF DEODORISING AND DISINFECTING—APPLICATION OF THE REFUSE OF TOWNS TO THE CULTIVATION OF THE COUNTRY.

GENERAL VIEWS.

It is not the object of the present volume to examine minutely the several shapes in which medical and engineering science may be able to promote the cause of public health. Science is ever enlarging its bounds—ever increasing its means of being effective; and we may safely trust that when once it has got free access to apply itself to this great department of human wellbeing, it will go on, as it does in other departments, adding daily new triumphs to what it has already achieved. The great object in the meantime is to awaken the public at large to the extent of the field open to the exertions of this department of science—to the great facts indicating how beneficently it may be exercised. This is done by showing the vast extent of mortality from preventible causes—by pointing out the nature of those causes, and the way in which they operate; by showing not only by reason, but experiment, that they are capable of removal; and finally, by exhibiting improved vitality, health, and happiness as the fruit of the removal. Although, however, it may not be necessary or expedient in a book addressed to all classes of the community to enter into the scientific details of the several operations which conduce to sanitary reform—details which, to a certain extent, would necessarily be dry and technical—yet it may be well to give a general account of the main objects to be accomplished.

These are—the removal of the impurities of the population by drainage and other agencies; the provision of pure air by means of ventilation, and other arrangements connected with towns and buildings; and a plentiful supply of clean water. Such are the main objects of sanitary arrangement. There are others of a subordinate nature which come more or less under these compre-

hensive divisions. We shall find that light is necessary to the full development of the human faculties, but it is not easy to imagine abundance of good air without it. Freedom of locomotion, and places of exercise and recreation, will be among the auxiliary means of securing good air; and the removal of whatever is noxious, whether arising out of the occupations of individuals, the places where they require to live or work in, or the numbers assembled together, comes under the general object of the removal of impurities.

In the course of our researches, it does not happen that we have ever met with so full an analysis, going to the very root of the elements which cause the more or less presence of infection, and consequently of the states of things to be encouraged, and of those to be avoided, in a sanitary view, as the following extract supplies. It may not be full enough and minute enough for actual practice, but it possesses the valuable property of connecting the cause and effect, so that the reason of the principles applied is fully developed. It is contained in the minutes of evidence taken before the Metropolitan Commission of Inquiry in 1848:—

REMARKS ON DISINFECTION, BY ROBERT ANGUS SMITH, ESQ. M.D.

'Generally what we call an antiseptic will be a disinfectant. The prevention of infection will depend upon the prevention of putrefaction. I believe we know of no infection without the presence of a putrefying body. The origin and continuation of all plagues point to this fully and satisfactorily, and the only difference of opinion seems to be whether gases can do it, or organic decomposing vapours only. I know of no case of disease produced from chemical compounds in a permanent condition; no disease produced by the constant exposure to them: concentrated at times, and dilute at others. I know, on the contrary, cases of long life and health under exposure to them. We cannot imagine a state of the atmosphere in which there is no organic matter floating; that is to say, not ammonia, or other gases, but organic matter, which leaves charcoal on burning. It is given out by all animals, and it is probable that, being a necessary state of things, and not removed by health, it is also conducive in like degree to health. But when it collects it is very injurious. In a crowded room it may be gathered, and its concentrated qualities be observed, but even here it is not a pestilence: it becomes so only after the time necessary for decomposition to set in.

'This matter will of course act on the nose and the lungs chiefly, if not entirely. On the nose first. This organ can tell at once when we are getting into impure air, but it ceases after a while to be aware of it, and we are referred then to the general feeling of the whole body, and to the state of the system for a true answer to the question—where are we? Odour, then, becomes a comparative

thing, but its first occurrence should be noted; we cannot smell what we are continually exposed to, and we cannot smell what we never pay any attention to: it is a sense capable of education, but much neglected. A man in health has a certain odour about him; he cannot be aware of it; but some persons, and many animals can; also persons in certain peculiar and diseased conditions are aware of it. Health has, then, an odour, and this odour is connected with organic decomposable matter; much more has disease an odour, and much less likely to be free from decomposable matter.

'The action of substances giving odours is very various: it is as various probably as the other senses, and capable of throwing us into as various states of mind. The quantities used are small, and our general use of them has sanctioned the conclusion that powerful effects are produced by odours given in the most minute quantities; and also that even in imperceptible quantities they are operative. We know that there may be an action before it becomes a distinct sensation; there may be a change produced before we are so far aware of it as to express it; and we have a right to conclude that if a small quantity produce a sensible effect, a smaller may produce an efficient, although insensible effect.

'This action on the system may well be called an inner sense; it often changes one state of feelings instantly, and we wonder why. Its continued action produces disease. I have made these remarks because some persons are unwilling to believe in the great power of forces which they neither see nor feel, not considering that such are of all others the most dangerous.

'I shall mention first a few of the methods by which the atmosphere is disinfected by nature, and then a few artificial ones:—

'Air I consider the great disinfector, partly by its removal of matter, and partly by its oxidating powers. Its mechanical properties are more under due management than its chemical. The source of miasm is in the ground; this arises from the consideration that it is gaseous in an emanation. If on the ground, then, it would be at least advisable that our houses should not be ventilated from the lowest stratum of air, why not go a few feet higher, from ten to fifteen feet? The lowest stratum must be the worst, and any summer evening will tell one that the vapours condense there, and probably the greater part of the miasm. In cases of yellow fever and ague it is notoriously so, and often confined to the lower storeys of houses. Ventilation, then, especially ventilating a house with a pure air, not from a cellar, is a most important permanent disinfectant; perhaps not in the most rigorous sense of the word, but nevertheless in a useful and practical sense.

'Water is the next agent extensively used by nature. Although moist and drying bodies decompose in the most dangerous way, bodies wholly immersed in water undergo a different, and, it would seem, less noxious decomposition. Water also acts from being a conveyor of air, by which means the organic matter is oxidised, forming various products, and among others nitric acid. Water also

is a valuable agent in washing the air, throwing down immense quantities of organic matter as food for vegetables. Lakes, rivers, and seas are healthy, and springs and rivulets also; but stagnant water, marshes, and mixed water and plants, do not make wholesome climates. If heaps of rubbish are completely covered with water they become far less injurious, as the rising and falling tides show us clearly; this is particularly the case when the water is cold; if it be warmed, the effluvia comes off with the vapour of the water. This is a case which may sometimes occur in towns or houses. One evil is, the amount that penetrates into the soil; this, if wells are not near, is not a great evil, as it is so rapidly converted, especially in porous soil, into an inorganic substance.

'Soil is the next largest natural disinfectant, and in conjunction with air and water is the most efficient of all. The organic matter is quickly rendered innoxious or inorganic, especially if the land be drained; if it be not drained, the matter will then pass into a decomposition to be allied to putrefaction, instead of an oxidation. The same may be said of all porous bodies, not merely that they absorb the organic matter, but decompose it. The drainage of a country is therefore an antiseptic and disinfectant. The great remedial measures are therefore to provide air, water, and land drainage.

'But when these things are not done, and disease does enter, a state of things has arisen which has to be destroyed as quickly as possible. For this there are two agents, which are partly natural, partly artificial. Heat is a powerful agent of infection and disinfection. Like many other changes, infectious matter does not decompose, except under degrees of heat which may be called temperate and warm. In the hottest tropical season of Egypt plague disappears. Dryness has probably a great deal to do with this, in a climate, too, where mummies have lain under ground so long. At the same time heat and dryness have been always recommended in ague districts; the great point so often insisted on is not to sleep in the open air, and probably there is more than one cause for this. Hot water suddenly stops many kinds of decomposition, probably all, although it is not capable of removing some compounds not gaseous which may be found. This I find has been stated by Dr Playfair in his evidence. That violent organic power which has killed so many in Germany, sausage-poison, is destroyed by hot water. Although perhaps we do not boil or heat meat at all times to the temperature necessary, the uneven part of a piece of beef is frequently red, a colour which is removed, according to Liebig, at a temperature so low as 140 degrees Fahrenheit. This is the temperature at which, if I recollect, Dr Henry said that the pestilential matter was removed, showing that about this point a change occurs in organised matter, making it incapable of its former decompositions.

'Cold is another disinfectant, and of all antiseptics the most powerful, preventing decomposition for an indefinite, if not for an infinite period. The iced-up animals in the north are an example. It is, however, the one which is least easily applied to ourselves; the

system does not feel invigorated by much cold, although braced by a little: we do, however, apply it, and perhaps might apply it still more to substances which we wish to preserve. Anything liable to decompose, or give out disagreeable odours, should never be kept warm. This is an ordinary occurrence with beer, wine, milk, and meat. It may be extended to putrid matter of all kinds, which in many places is exposed to the rays of the sun, and also spread over a large surface, as if to let the air act more rapidly on it. It is true this causes more rapid decomposition, but it also yields more volatile matter. It is used by medical men. In seeking powerful artificial antiseptics and disinfectants for violent and extreme cases, we are obliged, as in cases of disease, to administer what is of itself to some extent hurtful to the body. It is important as much as possible to avoid this. But the first consideration is, with what are we to deal? If it be a substance analogous to flesh, then have we a difficult body to deal with, for flesh is not easily decomposed. Chlorine does decompose it, and give off nitrogen, keeping the rest, the fat excepted, in solution. There is no doubt of its power to decompose all infectious matter and uninfectious also. Sulphurous acid gas will also destroy it; but both are violent remedies, and all hopes of destroying infection are small, unless a more easily-managed substance is to be dealt with. Decomposing matter gives out gases and volatile matter. This matter has always ammonia with it; it comes off alkaline; and we probably destroy the one by destroying the other. If it be in conjunction with ammonia that the miasm comes, then will an acid remove it; if it be in a state of an organic alkali, containing nitrogen, then will an acid combine with it. Chemical action, by elementary substances, is not so rapid, although often more violent; if electric affinity be allowed to act in decomposing, it is better.

'Chlorine must act in somewhat the same manner in order to combine; and it even decomposes ammonia, an action not causing any evil, but requiring, I imagine, strong gas. Chlorine acts on all metals, and not agreeably on the lungs. It rots the wood in bleaching-houses, and is generally mischievous. The wood of the dye-houses, and the beams of print-works, are not subject to rot, although with an equal amount of moisture. It acts violently on the mucous membrane of the nose, producing rapidly a catarrh when weak. Chloride of lime is very different, and decomposes ammonia and many other compounds of nitrogen with ease, by interchanging on double decomposition. It is a pity that it cannot be introduced into the atmosphere. I believe if it could be it would be found efficacious. I do not know whether it gives out pure chlorine only; I am inclined to doubt it. Its action on bleachers is to make them appear a ruddy, healthy set of men; but at the same time I think it acts better as a solid in solution; and as liquids will penetrate all places with ease, it may be used as a liquid with great advantage. I fear it cannot be introduced into the air well. If it is decomposed, it rapidly gives out chlorine only; and it is, as far as I know, only its long and gentle action that can be trusted to. I agree, however,

with those chemists who recommend it, and would recommend chlorine also, where especially people are not living; in fact, as a fumigator.

'I would say almost the same of sulphurous acid. It is a violent action; but its action on the system is proverbially deleterious. I think it must make a valuable fumigator, and a most efficient washer. If houses were washed with it, it would go into the pores of wood, which it is most difficult to enter by any of the ordinary methods. It is valuable as being gaseous also, by which means it acts as a bleach in the works of woollen bleachers, and is very penetrating. In purifying sources of bad odour these agents are all valuable.

'If, however, chlorine acts as I suppose, I think any acid will act as well. Acetic acid is a useful and powerful antiseptic: it is mild and agreeable, and can be conveyed in any shape whatever into all places. Pyroligneous acid is perhaps the best form of it. I am not aware of this being tried to any great extent; certainly, if we may judge of its results in many cases of putrefaction, we should ascribe a great deal to it. It could often be innocently used about the sick. All metallic salts are, more or less, disinfectant or antiseptic; chiefly because they contain acids which, in one form or other, combine with the nitrogen, and prevents its escape. The metal combines with the sulphur, which also prevents the formation of sulphuretted hydrogen. Any metallic salt which is sanctioned by use may be employed for this purpose.

'I have shown in the "Memoirs of the Chemical Society," 1847 (and I am told Boussingault has since obtained the same results), that the salts of magnesia, including the flocculent carbonate, are capable of fixing both the ammonia and the phosphorous of organic matter, leaving a crystalline compound, clear and transparent, of phosphate of magnesia and ammonia. This is valuable, because it preserves the ingredients most valuable for farmers, and gives the magnesia in a state in which it is an excellent manure; but it does not keep the sulphur, and may therefore be considered as imperfect; it will, however, arrest the evolution of it to a great extent. I would not give it as a perfect body, however, without the addition of a little metallic salt, such as I use to prevent sulphuretted hydrogen, which is a bad gas, although by no means the worst. It prevents the formation of phosphuretted hydrogen, although I cannot attribute any extraordinary effects to this gas. It does not merely act as an antiseptic; but I think one of its valuable properties consists in breaking up the compounds quietly, and making them inorganic, retaining them at the same time for further use. Muriatic acid thrown on magnesian limestone is enough; it acts especially well on urine and liquid manures. It is chiefly for the farmer and the manufacturer, not so much for the house or hospital.

'Any slight acid is a great preserver. The acid peat-bogs preserve substances in them a long time. I am not aware as to the alkaline peat-bogs, but I think preservation will probably not occur

with them, as they are not alkaline to any depth. Tannin is another substance which is a valuable antiseptic, acting little on the organism, but in a length of time doing its work efficiently. Tan-yards have a great deal of filthy matter about them, but the tanners are reckoned healthy men; whether there be anything here on which we might lay useful hold is a question worth answering.

'The infectious matter of plague, cholera, and yellow fever, is probably not a true gas: it does not diffuse. Plague and cholera run up one side of a street, and have been found not to enter a house till the door was opened. Yellow fever can be shut out by protecting the side from which the miasma is blown. Yellow fever may be blown away by a wind. Other pestilences have also disappeared by wind (Hecker). There are cases in which gases do not diffuse readily: what causes are in operation I do not know; some may combine more readily with water, and thus be prevented from acting as true gases. It is very probable that emanations from organic matter combine with water also. Organic matter of animal origin may be detected abundantly in the air. In a crowded room it is got in large quantities, and fatty bodies and nitrogenous bodies may be recognised separately; when burnt, charcoal is left, in quantities by no means microscopic. I cannot agree with those who attribute the unwholesomeness of crowded rooms to carbonic acid. Experiments with the pure substance have been contradictory in their statements. The animal matter has far more power to act, and, like other animal poisons, does not require to be given in large doses to produce bad effects. These vapours may then lie for a considerable time full of the worst qualities, and we cannot calculate to what place any amount of vapour will go, the circumstances of the ground and the atmosphere are so numerous.

'When we say, remove the cause, and the disease will disappear, we are right—both are the cause, want of purity is want of health. At the same time let us not forget that there may be extraneous agencies to act on us, which make more impure that which is impure among ourselves; and that, to whatever pitch of cleanliness we may ever arrive, as long as any one nation in the world is not so, we are subject to the seeds of a pestilence, as we have, from sad experience, in all ages learnt; and that also, in whatever state our lands may be, until the land of other countries is also removed from the state of producing pestilence, we also are subject to be threatened with its seeds, and the lesson we must learn is, to be doubly careful that when it does come, it may die out from the excellency of our arrangements, which should leave nothing on which it can feed; however, I am not aware that miasma from land has ever been found infectious.'

REMOVAL OF NUISANCES.

Of the extent to which these main objects of sanitary reform here referred to remain unaccomplished, it would be useless to

speak. If we went through all the local reports that have at various times been made from the towns of England and Scotland, it would be but a weary detail of filthy streets, choked or uncovered sewers, unventilated houses, and polluted streams. The following, reported by Mr P. H. Holland, surgeon, as to Chorlton-upon-Medlock, is but a type of the rest:—

'The river Medlock is the receptacle for the drainage of Ardwick, Chorlton-upon-Medlock, Hulme, and a large portion of Manchester, in all having a population of about 100,000. In addition to the filth drained from the streets and houses, it receives the waste from numerous dye-works, print-works, and factories, the whole forming the vilest compound of villanous smells that the most lively imagination can conceive. Part of this fluid filth—it cannot be called water—flows into the Irwell, near Hulme Hall, but part also is retained to feed the Duke of Bridgewater's canal, which for miles gives out its disgusting odours. A constant decomposition of the filth at the bottom of the canal is going on, and large quantities of carburetted hydrogen bubble up, causing an appearance like strong ebullition. The inhabitants of the houses near the canal are very much annoyed, and it no doubt causes a very great deterioration in the value of the property in its neighbourhood. The little brook which runs through Greenheys, Cornbrook, produces injury of the same sort on a smaller scale, but as there is more valuable property in its neighbourhood, the actual injury it causes may be even greater, and it is the more annoying as the remedy is so easy—that of sending the filthy water underground.'

Mr Baker, as cited in the Sanitary Report, says of Leeds:—

'With broken panes in every window-frame, and filth and vermin in every nook. With the walls unwhitewashed for years, black with the smoke of foul chimneys, without water, with corded bedstocks for beds, and sacking for bedclothing, with floors unwashed from year to year, without out-offices . . . . while without there are streets elevated a foot, sometimes two, above the level of the causeway, by the accumulation of years, and stagnant puddles here and there, with their fetid exhalations, causeways broken and dangerous, ash-places choked up with filth, and excrementitious deposits on all sides as a consequence, undrained, unpaved, unventilated, uncared for by any authority but the landlord, who weekly collects his miserable rents from his miserable tenants.

'Can we wonder that such places are the hotbeds of disease, or that it obtains, upon constitutions thus liberally predisposed to receive it, and forms the mortality which Leeds exhibits? Adult life, exposed to such miasmata, gives way. How much more, then, infant life, when ushered into, and attempted to be reared in, such obnoxious atmospheres! On the moral habits similar effects are produced. An inattention on the part of the local authorities to the state of the streets diminishes year by year the respectability of

their occupiers. None dwell in such localities but to whom propinquity to employment is absolutely essential. Those who might advocate a better state of things depart; and of those who remain, the one-half, by repeated exhibitions of indecency and vulgarity, and indeed by the mere fact of neighbourship, sink into the moral degradation which is natural to the other, and vicious habits and criminal propensities precede the death which these combinations prepare.'

Dr Southwood Smith stated to the Commission on the state of large towns—

'The place called Punderson's Gardens is a long narrow street, in the centre of which is an open sunk gutter, in which filth of every kind is allowed to accumulate and putrefy. A mud-bank on each side commonly keeps the contents of this gutter in their situation; but sometimes, and especially in wet weather, the gutter overflows; its contents are poured into the neighbouring houses, and the street is rendered nearly impassable. . . . . The street is wholly without drainage of any kind. Fever constantly breaks out in it, and extends from house to house; it has lately been very prevalent here, and we have had several fatal cases from it in the London Fever Hospital. The open area called Lamb's-Fields is about 700 feet in length, and 300 feet in breadth; of this space about 300 feet are constantly covered with stagnant water, winter and summer. In the part thus submerged there is always a quantity of putrefying animal and vegetable matter, the odour of which at the present moment is most offensive. An open filthy ditch encircles this place, which at the western extremity is from eight to ten feet wide. . . . . Nothing can be conceived more disgusting than the appearance of this ditch for an extent of from 300 to 400 feet; the odour of the effluvia from it is at this moment most offensive. Lamb's-Fields is the fruitful source of fever to the houses which immediately surround it, and to the small streets which branch from it. Particular houses were pointed out to me from which entire families have been swept away; and from several of the streets fever is never absent. . . . . I know that no verbal description of these places can convey any conception of their disgusting and poisonous condition; they must be seen to be at all understood, and when seen, every one involuntarily exclaims, "Can such a state of things exist in a country that has made any progress in civilisation?"'

Now, about such nuisances, and their direct influence not only on the senses, but on health, Dr Southwood Smith, when reporting to the Poor-Law Commission about the pressure caused on the poor-rates by disease, said—

'It appears that the streets, courts, alleys, and houses in which fever first breaks out, and in which it becomes most prevalent and fatal, are invariably those in the immediate neighbourhood of uncovered sewers, stagnant ditches and ponds, gutters always full of

putrefying matter, nightmen's yards, and privies, the soil of which lies openly exposed, and is seldom or never removed. It is not possible for any language to convey an adequate conception of the poisonous condition in which large portions of both these districts always remain, winter and summer, in dry and in rainy seasons, from the masses of putrefying matter which are allowed to accumulate.'

When this passage was referred to by the commission on the state of large towns, and he was asked, 'Does much of that to which you refer still remain in the same state?' he said—

'It is essentially the same. I have very recently been over the same places with a distinguished foreigner, who takes an interest in the welfare of the humbler classes, and who was desirous, his attention having been drawn to these reports, to test their accuracy by a personal inspection of the places described. Before we set out on our visit, he could not conceal that he thought the description exaggerated. From the cleanliness, neatness, and apparent healthfulness of the main streets and thoroughfares in London, he could not bring himself to believe that there could be large districts containing hundreds of thousands of the people allowed, year after year, to remain in such a neglected and poisonous condition. "It would be incredible," said he, "it would be unworthy of your state of civilisation, were such descriptions true, even of a few isolated places; but when it is asserted that they are true of the localities in which a very large proportion of the population resides, I own I feel curious to see these places." It so happens that the district over which I took this gentleman has been improved in some respects since these reports were written. A common sewer has been made in the most densely crowded and filthiest locality; and the very worst place I ever saw—namely, Baker's-arms-alley, a narrow court in Rosemary Lane, Whitechapel—has been materially changed for the better by the building of the Blackwall Railway directly through it. But these improvements relate only to a few of the larger thoroughfares; the places most concealed from the public view, the most close, crowded, and filthy districts, remain wholly unaltered. When my foreign friend saw these places he admitted that the wretchedness of their condition had been understated: when he expressed his astonishment that a concern for the common safety had not induced the authorities to attend to the sanitary condition of these extensive districts, I told him (but he thought the statement scarcely mended the matter) that these places were as unknown to our legislators, to almost all our people in power, as an hour ago they had been to himself.'

In his farther examination he said—

'I conceive the immediate and direct cause of fever to be a poison generated by the decomposition of animal and vegetable matters. It is only by a system of good and general sewage that the animal and vegetable refuse—which there must always be wherever there

are human beings, and the quantity of which must of course be great in proportion to the number of persons that are congregated together, and therefore must always be the largest in the largest towns, and in the most densely-populated parts of those towns—can be removed before putrefaction takes place, and consequently before the poison of fever is matured and diffused. Hence the rapid and complete removal of this refuse matter, which it is the object of sewage to effect, is the primary and fundamental means of preventing the production of fever; without this all other precautions must be vain; and next in importance to this is ventilation; both because currents of air are to the poisonous gases, when generated, what the sewers are to the solid matters from which the gases are produced —that is, the great means of carrying them off; and because the free admixture of pure air with poisonous gases, by diluting them, renders them innoxious.'

Dr Augustus Guy in his lecture in Crosbie Hall, said in relation to the localities of fever—

'It makes itself at home in the neighbourhood of cesspools and badly-constructed drains, and takes especial delight in the incense of gully-holes. It has a perfect horror of fresh air, soap, and whitewash, but when left to itself will linger for years amid scenes of filth and corruption, and fold in its deadly embrace all human beings who have the same depraved taste, or are so unfortunate as to be thrown into its company. It is the favourite child of *laissez faire* (in plain English, *let alone*), and bears the same relation to *filth* as crime does to *ignorance*. Unfortunately for us, it has kept the same name for a long time past, and has grown so familiar that no one minds it. When the cholera did us the favour to pay us a visit (I speak seriously, it was a favour), we made preparations for its reception. We cleared out many an Augean stable, set the scavengers to work in right earnest, whitewashed sundry houses, and showed a wholesome respect for the threatened invader. He came at last, and he was too strong for us. He landed, and took up his quarters where we should expect to find him—on the banks of rivers; in low marshy spots; in the crowded, filthy, and ill-drained districts of large towns; and wherever we had either made no efforts to remove accumulated filth, or where the long neglect of years admitted of no immediate reparation. I saw sundry cases of cholera myself, and they all occurred (they were the first in that neighbourhood) in a quarter of the borough of Southwark, hopelessly sunk below the level of the surrounding district, and which set at defiance all attempts at drainage. Now, it is a strange example of the effect of habit, and the influence of names, that this formidable stranger should have produced such a sensation, and roused us for a time into so much activity, and yet that this domestic pestilence should be allowed to go on poisoning and killing, year by year, thousands of our people, without setting a broom or a brush in motion. When the cholera was on his way to us, and while he was among us, we were really up and stirring, and

waging a not unsuccessful war against the causes of disease; but no sooner did he take his departure than we lapsed into our accustomed negligence. The Commissioners of Sewers laid down their trowels, the scavengers walked away with their brooms in their hands: there was a sudden falling off in the consumption of soap and whitewash; the Boards of Health closed their books and their labours; the government fell into its habitual state of calm repose; all things returned under the sleepy rule of *laissez faire*, and Filth, with his attendant train of Disease, and Misery, and Crime, resumed his empire.'

SEWERS AND DRAINS.

If there were no legislation as to the duties of the owners of lands and houses to each other and the public, the general state of practice would be that each would discharge the impurities arising on his property upon that of the conterminous owner, and every one would be occupied in driving the nuisance from his own door to that of his neighbour. This is a state of matters from which society would at once relieve itself by some general rule of toleration and forbearance. The earliest traces of laws in all countries becoming civilised show arrangements for fixing the mutual rights and liabilities of individuals as to this department of the public service. In the Roman law, the obligation by which a person was bound in some measure to submit to the effect of his neighbours' operations, or to restrain his own, was called a servitude. Thus there was the servitude of *Stilicidium*, the possessor of which might let the rain from the eaves of his buildings drop on his neighbour's property; and there was the servitude restraining the height of buildings, the possessor of which might restrain his neighbour from raising edifices so high as to obscure his lights. When there was a stream passing through contiguous lands, it was called a natural servitude attached to the lower lands to receive the water as it passed from the upper. But this would not entitle the owner of the latter to pollute the water with filth—it would require the possession of another and more stringent servitude to give him that right.

Like every other department of the law, these arrangements are capable of high improvement under the influence of skill and thought. Where large masses of human beings have congregated together, it has been absolutely necessary to establish regulations, and these sometimes of a very complicated, costly, and harassing kind, to prevent the people at large from suffering by the impurities which must be generated among them. If there were not extensive scavenging, and other operations for removing the filth of London, the people would die off as they did in the great plague.

But it has hitherto been the prevailing defect of such services that they have been local and limited—undertaken rather under the urgency of a pressing contemporaneous necessity, than on the wide principles which would be suggested by enlightened forethought. Hence there is a want of union of action, and of presiding and comprehensive skill, sufficient to make each local interest adjust its demands to those of the public at large. Some places are drained, and others are not. In some instances a system of sewers conveys the filth from one district—rich and selfish—only to accumulate it on the indigenous impurities of another district, poor and improvident. The sewer system of the metropolis has been in the hands of many local bodies whose interests clash with each other instead of being adjusted to a coincidence. In Edinburgh the sewers are partly made with public money, partly at the cost of individuals, and there is no public officer who knows what part of the town is drained by these subterranean cleansers, and what is not. In the Sanitary Report it is said of the system throughout the country and its general character—

'The local reports abound with instances of expensive main-drains, which, from ignorant construction as to the levels, do not perform their office, and do accumulate pestilential refuse; others, which have proper levels, but, from the want of proper supplies of water, do not act; others, which act only partially or by surface drainage, in consequence of the neglect of communication from the houses to the drains; others, where there are drains communicating from the houses, but where the house-drains do not act, or only act in spreading the surface of the matter from cesspools, and increasing the fetid exhalations from it in consequence of the want of supplies of water; others again, as in some of the best quarters of the metropolis, where the supplies of water are adequate, and where the drains act in the removal of refuse from the house, but where, from want of moderate scientific knowledge or care in their construction, each drain acts like the neck of a large retort, and serves to introduce into the house the subtle gas which spreads disease from the accumulations in the sewers. Other districts there are where their structural arrangements may be completed, and water supplied, and the under drainage in action, and yet pestilential accumulations be found spread before the doors of the population in consequence of the defective construction, and the neglect of the surface-cleansing of the streets and roads. * * *

'No one can have had occasion to examine much of the business of local administration without being aware of other evils entailed by the multiplication of badly-appointed officers in addition to the evils of excessive cost and bad quality of the service to the rate-payers. One of the evils is the fuel they add to the flames of local parties, by which both parties are generally losers. Where special and scientific qualifications are not defined, or, if defined, not secured

—where the most fatal errors, as in this instance, are shrouded by the nature of the work from detection—all the idle dependants of election-committees who have time to spare, because they have failed in their own business for want of steady application, and because their time is worthless, are let in as candidates, and in proportion to the absence of security for qualifications is the extent of expectation created and disappointment insured. The dreadful state of the labouring-classes in the most important towns—the entire neglect of existing sanitary regulations—the apathy to repeated remonstrances that have been made by eminent medical practitioners, as by Dr Ferrier in Manchester, and by Dr Currie of Liverpool—the entire neglect of recommendations made by them, which, if carried out, would have protected those communities from immense burthens, from pestilence and slaughters worse than many wars, and from an enfeebled, diseased, and, by physical causes, a degraded generation of workpeople—the resistance made from no other manifest cause than a blind jealousy of interference, to the exercise of powers that can have no other object than to prevent the like evils for the future—all indicate the conclusion as to the nature of the arrangements to be expected from those who have by familiarity become insensible to the means of preventing the evils which fall with the greatest weight on the least protected classes.'

In all partial and local operations which are not subject to a general supervision, there must be a waste of effort and of execution, which is not only a loss in itself, but serves to impede every effort towards general improvement, by disgusting people with the expense and difficulty attending it. It is further remarked in the Report :—

'It has been shown, in respect to drainage as well as road construction, that the economy and efficiency of the works will be according to the qualifications, the powers, and responsibilities of the officers appointed to execute them, secured by legislative means, and that new labour on the old condition, without skill, will be executed in the old manner—extravagantly and inefficiently. But engineers, or properly-qualified officers, having the science of civil engineering, could not be procured for every separate purpose in every part of the country, as is generally assumed in acts of parliament for effecting particular objects. When such connected work is divided and separated, the remuneration necessary to obtain properly-qualified officers to attend to the fragment of service is too high; the separation, therefore, in most places amounts to the exclusion of science from public work, or, in other words, to its degradation. It will be found, when the works of draining and road-making and maintenance are examined, that the common practice of making sewers on plans independently of the construction of roads, and roads independently of the arrangements for cleansing and keeping them dry, is always to the disadvantage of the work

and to the public. The same surface levels and surveys serve for drainage and for road construction. The construction of the drains for roads and streets, and the maintenance of them, are the primary and most important works; the construction and maintenance of the surface of the road is a connected work, subsequent in order, and can be best superintended by the same officer. In every part of the country inconveniences and losses are experienced from the separation of such work on almost every occasion where repair or new construction is needed. In the towns a road is broken up by the bursting of a sewer, or the necessity of cleansing or repairing it; the sewer is repaired, but the road is left broken, because the road-surveyor and his separate set of workmen are engaged in some other work. In the metropolis, the breaches left in the roads by the delay and want of concert amongst the various officers are a source not only of great obstruction but of frequent accidents. In replacing the pavements, the water and the gas-pipes are not unfrequently put out of order, and these again occasion another opening and another expense to the public for repairs. In the rural districts a road is out of repair, but the first remedy is drainage; the road-surveyor cannot proceed because the sewers'-surveyor has his men elsewhere occupied. In various other particulars the consolidation of the same work, under the same officer, acting with a combined staff of foremen and workmen, is attended with advantages in efficiency and economy to which it were unnecessary to advert if the opposite arrangements were not the most frequent. In the few instances that have taken place of a combination of duties, the experience of the advantages of the combination would occasion a proposal for separating them to be viewed as an increase of trouble and expense, and a hindrance to the proper execution of the work.

'In the districts where the greatest defects prevail, we find such an array of officers for the superintendence of public structures as would lead to the *à priori* conclusion of a high degree of perfection in the work from the apparent subdivision of labour in which it is distributed. In the same petty districts we have surveyors of sewers appointed by the commissioners of sewers, surveyors of turnpike-roads appointed by the trustees of the turnpike trusts, surveyors of highways appointed by the inhabitants in vestry or by district boards under the Highway Act, paid district surveyors appointed by the justices, surveyors of paving under local acts, surveyors of building under the Building Act, surveyors of county bridges, &c.'

That such imperfect and conflicting operations have really been a heavier burthen to the communities by which they have been applied than would fall to their share of contribution to a general and effective system, is shown in abundance of forms. It is further stated in the Sanitary Report—

'All this incompleteness as to the extent of the districts drained,

and the imperfection in the mode of executing the works, appears, from the complaints and evidence given before the committee, to be accompanied by disproportionate and oppressive assessments and extravagant expenditure.

'The rates were complained of as levied on property which was undrained, and derived no benefit from them; and by equal assessments on houses which derive benefit by direct communications with the sewers, and on houses which have no communication with them, and only derive benefit from the surface drainage, and in some cases on houses which were unoccupied. These unequal charges, sometimes for long periods, and for large and permanent works, fell upon a fluctuating tenancy. "We should claim," says one witness, "twenty years' rate from the incoming tenant, or we might have sold the premises." * * *

'Besides the evils inherent in narrow districts, and the splitting of connected functions, which prevent the application of science, by preventing the appointment of scientific officers, there are other evils attendant on such small jurisdictions and separation of functions—namely, in the mode in which the money for such expenditure is levied. The popular jealousy is excited by the further multiplication of unnecessary offices, as of clerks and collectors, but real annoyance is given by the consequent increased expense of separate collections. The prevalent repugnance to direct taxation in any shape has hitherto been greatly owing to the cause of grievances experienced in the number and oppressiveness of the collections incidental to the ordinary local taxation. Those collections confuse and obstruct the ratepayers' economy. Where there are a number of rates collected at different periods, some are forgotten, and not provided for; and when demanded, they fall with the inconvenience, and create the irritation, of a new tax. The householder may have paid the collector of his poor's-rates, then the collector of his assessed taxes, then the collector of the land-tax, then the collector of the watch-rates, then the collector of his paving-rates, then his lighting-rates, then his water-rates, and then he thinks he has done, when a collector calls to demand the payment of the church-rates; he may have paid him, when another collector appears to demand the payment of a sewers'-rate for two years, probably for the period of a former tenant, and for which the tenant on whom the demand is levied receives no apparent advantage. A witness says, "In Limehouse there had not been a sewer built for one hundred and odd years, and there are 2000 houses, and not a sewer to them." Another states, "In one case a sewer-rate of 6d. in the pound was levied for ten years, without even surface drainage;" and in that case the party paid another rate to a trust for paving, lighting, and making drainage. "We could claim six years," says another witness; "three years' rates in arrear, as against former occupiers, were levied on the incoming tenants."

'In a house receiving no benefit, the occupier, having refused to pay the rate ten years, and having paid it but once, in 1827, the com-

missioners, when he left (1834) the house, "distrained on the newcomer, and tore down the corn-bin," &c. His solicitor previously wrote to them that the occupier was out of town, and wished them to abstain from taking any violent measures, at the same time offering on his part to refer the matter to any competent person. In another case of aggravated proceeding, Mr William Baker, who was clerk to a like commission, complained of the state of the sewerage, and of the rates in another commission. He did not resist the rate, "for he knew very well what the powers of the commissioners are, and it was not worth his while to resist so strong a body." The assessments of sewers'-rates are seldom strictly legal.

'Such rates, being small in amount, they are levied at long intervals, for the collection at once of a sum sufficient to defray the expense of collection; and because they are collected at long intervals, the irritation and resistance and trouble are great, and an additional sum is paid by the public for the collector's share of the trouble of the collection. For the collection of the assessed taxes 3d. in the pound is paid; for the collection of the sewers'-rates from 6d. to 1s. in the pound is usually paid. I venture to state, that by a consolidation of the collection of such charges, enough may be saved of money (independently of the saving of oppression and irritation) from the collection of the one local tax, the sewers'-rate, to pay the expense of the services of scientific officers throughout the country.'

When, on the approach of the cholera, a London clergyman asked the Board of Health 'what he should do in order to effect the cleansing and draining of his parish?' they were obliged to tell him—

'There appear to be upwards of 120 local acts for the more dense portions of the metropolis, for the management of upwards of eighty distinct local jurisdictions, many of which coincide neither with parish, nor Union, nor police district, nor any other recognised division. When a householder, who gives his address in a particular street, applies to know how he may proceed—if the local act be sought out, and the provision in relation to the matter in question be also sought out—he cannot always be safely answered, inasmuch as streets are frequently divided, sometimes longitudinally, and paved and cleansed at different times, under different jurisdictions. At present no public maps are known to exist by which the area of the jurisdiction could in any such cases be ascertained correctly.

'In the parish of St Pancras, where you reside, there are no less than sixteen separate Paving-Boards, acting under twenty-nine acts of parliament, which would require to be consulted before an opinion could be safely pronounced as to what it might be practicable to do for the effectual cleansing of the parish as a whole.'

When devising means for protection from the pestilence, the Board had thus to complain of the causes of local difficulties:—

'The separation of local administrative bodies in respect to the

execution and control of works; the separation of the works for the water supply from the works for sewerage; the separation of the works for sewerage from those for house-drainage, and of the whole from those for surface-cleansing; the separation of the surface-cleansing from the cleansing of sewers and drains, and even, as is sometimes the case, the separation of the cleansing of the main streets from that of courts and alleys; the separation of these and other services, for the consolidation and combination of which the legislature has provided in the Public Health Act, have seriously impeded the execution of the Diseases' Prevention Act.

'The legislature contemplates the Poor-law Union in England and Wales with its medical officers, its Union-house with its new fever wards, and its provision for medical relief, as the chief local administrative body by which preventive measures could be best carried out; and in general it is the most eligible for the purpose. But in towns there are also Commissioners of Pavements under local acts, who are charged with the duty of surface-cleansing as well as paving, who act independently, and who were frequently found to be unwilling to receive directions from the Boards of Guardians or the medical officers appointed by them. The municipal town-councils have in some instances the control over the roadways, and they have also under their direction a body of police, whose services are of great importance in the execution of orders, especially where it is requisite immediately to carry out combined regulations. Even where there is a fair and liberal desire to co-operate on the part of these separate authorities, there has been a serious loss of time in the service of notices, and in framing expositions of the grounds of requests from one to the other. Added to these impediments, the separation affords the means of shifting responsibility from the one to the other.'

It is a circumstance perpetually overlooked in relation to the public health, that if every individual were just to do what seems best for the preservation of his own individual comfort and convenience, without paying regard to the state of the community at large, each would be the enemy of all, and everything that the well-meaning citizen does to remove the natural growth of impurities from his own household and neighbourhood, would only be casting them on his neighbours. There is in this country a praiseworthy spirit for preserving the sanctity of each man's home as the cincture of the domestic circle. The Englishman's house is his castle—an adage expressing a fine free feeling, but, like many other adages, much abused. From a prejudice which may have had its origin in this free spirit there has been throughout nearly all the city organisation in this country a division between public and private rights and obligations where no such division was necessary. In towns, the corporation or some other public body has generally taken the charge of the main sewerage,

while the communication-drainage from the houses to the sewers has been left to individuals. The independent citizen has resisted any public control over the drain that communicates between the common sewer and his house, as if it might lead parochial authorities and officers of health into his bedroom and his children's nursery. But his neighbours and their health, with that of their households, are scarcely less concerned in the free and fitting removal of that which leaves his house as he himself is. Hence the method in which the house-drains communicate with the main sewers is of nearly as much consequence to the community as the structure of the main sewers themselves. If each proprietor were left to construct so much of the street sewer as passes parallel to his property, at his own expense and in his own way—an arrangement not entirely unexampled—none would expect any other result than incongruity, waste, and inefficiency. But so long as the branch drains are allowed to be made by each proprietor in his own way, the result must be of the same unsatisfactory kind in a modified shape. Hence where considerable public efforts have been made to clear off the accumulations in the main sewers of cities, it has been found that less than half of the task of purification has been accomplished, since there is quite enough of putrescence to poison the air and ruin health left in the thousands of private conduits which it has not been the proper function of the public authorities to touch. 'For private drains to be efficient,' says Mr Hawksley, an eminent engineer, 'they require nearly the same amount of skill and attention in respect to falls, curved junctions, and general arrangement, as is required in laying down water or gas-pipes. All underground work is apt to be carelessly and badly done, for the defects, however serious, are buried with the materials.'

It was found some years ago, as one of the first fruits of the direction of inquiry and skilled investigation to sanitary matters, that the structure of sewers required to be reformed and simplified. The large vault with its flat floor became a long storehouse, where the filth conveyed by the several branch drains was deposited instead of being carried through, the small quantity of water passed into the sewer making a sort of streamlet in the centre, running along a bed of the most obnoxious compound which the impurities of cities could supply. Here was a vast storehouse of impure and deadly gases; and that their influence on health and life might not be lost, perforations called gullies were made here and there to convey the poison to the street, and diffuse it abroad. According to the evidence given by Mr Roe, the surveyor of one of the London sewer districts, the effect of the whole was as follows:—

'Will you explain the system of cleansing the sewers as at present practised, and show the advantages to be derived from it over the former mode of cleansing?—Under the former system, when complaints came to the office, the sewer was examined to ascertain the cause of the stoppage, and if it was in the sewer, it was ordered to be cleansed; sometimes filth and soil had accumulated to eighteen inches, sometimes to two feet, sometimes to three, and even to four feet, when the complaint has come; in that case the houses situated on rather elevated ground would not feel the obstruction to the sewer so soon as those which were on a lower level or with deep basements. To cleanse the sewers the commissioners caused man-holes to be placed, to prevent the necessity of breaking the arch of the sewer; but as a great portion of the sewers had no man-holes, the arch as well as the street was obliged to be broken open, and the soil raised to the surface, and afterwards carted away.

'Does that cause a great nuisance?—A very great nuisance: the first nuisance was to the inhabitants, who complained that their houses were overflowed, and that probably for some time before they came to the office; sometimes when we went we found that they had been annoyed perhaps for months; they had not conceived it was by the stoppage in the sewers: the next inconvenience was in the raising of the soil, it being emptied on the street, and allowed to remain for some time; oftentimes it filled the kennels, and annoyed the passers-by till it was removed.

'What was the cost per cubic yard for removing?—For removing the soil from the sewers which had man-holes, it was 6s. 10d. per cubic yard; from those without the advantage of man-holes, 11s. per cubic yard. That extra price was considered as including the expense of breaking open the arch, and making it good again.'

A smooth, cornerless channel, with a full flow of water, is now deemed essential to the removal of the matter which finds its way into sewers; and hence the principle of tubular sewers, and tubular drains running into them, has been adopted by sanitary reformers. Mr Dyce Guthrie explained the advantage of the tubular system, both in large and small drainage, to the commission of 1843 on the state of large towns; and he showed the simplicity as well as the effectiveness of the plan in the following examination:—

'Have you paid special attention to the subject of town sewerage and the cleansing of streets?—I have. Being convinced that much sickness results from emanations from decomposing filth, as well on the surface of streets and roads as in the interior of drains and sewers, I have directed my inquiries with a view to discover the best means of remedying the evils.

'You have proposed some mechanical improvements for the prevention of the consequences of emanations from sewers, and have turned your attention generally to the improvement of the sewerage

in large towns?—I have. My attention has been more especially directed to private drainage, or the sewerage of individual tenements; for I am satisfied the public health is more deleteriously influenced by the exhalations which arise from pent-up matter in them than by those which issue from the great main or common sewer.

'You are aware that, in some districts of London, sewerage is conducted on the system carried on for many years past, and that in other districts a different arrangement, by the introduction of what is called flushing, has been made?—I am aware of the system of flushing in adoption in the Holborn and Finsbury divisions of this metropolis, and I look upon that as a great improvement, for I have had repeated opportunities of judging of its beneficial effects; but I hold every system of flushing to be imperfect which merely hurries along the contents of the principal or main sewers, while the putrefying débris of inhabited tenements is left undisturbed in house-drains.

'Have you noticed the emanations from sewers in those different places?—I have.

'What is your observation as to their effect on public health? how do they escape?—They escape by the improper position of the gully gratings, and from these not being trapped. By improper position, I mean the top of an eminence, where no surface water can by possibility accumulate; gratings and gullies are therefore injurious in such situations when untrapped. Two or more of large sizes are frequently to be found where a small one is only required, therefore unnecessary expense has been added to injury.

'What do you suggest?—As the débris from any tenement can only be carried off by the water which is furnished to it, the size of the tube to carry off that water after the soil is added to it ought to bear a direct proportion to the supply of water.

'You think that the size of the internal drains is one material point; that they are made too large, and that they ought to be smaller, that a certain quantity of water, being small, may have an influence upon them?—Yes; and I would beg to direct especial attention to these facts, for I am decidedly of opinion that the great evils of sewers complained of are mainly referable to the errors existing in this department of sewage. The reason why house-drains act so imperfectly, that they frequently get entirely choked up, is simply because their too limited supply of water is spread over so great a surface that its power to carry along matter in suspension is lost. Choking from accumulation seldom takes place in the small iron or lead soil-pipe, neither would such a circumstance ever take place if the calibre of the tube or drains, intended to carry off the soil, were not made so great that the usual allowance of water is unequal to the task of washing out its interior.

'What do you think ought to be the form of those drains?—The tubes I would employ for house-drains should be circular, as that form facilitates their manufacture, and they can be made so strong

that there need be no apprehension of want of strength in the material.

'What diameter do you suggest?—Not more, for any ordinary tenement, than from three to six inches. On some occasions perhaps a greater diameter may be necessary.

'Do you consider that sewers being curved at the bottom is an important point, inasmuch as it gives full action to the water?—The curved invert at the bottom of main sewers is indispensable to their perfect action, and I admire those most which have the segment of a smaller circle at bottom than at top, for the very reason that such an arrangement gives full action to water at the time when it is most needed—namely, when the quantity is smallest. The shape I approve of is that in use in the Finsbury and Holborn commission.

'Do you think, with respect to the material that would be required, they should be made of the cheapest material consistently with their being properly constructed?—As cheap as is consistent with sufficient strength of material to resist considerable hydraulic pressure; because, should any obstruction occur (a circumstance which I do not think would ever happen in drains of the description I speak of), that obstruction could be readily removed by cheap hydraulic apparatus.

'You spoke of three or six inches for small drains?—Yes.

'Do you think it would be practicable to have those formed of strong drain tiles, if they were made one part to fit on another?—A cheap arrangement of that kind might be adopted with advantage for properties of small value. Strong drain tiles, made of good material, and carefully burned, I have seen used in Scotland for sewering. These were carefully placed, and continue to operate perfectly, and have been found of sufficient strength to support an incumbent weight of fourteen or fifteen feet. But I would give a decided preference to perfectly circular tubes of entire pieces in moderate lengths. I would suggest that glazing the interior of these tubes would be an immense improvement; for the smoothness of the glazed surface would vastly facilitate the removal of dirt and filth, and the additional expense would be inconsiderable.

'Do you conceive that so made, that would be one of the cheapest and most effectual materials for the humbler classes of houses?—Yes.

'Considerably cheaper than if it were of bricks?—Much cheaper. I would suggest that the interior even of these coarse tiles should be glazed, which would not materially add to the cost, and would for several reasons be a great improvement.'

The same gentleman when asked to give the results of his experience 'on the system too much in use' which does not admit of a sufficient supply and pressure of water for the removal of the solid matter in the sewers, said that it is an evil rather than a benefit to have a drain communication with such a receptacle:—

'The evil is undoubtedly greater; the emanations are increased,

because to the extent of the surface accumulations in the private drain and of the cesspool there is added the gaseous accumulations from the street sewer. A communication by a drain from the sewer brings into a house the emanations from a whole district. This is the case in some parts of the metropolis, where the effect is produced by strong southerly winds, which blow into the mouths of sewers opening into the river, and carry a backward current of emanations into the houses and streets of the upper parts of the district, where the drains or gullies are untrapped. So invariably is this the case in narrow streets and densely-crowded districts sheltered from the wind, that the inhabitants commonly infer a change of the wind from the offensiveness of the drains and the sewers. Hence the tenantry of the districts newly sewered and drained, complain that they are worse off after the sewerage than before, where the sewers are so constructed as to allow of accumulations, and the drains are inadequately supplied with water. * * *

'Have you known any cases of actual illness by retrograde currents into tenements from house-drains?—Yes; in a particular part of the districts in Sidmouth Street there were three servants in one house who were taken ill with fever, and removed, and five of the family of children were also seized, and one died, as I apprehend, of that cause. In Gray's Inn-road another family had fever, but of a more mild form; that was more remote from this particular concentrated spot; but by and by the same family that had the measles here, removed into the very house where this system of sewerage exists, and three children were immediately seized with scarlatina, and one died.'

Mr Hawksley, an eminent engineer, when asked by the same commission, 'Do you consider that the sewage of towns may be improved in general construction, and rendered more economical?' answered—

'Yes; by the use of egg-shaped sewers, built with radiating bricks. I find an egg-shaped sewer, 2 feet 9 inches high, and 2 feet wide, may be laid at a depth of at least 8 feet for about 3s. per foot, the bricks radiating, and the rim 4½ inches thick. Such a sewer will be large enough for two-thirds of the streets of a provincial town, if the inclination be not less than 1 inch in 10 feet. Such a sewer would frequently drain 500 or 600 houses, and would relatively answer the purpose of second-sized (4 feet 6 inches by 2 feet 6 inches) sewers in London. Staffordshire drain-pipes of 10 inches diameter would answer for most courts.'

Being further asked, 'May it be confidently stated that the application of science to the construction of the drains and sewers of most towns would lead to reductions of the common expense, as well as improvements in efficiency?' he said—

'Yes; for drainage works now require frequent alterations and

amendment, in consequence of the want of due knowledge and the deficiency of foresight of the variable and unskilled bodies on whom the management now devolves. Any competent officer, acting under general instructions, and possessing scientific knowledge on these points, might save much money, and at the same time effect great improvements. Drainage works are too commonly considered to be insusceptible of improvement by the application of scientific principles, and hence fall into the hands of tradesmen or other parties quite incompetent to design or execute the work in an efficient way; and in the few instances in which such works are conducted by competent men, such men are commonly controlled and directed by persons totally incapable of exercising a sound discretion on the subject.'

In the continuation of Mr Dyce Guthrie's examination there are the following passages:—

'What would be the expense per yard for a drain of the cheapest and best construction—what you would call the collateral drain?—I should imagine that a drain from the diameter of 12 to 16 inches would be sufficient to carry off everything from the humbler dwellings of a short court, for example, consisting of twenty houses on either side.

'Is it not preferable to have it deeper in its section?—Tubes made in one continuous piece, probably of a circular form, would be as strong as any.

'Take the expense of a circular form; regarding that, what would be the cost per yard?—About 8s.

'Of what would that be formed?—Tubes of so large a diameter as 12 or 18 inches would require to be formed of the clay they use for common earthenware. The prices in these lists are not so low as tubes could be had for if they were required in large quantities.

'What number of tenements of that size would such a tube be sufficient to serve?—That I have not calculated.

'There must be a proportion between the size of the drain and the number of houses to be served?—Of course there must. The calculation required is the number of houses, the quantity of water likely to be collected from the roofs, the quantity of water from each tenement laid on, and the fall.

'Would it be difficult to make such a calculation?—I should say not.

'Would a drain of that size be sufficient to take the débris from twenty houses on each side, and to carry away, if properly supplied with water, that which runs from each of them?—I should have no doubt it would.

'Would the same diameter of drain carry off a greater quantity of matter if it has a better inclination than if it has a smaller inclination?—Of course the nearer to the perpendicular the better.

'Then you must take into consideration the fall as well as the capacity of the drain?—Yes.'

The system of using earthenware pipes for drainage has the authority of antiquity and experience far more distant and distinguished than anything capable of being supplied by the few centuries of civilisation in this country. Many architects and other men of science have observed the glazed stoneware pipes in the Colosseum, and Vitruvius recommends the use of earthenware pipes as both cheaper and more effective than any other kind.*

On the supply of water for drainage purposes, and in so far as it is connected with the subject we have just been discussing, Dr Southwood Smith says—

'It is quite obvious that it cannot matter in the least what pains are taken with the construction of the drain, so as to give to it the form, the diameter, the fall, and so on, which scientific observation may show to be the most effectual—it is plain that all this must be useless, and that all the cost of making it must be entirely wasted if it is not amply supplied with water. No drain can be efficient through which there do not flow currents of water. If, in any particular case, it be not practicable to cause a current of water to be constantly flowing through a drain, then contrivances must be adopted to cause currents to flow through it at regular and no distant intervals. Without a provision for this regular and abundant supply of water, drains not only fail in accomplishing their object, but they become positively injurious. They generate and diffuse the very poison the formation of which it is their object to prevent. When the animal and vegetable matters contained in a drain are not regularly and completely washed away, they become stagnant; a deposit is gradually formed; the matters constituting this moist and semi-fluid deposit are placed under circumstances highly favourable to their decomposition; at regular distances along all the great thoroughfares, close to the pavement, and opposite the doors of dwelling-houses, are placed gully-holes, most conveniently situated for the regular escape of the poison as it is formed. In this manner a drain may become at once a laboratory in which poison is generated on an immense scale, and a conduit, by which it is effectually spread abroad; and the extent to which at present poison is actually thus generated and carried forth, may be accurately measured by every inch of drain which is not regularly washed by a good stream of water.'

SUPPLY OF WATER.

This brings us to another great sanitary object—the supply of water. Of the blessings which a full command over this element confer on the poor, it would be difficult to give too strong a view. At all times, in all nations and climates, its possession has been looked to as the greatest blessing—its privation as the greatest curse. In Scripture, the digging of a well is often mentioned

* Lib. 7, cap. 7.

among the most important acts of some great tribe. To destroy a fountain as an act of vengeance was counted a terrible crime among an Oriental people, which might call up before the eyes of its perpretator the spectre of parched wretches laying themselves down to meet the most torturing of deaths upon the burning sand. Fountains of water received the benedictions of the ministers of religion among pristine nations: they were consecrated by the primitive church; and at the present day, in the British empire, the name given to many wells after some patron saint represents a respect often older than Christianity, since in many instances the fountain had been worshipped in the old pagan days, and the Christian missionary had there established himself, as he did about the heathen shrines, that where he found adoration and worship already bestowed, he might lead them in the right direction.

In many sandy Eastern tracts there is great suffering from the impossibility of supplying towns with a sufficient amount of water. Nay, even in Holland, where 'the broad ocean leans against the land,' the circumstance that a great part of the country is actually artificial soil, under the level of the sea, and protected from it by dikes, has rendered it impracticable by any known process to bring pure water in even by pipes, and so a glass of water is sold in Amsterdam like a glass of beer or scheidam. It would be difficult, perhaps, to make the children of the desert or the artificial soil believe that in a country like this, where the purest water is abundant in the neighbourhood of every town and habitation, and only requires to be brought in clean ducts to the place where it is used, millions of people find it scarce and precious. A country which expends so many millions collected by national and local taxation, ought to be able to supply its people with running water, so as to give the inhabitant of the town the advantages he might have felt in the country, where he had the command of the passing brook. In the local report on the state of the law for sanitary purposes in Scotland, it is said—

'In many parts of Scotland the want of a good supply of water is one of the most material impediments to the furtherance of cleanly habits among the working-people. Besides the immediate evils of a narrow supply, much time is wasted, and many bad habits are acquired by those who have to wait their turn at the wells in a time of drought. Dundee, Stirling, Dunfermline, Lanark, and Arbroath, are all, I believe, imperfectly supplied. The community of Dundee have spent about £30,000 in a contest between the supporters of two contending water bills, and I understand that an act which was passed about three years ago has been found incapable of being put in operation. The evil is rendered more serious by the

demand for cooling water for the numerous steam-engines; and the article is so precious, that it is for these purposes to be repeatedly recooled by exposure and evaporation after it has been heated. I believe that in many of the colliery and manufacturing districts there is inconvenience, amounting to suffering, from want of water.'

Every one can figure to himself the miseries surrounding the family where this element is not attainable; but as it is best on all such matters to have the testimony of actual observers, the following statement made by Mr Toynbee, an eminent surgeon, to the Health of Towns Commission, may be taken in its pure simplicity as a sample of many others which might be made more harrowing by being more picturesque and less precise:—

'I have observed the same water, which is very filthy, from having been used in washing some clothes, used again to wash others. They have told me, indeed, that they have done this to avoid the inconvenience of fetching water from a distance, and from the inability to carry the water up stairs when the rooms inhabited have been on the upper floor. My informants on this topic, it should be remembered, are patients, sickly people, weakened by sickness, and who cannot afford to pay for attendance. To the mothers who are debilitated, the carrying water up stairs is a very great exertion; mothers not daring to leave a child in the room, have to carry the child in one arm and the vessel of water with the other. I have had even sick children neglected and left dirty, and the excuse given has been the inability to fetch the water. Recently I have had a case of this kind. I have attended three children, two of them with scrofulous inflammations of the eyes, the other of them with a scrofulous affection of the throat; all of them rarely washed, and in an extremely filthy condition. The mother is a poor woman, who has been in a respectable condition, but she is now so far advanced in pregnancy, as to be incapacitated from going up and down stairs to fetch water. She continually deplores her condition of having neither the strength to fetch a sufficient supply of water, nor the means of paying for it being brought to her.'

Of Tranent, a village in East Lothian, we have this description in the Local Medical Report:—

'I do not believe there is a house in Tranent into which water is conducted by pipes. There existed great difficulty on many occasions in getting water at all. During the seven years I lived there, the village was, on the whole, extremely ill supplied with water: it was usual for it to be occasionally absent from Tranent altogether. Last summer the supply of water was stopped for several months. The inhabitants suffered the greatest inconvenience from this cause: they could not get sufficient water to maintain cleanliness of person and clothes; it was even difficult for labouring people to get enough to cook their victuals; and I know that many of the poor

were, in consequence, reduced to the practice of using impure and unwholesome water. On these occasions water was carried from a considerable distance from the village. Some went the distance of a mile; some used barrels drawn on carriages; some employed children to bring it in small vessels; and I doubt not many went without it, when it was highly necessary, from inability or infirmity to go themselves, and from want of funds to employ another for the purpose. Since the above was written, I have learned from a lady, previously resident in Tranent, that when cholera prevailed in that district, some of the patients suffered very much indeed from want of water; and that so great was the privation, that on that calamitous occasion people went into the ploughed fields and gathered the rain-water which collected in depressions in the ground, and actually in the prints made by horses' feet. Tranent was formerly well supplied with water of excellent quality by a spring above the village, which flows through a sand-bed. The water flows into Tranent at its head, or highest quarter, and is received into about ten wells, distributed throughout the village. The people supply themselves at these wells when they contain water. When the supply is small, the water pours in a very small stream only; and it happens, in consequence, that on these occasions of scarcity great crowds of women and children assemble at these places, waiting their "turn," as it is termed. I have seen women fighting for water. The wells are sometimes frequented throughout the whole night. It was generally believed by the population that this stoppage of the water was owing to its stream being diverted into a coal-pit which was sunk in the sand-bed above Tranent. That pit has been lined with sheets of iron, and the water has lately returned to Tranent in great abundance.'

If, instead of the precarious supply of the nearest stream or spring there were accessible pumps in all populous places, it would be a great improvement; but the full beneficial efficacy of a supply of water will not be evinced until, in towns at least, it is brought into the houses even of the humblest classes. Mr Quick, an engineer, gave the following estimate of the advantages of internal over external supply in his evidence before the Health of Towns Commission:—

'You have spoken of the evils to the people themselves from the system of supply by stand-pipes instead of a supply carried into each house. What are those evils?—The labour of fetching the water, the loss of time in waiting for what they call their turns, and the demoralisation from the numbers brought and kept together. I have seen as many as from twenty to fifty persons with pails waiting round one or two stand-pipes. Then there is quarrelling for the turn; the strongest pushing forward, and the pails, after they are filled, being upset. In the winter-time, the inconvenience is increased by the liability of the cock being frozen, and injuries to

the health from the weather, and getting wet-footed It also happens frequently that the man and woman are out at work during the time the supply is on the common tap. When they return home there is no supply, and this may occur from day to day: if the man has work, he is generally out, and a large proportion of the women work from home.

'What is the rate of wages in your district for labouring people?—For the lowest class of labourers it is from 15s. to 21s. per week; for mechanics from 24s. to 35s. and 40s. Women get from 1s. to 2s. per diem.

'Then the system of supply by stand-pipes must be an extravagant waste of labour to them as compared with the expense of having water laid on?—That is peculiarly so in our district, where so many even of the children are engaged in hat-lining, and various sorts of work, which makes every moment of time of very great importance to them. Many of them object to take goods home to the shop if it be at a distance, without extra payment, on account of the loss of time.

'Are water-carriers still employed and paid in the district?—Yes; in some part of the district, such as at Clapham and Rotherhithe.

'What is their charge?—A halfpenny for two pails, or for one turn.

'How much is paid per week for water supplies?—Some pay 1s.; laundresses, who use much water, pay as much as 3s. a week.'

The circumstance that the supply of this element is generally left to money-making joint-stock companies, has been one of the causes of its not being provided as a means of health police, but as a luxury to be paid for. The object of water-companies is not to keep the people well supplied, but to make money; and they must, to keep up their dividends, make it as inconvenient as possible to the community, to evade the payment of the highest tax they choose to lay on. Hence every drop given for general purposes is grudged. In Edinburgh, where the Water-Company only became bound to supply the old wells erected when the population was within a comparatively narrow space, while, as it has been already said, some of the strata of the gigantic edifices in the Old Town are supplied by water carried up in casks, there are whole districts of the poor part of the New Town where there is not a public well. It has an evil effect on the condition, whether physical or moral, of poor people to be subjected as they are to these influences, and were it only to remove the odium which joint-stock companies and their mercenary doings heap upon the monied classes of the country, it would be worth their while to give up this source of revenue, and let large communities have a supply of water by paying the cost price of the commodity without affording a profit to capitalists.

The incident mentioned in relation to Dundee has, it is feared, been too often repeated, and that by persons who, if they saw the immediate effect of their conduct, would not be guilty of any inhumane action. The evil mentioned in the quotation has now, it is understood, been removed by the passing of a local act; but the town long suffered from a contest between two projects for a supply of water, and a large proportion of a population upwards of 60,000 was supplied by cartage from the springs here and there a few miles distant. The source of this costly opposition to the plan originally suggested for introducing a supply of water, is understood to have been in the self-interested feelings of some individual proprietors who had dug wells for their own use, and thought it hard that not only should the superiority enjoyed by them be neutralised by a system of water supply, but they were at the same time to be taxed to support it.

It is necessary in this, as in some other matters, that the legislature, if it gives a monopoly, should give it with equitable and merciful conditions, so that a water-company may not be able to tyrannise over a town by an arbitrary command of the necessaries of life, or those things which, in crowded cities, make a near approach to being necessaries. On the high-pressure system, which dispenses with regulating arrangements within dwellings, and adjusts the supply of water on a general central principle in any town of medium size, water can be abundantly supplied to all the houses at a charge that is trifling in comparison with the tariffs of water-companies. As to the amount that the public in the end pay for competition in this department of service—where people are not competing, and cannot compete in a free market, but are setting one monopoly against another—there is much curious information in the Report of the Health of Towns Commission. Mr Hawksley, an engineer who had many opportunities of seeing practically how such services could be economised, thus showed in a report the evil economy of this free trade in monopolies—that is to say, of the legislation that allows monopolists to seek their own advantage instead of binding them down to the performance of due public services :—

'Parliament authorises the establishment of public companies, requiring from them the fulfilment of certain purposes in return for conferring the necessary powers, provisions, and limitations which are deemed to be useful and proper for the preservation of the interests both of the proprietors and of the public. But here the concern of parliament terminates; *no competent authority is appointed to compel the fulfilment of the purposes, or to protect the companies against the aggressions of the public;* the consequence is, that the companies and the public are left to contest the matter between themselves. The

companies usually obtain all they can or dare from the public, and on the other hand the public generally takes the first opportunity to set up rival establishments to crush what is denominated "monopoly," and to institute an acrimonious rivalry from which its promoters hope to derive a permanent advantage. That "competition must do good," is a maxim of such universal acceptance, that parliament now, without much hesitation, concedes the necessary powers to the proposed rival, and *again without imposing supervision.* A second capital becomes invested—a warm combat for public patronage ensues—both companies are on the verge of ruin. To save themselves, a coalition ensues between them—the public is no longer able to resist the two—dividends must be made upon at least a double investment, the expenses of duplicate works and managements must be defrayed, and the final result almost invariably is this—that the public pays more than at first, or at least *equivalently* fails to obtain those reductions which a single company might, and *under supervision* would, have been able to effect. But this is not all: both works are constructed with little regard to future wants. Though in duplicate, they are scarcely capable of being extended except at great and disproportionate cost; and the streets and highways have become filled with indifferent and parallel works, to the great inconvenience and obstruction of other public accommodations of at least equal importance. And so great is the uncertainty of capitalists with respect to the security of investments in public undertakings, that it has become needful, as an inducement to investment, to authorise the shareholders in public works to divide amongst themselves a much higher rate of interest than would be required if greater security were afforded. Moreover, all these circumstances operate most injuriously in other ways. The value of the shares in the undertaking fluctuates with the hopes and disappointments of the holders, jobbing and gambling result, confidence is weakened or destroyed; when shares are high, the public are vehement in their expressions of dissatisfaction, and active in their endeavours to introduce an opponent; when low, the holders (amongst whom are very commonly found the widow and the orphan) are materially injured, and not unfrequently ruined. And it may be further observed that the apprehension of insecurity is found to operate most powerfully and most injuriously during periods of commercial depression, when the maintenance of public confidence and credit is of the last importance to the general welfare.'

The reasons which this gentleman had for objecting to waterworks in populous towns being made a matter of personal interest through local acts, and for some public police system being created for the supply of the element which might adjust it on principles independent of dividends, is more fully brought out in the following passages from his examination:—

'State upon what you ground that opinion?—Two capitals become invested; two sources of wear and tear are created; two manage-

ments, and two complete sets of officers, must be maintained; two causes of loss and leakage are established; for all which the public must and do ultimately pay as well as for the enormously-expensive conflict to obtain the act of parliament, and for the rivalry and strife of several subsequent years. It may be mentioned that in some districts of London three, four, or five companies have pipes, and are occupied in performing the service which might be quite as effectually rendered by one, and perhaps by that one, under proper supervision, at half the cost of the present supply. These companies seldom continue in *active* competition for long periods. Finding the competition ruinous, they coalesce openly, or enter into a private understanding, by which the public are deprived of the benefits of the supposed competition. The charges are either increased, or remain fixed much above those at which a single company would willingly supply. It may be affirmed that the metropolis might, under proper arrangements, be efficiently supplied with gas at 5s. per thousand feet, instead of at the 8s. or 9s. now charged, and yet the companies are in general ill remunerated for the capital they have invested, and the risk they have encountered; and this evil arises solely from the great amount of capital brought into the field to encourage competition, and to satisfy the complaints against a monopoly which exists only in consequence of the omission of parliament to subject single companies to a supervising authority competent to afford an equal protection to the interests of the public and of such companies.'

The examination proceeds thus:—

'Then if the metropolis were supplied with gas under one management, might the gas be sold at 5s. per thousand cubic feet, and yet afford a fair rate of remuneration upon the investment?—It undoubtedly might: at Manchester, with one concern, the charge for gas in 1842 was 5s. 2d. per thousand cubic feet delivered; while in Liverpool, with two companies, it was 6s. 2d.; but notwithstanding the 1s. difference in price, and a smaller manufacture, Manchester was enabled to apply to the improvement of the town, and in increase of assets, as much as the two 10 per cent. dividends of the Liverpool companies—thus showing that two companies will cost the public 20 per cent. more than one company. Another remarkable instance is that of Glasgow, which, being at present supplied by one company, the public are charged only 1s. 3¾d. per thousand feet in payment of dividends, whereas in Liverpool, where there are two companies, the public are necessarily charged 2s. 5½d. per thousand feet for the payment of dividends.

'Can you state that the same circumstances are applicable to the supplies of water to the public?—Yes; they are more or less applicable to all rival establishments working with a superfluous capital, which is for the most part irremovable. Second companies would, in general, be wholly unnecessary, but for original defects in the system of legislation. In nearly all cases the objects sought to be

obtained by the introduction of rival companies would be infinitely better obtained through the agency of an authority instituted for the double purpose of enforcing the compliance of the original companies with the provisions of the acts under which they are established, and of protecting them from the aggressions of interested parties and of capitalists stimulated to the conflict by the hope of pecuniary gain. For example, in the case of Liverpool there are two capitals employed in supplying the town with water on the old system. I believe it would be found that one of these companies could, with but small additions to its means, supply the whole of the water required for public purposes had there been any authority to interfere and adjust equitably the additional charge to be made for the extended supply. But the usual mode of intervention was in this case resorted to. A third capital of £100,000 has been introduced to effect purposes which might have been obtained at probably one-third the expense. This additional capital has been raised for the attainment of a nearly single object—namely, the extinction of fire, and will entail a lasting tax and an annual expenditure of large amount upon the inhabitants. Moreover, the machinery being intended for only very occasional use, is less likely to be maintained in perfect order and readiness than machinery required for constant service.'

LIGHT AND AIR.

Approaching another branch of the series capable of being performed through the instrumentality of sanitary regulations, we may comment on a poet's boast—

> 'I care not, Fortune, what you me deny,
> You cannot shut the windows of the sky.'

Alas! this, like many a pastorally-poetical idea, has but a slight echo in real life. There are too many—too many thousands—to whom fortune has shut the windows of the sky, by compelling them to live in a sort of semi-blindness—the sun being, *first*, intercepted by a dense curtain of smoke; *secondly*, by the high houses on either side of the alley; and *thirdly*, lest 'a sunbeam, which had lost its way,' should accidentally get through these barriers, the pane of glass, if there be a pane of glass in the room or cellar, is coated with a thick covering of inky dust matted with cobweb. Those only who have seen and enjoyed the blessed light of heaven can know the privation of existing in such living graves; but even the children who are brought up in them, as their native soil and atmosphere, though unable to contrast their lot with a better one, and in a manner acclimated, must feel the influence of their condition like those vegetables which, growing in darkness, are white instead of being green. Mr Bagshaw Ward, who had paid attention to the influence of light on the human constitution, thus

gave the results of his knowledge to the Commission on the State of Towns:—

'Have you directed your attention to subjects connected with the health of the humbler classes in crowded communities?—I have.

'To what points have you particularly directed your attention?—The influence of light and of air freed from deleterious particles.

'What observations have you to make upon those points?—During a practice of thirty years in a densely-populated neighbourhood, my attention has been repeatedly drawn to the influence of light, not only as a most efficient means of preventing disease, but likewise as tending materially to render disease milder when it occurs, and more amenable to medical and other treatment. Dupuytren, I think, relates the case of a lady whose maladies had baffled the skill of several eminent practitioners. This lady resided in a dark room (into which the sun never shone) in one of the narrow streets of Paris. After a careful examination, Dupuytren was led to refer her complaints to the absence of light, and recommended her removal to a more cheerful situation. This change was followed by the most beneficial results. All her complaints vanished. Sir James Wylie has given a remarkable instance of the influence of light. He states that the cases of disease on the dark side of an extensive barrack at St Petersburg have been uniformly for many years in the proportion of three to one to those on the side exposed to strong light. The experiments of Dr Edwards are conclusive. He has shown that if tadpoles are nourished with proper food, and exposed to the constantly-renewed contact of water (so that their beneficial respiration may be maintained), but are entirely deprived of light, their growth continues, but their metamorphosis into the condition of air-breathing animals is arrested, and they remain in the form of large tadpoles. Dr Edwards also observes that persons who live in caves and cellars, or in very dark and narrow streets, are apt to produce deformed children; and that men who work in mines are liable to disease and deformity beyond what the simple closeness of the air would be likely to produce.

'Does your observation in the densely-peopled districts where you have practised confirm those observations?—Most strongly.

'Has any recent account of that case of the barracks at St Petersburg been received?—I believe not.

'Do you propose any suggestion with reference to practical measures of improvement?—I would only propose that as much light be admitted into the dwellings both of the rich and the poor as can be possibly admitted, for I am satisfied that, *cæteris paribus*, their health would be improved.

'You think that regulations to secure streets being of a sufficient width, and regulations for the introduction of light and air into the dwellings of the people, would be beneficial to their health?—Yes.

'Beneficial to their moral condition also, as giving them more cheerful habits?—Most assuredly: the more dark corners you have in the dwellings of the poor, the greater amount of dirt and filth.

'Besides your general impression from what you have seen, and the facts you have quoted, do you happen to recollect any cases where you were certain it was the physical influence of the want of light, unconnected with other causes, which had produced the evils? —Yes. It is a very difficult matter for a general practitioner, not attending any large collection of cases, to cite instances; but from noticing hundreds of times the beneficial consequences of the alteration from darkness to light, and the evils resulting from the want of light, I am satisfied that it is a matter of the highest importance.

'At what period of life do you consider that the influence of light is of the most importance to the human species?—During childhood, because it directly influences the physical development.

'The strength and constitution of the man is very much dependent on his early rearing during childhood?—Certainly.

'Whatever stints the growth of a child must operate upon his physical capacity for labour?—Certainly.

'Having good light and good air is of still more consequence to districts which are thickly-peopled, and where there are a great number of children than where there are not so many children?—Decidedly.'

DISPOSAL OF THE DEAD.

In all ages of the world the history of which is sent down to us, in almost every community of which we know or learn, the disposal of the remains of the dead has called forth the deep interest and attention of the living. The sedulousness with which the dust that is left has been returned to the dust that was before, and especially the laborious ingenuity with which the spot is marked to future ages in which every perceptible particle of what was once alive must have been absorbed, are things that have not unaptly been thought to indicate a vague sentiment, even in the rudest breast, that all does not disappear with the corroding tenement of clay, and that there is a separate existence which in some manner throughout the realms of physical or psychical being preserves the separate identity of the individual whose corporeal part has perished. From the steppes of Tartary to the snows of Iceland, wherever little mounds of stone or earth have been seen protruding out of the sod, the researcher has found bones or ashes, or some memorial to show that in ages, no one can tell how distant, the body of a human being has been laid there. The rough, dumb monuments which bear no mark of hammer or chisel, called Druidical stones, have in a like manner developed the types of sepulture. The pyramids and mosques of the East are gigantic funereal monuments. The great round tower of the Castle of St Angelo is a tombstone. Another tower of this form has nothing more to tell us of what or whom it is intended to commemorate than a woman's name—

'There is a stern old tower of other days,
Firm as a fortress with its fence of stone,
Such as an army's baffled strength delays,
Standing with half its battlements alone,
And with two thousand years of ivy grown,
The garland of eternity, where wave
The green leaves over all by time o'erthrown.
What was this tower of strength? Within its cave
What treasure lay so locked, so hid?—a woman's grave!'

In the fine poem from which this stanza is taken there are no more delightful expressions of sentiment than the various suggestions to which the greatness of this monument, and the world's total ignorance of the dead within it, give rise. Thus—

'Perhaps she died in youth: it may be bowed
With woes far heavier than the ponderous tomb
That weighed upon her gentle dust; a cloud
Might gather o'er her beauty, and a gloom
In her dark eye, prophetic of the doom
Heaven gives its favourites—early death; yet shed
A sunset charm around her, and illume,
With hectic light, the Hesperus of the dead,
Of her consuming cheek the autumnal leaf-like red.
* * * *
I know not why—but standing thus by thee,
It seems as if I had thine inmate known,
Thou tomb!'

When we casually alight upon the multitudinous elaborate monuments which the world contains of the unknown dead, we cannot but reflect how strong must have been the feelings of which such stony vast memorials are the record—yet how faintly even these great masses can recall any actual recollection of an individual human being. Perhaps this curious and interesting feeling, always attending on the observation of sepulchral monuments, is called into more vivid existence by Egyptian mummies than by any other memorial of mortality. We are involuntarily reminded of the high science that must have been devoted to the preservation of the body—the exquisite neatness, and the skilfully-laborious application of the ligatures, the curious and valuable ornaments, the chests one within the other so carefully cut out of seasoned wood, so rich in elaborate painting, and so capable of resisting the effects of time, that some which have been brought into this country a century or two ago seem to have started fair with their contemporary still life, and bear scarcely so many marks of age or decay as the tombstones that were raised above our great-grandfathers, when these eastern relics were more than two thousand years old. That curious reflective genius, Sir

Thomas Browne, when he held in his hands the ashes found in some funereal urns—carefully, and with pains and cost, preserved from the rest of the earth's dust, yet so little capable of being individualised, that he could only guess at the nation and the age to which the departed had belonged—thus delivered himself of the reflections passing through his mind:—

'Time, which antiquates antiquities, and hath an art to make dust of all things, hath yet spared these minor monuments. In vain we hope to be known, by open and visible conservatories, when to be unknown was the means of their continuation, and obscurity their protection. If they died by violent hands, and were thrust into their urns, these bones become considerable; and some old philosophers would honour them, whose souls they conceived most pure which were thus snatched from their bodies, and to retain a stronger propension unto them; whereas they weariedly left a languishing corpse, and with faint desires of re-union. And if they fell by long and aged decay, yet wrapt up in the bundle of time, they fall into indistinction, and make but one blot with infants. . . . . What song the Syrens sang, or what name Achilles assumed when he hid himself among women, though puzzling questions, are not beyond all conjecture. What time the persons of these ossuaries entered the famous nations of the dead, and slept with princes and counsellors, might admit a wide solution. But who were the proprietors of these bones, or what bodies these ashes made up, were a question above antiquarism, not to be resolved by men, nor easily, perhaps, by spirits, except we consult the provincial guardians or tutelary observators. Had they made as good provision for their names as they have done for their reliques, they had not so grossly erred in the art of perpetuation. But to subsist in bones, and be but pyramidally extant, is a fallacy in duration. Vain ashes! which in the oblivion of names, persons, times, and sexes, have found unto themselves a fruitless continuation, and only arise unto late posterity as emblems of mortal vanity, antidotes against pride, vainglory, and madding vices.'*

It is one of the effects of this innate desire throughout mankind honourably to memorialise the dead, that among the multifarious fashions in which the body is disposed of—whether it be reverently hidden out of sight, or, stripped of its more corruptible parts, be preserved and openly honoured—provision is almost universally made for removing the decaying dead from the presence of the living, so that there is scarcely a country so barbarous as not to distinguish human remains from the other offal that lies upon the earth. 'Man is a noble animal,' says the same author who has just been quoted, 'splendid in ashes—pompous in the grave; solemnising nativities and deaths with equal lustre, nor

* Hydriotaphia, pp. 71-72.

omitting ceremonies of bravery in the infancy of his nature.' The funerals of the Sandwich islanders were full of pomp and ceremony, yet all was devoted purely to the honour of the deceased, and not to publicity, for Cook and his followers found it difficult to be permitted even to see a portion of them. Alike in these islands of the extreme south and in the North American prairies, the burial-place containing the dead of generations is a sacred spot. Even those wild tribes who do not decorously remove the remains of mortality entirely out of sight, sometimes, in their way of treatment, show a still more lasting interest in them. Thus:—

'In Brazil the practice is to immerse the body of the dead in quicklime; and when the flesh is consumed by its causticity, the bones are collected, scraped, and cleaned, and deposited together in a box, with a lock and key, which is then closed, and the key delivered to the family. These cases have no resemblance to coffins. They are of different shapes; and with their ornamental exterior, the smaller ones rather resemble a lady's dressing-box. They are deposited in dry receptacles made in the walls of the cloisters or other parts of the church; and on this annual festival are brought out, and the living friends come with their keys and inspect them.' *

This may seem very barbarous, yet ordinary funerals in this country are still accompanied with barbaric pomp, derived from an obsolete state of society:—

'The array of funerals commonly made by undertakers is strictly the heraldic array of a baronial funeral—the two men who stand at the doors being supposed to be the two porters of the castle, with their staves, in black; the man who heads the procession, wearing a scarf, being a representative of a herald-at-arms; the man who carries a plume of feathers on his head being an esquire, who bears the shield and casque, with its plume of feathers; the pall-bearers, with batons, being representatives of knights-companions-at-arms; the men walking with wands being supposed to represent gentlemen-ushers, with their wands.'†

No one would wisely recommend that whatever is felt to be decorous and impressive—to give solemnity and pious feelings to sorrow, and remind the survivors of the fleetingness of life—should be omitted. Whatever the world may become, it is not yet the time for proposing that the dead should be removed to their last receptacle like goods to a wareroom. In the words of Jeremy Taylor:—

'Something is to be given to custom, something to fame, to nature,

* Walsh's Notices of Brazil.

† Report on Interments.

and to civilities, and to the honour of deceased friends; for that man is esteemed to die miserable for whom no friend or relation sheds a tear or pays a solemn sigh. I desire to die a dry death, but am not very desirous to have a dry funeral; some flowers sprinkled on my grave would do well and comely; and a soft shower, to turn those flowers into a springing memory or a fair rehearsal, that I may not go forth of my doors as my servants carry the entrails of beasts.'

Yet purchased pomp does not always supply the demand for quiet solemnity. Among the many austere but true pictures of the author of the 'Parish Register,' is the following:—

'Lo! now what dismal sons of darkness come
To bear this daughter of indulgence home!
Tragedians all, and well arranged in black!
Who nature, feeling, force, expression lack;
Who cause no tear, but gloomily pass by,
And shake their sables in the wearied eye,
That turns disgusted from the pompous scene,
Proud without grandeur, with profusion mean!
The tear for kindness past affection owes;
For worth deceased the sigh from reason flows;
E'en well-feigned passions for our sorrows call,
And real tears for mimic miseries fall:
But this poor farce has neither truth nor art,
To please the fancy or to touch the heart.'

It has been fully and convincingly shown by Mr Chadwick in his Report on Interment in Towns, that from want of proper public precautions, even the extravagant sums which the better classes bestow on funeral ceremonies fail to obtain decency and solemnity:—

'The survivors, however, are seldom in a state to perform any office of every-day life, and they are at the mercy of the first comer. The supplies of the funeral goods and services are therefore a multiform monopoly, not apparently on the parts of the chief undertakers, or original and real preparers of the funeral materials and services, but of second or third parties living in the immediate neighbourhood—persons who assume the business of an undertaker, and who obtain the first orders. The reason why the charges are seldom or ever disputed after interment is, that however severe or extortionate they may be, it would be more severe for the widow, or survivor, or friends to scrutinise the items, or resist the payment of the total amount. Nor can it be expected of any individual to break through such customs, however generally they may be disliked. All isolated efforts to simplify the supplies and use of the goods and *matériel*—all objections to the demands for them—are exposed to the calumny that proper respect to the deceased is begrudged. A late right reverend bishop thought it a moral duty to resist an extortionate charge for

such service, and he did so even in a court of law: the well-intended but isolated effort, however, was fruitless. Another reason for the impunity of the extortion is, that much of the funeral expenses are from trust-funds of the higher and middle classes, who influence the practice of the lower classes; and the trustees have but weak motives and means to defend them. In so far as the funeral expenses are concerned, such funds, as will appear in respect to the funds raised for burial amongst the labouring-classes, are an exposed prey.'

And the great outlay goes to purchase such scenes as are described here:—

'If the relatives of one who has been honoured with what is called a respectable funeral could witness the scenes which commonly ensue, even at the very place where the last ceremony has been performed, they would be scandalised at the mockery of solemnity which has preceded the disgusting indecency exhibited at the instant when the mourners are removed. An empty hearse, returning at a quick pace from a funeral, with half-a-dozen red-faced fellows sitting with their legs across the pegs which held the feathers, is a common exhibition. But let the relatives see what has preceded the ride home of the undertaker's men. In the spring of 1842, two friends walked into a village inn about twelve miles from London for the purpose of dining. One had recently sustained a severe domestic calamity. The inn is generally distinguished for its neatness and quiet. All now seemed confusion. The travellers were shown up stairs to a comfortable room. But the shouts, the laughing, the rapping the tables, the ringing the bells in an adjoining room, were beyond endurance; and when the landlady appeared with her bill of fare, she apologised for what was so different from the ordinary habit of her guests. "Is it a club feast?" "Oh no, gentlemen; they are the undertaker's men—blackguards I should say. They have been burying poor Lord ——; he was much beloved here. Shame on them. But they will soon go back to town, for they are nearly drunk." The travellers left the house till it was cleared of these harpies.'

Yet the revulsion that may be supposed to be occasioned by such scenes, is a trifling matter when compared with the heavy solid misery of those in the humbler but respectable walks of life, whom the domination of custom and fashion requires to imitate the costly grandeur of richer people. Mr Wild, an undertaker, gave this description in answer to Mr Chadwick's questions:—

'What are the matters objected to that are of common experience in our burials, when the corpse and attendants have arrived within the churchyard?—In certain seasons of the year, when the mortality is greater than usual, a number of funerals, according to the present regulation of the churchyards, are named for one hour. During last Sunday, for example, there were fifteen funerals all fixed during one

hour at one church. Some of these will be funerals in the church; those which have not an in-door service must wait outside. At the church to which I refer there were six parties of mourners waiting outside. My man informed me that all these parties of mourners were kept nearly three-quarters of an hour waiting outside, without any cover, and with no boards to stand upon. The weather last Sunday was dreadfully inclement. I have seen ten funerals kept waiting in the churchyard from twenty minutes to three-quarters of an hour. I have known colds caught on the ground by parties kept waiting, and more probably occurred than I could know of. It is the practice on such occasions to say the service over the bodies of children and over the bodies of the adults together, and sometimes the whole are kept waiting until the number is completed. Even under these circumstances the ceremony is frequently very much hurried.

'How many are there in some parochial burial-grounds to be buried at one time?—Sometimes fifteen.

'With such a number to bury, is it physically possible that the separate service should be other than hurried, and in so far as it is hurried, unsatisfactory to the mourners?—According to the present system, I do not see that it is at all times practicable to be other than hurried and unsatisfactory.

'Would not an in-door service be acceptable to the labouring-classes?—I conceive highly so. In some parishes, as at Camberwell, the custom is to give an in-door service to all, whether rich or poor. This is considered highly acceptable. Where the labouring-classes are excluded, they not only feel the inconvenience of having to wait, but they feel very much the exclusion, on account of their poverty. They frequently complain to me, and question me as to whether it is right, and ask me the reason.

'What other inconveniences are experienced in the service in churchyards?—It is a frequent thing that a gravedigger, who smells strongly of liquor, will ask of the widow or mourners for something to drink, and, if not given, he will follow them to the gates, and outside the gates, murmuring and uttering reproaches.

'Is that ordinarily the last thing met with before leaving the churchyards?—Yes, that is the last thing.

'That closes the scene?—Yes, that closes the scene.'

The poor are in every country fond of pomp and circumstance beyond their ability in the funerals of their relatives. The feeling proceeds from a good source, and ought not to be discouraged, but it might be directed into an improved channel, by arrangements which would afford more real solemn decency at less cost. The comparatively great expenditure that occurs on the occasion of a death in a poor person's house is, like all large expenditures by the uneducated, the occasion of much gambling, which in this instance takes a horrible shape. Several trials have taken place for infanticide, where the parents' motive to put the

offspring to death was the temptation of drawing on a burial society. A collector of cottage rents, as his words are given in the Health of Towns Report, said—

'The poor people have often told me that they were unable to pay at that time; but when a certain member of the family—generally a child—died, they would be able to pay. I have felt much shocked at this, and I have told the people that it was very wrong to depend upon anything of the kind. Most of the children at the houses which I visit are in burial clubs.'

And Mr Clay, in his Report on the Parish of Preston, says—

'A lady, a friend of the author of this report, states that a young woman, whose services she required as a wet-nurse, having a child ill, she offered to send her own medical friend to attend it. The reply of the nurse was, "Oh, never mind, ma'am, it's in two burial clubs!"'

In Mr Chadwick's Report, the ordinary influence of the system is thus described:—

'Mr Robert Hawksworth, the Visitor to the Manchester and Salford District Provident Society, recently stated to me, "Here the mode of conducting the funerals—the habits of drinking at the time of assemblage at the house, before the corpse is removed, renewed on the return from the funeral, when they drink to excess, the long retention of the body in the one room, are all exceedingly demoralising. The occasion of a funeral is commonly looked to amongst the lowest grade as the occasion of 'a stir;' the occasion of the drinking is viewed at the least with complacency." A minister in the neighbourhood of Manchester expressed his sorrow on observing a great want of natural feeling, and great apathy at the funerals. The sight of a free flow of tears was a refreshment which he seldom received. He was, moreover, often shocked by a common phrase amongst women of the lowest class, "Ay, ay, that child will not live: it is in the burial club!"

'The actual *cost* of the funeral of a child varies from 20s. to 30s. The allowances from the clubs in that town on the occurrence of the death of a child are usually L.3, and extend to L.4 and L.5. But insurances for such payments on the deaths of children are made in four or five of these burial societies; and an officer mentioned to me an instance where one man had insured such payments in no less than nineteen different burial-clubs in Manchester. Officers of these societies, relieving-officers, and others whose administrative duties put them in communication with the lowest classes in those districts, express their moral conviction of the operation of such bounties to produce instances of the visible neglect of children, of which they are witnesses. They often say, "You are not treating that child properly; it will not live: is it in the club?" and the answer corresponds with the impression produced by the sight. Mr Gardiner,

the clerk to the Manchester Union, in the course of his exercise of the important functions of registering the causes of death, deemed the cause assigned by a labouring man for the death of a child unsatisfactory, and on staying to inquire, found that popular rumour assigned the death to wilful starvation.

'The child (according to a statement of the case) had been entered in at least ten burial clubs, and its parents had six other children, who only lived from nine to eighteen months respectively. They had received L.20 from several burial clubs for one of these children, and they expected to receive at least as much on account of this child. An inquest was held at Mr Gardiner's instance, when several persons who had known the deceased stated that she was a fine fat child shortly after her birth, but that she soon became quite thin, was badly clothed, and seemed as if she did not get a sufficiency of food. She was mostly in the care of a girl six or seven years of age: her father bore the character of a drunken man. He had another child, which was in several burial clubs, and was a year old when it died: the child's mother stated that the child was more than ten months old, but she could not recollect the day of her birth; she thought its complaint was convulsions, in which it died. It had been ill about seven weeks; when it took ill, she had given it some oil of aniseeds and squills, which she had procured from Mr Smith, a druggist. Since then, she had given it nothing in the way of medicine except some wine and water, which she gave it during the last few days of its life, when it could not suck or take gruel. It was in three burial clubs; her husband told her that they had received upwards of L.20 from burial clubs in which the other child had been entered; none of her children who had died were more than eighteen months old.'

These matters, though intimately affecting human life and well-being, may perhaps be considered foreign to the present purport, which is to explain the physical rather than the moral causes of malign influences on the human body and mind. But there is one condition frequently attached to the death and burial of the poor, which is of the highest sanitary importance: this is the practice—too often yielded to from necessity—of keeping the dead among the crowded living. On this it is said in the Report on Interments—

'The duty which attaches to male relations, or which a benevolent pastor, if there were the accommodation, would exercise on the occurrence of the calamity of death to any member of a family, is to remove the sensitive and the weakly from the spectacle, which is a perpetual stimulus to excessive grief, and commonly a source of painful associations and visible images of the changes wrought in death, to haunt the imagination in after-life. When the dissolution has taken place under circumstances such as those described, it is not a few minutes' look after the last duties are performed, and the

body is composed in death, and left in repose, that is given to this class of survivors, but the spectacle is protracted hour after hour through the day and night, and day after day, and night after night, thus aggravating the mental pains under varied circumstances, and increasing the dangers of permanent bodily injury. The sufferings of the survivors, especially of the widow of the labouring-classes, are often protracted to a fatal extent. To the very young children, the greatest danger is of infection in cases of deaths from contagious and infectious disease. To the elder children and members of the family and inmates, the moral evil created by the retention of the body in their presence beyond the short term during which sorrow and depression of spirits may be said to be natural to them is, that familiarity soon succeeds, and respect disappears. These consequences are revealed by the frequency of the statements of witnesses, that the deaths of children immediately following, of the same disease of which the parent had died, had been accounted for by "the doctor," or the neighbours, in the probability that the child had caught the disease by touching the corpse or the coffin whilst playing about the room in the absence of the mother. Dr Reicke, in the course of his dissertation on the physical dangers from exposure to emanations from the remains, mentions an instance where a little child having struck the body of the parent which had died of a malignant disease, the hand and arm of the child was dangerously inflamed with malignant pustules in consequence. The mental effects on the elder children or members of the family of the retention of the body in the living room, day after day, and during meal times, until familiarity is induced—retained, as the body commonly is, during all this time in the *sordes* of disease, the progress of change and decomposition disfiguring the remains, and adding disgust to familiarity—are attested to be of the most demoralising character. Such deaths occur sooner or later in various forms in every poor family; and in neighbourhoods where there are no sanitary regulations, where they are ravaged by epidemics, such scenes are doubly familiar to the whole population.

'Astonishment is frequently excited by the cases which abound in our penal records indicative of the prevalence of habits of savage brutality and carelessness of life amongst the labouring population; but crimes, like sores, will commonly be found to be the result of wider influences than are externally manifest; and the reasons for such astonishment will be diminished in proportion as those circumstances are examined, which influence the minds and habits of the population more powerfully than precepts or book education. Among these demoralising circumstances, which appear to be preventible or removable, are those which the present inquiry brings to light. Disrespect for the human form under suffering, indifference, or carelessness at death, or at that destruction which follows as an effect of suffering, is rarely found amongst the uneducated, unconnected with a callousness to others' pain, and a recklessness about life itself. A known effect on uneducated survivors of the frequency of death

amongst youth or persons in the vigour of life, is to create a reckless avidity for immediate enjoyment. Some examples of the demoralisation attendant on such circumstances cannot but be apparent in the evidence arising in the course of this inquiry into other practices connected with interments.

'On submitting the above to a friend, a clergyman, whose benevolence has carried him to alleviate the sufferings in several hundred deathbed scenes in the abodes of the labouring-classes, and who has been present, perhaps, at every death in his own flock, in a wretchedly crowded parish, he writes in the following terms his confirmation:—

"The whole of this I can testify, from personal knowledge, to be just. With the upper classes, a corpse excites feelings of awe and respect; with the lower orders in these districts, it is often treated with as little ceremony as the carcase in a butcher's shop. Nothing can exceed their desire for an imposing funeral; nothing can surpass their efforts to obtain it; but the deceased's remains share none of the reverence which this anxiety for their becoming burial would seem to indicate. The inconsistency is entirely, or at least in great part, to be attributed to a single circumstance—that the body is never absent from their sight: eating, drinking, or sleeping, it is still by their side; mixed up with all the ordinary functions of daily life, till it becomes as familiar to them as when it lived and moved in the family circle. From familiarity it is a short step to desecration. The body, stretched out upon two chairs, is pulled about by the children, made to serve as a restingplace for any article that is in the way, and is not seldom the hidingplace for the beer-bottle or the gin, if any visitor arrives inopportunely. Viewed as an outrage upon human feeling, this is bad enough; but who does not see that when the respect for the dead—that is, for the human form in its most awful stage—is gone, the whole mass of social sympathies must be weakened, perhaps blighted and destroyed? At anyrate it removes that wholesome fear of death which is the last hold upon a hardened conscience. They have gazed upon it so perpetually, they have grown so intimate with its terrors, that they no longer dread it, even when it attacks themselves; and the heart which vice has deadened to every appeal of religion, is at last rendered callous to the natural instinct of fear."

'That it is possible by legislative means to stay the progress of this dreadful demoralisation, which must, if no further heed be taken of it, go on with the increased crowding of an increasing population—that it is possible to abate the mental and physical suffering—to extend to the depressed urban districts an acceptable, and benign, and elevating influence on such impressive occasions—may be confidently affirmed, and will in a subsequent stage of this report be endeavoured to be shown by reference to actual examples of successful measures.'

There is no doubt that early interment is dangerous, unless in

hot climates, where decomposition immediately proves the certainty of death; and that the most horrible events might be suspected to take place in the darkness of the grave were the time between death and interment thoughtlessly abbreviated. Among many other instances of unexpected resuscitation, M. Orfila of Paris stated—

'In October 1837, M. Deschamps, an inhabitant of La Guillotière, at Lyons, died at the end of a short indisposition. His obsequies were ordered for the next day. On the next day the priests and the vergers, the corpse-bearers and conductors of funerals, attended. At the moment when they were about to nail down the lid of the coffin, the corpse rose in its shroud, sat upright, and asked for something to eat. The persons present were about to run away in terror, as from a phantom, but they were re-assured by M. Deschamps himself, who happily recovered from a lethargic sleep, which had been mistaken for death. Due cares were bestowed upon him, and he lived. After his recovery, he stated that in his state of lethargy he had heard all that had passed around him without being able to make any movement, or to give any expression to his sensations..... It is fortunate for M. Deschamps that the funeral, which was to have taken place in the evening, was deferred until the morning, when the lethargic access terminated, otherwise he would have been interred alive.' * * *

In the 'Annalés d'Hygiene,' the following recent instances are cited, as proving the necessity of a regular verification throughout the kingdom of the fact of death:—

'A midwife of the commune of Paulhan (Herault) was believed to be dead, and was put in a coffin. At the expiration of twenty-four hours she was carried to the church, and from thence to the cemetery. But during its progress the bearers felt some movement in the coffin, and were surprised and frightened. They stopped and opened the coffin, when they found the unfortunate woman alive! she had merely fallen into a lethargy. She was carried back to her home, but in consequence of the shock she received, she only survived a few days the horrible accident.'

It is stated from Bergerac (Dordogne), of the date of the 27th of December 1842, that—

'An individual of the commune D'Eymet, who suffered from the continued want of sleep, having consulted a medical practitioner, took, on his prescription, a potion which certainly caused sleep; but the patient slept always, and the prolongation of the repose created great anxiety, and occasioned his being bled. The blood flowed feebly, drop by drop. Then he was declared to be dead. At the expiration of a few days, however, the potion given to the patient was remembered, and an uneasy sensation that it might have been

the cause of an apparent death caused the exhumation of the body. When the coffin was opened, the horrible fact was apparent to all present, that the unfortunate man had really been buried alive: he had turned round in the coffin! His distorted limbs showed that he had long struggled against death.'*

The author of the Report on Interments suggests as a method of meeting the chance of such occurrences—

'It is submitted that suitable accommodation should be provided for the removal and care of bodies, and given, as it would be, as a boon. Confident statements are frequently made that the removal of the deceased from private houses to any public place of reception would be resisted; but it appears, on an examination of the cases in which resistance was made, that in most of them the arrangements were really offensive, coarse-minded, and vulgar, and such as to prove that the feelings of the relations and survivors were little cared for by those who ought to have understood and consulted them. In some cases of the lowest paupers the retention of the body has been proved to have arisen from a desire to raise money, on the pretext of applying it to defray the expenses of the funeral long after it had been provided for; but the objection of the respectable portions of the labouring-classes are objections not to the removal itself, but to the mode and sort of place in which it is commonly performed on the occurrence of a death from contagious disease—in a bare parish shell, by pauper bearers, to the "bone-house" or other customary receptacle for suicides, deserted or relationless, or, as they are sometimes termed, "God-forsaken people." On the occurrence of the cholera little difficulty was interposed by any class to the immediate removal of the dead. The success of such a measure would depend entirely on the mode in which it is conducted.'

OVERCROWDED GRAVEYARDS.

We now approach a still more serious form in which the present system of interment affects the public health—the quantity of old overcrowded burial-grounds within the walls of cities, and the practice—now, it is true, rendered to some extent illegal—of burying the dead in churches where the living congregate to worship. The examination of this subject has been the means of developing horrors, which no one would have believed without the best evidence, to exist in a civilised community. The following instances are taken from the Report in 1842, of the select committee of the House of Commons on the Health of Towns. Mr John Irwin, a house-painter, stated to the committee—

'I live in Clement's Lane, Clare Market, overlooking Portugal Street burying-ground, belonging to the parish of Saint Clement Danes. Neither I nor any one of my family have been in good

* Report on Interments, p. 44.

health since we came there, now three years since. The mortality of the neighbourhood has been very great; all the symptoms are generally those of typhus fever. I had a lodger of the name of Britt, a ruddy-complexioned man, who chose my house because it was a quiet place, but he became ill of fever almost immediately. His wife also caught it, as did Mr and Mrs Rosamond, who also lodged with me. Three out of the four went to the hospital; they all died. Rosamond died in the hospital; Britt in my house. Britt was buried within *ten feet of my wall*. The grave was opened, and a fortnight after, there was another put a-top of him; but previous to that, the smell was so nauseous, I could hardly contain myself; I was obliged to keep my window down. "If this be the case," said I to the gravedigger, "well may typhus fever rage in this neighbourhood." There is a *workhouse* on the right hand.'

John Eyles, a gravedigger in this same churchyard in Portugal Street, admitted, in the following examination, that he suffered in health from his occupation—

'How did it affect you?—When I went down the grave I went down a little way, and it smelt as if it was brimstone or some sulphury stuff; and when I reached the bottom my sensation was taken away altogether, and I could hardly make my way up to the top; and when I got to the top I dropped on the boards, and then I went home and got some shavings and an old bed-tick, and burnt it down the grave, to get the foul air out.

'How were you affected; did it make you vomit?—It did a great deal: it was a trembling sensation over me, and a nasty coppery taste in my mouth.

'Did you lose your appetite?—I did not lose my appetite, but in the afternoon I was again taken at the same grave. I went down in the afternoon; a child was buried, and the webbing that checked the coffin had turned the coffin over, and it was my duty to unfasten the webbing. When I reached the bottom I could not make anybody hear, and I grasped hold of the webbing, and they pulled me up; and when I got out of the grave I walked to the side of the church, and there I lay for half an hour.

'What church was it?—St Clement Danes, in the Strand.

'Have you seen coffins cut through?—If you have orders for it, you are compelled to do it. If you are to dig a grave in a certain place, it is your duty to do it; and if not, you are told directly, "I will get somebody else to do it."

'Then you have cut through coffins?—I have.

'Have you ever cut up the lead of a coffin?—Yes, I have once.

'By orders?—By orders.

'What became of the lead?—I do not know: it was not in my time; I went away soon after I cut it up.

'What did you do with the lead when it was cut?—I left it there.

'What burial-ground was that?—In St Clement's Church.

'Is it a matter of common occurrence to do so?—I do not know;

but if I must speak my mind, I think there is a tremendous deal of lead taken away both in the churchyard and in the vaults; but I think it is a common thing for the old original coffins to be taken and chopped up; and I think it to be nothing else but the duty of any gentlemen that has got any authority to go into every church vault, and to have the books brought forward to prove how many coffins there ought to be, and to make them account for how many coffins are missing. The lead, I believe, is a hundred and a-half or two hundred in each coffin: I should say there were about two hundred and a-half, and it would fetch three-halfpence a pound.

'What quantity of wood have you seen taken away, or do you know has been taken away, from this churchyard? How many wheelbarrows full in a week?—I could not say, sometimes more, sometimes less, sometimes none; it all depends upon the work: sometimes we get as much out of one grave as you may get out of six or seven others; sometimes you may have a bag full in a week.

'What do you mean by a "grave;" what depth do you mean?—Five feet is the common depth for a grown person, and three feet for a child: when it is five feet, that leaves four feet from the surface of the earth; but I do not think four feet is enough to keep the effluvia out.

'You think the gas gets out of the ground at that distance?—I am sure it does, because the gas will penetrate through anything: it will penetrate through the strongest man: if he happen to hold his head over the place where the gas is flying, it will make him ill; and I think that people going by at the time when a grave is open must breathe some of the gas, as well as persons working in the grave; for when the gas is out, you can smell it quite strong up above.

'How far from the grave will the smell of the gas extend?—It depends upon the wind.

'Supposing the wind is blowing towards you, how far will it take it?—If the corpse is about five or six feet below the ground, you may smell it six or seven yards from you, but you do not smell it if you are standing by the side and continually in it.

'The vaults in St Clement Danes are close to the street?—Yes; the gas escapes from the vaults into the church through a grating cullett, and many persons who go to the church on Sunday, when they come home are taken ill, and are dead soon afterwards, through the gas in the church: I do not think the lead is of any use to keep the gas in.

'You would not like to go to a leaden coffin and tap it?—Yes, I should not object to it: if you keep underneath the coffin, you would not have so much of the gas then; if you keep underneath, the gas flies up; if you tap it underneath, if there is any dead water or any "soup," as it is called, it runs into a pail, and then it is taken and thrown into some place or another, perhaps down a gulleyhole. I have been before now compelled to put my clothes out of the window because the stench has been so great that they could not bear the place.

'Has it ever occurred to you to go into a public-house, and to find the smell of your clothes offensive to people there?—Yes, many a time; when I have been doing rather dirty work, when I have come in, I have noticed the people smell and get away on the other side of the place: there is sure to be plenty of room when we come in; they are sure to say, "These chaps have been emptying some cesspool."

'Is the smell of these graves more offensive than that of a common cesspool?—I emptied a cesspool, and the smell of it was rosewater compared with the smell of these graves.

'Has it ever happened, to your knowledge, that the men have declined digging through the coffins, and that they have been induced to do so by the sexton?—Yes; that is the word. "If you do not like to do it, I will get somebody else."

'You, or some of the men, have felt a repugnance to cutting through coffins?—It is not a pleasant thing to chop away when it is not fit to chop away; when the body is decayed, it does not matter taking that away.

'And you have found yourself, and other workmen with you, obliged to cut through, whether you liked it or not?—If you are paid for doing it, you must do it, whether you like it or no; if you do not like it, you must go.

'Is your father interred there?—Yes he is: I did not want him to be buried there.

'Did anything occur to his remains?—I saw them chopping the head of his coffin away; I should not have known it if I had not seen the head with the teeth; I knew him by his teeth: one tooth was knocked out, and the other was splintered. I knew it was my father's head, and I told them to stop, and they laughed; and I would not let them go any further, and they had to cover it over. It is time that something was done to stop it; and there is a slaughter-house close by, in St Clement's Lane, which is enough to breed any fever.

'Have you ever hesitated, when ordered to dig a grave, in cutting down through coffins?—Yes; I have said, "There is not room to put down;" but it is said, "You must make room:" but the sexton will not stop over the grave while that is being done; our sexton, I know, is fonder of pastry than standing over the top of a grave: he goes and has a shilling's worth of pastry while it is being done.

'Then, when the sexton orders you to dig a grave, he goes away himself?—Yes, and leaves you to do the rest.

'Do you know anything of the burial-ground under the windows of the almshouse in St Clement Danes?—I know that the bodies ought to be removed from there; it is not fit for anybody to live in the adjoining houses; I could go there and take a carving-knife, and almost take some of the lids off. They are in a deal box half an inch thick; there is a great heap; and if that heap was taken away within nine inches from the top of the earth, you would have to take half of the sides of some of the coffins away.

'Do you know anything about the health of the people in the neighbourhood?—Some are ill; some are better than others. I do not know how the people in the almshouses feel. If it was a hot summer, you would see the ground smoke, the same as if there was boiling water put over it.

'Have you seen that yourself?—I have not noticed it particularly myself, but I know those that have; and if you take the ground up in your hands, it is the same as taking ink into your hands.

'The ground is so saturated with the remains of dead bodies?—Yes it is.

'Is this in Portugal Street?—No, it is in St Clement Danes: it is what they call the pauper ground, where the people that are buried by the workhouse are put.

'Have you ever observed anything of the same kind in the burial-ground in Portugal Street?—Yes; I have seen the ground smoke and reek on a summer's morning; about five o'clock, you will see it smoke the same as if there had been hot water poured down.

'Is a grave ever left open at night?—If you are going to dig a deep grave, you cannot do it all in one day; perhaps you may be four or five days over it, and then it is left open: sometimes we put a tarpauling over it.

'Then the smell must come up?—It does.'

A brother of the spade narrated this truly appalling incident:—

'In digging this depth, and taking away the wood of these coffins, has it ever occurred to you that any bodies have fallen upon you?—I never had one in a deep grave, but I had one once. Before I was there a man of the name of Fox had the ground; I succeeded him; he is now dead; he was a bad character: he is dead about three weeks. I dug a grave on a Sunday evening on purpose to get ready for the Monday; that Sunday evening, and it rained, I was strange in the ground at that time; and when I went to work on Monday morning I finished my work, and I was trying the length of the grave, to see if it was long enough and wide enough, so that I should not have to go down again, and while I was in there the ground gave way, and a body turned right over, and the two arms came and clasped me round the neck. She had gloves on, and stockings and white flannel inside, and what we call a shift, but no head.

'The body came tumbling upon you?—Yes, just as I was kneeling down. It was a very stout body; and the force that she came with knocked my head against a body underneath, and I was very much frightened at the time.

'You were at the bottom of the grave, and as you were digging at the bottom, the body of this woman without a head fell upon you?—Yes.

'From the side?—Yes, from the side.

'Out of the coffin?—It had never been in a coffin; it is supposed that they took the head off for the purpose of sale.

'How long had this body been interred?—Not long, because the clothes upon her appeared to be quite fresh.

'Do you believe that the lead of the coffins has been taken away?—I cannot say anything as to myself, as I never did anything of the sort myself; but the man that is dead has done most wonderful things in the vaults. He stripped the lead off the coffins in the vaults; he has been the biggest brute of any gravedigger in this earth; and he suffered for it at last: he died in the Strand Union Workhouse at last: he died actually rotten.

'What salary do you get?—Eighteen shillings a week, and then of course there is a little what we call pickings-up—perquisites; maybe 10s. a week.

'Still, you would give up the situation if you could get anything else?—If I could get anything with half the money. My wife has been making home-baked bread, and we now find that we have got enough; so that, by persevering a little, we shall be able to get our living, so that I am about to leave in a fortnight or so.'

Mr Pitts, a cabinetmaker, had this statement to make:—

'I used to attend as one of the Baptist congregation at Enon Chapel, Clement's Lane. The surface of the floor was 50 or 60 feet by 40. The cellar below was used as a burying-place, the corpses having no covering but the coffins, and nothing separating the living congregation from the dead "*but the thin boards between the depositary and the chapel*, and there were openings between, owing to the shrinking of the boards." The chapel and vault were owned by the late Rev. Mr Howse, who preached there. I attended from about 1828 for six or seven years. There have been, on the whole, about 12,000 persons buried here; the depth is about 6 feet. I have heard, when it got too full, a great many have been removed to make way for others. I did hear, and it came through a woman who used to wash for Mrs Howse, living close by, *that they used to burn the coffins under the copper, and frequently in their own fireplace.* I do not know what became of the remains, unless they were *shovelled all together*, which I believe to be the case. The fees were small, and were part of Mr Howse's emoluments. As many as nine or ten have been buried there one Sunday afternoon.'—'While I attended the chapel,' said another witness, 'the place was in a very filthy state; the smell was *abominable*, and very injurious; also there were some insects, something similar to a bug in shape and appearance, only with wings. I have seen in the summer hundreds of them flying about the chapel; I have taken them home in my hat, and my wife has taken them home in her clothes. We always considered that they proceeded from the dead bodies underneath.'

The general state of the London burying-grounds is thus summed up in Mr Chadwick's Report:—

'In the metropolis, on spaces of ground which do not exceed 203

acres, closely surrounded by the abodes of the living, layer upon layer, each consisting of a population numerically equivalent to a large army of 20,000 adults, and nearly 30,000 youths and children, is every year imperfectly interred. Within the period of the existence of the present generation upwards of a million of dead must have been interred in those same spaces. A layer of bodies is stated to be about seven years in decaying in the metropolis; to the extent that this is so, the decay must be by the conversion of the remains into a gas, and its escape, as a miasma, of many times the bulk of the body that has disappeared.

'In some of the populous parishes, where, from the nature of the soil, the decomposition has not been so rapid as the interments, the place of burial has risen in height; and the height of many of them must have greatly increased but for surreptitious modes of diminishing it by removal, which, it must be confessed, has diminished the sanitary evil, though by the creation of another and most serious evil, in the mental pain and apprehensions of the survivors, and feelings of abhorrence of the population, caused by the suspicion and knowledge of the disrespect and desecration of the remains of the persons interred.

'The claims to exemption in favour of burial-grounds which it is stated are not overcrowded would perhaps be most favourably considered by the examination of the practice of interment in the new cemeteries, where the proportion of interments to the space is much less.'

So matters stood in the year 1842, and the testimony in the documents which follow, developing the state of the metropolitan graveyards in 1849, shows how entirely these revelations of horrors and abuses had failed to rouse the attention of those most deeply interested in them. The following letter appeared in the 'Times:'—

METROPOLITAN GRAVEYARDS—TO THE EDITOR OF THE TIMES.

'SIR—If, in one of the most crowded thoroughfares of London, such as Fleet Street, one side of the pavement were bounded by an open graveyard, in which day by day might be seen the process of opening the earth, black and fetid with the accumulated deposits of years—if poisonous vapours were given out during this operation loathsome to the sense of the most unobservant passenger—and if this were to occur during the prevalence of a fatal epidemic, which renders the existence of such a barbarism doubly alarming—would it be possible that the indignation and disgust expressed by the thousands who pass along should not at once and for ever put an end to the nuisance? Let the Fleet Street pedestrian step twenty yards out of the great current of traffic at St Bride's Church, and he will be in a passage about six feet wide, with a heaped-up graveyard such as I have described, in which these scenes occur, and with the back entrances of six or eight houses of business, whose fronts are in

Fleet Street, exposed to these pestilential influences. These houses screen the evil from the great stream that flows along the thoroughfare.

'I have the misfortune to carry on my business at this spot, and my warehouse has numerous windows, looking into this churchyard, from rooms in which clerks and porters are daily engaged, and, in consequence, exposed to the dangers of this charnel-house. On Saturday last two graves were being opened at mid-day, sending out fearful exhalations under a glaring sun. Anxiously are these movements watched from my house. The churchyard, it seems, is so full, that on some occasions the gravediggers remove the flagstone that covers a family grave a foot or so on one side, and make small room, like the money-takers in a crowded theatre, for all who are provided with the entrance-fee. Sometimes, when the heaped-up mound shows to the observer that there has been a new burial, the mound suddenly vanishes in the night, and no tales are told of disturbed relics. For myself, I may escape from these abominations to the country, and, in truth, the desk which overlooks this Golgotha has become hateful to me; but I have a feeling for those who labour in my establishment, and I know that these scenes prey upon their spirits, and affect their health. Remonstrance is vain, when the parish authorities affirm that they cannot refuse to open the ground at the demand of a parishioner. Is there no power that can interfere? The lord mayor of London is alderman of the ward in which this nuisance exists. The Bishop of London has a voice of influence if not of command. A bishop and a mayor have honourable mention in history for having assuaged the horrors of a plague. Let these I have ventured to name do something towards the prevention of a pestilence.—I remain, sir, your obedient servant,

CHARLES KNIGHT.'

The 'Examiner' of 1st September 1849 thus reports a complaint made at Bow Street by Mr Lyons, the secretary of King's College Hospital, in Portugal Street, of the loathsome and noxious graveyard in that street:—

'The graveyard in question belongs to the parish of St Clement's, and has been filled up for some considerable time past, although the interments continue as usual. Lately, the churchwardens caused a hole, thirty feet in depth, to be dug in one portion of the ground, and the skulls and human remains thrown up were occasionally so fresh, that the medical students were in the habit of purchasing them—the price of 7s. 6d. having been lately offered for a head, the eyes and teeth of which were perfect. The stench arising from this hole had sickened and alarmed the whole neighbourhood, and in some of the poorer houses adjoining the graveyard the inmates were in the habit of sleeping in rooms and kitchens below the surface of the ground, and only separated from the dead bodies interred by a thin brick wall, capable of being perforated by the nauseous effluvia arising there-

from. He (Mr Lyons), although not sleeping in the hospital, had suffered considerably from the stench, and two of their nurses had just died of the cholera. In fact it would be impossible to sleep in the building if they did not keep the back windows and doors perfectly closed. The churchwardens had behaved with great courtesy to those who had complained to them upon the subject, and had visited the spot; but as the exhalations did not happen to be so offensive at that moment, they suggested that the annoyance might have sprung from some other source, at the same time admitting that there was no more room in the ground, and that fresh interments were undesirable, if any means of preventing the evil could be devised. Mr Lyons wished it to be understood that he had no complaint to make against the churchwardens, who appeared as anxious as himself to provide a remedy, if they had the power to do so. It was against the system of intramural burials altogether, and especially in overcrowded graveyards, that their complaints must be directed. It was quite obvious that the one in Portugal Street should have been closed long ago, and covered over with asphalte, which he regarded as an effectual mode of preventing the exhalations likely to emanate from such a place. He wished to know if the parish could not be compelled, by some recent act, to purchase a piece of land in some open district for a parochial burial-ground?

'Mr Henry had before heard many complaints having reference to the same grievance, and was quite prepared to do all in his power to assist in its removal; but although the legislature had devoted much time to the subject of intramural interments, there had been no practical remedies provided as yet. There was no act of parliament authorising his interference in such a matter, and none, indeed, to prevent the parish authorities from continuing to bury there. The subject was no doubt beset with difficulties. If the parish wished to purchase a piece of ground at some distance from the town, there was no rate which could be applied to such a purpose; and even if this object were attained, the poor would urge their inability to bear the expense of removing their deceased relatives to so great a distance. With regard to the suggestion of Mr Lyons as to covering the graveyards with asphalte, it would be likely to be met with a great deal of opposition from the owners of private graves, and the friends of persons buried there, who were always extremely jealous of any proposed disturbance or interference with the graves.'

The mighty heart of London was at length stirred into expressions of lively alarm. The 'Times,' in the middle of the panic, gave the following account of the appeals made for its aid and counsel:—

'The columns of the "Times" have been teeming for some days—we might say weeks—past with letters from persons who have had reason to complain of the unnatural and pestilential practice of

intramural interments. Whether the burial be in the church vault or the churchyard, matters not: it is a foul disgrace to the boasted civilisation of the nineteenth century that such a system should be permitted to continue within the limits of the principal capital city of the world. It is a mistake to suppose that the vault is preferable to the yard. How little do the persons who are attending divine service in the various metropolitan churches imagine, whilst intent upon their devotions, that they are inhaling disease and death in the various noxious gases which have escaped from the vaults beneath the church! These deadly and penetrating influences are floating round them unseen, but their effect is not the less potent on the strong man, the tender woman, and the young child who remain for two hours at a time exposed to their noxious power. The assertion is generally made that the poisonous gases which are generated by decomposition can be confined by encasing bodies in lead previous to interment. The common belief on this subject is entirely a false one. For a time, no doubt, the lead case, if it be a sufficiently strong one, will resist the pressure, but after a while the accumulation tells, and the case bursts at once, or at least a fissure is made, which permits the gradual escape of the gas as it is generated. A letter appeared yesterday in our columns in which the truth with regard to this horrid system of burial in vaults was very well put:—

"It is a well known and easily ascertained fact, that these very coffins are incapable of confining the gases generated by the decomposition of the bodies within them, and to allow the escape of the mephitic vapour, they are frequently 'tapped,' when it can be done, to prevent bursting, and where such a probability is clearly indicated. When they are not watched, the bursting of leaden coffins appears to be not unfrequent. Indeed, so quickly accumulating and so powerful in expansion are these gases, that in cases of rapid decomposition such instances occur with leaden coffins in private houses before entombment. A gentleman opposed to the burial of the dead in the vaults of the church alluded to, declared his belief that more injurious results arose from opening one of these than opening a grave. His apprehensions were fully justified. The living who inhale the fetid exhalations of the dead deposited in vaults breathe a concentrated miasma, which, when it proceeds from leaden coffins, is of an intensely poisonous nature. Where these coffins are not watched and tapped in time, the consequences are obvious. Whence proceed the frequent faintings, the sensation of nausea, headache, languor, during and after divine service? Whence proceed many fevers, more especially of a putrid character, and caught people know not how?—from the disgusting and disgraceful custom of burial within, under, or by the walls of churches and chapels. The myriads of motes we see dancing in the sunbeams which dart before our eyes are here, it is no mere imagination to conceive, atoms impregnated with the deleterious particles of mortality—so much 'death dust' rising from the matting of the aisles, the cushions of our pews, and other lodgments. This, I repeat, is no mere imagination, for disease

and death have been clearly proved to have seized on those whose employment it has been to cleanse from one Sabbath to another the churches and chapels where vault-burials are permitted, these burials converting the temple of God into a charnel-house."

'In addition to the process of "tapping" the coffins, which falls within the duty of the sexton or his assistants, it is a well known practice amongst undertakers to make little holes in the coffins, which are partly concealed by the coffin-plate, to prevent the coffin from bursting. We would have the public reflect well upon these matters, for they are very disgraceful to us as a nation. While society remains what it is, wealth will carry weight with it, even after death, and enable survivors to pay respect to the memory of a lost member of their family. If this must be shown by a visible preservation of the covering which contains the perishing relics of frail mortality, let this be done without the limits of the city, and in vaults which can readily enough be built and consecrated for the purpose. There is at least no reason why the piety of surviving relatives should be a source of disease and death to themselves and their neighbours. The scheme we propose is not a new one. The inspiration of common sense has in this case received the sanction of experience, modern as well as ancient. Cemeteries, such as Kensal-Green or Père-la-Chaise, afford every opportunity that piety or affection could require for showing respect to the memory, or preserving, as far as may be, the mortal relics, of a relative or friend.

'The church vault is of course the burying-place of the comparatively rich; the churchyard must be the receptacle of the absolutely poor. The scenes that occur in the churchyard are certainly more shocking to the feeling, although it may very possibly be the case that the upturning of recent graves is not so deadly a process as the escape of the mephitic vapour generated by the decomposition of the body in the leaden case. Our columns and our files teem with letters written by persons who are suffering either in health or in feeling from the pestilential vapours or the disgusting scenes which in the London churchyards are of daily occurrence. Here are a few examples. It will be remembered the other day that the churchwardens of St Anne's, Blackfriars, denied the truth of some statements we had published of the desecration of the dead in their churchyard. We published, however, yesterday, a letter from Mr Charles Scott, one of the inspectors of the city police force, to the Commissioner, from which the following passage is an extract:—

"Upon the retirement of some persons who had just witnessed the interment of a friend, *the gravedigger dragged from behind a tombstone part of a mutilated body (from the hips downwards) to the grave*, which had a few minutes previously received its tenant, and thrust it in with great violence without a covering; *he then descended into the grave*, which was about twelve feet deep, *and dismembered the limbs with a spade, and placed them beside the coffin, over which he sprinkled a small quantity of earth.* This grave has been left open

for upwards of three weeks for the reception of bodies, having only a slight covering of earth and boards."

'Thus much for the churchwardens of St Anne's, Blackfriars. Another correspondent, a surgeon, writes to us, complaining of the poisoned air in the neighbourhood of St Saviour's in the Borough. He states that his neighbours die around him daily of cholera, and that this is good evidence of the virulence of the mischief. Another letter brings again before the public the condition of the Portugal Street burying-ground:—"I have seen scenes in this place," says our correspondent, "that made my blood curdle—*such borings through dead bodies*, and throwing up of human bones, and smashing up of coffins, as no Christian man should witness, or even cannibal be guilty of. All this has been going on for many, many years. The stench is at times awful, and the language of the gravediggers as brutal as the work they do." This Portugal Street nuisance has just been closed by an order of the Board of Health; but as our uninitiated readers may be in ignorance of what is meant by "boring through dead bodies," we are enabled to gratify their curiosity by furnishing them with another little extract from the letter of another correspondent, who has favoured us with a description of the burying-ground of Christ-Church, Blackfriars Bridge. The passage we have *italicised* will sufficiently explain what is meant by "boring:"—

"Usually the business of the day begins about ten o'clock, when are to be seen two or three groups of persons in the churchyard to choose a place to deposit the remains of their departed friends. *The gravediggers are there with huge iron instruments*, some ten or twelve feet in length, in the shape of an immense auger. A spot is chosen; this instrument is thrust into the earth to see if there be room—but it invariably comes in contact with a coffin; *heavy thrusts are then made, and if, by bearing his whole weight upon the instrument, the gravedigger can force it through, it is considered sufficiently decayed, and the grave is dug;* generally three or four of these borings for the dead have to be made before sufficient space is found."

'We could, if our space would permit it, give extract after extract from letter after letter, and all to the same effect. We call ourselves civilised, we talk much and loudly of our sanitary commissions and what not, and yet such an open desecration of the dead continues amongst us; such centres of pestilence have been permitted to radiate their virulent poison around without any interference from the legislature until yesterday. We now find that the Board of Health has taken up the matter, and we can only trust that the members of the Commission will never rest until they have put an entire end to this most disgraceful and intolerable practice.'

Correspondents of newspapers are a class generally chargeable with exaggeration, which is believed sometimes to communicate itself to the organs which they desire to influence. It may not, therefore, be inappropriate to place beside these highly-coloured

statements the following sober official reports made to the Board of Health:—

'Gwydyr House, Whitehall, 1*st Sept.* 1849.

'Sir—I beg to report, for the information of the General Board of Health, that I have been engaged for several hours this day in collecting evidence respecting the state of the burial-ground of St Clement Danes in Portugal Street. It occupies a superficies of about 15,000 feet, or rather more than one-third of an acre. It is closely hemmed in on the east and west sides by Carey Street and St Clement's Lane; on the other two sides it is somewhat more open. The average number of interments in it for many years past has been about 200 in the course of the twelve months.

'From the concurrent testimony of the occupants of all the houses which overlook the ground, it appears to be undeniable that for some years past there have been perceived occasionally exhalations of mephitic effluvia, especially when the wind sets in particular directions, or when the weather was close and warm before rain. They were always observed to be most offensive whenever the ground had been opened for interment.

'Until within the last eight or ten months there existed a very foul slaughter-yard, pig-sties, &c. on the south side of the burial-ground, and these were blamed by some persons as the cause of the nuisance; but since their removal this has been as bad as ever, and indeed within the last three months it has become more frequently recurring and more disgusting than it was ever known to be before. The inmates of King's College Hospital in Carey Street, and of the houses in Portugal Street and St Clement's Lane, have often been obliged to shut their windows to keep out the intolerable stench that set in upon them. Mr Smith, house surgeon of the hospital, states that he has frequently of late had attacks of nausea and vertigo, which he attributes to the effluvia from the graveyard. The same effects have been experienced by many of the patients in the hospital, and also of the residents in the houses in St Clement's Lane. The case of the latter persons is especially deserving of attention. Several of them have but one room for their dwelling, and the window of that room, looking out upon the burial-ground, sometimes cannot be opened for an entire day, in consequence of the horrible effluvia with which the atmosphere is charged. A very intelligent and respectable woman living in Portugal Street informed me that she had been obliged to change her bedroom and the nursery of her children from the back to the front of the house, to escape the fetid exhalations. She particularly specified one occasion, on which they were more than usually disgusting, and she had made a short memorandum of it at the time. The facts were these:—A grave was opened on the 29th of June last, and a body interred therein; another body was put into the same grave on the 1st of July; a third on the 8th, and a fourth on the 15th.

'I should here mention that the back wall of a labouring man's

dwelling on the ground-floor of No. 35 Clement's Lane forms part of the boundary of the burial-ground on the west side. A few years ago there was a window in this wall looking out upon the ground; but in consequence of the gradual elevation of the soil, from the constantly-increasing accumulation of coffin upon coffin, he was obliged to brick up the window, and make a skylight to the room, the floor of which is now about six feet below the surface of the graveyard. The wall distinctly bulges in from the pressure of the incumbent earth. About six months ago it began to crack in several places; a small portion of the brick-work gave way, and earth containing some fragments of human bones fell in.

'Offensive as the exhalations from this burial-ground have been on various former occasions, it would seem, from the unanimous testimony of all the witnesses I questioned, that never were they so horribly disgusting as on Tuesday last, when a very deep grave had been dug, about the centre (I believe) of the ground. A large quantity of bones was exhumed: Mr Smith ascertained, by a careful inspection of them, that the remains of at least ten different skeletons were thrown up. One or two of the skulls presented the appearance of comparatively recent interment, all the teeth being entire, and the bones exhibiting the aspect of still retaining a portion of their gelatine.

'The fetor upon this occasion was so overpowering, that even the beadle of the parish acknowledged that it was very bad. Of course not a window facing the graveyard could be opened, notwithstanding the oppressive heat of the day. Some of the residents were obliged to leave their houses for a time; persons passing along Portugal Street held their nostrils; a policeman standing at the door of King's College Hospital was seized with vomiting; and one of the physicians of this institution, who approached the open grave, was suddenly seized with giddiness, and would have fallen down if he had not been supported by another gentleman.

'Although the ground in this graveyard thus appears to be so saturated with corruption that it cannot be moved without giving forth poisonous emanations, I was informed by the beadle that three or four burials at least take place there every week. It is altogether horrible to think of these continual additions to the already enormous mass of festering decay, and this, too, in the very midst of the dwellings of the living!

'I was given to understand that it is the intention of the parochial authorities to close the ground against interments in the course of a very short time; but every day the evil is becoming worse, and the danger to life more imminent. The case is one, in my opinion, demanding instant attention. At all times the disengagement of putrescent cadaveric effluvia cannot but be noxious to the health of those who are exposed to their influence: all experience testifies to the truth of this; but in a season like the present, when putrefaction appears to be more than usually active, and when a pestilential disease, whose malignancy is apt to be so terribly concentrated upon localities where the atmosphere is tainted with pre-

ventible impurities, is committing its ravages among us, the danger is of course a hundredfold greater, and calls loudly, I think, for an immediate check.—I have the honour to be, sir, your most obedient servant, GAVIN MILROY.'

To HENRY AUSTIN, ESQ.,
Secretary to General Board of Health.

'GWYDYR HOUSE, *6th Sept.* 1849.

'SIR—I have to report, for the information of the General Board of Health, that I have been engaged this day in inquiring into the state of the burial-ground belonging to the church of St Anne's, Blackfriars. It is of very limited dimensions, and is completely hemmed in on all sides by buildings. It is divided by a passage-way [which is many feet below the surface of the burial-ground] into two parts, one being reserved chiefly for the interment of paupers.

'The average number of burials per annum for some years past has been rather below fifty; but within the last nine weeks, as many as forty-one have taken place. The ground is so entirely occupied, that it is only by "boring" that the gravedigger can find out where a new grave can be opened; and it appears from this functionary's own admission that the revolting circumstance recorded in the "Times" of the 4th instant, respecting a mutilated portion of a body being thrust into a grave where a coffin had just been deposited, is in the main quite true. On inquiring of the man how the one portion of the body was separated from the other, he said that it had fallen out from one of the sides of the grave when he was digging it!

'Some of the inmates of the houses overlooking the pauper part of the burial-ground state that they have seen skulls with portions of the scalp and hair adhering to them thrown out from a newly-made grave. Even on the undisturbed surface of this part of the ground I could observe numerous fragments of bones lying about, so that it is probably no exaggeration to say that, if this ground became solidified, it would be found to be a sort of *breccia*, composed in a great measure of fossilised human remains.

'Most of the occupants of the dwellings surrounding the churchyard complain much of offensive exhalations from it, more especially for the last two or three months; and during this time there has been a good deal of the prevailing sickness among them. The effluvia from one grave in particular are described as having been more than usually disgusting. It was opened about four or five weeks ago, and was not entirely closed until the 2d instant, after having received eight or nine bodies.

'The case of this graveyard demands, in my opinion, immediate attention: not a day should be lost in putting a stop to all interments in it at the present time.—I have the honour to be, sir, your most obedient servant, GAVIN MILROY.'

To HENRY AUSTIN, ESQ.,
Secretary to General Board of Health.

Before these pages shall have reached the public, it is probable that a measure, conceived on a great and bold scale, may have been proposed for abating these dreadful abominations. If such a measure be brought forward, it will require the aid of public opinion; and therefore as it may be well, since the immediate panic occasioned by the late pestilence has passed off, to keep the subject fully in the eye of the public, the following hints have been collected as to the general nature of the evils arising from interment in unsuitable places, and the remedies that have been proposed. Mr Walker, a medical practitioner of Drury Lane, was thus examined before the committee of 1842 on his knowledge of the influence of churchyard exhalations on health:—

'*Mr Denison.* Will you state whether you have seen disease arising from that cause?—I have; but it is sufficient to state that the neighbourhood to which my attention has been especially directed is surrounded with graveyards, and that there are hundreds of tons' weight of human bodies resting temporarily in the earth until displaced to make room for a succeeding tenant. Bodies, in many situations, are placed within six inches of the surface. Martin's ground, in the Borough, measures 295 in width, and 379 in length. If we multiply these together, we shall make 111,805 superficial feet. If we allow 27 feet for the burial of an adult body, and divide this (the product) by that number, we shall obtain a quotient of 4140 and a fraction. The vault is 118 feet long, and 41 feet wide. If we take the main width of a coffin, or the space it will occupy, I think, speaking of adults, we shall be able to place on the surface 403 bodies. According to the best information I can obtain from a man that has worked there ten years, it appears that 14,000 dead bodies have been deposited in this ground and vaults during the time he has been there.

'Can you say whether, in your immediate neighbourhood, there is any disease traceable to this cause?—Yes; and I shall prove, by a very intelligent witness, that he has known persons affected by this cause. They prepare graves in many graveyards in London for ten or twelve funerals on a Sunday, the day on which funerals mostly take place: there is the most unseemly haste during the time of the burying: I have seen a clergyman go hastily from one to another reading the service at each. A number of mourners come depressed with grief; their power of resistance is weakened: they may not have eaten for some time previously; they breathe the gases given off, and have been seen to stagger both in the vaults and on the edge of the grave, and in many instances have, within a week, been deposited in the grave themselves.

'You have mentioned the circumstance of burials taking place only six inches from the surface? From what cause is that? Is it to save trouble?—It is frequently done to save trouble; but in many instances they cannot go lower. There is an utter disregard of consequences; and I know the working clergy are so careful not to

breathe this air, that a direction has been given to the sexton to place the box at a considerable distance from the grave, so as to avoid it.

'You have mentioned two sorts of gases, one sinking to the bottom, and the other rising up, and you stated that you considered that there was some animal matter floating in the gas?—In the compound mixture I have no doubt there is.

'How do you distinguish the two gases?—There are several gases intermixed with an oleaginous compound; and I am quite certain there is an animal matter floating in that mixture. Having passed a quantity of this through water on one occasion, a pellicle arose: there is no doubt a very large portion of animal matter is present in a suspended form.

'You form your conclusion from the greasy sort of matter found in the water?—Yes; the gas will be absorbed, to a certain degree, by the water, and this fatty matter will be found on the surface.

'What is it that sinks to the bottom?—The carbonic acid and other gas: these are the gases which destroyed the men in Aldgate churchyard in 1838. If the man had been on his guard, and held his breath during the time he endeavoured to render assistance, I do not think he would have died; but he unfortunately leant over the body of the dead man, inspired the gas, and fell down lifeless.'

In Paris there had at one time been so terrible an accumulation of putrefying flesh within the only graveyard which that city possessed—the Cemetery of the Innocents, or St Etienne Du Mont—that the formidable operation of the removal of the corpses was at last undertaken. The stench had been the subject of complaint for many years, and people could even see the steam rising from the fermenting bodies, which lay packed together in thousands—even in millions! The removal lasted from 1785 to 1787. It was pursued not only by day, but at night with the light of torches; and many grand religious ceremonies were adopted to reconcile the people to a process essentially so revolting. The great symmetrical collection of the emblems of mortality which attracts strangers to the Catacombs of Paris was arranged on this occasion from the bones raised from the cemetery.

Interment within and near places of worship has been peculiar to Christian countries, and comparatively later times. Christ met the bearers taking the widow's son out of the town, and in ancient Rome the monuments stood without the city, addressing themselves by their *ciste viator* (stop traveller) to the passing wayfarer, and inviting him to reflection. Churches were raised over the remains of saints, and about the eighth century it came to be the practice to inter men of renowned sanctity in their choirs. Persons of influence desired to have their remains near those of the holy men. Kings and great heroes at first got access to the

porch, and thence gradually to the interior, and then the custom spread till the floors of churches were thick burial-places. Sir Christopher Wren disapproved of this practice, and when recommending the rebuilding of London after the fire, he took occasion to say—

'I would wish that all burials in churches might be disallowed, which is not only unwholesome, but the pavements can never be kept even, nor pews upright; and if the churchyard be close about the church, this is also inconvenient, because the ground being continually raised by the graves, occasions in time a descent by steps into the church, which renders it damp, and the walls green, as appears evidently in all old churches. It will be inquired where, then, shall be the burials?—I answer, in cemeteries seated in the outskirts of the town; and since it has become the fashion of the age to solemnise funerals by a train of coaches (even where the deceased are of moderate condition), though the cemeteries should be half a mile or more distant from the church, the charge need be little or no more than usual; the service may be first performed in the church: but for the poor, and such as must be interred at the parish charge, a public hearse of two wheels and one horse may be kept at small expense, the usual bearers to lead the horse, and take out the corpse at the grave. A piece of ground of two acres, in the fields, will be purchased for much less than two roods amongst the buildings. This being enclosed with a strong brick wall, and having a walk round, and two cross walks, decently planted with yew-trees, the four quarters may serve four parishes, where the dead need not be disturbed at the pleasure of the sexton, or piled four or five upon one another, or bones thrown out to gain room. In these places beautiful monuments may be erected; but yet the dimensions should be regulated by an architect, and not left to the fancy of every mason; for thus the rich with large marble tombs would shoulder out the poor: when a pyramid, a good bust, or statue on a proper pedestal will take up little room in the quarters, and be properer than figures lying on marble beds: the walls will contain escutcheons and memorials for the dead, and the real good air and walks for the living.'

Evelyn, in his 'Sylva,' regretted that such a plan had not been adopted, and 'that when that spacious area was so long a *tabula rasa* the churchyards had not been banished to the north walls of the city, where a grated enclosure of competent breadth for a mile in length might have served for a universal cemetery to all the parishes, distinguished by the like separations, and with ample walks of trees—the walks adorned with monuments, inscriptions, and titles apt for contemplation and memory of the defunct.' In contrast to the quiet solemnity of such a scene, take the following picture, drawn by Mr Stone, the rector of Spitalfields:—

'Indeed, as my church extends along one side of another crowded street, I have had most inappropriate musical accompaniments, even during that part of the burial service which is performed *within* the church. My burial-ground is partially exposed to the street at the west end also; and there, as at the east, it is liable to be invaded by sounds and sights of the most incongruous description. Boys clamber up the outside of the wall, hang upon the railing, and, as if tempted by the effect of contrast, take a wanton delight in the noisy utterance of the most familiar, disrespectful, and offensive expressions. Of course all attempts to put down this nuisance from within the burial-ground serve only to aggravate it, and nothing *could* put it down but a police force ordered to the outside every time that a burial takes place. To this wilful disturbance is added the usual uproar of a crowded thoroughfare — whistling, calling, shouting, street-cries, and the creaking and rattling of every kind of vehicle— the whole forming such a scene of noisy confusion as sometimes to make me inaudible. On all these occasions, indeed, I labour under the indescribable uneasiness of feeling myself out of place. Amidst such a reckless din of secular traffic, I feel as if I were prostituting the spirituality of prayer, and profaning even the symbolical sanctity of my surplice. And yet the exposure of my burial-ground is but partial, and is little or nothing compared with that of many others. The ground is hardly less desecrated by the scenes within it; on Sundays especially it is the resort of the idle, who pass by the church and its services to lounge and gaze in the churchyard. It is made a playground by children of both sexes, who skip and scamper about it, and if checked by our officers, will often retort with impertinence, abuse, obscenity, or profaneness. I generally have to force my way to a grave through a crowd of gossips, and as often to pause in the service, to intimate that the murmurs of some or the loud talk of others will not allow me to proceed. I hardly ever witness in any of these crowds any indication of a religious sentiment. I may sometimes chance to observe a serious shake of the head among them; but, with these rare exceptions, I see them impressed with no better feeling than the desire to while away their time in gratifying a vulgar curiosity. On the burial of any notorious character— of a suicide, of a man who has perished by manslaughter, of a woman who has died in child-birth, or even of a child who has been killed by being run over in the street—this vulgar excitement rises to an insufferable height. If, in such a case, the corpse is brought into my church, this sacred and beautiful structure is desecrated and disfigured by the hurried intrusion of a squalid and irreverent mob, and clergyman, corpse, and mourners are jostled and mixed up with the confused mass by the uncontrollable pressure from without. I will not, indeed, venture to say that on these occasions the mourners always feel and dislike this uproar, for I believe that among the working-classes they often congratulate themselves upon it. There is an éclat about it which ministers to the love of petty distinction before alluded to; but whether through the operation of this feeling,

or the many other abominable mischiefs attending the burial of the dead in populous places, there is much to counteract or impair the solemn and impressive effect of religious obsequies.'

It is pleasant to reflect, that by the removal of prejudices, irrationally indulged until they had begun to counteract their original good impulse, these evils are in progress of removal. The present alteration is on a small scale, but the project suggested by the evils of intramural interment will speedily, it may be hoped, receive an effective and full accomplishment, when the city golgothas will be deserted for verdant cemeteries apart from the crowded streets. Then the country will be likely again to realise the beautiful idea of Wordsworth:—

'In ancient times, as is well known, it was the custom to bury the dead beyond the walls of towns and cities, and among the Greeks and Romans they were frequently interred by the waysides. I could here pause with pleasure, and invite the reader to indulge with me in contemplation of the advantages which must have attended such a practice. We might ruminate on the beauty which the monuments thus placed must have borrowed from the surrounding images of nature, from the trees, the wild-flowers, from a stream running within sight or hearing, from the beaten road, stretching its weary length hard by. Many tender similitudes must these objects have presented to the mind of the traveller, leaning upon one of the tombs, or reposing in the coolness of its shades, whether he had halted from weariness, or in compliance with the invitation, "Pause, traveller," so often found upon the monuments. And to its epitaph must have been supplied strong appeals to visible appearances or immediate impressions, lively and affecting analogies of life as a journey—death as a sleep overcoming the tired wayfarer—of misfortune as a storm that falls suddenly upon him—of beauty as a flower that passeth away, or of innocent pleasure as one that may be gathered—of virtue that standeth firm as a rock against the beating waves—of hope undermined insensibly like the poplar by the side of the river that has fed it, or blasted in a moment like a pine-tree by the stroke of lightning on the mountain top—of admonitions and heart-stirring remembrances, like a refreshing breeze that comes without warning, or the taste of the waters of an unexpected fountain. These and similar suggestions must have given formerly, to the language of the senseless stone, a voice enforced and endeared by the benignity of that nature with which it was in unison. We in modern times have lost much of these advantages; and they are but in a small degree counterbalanced to the inhabitants of large towns and cities by the custom of depositing the dead within or contiguous to their places of worship, however splendid or imposing may be the appearance of those edifices, or however interesting or salutary may be the associations connected with them. Even were it not true, that tombs lose their monitory virtue when thus obtruded

upon the notice of men occupied with the cares of the world, and too often sullied and defiled by those cares, yet still, when death is in our thoughts, nothing can make amends for the want of the soothing influences of nature, and for the absence of those types of renovation and decay which the fields and woods offer to the notice of the serious and contemplative mind. To feel the force of this sentiment, let a man only compare, in imagination, the unsightly manner in which our monuments are crowded together in the busy, noisy, unclean, and almost grassless churchyard of a large town, with the still seclusion of a Turkish cemetery in some remote place, and yet further sanctified by the grove of cypress in which it is embosomed.' *

THE LABOURING-CLASSES AND PLACES OF WORK.

There is perhaps none of the forms of sanitary improvement in which the labouring-class are so much interested as that which relates to places of work, and the nature of the operations performed in them. Here, as in the tactics of armies, simple operations simultaneously affect large masses, and everything that can influence the health may have a vast influence either for good or evil. Speak as we may of free trade and competition, the individual who is able to give hundreds the means of gaining their daily bread may have an influence over their destiny of the most formidable kind. In the way of trade he may not have it—he cannot pay his operatives less than his neighbours do, and forcibly secure to himself a higher ratio of profits. In this direction he cannot act or stir without meeting competition in some one or other of its thousand forms ever at work with its ceaseless levelling operations. The workman is not obliged to take sixpence a week less than the market value of his labour, for another employer will immediately alter the market value. So much for the efficacy of human selfishness where money is concerned. But let it be what is infinitely more precious than money—human life—and the universal vigilance which at once detects the gap to be filled up, or the tumulus to be levelled, is asleep. There is something so immediate and palpable in a pecuniary difference—in the difference between one pound and eighteen and sixpence, that it acts instantaneously. In the influences affecting health, on the other hand, there is something so distant and contingent, that it seldom acts as a direct motive, especially on the uneducated. We do not hear of a rush for employment on any particular cotton mill because it is well ventilated, and provided with means for the removal of impurities; far less do we discover that smaller wages are taken in consideration of the enjoyment of these blessings; on the contrary, there is in this class of workers not only the ordinary

* Cited in Report on Cemeteries, p. 143.

disposition to gamble with life, but even sometimes a prejudice in favour of occupations directly tending to shorten life, as not likely to be overrun, and generally affording superior remuneration. It is not maintained that when there are palpable and visible operations going on which have the tendency to produce premature death, the working-classes are so utterly reckless as to crowd into them without regard to the amount of remuneration; for then their wages would be brought down to the level of the most salubrious professions. But a little addition to the pecuniary advantages seems to make a dangerous trade quite fascinating. In the ensuing part of this volume attention is particularly directed to the dry grinders of Sheffield, who rejoice and make merry in the assurance that the shortness of their life makes it more gainful.

Such motley pictures of life and death tend to throw a just suspicion on the notions too often conceived, that the sufferings of the working-classes must be attributed to the aggrandising selfishness of their employers. The capitalist rolling in his easy carriage, or enjoying his luxurious table—self-indulgent, proud, callous, while the thousands are toiling to death to bring together his riches, is an ugly monster to conjure up, and is not so completely unexampled as to seem unreal. The poet spoke not without some cause who said—

> 'Is this improvement? Where the human breed
> Degenerates as they swarm and overflow,
> Till toil grows cheaper than the trodden weed,
> And man competes with man like foe with foe,
> Till death, that thins them, scarce seems public wo?
> Improvement! Smiles it in the poor man's eyes,
> Or blooms it on the cheek of labour? No:
> To gorge a few with trade's precarious prize,
> We banish rural life, and breathe unwholesome skies.
> Nor call that evil slight. God has not given
> This passion to the heart of man in vain
> For earth's green face, the untainted air of heaven,
> And all the bliss of nature's rustic reign.
> For not alone our frame imbibes a stain
> From fetid skies—the spirit's healthy pride
> Fades in their gloom.' *

Perhaps the lovers of modern poetry may not disdain to see the lyre struck by a more vehement hand to the same note:—

> 'With her two brothers this fair lady dwelt,
> Enrichèd from ancestral merchandise;

* Campbell—Lines on Revisiting a Scottish River.

And for them many a weary hand did swelt
In torchèd mines and noisy factories;
And many once proud-quivered loins did melt
In blood from stinging whip: with hollow eyes
Many all day in dazzling river stood
To take the rich-ored driftings of the flood.

For them the Ceylon diver held his breath,
And went all naked to the hungry shark—
For them his ears gushed blood; for them in death
The seal on the cold ice with piteous bark
Lay full of darts; for them alone did seethe
A thousand men in troubles wide and dark—
Half ignorant, they turned an easy wheel
That set sharp racks at work to pinch and peel.

Why were they proud? Because their marble founts
Gushed with more pride than do a wretch's tears.
Why were they proud? Because fair orange mounts
Were of more soft ascent than lazar stairs.
Why were they proud? Because red-lined accounts
Were richer than the songs of Grecian years.
Why were they proud? Again we ask aloud,
Why, in the name of glory, were they proud?

Yet were these Florentines as self-retired
In hungry pride and gainful cowardice
As two close Hebrews in that land inspired,
Paled in and vinyarded from beggar spies,
The hawks of ship-mast forests—the untired
And panyered mules for ducats and old lies,
Quick cats' paws on the generous stray away,
Great wits in Spanish, Tuscan, and Malay.' *

Yet it is not part of the order of nature that 'torched mines and noisy factories' should be among the curses of the human race. If the great manufacturer at the apex of the whole pyramid of distributed benefits obtain the most conspicuous share, there are abundance of partakers on a larger or smaller scale. Looking beyond the persons employed by him—to whom the system will be a blessing or a curse, according to circumstances—we see in our manufacturing country that the peasant girl trips about in her clean neat frock of calico, purchased at a price that in the days of the distaff and weaver's beam would scarce have supplied a ribbon. The blacksmith and the carpenter have got carpets on their floors, which is more than Henry VIII. had. Every working man who is industrious and sober may wear linen or cotton next his skin, removable at short intervals—an advantage of modern times

* Keats—The Basil pot.

which is believed to obviate many diseases to which our ancestors were liable. Such and many others are the benefits to the poor from manufacturing enterprise, which does not therefore concentrate all its advantages on the great capitalist.

But to the workman it may or may not be a blessing, according to circumstances. In the eloquent denunciation of Keats, a portion, if not the whole of those who toiled for the haughty merchants, are slaves. These were entirely out of the category of trade and employment; and it were as unwarrantable to compare their work with voluntary hired labour, as to compare robbery with sale. Undoubtedly, however, there may be gradations from the most cruel slavery to unsullied freedom and justice; and though men be not the absolute property of their master, they may, through the despotic influence of him and his order, be subject to such restrictions and hardships as involve but a modified freedom. Nor will the position of the master in relation to his workmen be entirely free of the leven of class-tyranny, until he accomplish the removal of all those elements of unhealthiness and unhappiness which are capable of being removed without any infringement on the freedom of trade, on the amount of wages and of work exchanged, on the hours of occupation, and on the right of the worker to pursue any profitable employment.

CONSIDERATIONS AS TO UNHEALTHY OCCUPATIONS.

This last requisite of freedom might seem to militate against the principle that the causes of disease and early death should as much as possible be removed from the occupations of the labouring-classes, since some occupations are essentially unhealthy. If this be the case, it may yet be questioned if it would be a safe ground for absolutely prohibiting men from engaging in any useful pursuit. All grades and occupations in life have their casualties. The soldier and the sailor proverbially lead dangerous lives: the traveller and the geologist are liable to the very casualties which make the savage's life so uncertain: the chemist may inhale noxious gases, or suffer death through the heated atmosphere through which he watches discoveries fraught with wellbeing to mankind: the anatomist breathes poison from the dead, that he may learn how to protect the living: the clergyman, in the pestilential masses through which he labours with a blessed perseverance, imparting hope and consolation to the dying while he reclaims the living, is liable, in the midst of his virtuous heroism, to be struck down by the diseases which the vice and recklessness of those he is assisting in his Master's service have brought down upon themselves: even the patient scholar covers his head with premature white in the midst of his intellectual labours, and

passes to his grave, having enjoyed the less of this world that he has left the more behind him to adorn and dignify it.

In all grades of mankind, in countless forms, perils are encountered for the accomplishment of services to the human race. Nor would it be wise to interfere with man's right to encounter them when a satisfactory end is to be served. It is against the uselessly-encountered and generally unseen wasters of human life that sanitary legislation makes war; and indeed it will generally be found that the loss of life deliberately risked in the accomplishment of some legitimate aim, is small in comparison with the mortality which proceeds from mere gratuitous waste of human vitality. So the tailors of London, by their own ignorance and mismanagement, are more liable to premature mortality than a like number of soldiers or sailors employed in the general defence of the country.

It would seem, indeed, when we look into the matter practically, that an ordinary occupation is seldom to be found involving peril of life in its own very nature, so great as to be incapable of the application of simple means of precaution. The miner can be protected from the terrible choke-damp and fire-damp, that seemed at one time the inevitable perils of his dreary labours, by proper engineering and the simple safety-lamp of Sir Humphrey Davy. It is found that the causes of unhealthiness are as easily removable from many of the most deadly trades, and that it is often rather by the culpable negligence of the workers, than by the nature of the trade itself, that the diseases popularly believed to be characteristic of the trade, and inseparable from its pursuit, are occasioned. It has been well observed that the infirmary or dispensary physician, finding members of the same trade applying one after another in a continuous line for the remedy of the same disease, is apt to conclude that it is essential to their occupation, and thus give the sanction of medical science to the popular belief.

In mining operations we are always accustomed to consider that the worker is more subject to risks than in any other general class of employments. He is at the same time more separated from the rest of his kind—more dependent on the physical conditions by which he is surrounded, and also, perhaps, in his isolation from the rest of the community like the sailor in a ship at sea—more dependent on the arrangements made for his welfare by the persons who have induced him so to separate himself by a barrier from the community at large. In the play of the 'Recruiting Sergeant,' when one of this class of operatives is forcibly enlisted as a vagabond who has no trade, the way in which he is shown to the enlisting justice to be a man of no profession is, 'he has no

visible means of subsistence—he is a miner, and works underground.' But this is not the only cause of isolation to the mining population. The geological character of the districts in which mineral wealth is found often precludes other men from working on the spot. There are no cities or harbours, and seldom manufactories or a numerous agricultural tenantry, on the crust which the human moles leave above their subterranean journeys. Thus this class of workmen are dependent on the preparations made for them by their employers, not only in the strata in which they work, but on the surface of the earth, where other workmen, if the employer fail in properly supplying their wants, have the town or the well-peopled agricultural district to appeal to. These speculations will serve as an introduction to the following statements as to the position in which miners are placed above ground, and the causes of sickness and death which they are there apt to encounter after having met the risks and deleterious influences incident to their underground occupation. Dr Mitchell, as cited in the 'Sanitary Inquiry,' says, regarding the mines in Durham and Northumberland—

'Many of the miners, including young persons and boys, will go three miles and upwards from their own homes in the morning to work in the mines, or to wash the ore, and return again after their work at night. Some miners, who are too far off to be able to go and come in this way, find lodgings for the four nights in the week, and the washers for five nights, at some houses not too far from the mines. The usual price is 6d. a week each, for which sum there is a bed between two of them, leave to make their "crowdy" on the fire in the morning, and they have their potatoes boiled for them in the evening. They bring their provisions in a wallet on the Monday mornings: the miners go back on the Friday, and the washers of ore on the Saturday. But there are many mines, and some of them very large, in remote situations in the Fells, far away from all dwelling-houses, where lodgings might be had, and the proprietors have erected for their miners and washers buildings called "lodging-shops," which I now am about to describe:—

'The first one of them which I visited was about nine miles across the Fell, south from Stanhope. It was a plain building, constructed of sandstone, covered with a coarse slate, and all very substantial. There was no opening or window at either end, nor at the back, nor on the roof. On the front or south side was a door towards the west end, and two windows, one a little above the other. On entering the door, it was seen that the lower part was one room, lighted by one of the windows, and had a great fire burning at the east end. By pacing the floor, the length was ascertained to be about 18 feet, and the breadth about 15 feet. Along the one side, that next the window, was a deal table, extending the whole length of the room, and alongside of it was a form, and there were two other forms in

the room. All along the other side on the wall were little cupboards, forty-eight in number, in four tiers above each other; six of the cupboards with the doors off, but the most of the rest carefully locked with padlocks, and in which the several miners had deposited their wallets with their provisions for five days. Throughout the room, more particularly at the end furthest from the fire, were hung, from hooks and nails in the joists, miners' trousers and jackets, to be put on in case of the owners returning wet from their work.

'In addition to the articles already named were the following:—One earthen pitcher to fetch water, one tea-kettle, one pan for boiling potatoes, two pans for frying bacon, iron fender, a poker and shovel, a besom. There was a large box in the room secured by a padlock, said to contain the clothes which the masters put on when they come to see the mines.

'On ascending to the upper room by a ladder, it was seen to be a sleeping-room. The dimensions of the floor were of course the same as of the room below. There was no fireplace, which indeed was not wanted; but neither was there any opening into a chimney to produce circulation of air. Along one side of the room were three beds, each 6 feet long by about 4½ feet wide, the three beds extending the length of the room; then there were three other beds on the other side; and at the furthest end was a seventh bed, extending from the one line of beds to the other. Immediately over these seven beds, and supported on posts, were seven other beds placed exactly in the same way. Of course the person who slept in each of the six beds of the upper tier next the wall could raise his head only a very little way on account of the roof. Each of these fourteen beds was intended for two persons, when only few men were employed at the mines; but they might be made to receive three men each, and, in case of need, a boy might lie across at their feet. There was no opening of any sort to let out the foul air, yet from thirty-nine to forty persons might have slept there, the men perspiring from their work, and inhaling the small dust from their clothes, floating in clouds. The beds were stuffed with chaff. There were blankets, but no sheets. The furniture of the lodging-shops is supplied by the masters. The beds and blankets are supplied by the miners themselves: they are taken home sometimes to be washed. On Friday, when the miners leave, the beds are rolled up, to prevent damp. I visited the lodging-shop on Monday morning. The beds had not been slept in for Friday, Saturday, and Sunday nights preceding, yet was the smell most noxious. There was one excellent thing connected with this lodging-shop: there was a small but beautiful stream of water which was conducted across the Fell to this spot, and came through an iron pipe near the door, so that the men had an abundant supply of the pure element. I next went to see another lodging-shop on a larger scale. On the ground-floor were five rooms. The first is a blacksmith's shop: next to it is the cooking and eating-room of the washers of ore: from twenty to thirty men and boys, if so many, were employed. It was locked up, and I

did not see it. The upper room extended over the blacksmith's shop, and the cooking-room is the sleeping-room of the washers, men and boys. The next room on the ground-floor is a cooking and eating-room of the miners, exactly like the room of the lodging-shop already described. Adjoining to it is a room in which they hang up their wet clothes. At the end is a stable for the horses which are employed to draw the wagons with ore from the pits. By a ladder close to the wall between the cooking-room and drying-room is an ascent to a room exactly like that in the lodging-house already described, with the same number of beds. One little pipe of about two inches diameter was the only communication with the exterior air. Through the partition wall is an opening into a bedroom, extending over the drying-room and the stable. Across this room extended two beds, leaving a space for passing. Above these two was a tier of other two beds: then, at a short interval, was a second set of beds, four in number; and further on a third set, similarly arranged, four in number. Thus in the space above the cooking-room, drying-room, and stable, were twenty-six beds, each intended for two or three men, as it might be, and perhaps more; and the same beds for sets of miners in their turns, as one set came from their work, and another went off.

'*Though the beds had not been occupied for the three preceding nights, the smell was to me utterly intolerable. What the place must be in the summer nights is, happily for those who have never felt it, utterly inconceivable.* The medical men are best able to give a judgment on these matters; but for my own part, *I cannot but believe that these lodging-houses are more destructive than the air of the mines.* I should think it no hardship to have to remain twenty-four hours in a mine; but I should be terrified at being ordered to be shut up a quarter of an hour in the bedroom of a lodging-shop.

'Many miners speak of the horrors of lodging-shops of former days; but the only difference I could learn was, that at many mines there were not now so many men and boys at work, and consequently the lodging-shops were not so crowded. Some mines are not now wrought which formerly had large lodging-shops; for example, Mannergill, of which a miner stated to me that he was one of 120 who lodged in a suite of rooms there; and he declared that the nuisance was much aggravated by the great number. In such a dense accumulation of bodies, one man who might be ill was a disturbance to all the rest. The coughing of a few interrupted the sleep of others. Men coming from the mine at twelve o'clock at night, and frying their bacon at the fire below, sent up an odour which added to the already too suffocating smell of the sleeping-room above. The great number was an aggravation of what is intolerable at best.

'The miners showed me a tank through which running water passed, in which they had placed their bottles of milk which they had brought with them for their coffee. There was an excellent supply of running water of the best quality, and it was the only

beverage which the men had; for they stated that there was no public-house or beer-shop nearer than seven miles, and if there were one, they durst not go into it for fear of being discharged.

'The men all said that their lodging-shop was a fair sample of all the lodging-shops in the country, the only difference being the greater or less number of men lodging in them, which would depend entirely on the state of the mine. I have, however, since seen one refinement of which these men did not seem to be aware, and that was, a lodging-shop in which were not only the beds in tiers all round the room, but there also was a bed suspended or swung from the top of the room, which economically filled up a space which otherwise would have been vacant.'

The following is the account given by a miner himself of the lodging-places :—

'William Eddy, one of the miners, states—"I went to work in Greenside four years. Our lodging-rooms were such as not to be fit for a swine to live in. In one house there were sixteen bedsteads in the room up stairs, and fifty occupied these beds at the same time. We could not always get all in together, but we got in when we could. Often three at a time in the bed, and one at the foot. I have several times had to get out of bed, and sit up all night, to make room for my little brothers, who were there as washers. There was not a single flag or board on the lower floor, and there were pools of water twelve inches deep. You might have taken a coal-rake and raked off the dirt and potato peelings six inches deep. At one time we had not a single coal. After I had been there two years, rules were laid down, and two men were appointed by the master to clean the house up stairs twice a week. The lower apartment was to be cleaned twice a day. Then the shop floor was boarded, and two tables were placed in the shop. After that, two more shops were fitted up; but the increase of workmen more than kept up with the increased accommodation. The breathing at night, when all were in bed, was dreadful. The workman received more harm from the sleeping-places than from the work. There was one pane of glass which we could open, but it was close to a bed-head.

"The mines at Greenside were well ventilated, and in that respect there was nothing to complain of.

"In the winter-time the icicles came through the roof, and within twelve inches of the people sleeping in bed. During a thaw, water dropped plentifully into the beds. In the upper beds the person sleeping next to the wall cannot raise his head or change his shirt."

'Joseph Eddy, another workman, states—"*I consider the lodging-shops more injurious to the health of the miners than their work itself.* So many sleeping in the same room, so many breaths, so much *stour* arising from their working-clothes, so much perspiration from the men themselves, it is impossible to be comfortable. Two miners occupy one bed, sometimes three. The beds are shaken once a week on the Monday morning, when the miners come. Some miners

make their beds every night. The rooms are in general very dirty, being never washed, and very seldom swept, not over once a month. There is no ventilation, so that the air is very close at night."'

But if we pass from those occupations which are supposed to be the most precarious and unhealthy, and examine ordinary and simple trades, involving in their nature nothing that appears formidable, we shall yet find that from carelessness, ignorance, or a selfish neglect, they are made as mortal as the most deadly pursuits. Among the many eminent services contributed by Dr Guy to our knowledge of every agent affecting the public health, is the following description, given in evidence before the Commission of 1844 on the state of large towns and populous districts:—

'As far as I have had an opportunity of observing, the history of a London workshop is this:—A man begins by employing a few hands in a house often but ill adapted for an ordinary dwelling-house, and as his business increases, he contrives to add one low apartment to another, by knocking down partition walls, and making such slight alterations as suit his immediate purpose. He contrives by this means to accommodate an increasing number of men, and the only practicable limit to that number is the want of mere standing or sitting-room, as the case may be. He warms these rooms by a stove, by steam, or by hot air, and lights them with gas. The consequence is, that the workmen are exposed at the same time to a high temperature and a foul and stagnant atmosphere. This combination is carried to its highest degree in the tailors' workshops, and I have been told more than once, by the journeymen tailors themselves, that they have been obliged to strip to the very skin, that they might be able to bear the intense heat to which they are exposed. In buildings intended for workshops, more space is given to the men, but they are usually constructed on very bad principles. The whole building often forms one space, divided by floors perforated by a common staircase. If a steam-engine is employed, it is generally to be found in the lower compartment of this building, so that the heat rises from this into the upper rooms, and mingling with the foul air of the intermediate floors, ascends to the highest flat, where the hot and foul air collects in great abundance. Such a building as this once gave me the opportunity of a very striking comparison; 15 men were employed on the second floor, and 17 men in precisely the same way on the third and uppermost floor. On making personal inquiries of each of the men respecting his health, four only out of the 15 on the second floor made any complaint; one was subject to indigestion, a second to cough, the third to ulcers of the leg, and the fourth was what might be termed a valetudinarian. But of the 17 employed on the uppermost floor, three had had spitting of blood, two were subject to affections of the lungs, and five to constant and severe colds. Ten of these 17, therefore, were subject to

diseases affecting the chest; while one only of the 15 in the room beneath had a disease of this nature. The men themselves, who had been for a long time in the employment of the same master, were fully alive to the injury which they sustained, and had made frequent representations to their employer. Some unsuccessful attempts had been made to remedy a state of things mainly dependent upon the faulty construction of the building.

'It is not a little remarkable that another workshop of the same kind, and constructed in the same faulty manner, gave a similar result. Of 20 men in the upper room, two had had spitting of blood, two indigestion, two rheumatism, one was subject to headache, one had varicose veins, and two were subject to lowness of spirits (hypochondriasis); making in all 10 invalids in 20—being exactly half the number. On the contrary, of 15 men employed in the lower room, one only had spit blood, one complained of weakness, and a third of indigestion; making three in all—being at the rate of 4 in 20, in the place of 10 in 20 in the upper room.

'I may mention another striking fact of the same kind. In visiting workshops, I have carefully noted the dimensions of the rooms, the mode of heating, the mode of lighting, the number of lights, and the number of men employed. I have also ascertained from each man whether or not he has been subject to any disease, and if so, to what disease. All these particulars having been very carefully noted down, I have had the means of forming some very exact comparisons. The following is one of them:—Forty men were employed in five rooms, containing an aggregate of 12,121 cubic feet of air, being at the rate of 303 cubic feet of air per man. These rooms were lighted every evening by sixty gas-lights. Other 40 men were employed in other five rooms, containing 31,549 cubic feet of air, being at the rate of 789 cubic feet per man, and these rooms were lighted in the evening by seventy-five gas-lights. All the ten rooms were heated by stoves. Assuming that the gas-lights in the two sets of rooms produced an equal degree of impurity in the air during the time that they were burning, I have thought that the comparison between the two sets of rooms would become complete if I divided the quantity of air which they respectively contained by the number of lights burning during the evenings. The result of this division is as follows:—First set of rooms, 303 cubic feet of air per man, giving, when divided by the number of lights, a quotient of 5·05. Second set of rooms, 789 cubic feet of air per man, giving, when divided by the number of lights, a quotient of 10·52.

'It results from either of these comparisons that the 40 men occupying the first five rooms had less than half the quantity of air to breathe which the 40 men in the five larger rooms had. In all other respects their situation was precisely the same. Now, of the 40 men occupying the smaller rooms, and consequently breathing a hotter and fouler air, five had had spitting of blood, six were subject to severe catarrh, six complained of indigestion, two of great debility, and one of rheumatism. On the other hand, of the 40 men occupy-

ing the larger rooms, and having a purer and cooler air to breathe, one only was subject to catarrh, two to indigestion, one to pain in the chest, one to nervous symptoms, one to headache, and one had varicose veins. Not one of them had spit blood.'

It will be found among the remarks in the ensuing part, that it is not entirely to the selfishness of employers that we must attribute such defects. They are themselves often ignorant of the laws of nature on which health depends, and suffer with their workmen; nor is it their special function, however much it ought to be their desire, to attend to the health of their workpeople. The same gentleman whose description has just been cited, on being farther examined, gives the judicious remarks which form his answer to the following question:—

'You say that you have generally found employers willing to do anything which does not entail great expense: is this very generally the case?—Very generally; but I ought to add, that when the greatest willingness has been shown, very slight obstacles have sufficed to prevent these good intentions from being carried into effect. This happened in the case of a poor water-gilder, suffering from trembling palsy, caused by frequent exposure to the fumes of mercury. I suggested to his employer a very simple plan of getting rid of these poisonous fumes, and he promised willingly and gratefully to adopt it. I called after a few days, and found that he contemplated some alteration in his premises in two or three months' time, that he had thought of a plan that seemed to him preferable, and would then adopt it. Though evidently a humane and intelligent man, he seemed to think as little of this delay as if the health and life of a fellow-creature were not in question. Thus it is with all classes. They form a low estimate of the value of life and health. A man dies, and another replaces him without cost to his employer; but if it were a horse or a dog, the owner would have to pay for a new one. This makes all the difference. A man falls sick, and he, and not his employers, has to pay for his illness. A horse or a dog would have cost something. And yet these persons, who would be more anxious about a horse or a dog than about a man, are not necessarily hard-hearted. They have never been roused to a sense of the surpassing value of health and life. Even the educated classes are rendered in some degree indifferent to human life by a false theory, which, I believe, originated with a religious and humane man—or if not, is certainly entertained by many such men—namely, that plagues and consumptions were intended by Providence to keep down a redundant population. We now know better; and it may be hoped that better feelings will spring up with sounder information. There is much ignorance to be removed, and much prejudice to be overthrown, before the rich will do justice to the poor, and the employer to the workman. Those who use glazed cards, for instance, little think how many palsied hands are due to the glaze which the manu-

facturers use; as little effort is made to substitute some wholesome material for common paint, as if there were no such thing as painters' colic or the dropped hand. So also men are constantly breathing irritating fumes, and metallic particles, and poisonous air, with scarcely an attempt to get rid of them by ventilation or other efficient means. There is a general indifference on the part of the rich, and a corresponding recklessness on the part of the poor. A long time must elapse before either party will learn the true economy of health, and become duly impressed with the duty and gain of preserving it.'

A man is gifted with the means of acquiring such knowledge as will enable him to a certain extent to take care of himself, and perhaps it would not be a serviceable principle in the end that he should be taken charge of entirely by others, like the animals that are their property. It appears, however, that even in reference to such self-interested preservation of property, mistakes will be made through ignorance of the laws of vitality, as the following curious incident, told by Dr Arnott to the Commission on large towns, will show:—

'In the Zoological Garden in the Regent's Park a new house was built to receive the monkeys, and no expense was spared which, in the opinion of those intrusted with the management, could insure to these natives of a warmer climate all attainable comfort and safety. Unhappily, however, it was believed that the objects would be best secured by making the new room nearly what an English gentleman's drawing-room is. For warming it, two ordinary drawing-room grates were put in, as close to the floor as possible, and with low chimney-openings, that the heated air in the room should not escape by the chimneys; while the windows and other openings in the walls above were made as close as possible. Some additional warm air was admitted through openings in the floor from around hot-water pipes placed beneath it. For ventilation in cold weather, openings were made in the skirting of the room close to the floor, with the erroneous idea that the carbonic acid produced in the respiration of the animals, because heavier than the other air in the room, would separate from this, and escape below. When all this was done, about sixty healthy monkeys, many of which had already borne several winters in England, were put into the room. A month afterwards, more than fifty of these were dead, and the few remaining ones were dying. This room, open only below, was as truly an extinguisher to the living monkeys as an inverted coffee-cup, held over and around the flame of a candle, is an extinguisher to the candle. Not only the warmth from the fires, and the warm air that was allowed to enter by the openings in the floor, but the hot breath, and all the impure exhalations from the bodies of the monkeys, ascended first to the upper part of the room, to be completely incorporated with the atmosphere there, and by no possibility could escape, except as

a part of that impure atmosphere, gradually passing away by the chimneys and the openings in the skirting. Therefore, from the time the monkeys went into the room until they died, they could not have had a single breath of fresh air. It was necessary only to open, in the winter, part of the ventilating apertures near the ceiling, which had been prepared for the summer, and the room became at once salubrious.'

There have been instances found where a little interference by well-meaning people has produced on some unhealthy class of workmen a considerable improvement, by removing, or helping them to remove, causes of disease. In the Sanitary Report there are citations from Dr Barham's account of the workers in the Dolcoath mine in the parish of Camborne in Cornwall; and it will not detract from their interest that these passages mention some kindnesses done to the workmen of a description apart from our present object of inquiry:—

'Care is there taken in respect to ventilation in the mines. "The ventilation in Dolcoath is particularly good, and the men are healthier than in most other mines; there are more old miners." Care is taken for the prevention of accidents. "Our ladders," says one of the witnesses examined by Dr Barham, "are about two fathoms and a-half in length, generally with staves one foot apart. We use oak staves; old ship oak we find the best. We formerly used the hafts of the picks and other tools, but found these unsafe, the wood being sleepy and flawed, and sometimes breaking off in a moment, without having shown any outward sign of unsoundness. Iron staves, besides being at times very slippery, are apt to be corroded, so as to cut the hand. We have had no accidents on our footways for a long time." They have introduced the safety fuse, and the witness says—"Very few accidents now arise from explosions;" "they used to happen frequently formerly." Care is taken of the miners on quitting the mines; hence, instead of issuing on the bleak hill-side, and receiving beer in a shed, to prevent chill and exhaustion, they issue from their underground labour into a warm room, where well-dried clothes are ready for them, and warm water, and even baths are supplied from the steam furnace; and, in the instance of this mine, a provision of hot beef-soup instead of beer is ready for them in another room. The honour of having made this change is stated to be due to the Right Honourable Lady Basset, on the suggestion of Dr Carlyon. "Hence in this mine," says Dr Barham, "we may fairly attribute to the combination of beneficial arrangements just noticed that in Dolcoath, where 451 individuals are employed underground, only two have died within the last three years of miners' consumption, a statement which could not, I believe, be made with truth, nor be nearly approached in respect of an equal number of miners during the same term, in any other Cornish district." The sick-club of the mine "is comparatively rich, having a fund of £1500."'

INTERESTS LIKELY TO OPPOSE AMENDMENTS.

In connection with the moral influence of sanitary amelioration, it is elsewhere shown that its progress will teach both employers and employed secrets about the laws of human vitality of which they are now lamentably ignorant.

When once the apathy of this ignorance is overcome, it will not be in the working-people, or in the humbler classes generally, that any perverse or selfish opposition to the progress of improvement need be dreaded; they will soon find out that a sanitary law is a working-man's and a poor man's measure. Nor will the enlightened liberal employers or owners of house property interrupt measures calculated to raise the standard of vitality and happiness. At the commencement of their labours, the Board of Health were enabled to give this gratifying account of their reception by the poor:—

'The experience of the inspectors has been, that the directions to the seats of typhus and other epidemic and endemic disease invariably conducted them to places ill drained, and surrounded by filth, in which are found the conditions in respect to the removable causes of such disease as were anticipated, and which serve as the foundation of legislation. In the course of the inspections, and after the character of the seats of epidemic disease had been seen by the mayor or other inhabitants who accompanied the inspector, it became a frequent observation to the medical officer, on arriving at an ill-drained and ill-conditioned place, "Here, sir, you must have fever cases." The positive amount of sickness, pain, premature death, and misery, from diseases of this class being, as we find it, constant; or with variations from year to year chiefly in the way of excess in particular years; the extent to which the causes of such diseases (whether original or predisposing) appear to be removable is a source of proportional hope and satisfaction.

'The feelings manifested by the inhabitants of these, usually the poorest districts, were, in the first instance, surprise at the novelty of an official visit of inspection, by an officer acting under the authority of the government, and then satisfaction; next, complaints as to their condition; and lastly, urgent requests that something might be done for them. They readily threw open their doors, and gave every explanation to the inspectors.

'The extensive manifestation of a sense of their condition by the poorest classes has afforded important promise of the success of the new works contemplated by the legislature. Had those classes evinced a spirit of resistance to measures of improvement, had they shown a preference for dirt, or an indifference to works of cleansing, their introduction might have been much more difficult; but although the objections to new rates and the pleas of poverty were frequent, as might be expected, yet where there were opportunities of informing them of the real character of the changes contemplated, and ask-

ing them whether they were willing to pay rates in return for the advantages promised, there was a fair, and generally very hearty, expression of good-will to do so.

'Another uniform and general result of our procedure upon the lists of the localities of epidemic, endemic, and contagious disease has been, that the inspectors' visits of examination have taken guardians of the poor and others to the sources of the greatest chargeability to the poor's-rates, which they had then, almost for the first time, visibly displayed before them.'

The industrious and productive members of society in general will see in sanitary measures, even if they should cost something, a future economy through the reduction of burthens which now press heavily upon them. Sickness and early mortality among the poor at present throw heavy burthens on them, and when they incur expense for precautionary arrangements, they will compare the amount with the poor-rate it will supersede. Local bodies accustomed heretofore to irresponsible power will not welcome arrangements where a universal superintendence will prevent jobbing irregularities or undue exercises of authority. But the bitterest opponents of remedial measures will undoubtedly be the owners of those wretched tenements against which the sanitary reformer must make war. Their trade, which compels them to be ever suspiciously watchful over the miserable tenantry by whom they live, has generally hardened their hearts, strengthened their selfishness, and rendered them suspicious of human nature and its professions. The extent of their gains has depended on the improvidence and viciousness of the class who inhabit their houses, and they will look with jealousy on measures for promoting social improvement at their expense. Already the Board of Health have met with difficulties in this quarter, and have had thus to report:—

'The entire want of faith in the improvement of the future local expenditure has been one source of the opposition from the owners of the tenements chiefly requiring amendment, for which the highest rents in proportion to any outlay are commonly received. We must, however, repeat, that inasmuch as we believe in every instance the works of amendment proposed will be in reduction of existing charges, and be an improvement to the property—the abolition of cesspools, complete house-drainage and cleansing would, by the reduction of damp, be of full money value to the property by the saving of dilapidations—so we have held that every description of property must contribute. But the owners of the description of property which is supposed to be the poorest—namely, that excused from the payment of all rates on the ground of the poverty of the occupiers—have seen in the imposition of rates for these improvements only a precedent for the rating of that description of property for other purposes, and have been most violent in their opposition. Under the influence of

these classes of opponents, poor occupiers, who have expressed their satisfaction at the prospect of amendment, and petitioned for the application of the Public Health Act, have been frequently induced to retract their declarations, and in some instances to petition against measures which, however, were nevertheless measures of pecuniary as well as of sanitary relief.'

The most delicate operations in pursuit of sanitary reform will be those which positively interfere with individuals and the kind of edifices in which they choose to live. No one will, however, deny, that if a certain form of house—for instance, that of a cellar—is dangerous to life, and a source of disease which may desolate the community, the legislature may enact that houses of that form shall not come into existence. It may seem hard that poverty should be debarred from choosing the worst and humblest home, but it is wonderful how the energies will expand to provide the means of civilised wellbeing when degradation is avoided. Prohibit a thousand persons from living in cellars, and the chance is, that in compelling them to provide decent habitations for themselves, they are at the same time induced to become in every way more respectable and more wealthy. When they actually have assimilated themselves to the life of beasts living in dens, it becomes a questionable matter how far it may be either humane or prudent to drive them forth. Yet in one place where the cellar population assumed an alarming aspect, such a measure was boldly adopted, and promises high success. The cellar population of Liverpool was thus described by Dr Duncan in a document addressed to the Commissioners on the State of Large Towns in 1844:—

'The population of the parish of Liverpool, by the census of 1841, amounted to 223,054, of whom about 160,000 may be estimated to belong to the working-classes; and of these it is well known that a large proportion inhabit courts and cellars, the remainder living in houses or rooms to the front of the street. The courts, in which so many of the inhabitants of Liverpool reside, consist usually of two rows of houses placed opposite to each other, with an intervening space of from 9 to 15 feet, and having two to six or eight houses in each row. The court communicates with the street by a passage or archway about three feet wide—in the older courts, built up overhead; and, the farther end being also in many instances closed by a high wall or by the back or side of an adjoining building, the court forms in fact a *cul de sac* with a narrow opening. Such an arrangement almost bids defiance to the *entrance* of air, and renders its free circulation through the court a matter of impossibility. When other circumstances, to be afterwards mentioned, are taken into account, such as the dense population and abominably filthy state of many of the courts, it is easy to understand in what way the con-

struction of these dwellings may contribute to swell the mortality of Liverpool. The houses themselves are three storeys high, contain three rooms of about 10 or 11 feet square, and being built back to back with the houses of adjoining courts, there is of course no thorough draught. An enumeration of the court and cellar population of the borough was made two years ago under the authority of the town-council, when it appeared that there were in the parish of Liverpool—

Courts.		Houses.		Inhabitants.
1982	containing	10,692	and	55,534

That is to say, more than one-fourth of the whole parochial population, or more than one-third of the working-classes, were residents in courts. With regard to the *character* of these courts, it appears from the Report of the Corporation Surveyors, that—

629, or nearly one-third, were closed at both ends;
875, or less than one-half, were open at one end; and only
478, or less than one-fourth, open at both ends.

'The cellars are 10 or 12 feet square; generally flagged, but frequently having only the bare earth for a floor, and sometimes less than 6 feet in height. There is frequently no window, so that light and air can gain access to the cellar only by the door, the top of which is often not higher than the level of the street. In such cellars ventilation is out of the question. They are of course dark; and from the defective drainage, they are also very generally damp. There is sometimes a back-cellar, used as a sleeping apartment, having no direct communication with the external atmosphere, and deriving its scanty supply of light and air solely from the front apartment.

'The enumeration already alluded to showed that there were in the twelve wards forming the parish of Liverpool—

Inhabited Cellars.		Inhabitants.
6294	containing	20,168

exclusive of the inhabited cellars in courts (of which there were 621, containing probably 2000 inhabitants). From pretty extensive data which I have in my possession, I should be inclined to think these numbers, both of the court and cellar population, to be under the mark; but as they profess to be from actual enumeration, I am of course bound to take them as I find them. Of the entire number of cellars, 1617 have the back apartment I have mentioned; while, of 5297 whose measurements are given, 1771, or one-third, are from 5 to 6 feet deep; 2324 are from 4 to 5 feet; and 1202 from 3 to 4 feet below the level of the street: 5273, or more than five-sixths, have no windows to the front; and 2429, or about 44 per cent., are reported as being either damp or wet.'

Dr Duncan has favoured the editor with the following instructive account of the proceedings adopted for the improvement of this mass of population, down to December 1849:—

'The greater liability of the cellar population to disease had been long notorious, and, in particular, it was found that they suffered from fever in a proportion 35 per cent. greater than the rest of the working population. So long ago as 1802, the late Dr Currie (Burns's biographer) called the attention of the common council of Liverpool to the unhealthiness of the cellar dwellings, but nothing was done in the matter until forty years afterwards, when, in 1842, the council obtained power (5 and 6 Vict. c. 44) to prevent the separate occupation of any cellar less than 7 feet in height, or the floor of which was more than 5 feet below the level of the street, or which had not an area in front of at least 2 feet wide, from 6 inches below the level of the floor to the surface of the street. The occupation of cellars in *courts* was declared illegal.

'Under this act about 3000 cellars were cleared of their inmates up to the end of 1846; but it being found that the provisions of the act were not sufficiently comprehensive to embrace many cellars unfit for habitation, the council, in their local sanitary act (9 and 10 Vict. c. 127), which came into operation on the 1st January 1847, took powers to prevent the separate occupation of any cellar, the floor of which was more than 4 feet below the level of the street, or which had not an area in front of not less than 2½ feet in width. Cellars built or altered under the former act were, however, exempted from the operation of this clause. At the time of the passing of this act there were in the borough 14,084 cellars, of which 7668 were inhabited, and the remainder either had been let, or were intended to be let for separate occupation. The inhabited cellars contained nearly 30,000 inmates. Of the entire number of cellars, 12,877 were found to be, under the provisions of the act, unfit for habitations; but of these about 1300 have been claimed as having been built or altered under the former act, and may therefore be legally occupied, so that the total number of cellars in Liverpool which may be legally used as separate habitations at the present time is about 2500. After the passing of the act of 1847, the clearing of the illegal cellars was rapidly proceeded with for some months, when, it appearing that it had the effect in many instances of overcrowding the court houses, the Health Committee, at my recommendation (in order to give time for the supply of new habitations to overtake the demand), resolved that not more than 100 cellars per month should be cleared of their inmates. Up to the present time upwards of 4700 cellars have been thus cleared, exclusive of 355 cellars in courts which had continued to be inhabited notwithstanding the prohibition of the act of 1842. The number of inmates ejected amounts in round numbers to 20,000. The illegal cellars still inhabited, and which remain to be cleared, are 2256, containing about 8500 inmates.

'Of the 7668 inhabited cellars, 5869 were found, on inspection, to be damp, wet, or filthy. A good deal of difficulty has been experienced in carrying out the act, from the reluctance of the inmates to leave their miserable abodes, and the expedients to which they have

recourse in order to evade the law. Their reluctance seems to be chiefly founded on the convenience offered by the separate entrance to the cellars, and the facilities afforded for selling cakes, fruit, vegetables, chips; and so strong is this feeling, that were it not for the constant vigilance of the police, and of the inspectors employed for the purpose, the cellars would be re-occupied nearly as fast as cleared.

'In 1381 cases where the parties refused to obey the notice to leave their cellar habitations, it has been found necessary to summon them before the magistrates; and in 743 cases cellars which had been reoccupied after having been cleared, have been cleared a second time. To bring a cellar within the provisions of the act, the magistrates require proof of its being occupied *during the night;* and in order to withhold this proof, the parties are in the habit of concealing in the day-time the beds, or the sacks, straw, or shavings which they use as bedding. There can be no doubt that many cellars are at the present moment inhabited in Liverpool which in this way evade the operation of the act. Many illegal cellars also are occupied during the day-time only, the occupants finding accommodation during the night in the house above, or in some adjoining dwelling. Although this is a compliance with the clause as interpreted by the magistrates, it is clearly an evasion of the *spirit* of the act.

'With regard to the effect of this measure on the health of the 20,000 ejected cellar inhabitants, as it is obviously impossible to trace their further history in their new abodes, no direct answer can be given to the question. An approximate answer may be derived, however, from a comparison of the ravages in a particular district of the epidemic fever of 1847, which visited us before the clearing of the cellars was commenced, with those of the cholera epidemic of 1849, which did not come upon us until nearly 5000 cellars had been cleared of their inmates. The district in question is selected because it is the one with regard to which I am in possession of the most accurate statistics respecting *both* epidemics, and the one which formerly contained the largest proportion of inhabited cellars of the worst description. In 1847 the cellar population formed about 12 per cent. of the entire population of the district, and at the present time it amounts to less than 2 per cent. In connection with this fact I submit it as significant of the sanitary value of the measure in discussion, that while the epidemic which raged, previously to the clearance of the cellars, carried off upwards of 500 of the inhabitants of the district, that which prevailed after the cellar population had been reduced to one-sixth of its former amount caused only ninety-four deaths in the same district; the total number of victims *throughout the borough*, from each epidemic, being very nearly alike.

'I do not wish it to be inferred that the *whole* of this marked difference is to be ascribed to the reduction of the cellar population, for there is no doubt that much had been done in the interim, *in*

other ways, to improve the sanitary condition of this, in common with the other districts of the town; but in this district the cellars were of the worst description, and the ejection of their inmates had been effected to a greater extent than in any other. I am aware that, from the different nature of the two epidemics which have been compared, this may not be considered very satisfactory proof of the sanitary value of the cellar clearances; but the nature of the case admits of no better proof, and it is to be remembered that the two epidemics, although differing in name, have generally attacked the same districts. In conclusion, I may state that although instances must no doubt have occurred where parties ejected from cellars have taken up their abode in dwellings even more injurious to health than those which they were compelled to quit, yet no one who has personally inspected the worst description of the Liverpool cellars can hesitate to admit the policy of investing the authorities with power to prevent their being used as the habitations of human beings.'

DISCOVERIES—MEANS OF DEODORISING AND DISINFECTING.

There are few things more suggestive of the possible future influence which science may have over vitality, than the discoveries which have lately been made as to two kinds of chemical agents —the one tending to deodorise, or remove evil odours; the other to disinfect, or eradicate the productive elements of epidemic disease. It had possibly been dimly seen in earlier periods that the presence of some material objects had the effect of interrupting or mitigating the progress of disease; but speculation and superstition expanded them, confounding effective chemical agents with those invested with supernatural attributes; and so, while some had recourse to aromatics and acids, others placed equal reliance on amulets and relics. Any experience that facts might have afforded was thus apt to be neglected or mixed up with some preposterous fiction, and the medical profession turned their attention more to the medicinal cures, of which they saw distinctly the efficacy, than to these vague protectives. Within a very short period, however, the species of inquiry so neglected or abused has been beginning to reappear in a sound experimental form. As yet, it can only be said that scientific men have a dim glance of probable results, and are seeing openings of useful efficacy here and there. But such facts and observations as they have adduced are of great value and interest; and thus much curious instruction may, it is supposed, be derived, with all allowances, from the following selections made from the evidence of Dr Lyon Playfair to the Metropolitan Sanitary Commission :—

'How would you define disinfectant substances?—What are commonly called disinfectants may scientifically be divided into three

classes; first, true disinfectants — that is, those substances which act upon miasmata, or infection already existing; secondly, disinfectants improperly so called, which act by preventing decay or the emanation of miasm from organic bodies; and thirdly, deodorisers, or those which take away the odour without necessarily taking away the miasm or infection. I would therefore class them as *disinfectants*, *decay-preventers*, and *deodorisers*.

'Will you give examples of each class?—The true disinfectants are of various kinds; and therefore, before I can be understood, I must again be allowed to make some preliminary observations. An agent so subtle in its nature as miasm or an infection can only be combated by an agent capable of reaching it, and in this respect somewhat as subtle as the infection itself. Thus it would be almost impossible to act upon a gaseous miasm or a gaseous infection either by a solid or a liquid disinfectant, because these cannot penetrate into the recesses into which a gaseous miasm can, and therefore a gaseous infection or contagion can only be thoroughly combated by a gaseous disinfectant. It is well known that decaying emanations have a great tendency to be absorbed by porous materials, such as the walls of rooms, or by paper; and no solid or liquid disinfectant acting locally can penetrate into those places into which the gaseous miasm has entered. As an example of a gaseous disinfectant, chlorine gas is one of the most common and efficient. This body acts by destroying the nature of almost all decaying substances in a gaseous state, and forcing them to enter into rapid oxidation by means of the air. If oxidation be once effected, the character of a miasm or infection is lost, and it ceases to be injurious to the animal system. Chlorine is a disinfectant, very applicable to some miasms, though often inefficacious for others; for example, in cholera it has not been found to be so advantageous as was expected. In Russia, experience has not been favourable to the use of chlorine in cholera. Sulphurous acid gas, obtained by burning sulphur, and nitrous acid—an acid obtained by boiling starch with nitric acid—have been found more efficacious in many kinds of decaying emanations. Chlorine for ordinary decaying miasms, such as those produced from marshes or heaps of decaying matter, has been found generally efficacious; but it is not such a good deodoriser as many other substances. * * *

'With respect to the class of gaseous disinfectants to which you attribute this efficacy, would there be any danger in the use of them popularly?—An indiscriminate use of chlorine, without understanding its nature, would be injurious. If you trusted the evolution of chlorine, by giving the materials to a cottager, in order that it might be made at pleasure in his own house, he might do himself much injury, by incautiously allowing the fumes to escape. In regard to chlorine, though we have no evidence of its having been extremely favourable to cholera, still, as it is known to act in destroying decaying emanations generally, I should be very much inclined to recommend its use in the event of the cholera coming to this country; because, even if it did not act specifically upon this gaseous infection,

still it would act on other decaying emanations which are well known to favour the progress of the disease. I would, however, recommend it to be used by public scavengers, or a public body of cleansers. The most useful results have followed this course in Edinburgh, during the various fevers which have raged there. The public scavengers have been employed to fumigate the rooms where fever was supposed to exist, or those rooms where filth had been known to abound; and also to whitewash, very extensively, filthy rooms of cottages where infection had prevailed, or was likely to occur. In such cases it was usual to put a little chloride of lime in the whitewash: several very decided cases of its efficacy occurred whilst the scavengers were engaged in this operation. In one case which I may mention, a house had been successively inhabited by a number of tenants, and each succession of tenants had been obliged to remove on account of the fever. The scavengers entered into this house by direction of the public authorities, and whitewashed it, after which no case of fever appeared. This was a clear case of fever having successively happened; and after the use of the means the fever entirely left. * * *

'You have now described the cheap gaseous disinfectants; will you state what are the liquid disinfectants with which the chemist is at present acquainted?—The liquid disinfectants may be solutions of substances containing those gases. For example, a liquid disinfectant used in France is sulphite of soda, which contains sulphurous acid, which I have described as a disinfectant united with soda; this salt is a solid usually, but when dissolved in water, it acts as a liquid disinfectant, and has been used for that purpose extensively in anatomical theatres. Chloride of lime in solution, which contains chlorine gas, easily available, is also frequently used as a liquid disinfectant. These are the principal disinfectants in the first class which are mentioned as disinfectants altering the condition of the body, though there are many others that are used to prevent bodies from entering into a state of decay.

'Will you state what the value of these disinfectants is as compared with gaseous disinfectants?—For the reasons I have stated already, I think these liquid disinfectants are not so efficacious as substances in a gaseous state, because they cannot penetrate every crevice and corner into which the subtle miasm or infection can penetrate.

'But when they do come into contact with the miasm they are equally efficacious?—Yes, no doubt of it.

'You have spoken of gaseous and liquid disinfectants; are there any solid disinfectants?—There are some substances which, having a great absorptive power for gaseous decaying matters, might be called disinfectants. For example, charcoal has a great absorptive power; burnt clay and other such substances might also be mentioned.

'That is used for filters?—Yes, for the purpose of removing the decaying and colouring matter.

'Has animalised carbon any preference over wood?—It has, because it exposes a much larger surface, and it seems to act always by its surface.

'That disinfectant is employed to absorb decaying animal substances in water?—Yes.

'Having described gaseous, liquid, and solid disinfectant substances, will you describe those chemical bodies that act in the prevention of decay?—The substances acting in the prevention of decay are very numerous; for example, all salts of mercury, principally corrosive-sublimate, which is extensively used for this purpose.

'In what way is corrosive-sublimate used?—It is either mixed with the decaying substance, or the substance liable to decay is immersed in it. If you want to protect wood from decay, and it is immersed in corrosive-sublimate, it does not readily enter into decay. If it is desired to prevent night-soil from becoming putrid, and a little corrosive-sublimate is added to it, putrescence is in a great measure prevented.

'The corrosive-sublimate arrests the decomposition?—It arrests the decomposition by uniting with the animal matter, and that animal matter then does not enter into a further state of change. Arsenious acid, or what is commonly called arsenic, is also very efficacious in that respect, and the more efficacious because, from the very high equivalent of organic matter, a very small quantity of either of those substances may produce a very great effect. There are other substances which principally, by their mechanical action, prevent decay, such as putting iron-rust round wood or other decaying matter. It prevents the mechanical contact with the air, and therefore decay is prevented. In the same way lime-water is often used; lime-water, by absorbing carbonic acid, forms a crust of carbonate of lime round the substance, and the mechanical access of the air is thereby prevented. But those are not strictly substances which prevent decay by themselves; their principal action is mechanical. There are some other substances which have a tendency to unite with the particular constituents of animal bodies or animal substances, and therefore act partially as disinfectants, but they are easily decomposed. For example, salts of lead and salts of zinc form insoluble components with many animal substances, but they are much more easily decomposed than the corresponding compounds of arsenic and mercury. As an instance of this, the "Painters' Colic" may be prevented by sulphuric acid, or what is called the "Painters' Lemonade," because the sulphuric acid is able to decompose the lead-salt formed by the lead with the animal compounds in the body, whereas sulphuric acid has no effect upon the stronger combinations of arsenic and mercury, the compounds formed by them not being thus decomposed.

'Having described these gaseous, liquid, and solid disinfectants, and also those chemical substances which prevent decay, will you describe the other class which appear to remain to be described—the substances that, according to your view and the view of chemists,

simply deodorise substances giving off the offensive odour of decomposition?—Those substances which are practically used as deodorisers are salts of iron, salts of manganese, salts of lead, salts of zinc, and a variety of salts of other substances.

'How long have these been used?—Some of them have been long used; others have not been employed extensively. Sulphate of iron has been applied for a very long time for that purpose. Salts of manganese and zinc have also been so employed for a considerable time. Salts of lead, or nitrate of lead, have not been used before 1845, so far as I am aware.

'Will you state in what way those substances produce the effect of deodorisation?—Almost all those substances that I have mentioned are, for the ordinary purposes for which they are employed, equally efficacious; and for this reason—some of them, such as sulphate of iron, will not take up free sulphuretted hydrogen, and therefore will not deodorise sulphuretted hydrogen where it exists in a free state; but in decaying animal matter the sulphuretted hydrogen is rarely if ever free.

'That is to say, the gas that gives off an offensive smell?—Yes; it is the hydrosulphate of ammonia, and not sulphuretted hydrogen, which will be very readily seen from this: in any place where night-soil is, we perceive strongly the smell of ammonia distinct from that of sulphuretted hydrogen, and they could not exist together without being united, so that the deodorising gas is almost always hydrosulphate of ammonia; and from this circumstance happens the fact, that almost all those substances are equally efficacious as deodorisers.

'Supposing the deodorisation effected, is there any evidence, and if any, what, that the extinction of the smell affects in any, and if in any, in what degree any noxious miasm that may be supposed to be caused by the decay of the animal substance?—We may take, as an example of the most simple and most powerful of all disinfectants, the heat of boiling water. There is no miasm or decaying emanation that can bear the heat of boiling water without being totally changed in its properties; and no substance in a state of decay can be exposed to the heat of boiling water without the decay being wholly arrested. The heat of boiling water may therefore be called the most powerful disinfectant, and yet we well know that putrid beef may have been exposed to the heat of boiling water, and the putridity thus arrested; but the beef will decay as much as ever after it has been exposed to the atmosphere for some time and returned to its ordinary temperature. The arrest of the decay has therefore only been temporary. So is it generally with deodorisers of putrid substances; the decay of the substance may be wholly arrested, or even prevented, but the other matter which has not yet gone into a state of decay will decay just as much as if those deodorising substances were not present, unless such an extraordinary quantity is applied as in fact to render its application wholly unavailable for practical purposes. These deodorisers, therefore, in

certain cases, instead of having a favourable action, may have a decidedly injurious tendency; and for this reason: the odour is the best means of telling us that there is danger of a decaying emanation. There may be a miasm, as is often known, or an infection without the presence of any odour.

'It may be presumed that there are cases of fever and of various epidemics which are not accompanied with the antecedent warning of an offensive smell?—Yes; not accompanied with smell so far as we can ascertain from our senses. Many persons are able to detect odours from their senses being more acute than others; in the same way that many persons cannot hear the sound of crickets, while others hear it very painfully. About eighteen out of twenty persons perhaps have no idea of the shrill scream of a bat, whilst two out of the twenty know that it is one of the most piercing cries they can hear. Hence in all instances it is very dangerous to trust to the senses merely. A deodoriser ought, in fact, to be looked upon only as the perfumes about a century since, when perfumes were used merely to conceal the odour of unwashed and filthy persons. Eau-de-Cologne does not prevent the town bearing its name from being one of the most filthy in the kingdom; and a deodoriser may often be only a convenient means of concealing filth where it exists in abundance. It is going back in our knowledge to require and use deodorisers. The progress of knowledge requires a removal of the cause, which is now known, and ought to be removed. If decaying emanations were prevented by thorough cleanliness and ventilation, we would not require so clumsy an artifice for their concealment or mitigation. In cases of hospitals, where night-stools have to be used in crowded wards, deodorisers are useful; but I speak of the subject generally, without reference to such exceptions. People are at all times, by custom, too apt to neglect the warning of smell, and therefore, if it were thus artificially prevented, carelessness of decaying emanations would be still greater.'

One of the disinfecting, or perhaps, more properly, disodorising, agents which have attracted the greatest interest of late, is that of the French chemist Ledoyen, which has brought forth the resources of science to combat with some of the most familiar but odious of exhalations by which the human senses are tormented. A practical account of the operation of this substance from an Englishman of science—Mr Richard Dugard Grainger—may prove interesting. It is from the minutes of evidence before the Metropolitan Commission:—

'You first examined the effect of this fluid on substances already in a state of decomposition; what was the result of that examination?—In order to test, in the most efficient way, the action of this liquid, various vegetable and animal substances in a state of putrefaction and decomposition were prepared, such as decomposing vegetables and putrid fish, and putrid flesh of other animals, and putrid

feces, the discharges of the human body, which had been preserved in a moist and hot atmosphere for some days, in readiness for the experiment.

'Did you preserve them yourselves?—Those were prepared expressly in a hot and moist atmosphere. The liquid of Monsieur Ledoyen was then applied successively to those various matters, and in each case the offensive and penetrating stench arising was almost upon the instant removed as soon as any action began to take place: this was most striking. The general effect seems to have been, to remove the fetor of putrefaction, and to restore in every case the original smell of the matter, whatever it might be; so that when putrid fish was used, it took away the highly-offensive odour, or fetor, leaving, for example, the smell of boiled fresh mackerel. With reference to the flesh of other animals, it took away the fetor, and left a smell of an oily kind of character, the smell that belongs particularly to what is called adipocire. Its effect was immediate and certain, and observed by everybody present, there being a large number of medical men and others.

'Then, in fact, this fluid did not absolutely destroy the smell, but only removed the fetor?—It removed the fetor, the special smell of putrefaction in every case.

'In those cases was the substance covered by the liquid, or to what extent?—In some cases the pieces of the substances being tested were put into the liquid, dipped into it; in other cases the liquid was poured upon them; but some were immersed, and with the feces it was poured in and stirred. There were many other experiments subsequently of immediate contact with the surface.

'In some cases were not the fetid substances simply wrapped in cloths saturated with the liquid?—There were some pieces that were placed in wet cloths saturated with the solution.

'Did you, from that examination, find this fluid to be possessed of any peculiar efficacy in preventing substances from undergoing decay and decomposition?—It has the effect of retarding decomposition when it is applied under favourable circumstances. It appeared to me that if it were applied to large masses of the human body (for instance, to the arm), then it checked, but did not prevent, decomposition.

'For how long did it check it?—I may mention that one experiment was this: a fresh extremity of a human body, brought for the purpose of anatomy, was injected with this liquid into the blood-vessels, and that was kept, I believe, a month—for twenty days, at all events; and then it was examined, and it was found to be preserved. It may be said, decidedly, that it would have been in a worse condition if it had not been injected: it was preserved to a considerable extent, but it had not entirely prevented decomposition. And my general conclusion from that and other experiments of a similar kind was, that it does act like various other substances in retarding decomposition, but that there are other substances which have been in use for some time which are just as effective for that purpose. My con-

viction at the time was, that it might, with other agents, be useful for anatomical purposes.'

There is reason to believe that these neutralising agents may be of a character not much less simple and economical than those noxious productions which they counteract. Mr Young, the manager of a great chemical work in Manchester, gave this evidence before the Metropolitan Commission :—

'Have you invented a process for disinfecting manure; if so, will you describe it?—I will do so, making those preliminary remarks which I think necessary for its comprehension :—The present is a time when anything on the treatment of manures must be acceptable, whether for preserving the various refuse matters for agricultural purposes, or for preventing their decomposition in cesspools and such places, previous to their removal from the town to the country. One great sanitary problem, the solution of which has occupied much attention, is the prevention of decomposition in organic accumulations in towns. This has been partially accomplished by various methods; but the expense in some cases, and the noxious products in others, have proved a barrier to the adoption of any general plan. Any substance to be generally used for this purpose must be cheap; and must not only have the power of preventing decomposition in the organic matter to which it is added, but must also be free from any noxious effects upon the land or vegetables to which this matter may be applied as manure.

'Being engaged in the manufacture of chlorine on a large scale, it occurred to me that the chloride of manganese, which results from that manufacture, might have all those qualifications. The refuse of the chlorine process is principally chloride of manganese with a variable quantity of perchloride of iron, and is at present considered a useless product, one house throwing away thirty-six tons per day of this solution, of a specific gravity varying from 1280 to 1300.

'Having made a number of experiments during the summer, I am satisfied that this solution has in a high degree the property of preventing decomposition in organic matter, several cesspools and other places which gave out the most putrid odour having been almost instantaneously sweetened by its application, an effect heightened by a small quantity of free chlorine which this liquor always contains. I need scarcely describe to chemists the action of this salt, the principal effect being, that the chlorine combines with the ammonium of the sulphuret of ammonium, and the manganese combines with the sulphur, thus forming chloride of ammonium and sulphuret of manganese. The former is well known as a valuable manure, and the latter being in a flocculent state, will readily supply sulphur or sulphates to vegetables. The salts of manganese and iron are peculiarly fitted for land, both being employed by nature in feeding plants, both being akin to earths, and not possessing acrid metallic properties.

'As there are at present in this country not less than 150 tons of this solution produced daily, which is 5½lbs. per annum for each individual, from the experiments I have made, I consider that this is more than sufficient to deodorise all the cesspools in Great Britain. I may add, that after considering the matter carefully in the different points of view which would naturally occur to a practical person, I mentioned the matter to Dr Smith and Dr Playfair, both of whom fully agreed in the views I had taken on the subject.'

APPLICATION OF THE REFUSE OF TOWNS TO THE COUNTRY.

When proper building regulations have been followed, accompanied by street drainage and a supply of water, we have not yet accomplished all that science is capable of accomplishing by extensive sanitary operations. The mode in which the surrounding land is made to contribute its surplus water, and, still more, the mode in which the valuable refuse removed is disposed of, become matters of great importance both to health and property. Mr Chadwick says—

'Within the towns we find the houses and streets filthy, the air fetid; disease, typhus, and other epidemics rife amongst the population; bringing in the train destitution, and the need of pecuniary as well as medical relief; all mainly arising from the presence of the richest materials of production, the complete absence of which would in a great measure restore health, avert the recurrence of disease, and, if properly applied, would promote abundance, cheapen food, and increase the demand for beneficial labour. Outside the afflicted districts, and at a short distance from them, as in the adjacent rural districts, we find the aspect of the country poor and thinly clad with vegetation, except rushes and plants favoured by a superabundance of moisture, the crops meagre, the labouring agricultural population few, and afflicted with rheumatism and other maladies, arising from damp and an excess of water; which, if removed, would relieve them from a cause of disease, the land from an impediment to production, and, if conveyed for the use of the town population, would give that population the element of which they stand in peculiar need as a means to relieve them from that which is their own cause of depression, and return it for use on the land as a means of the highest fertility. The fact of the existence of these evils, and that they are removable, is not more certain than that their removal would be attended by reductions of existing burthens, and might be rendered productive of general advantage, if due means, guided by science, and applied by properly-qualified officers, be resorted to.'

On these views Dr Southwood Smith makes the following comment:—

'There are certain adjustments established between the physical and the organic kingdoms, and between the two great divisions of the organic kingdom, which we should do well to bear in mind even in the most practical consideration of this matter. We know that

atmospheric air is equally necessary to the life of plants and animals, but that they produce directly opposite changes in the chemical constitution of the air: the plant giving off as excrementitious that principle of the air on which the animal subsists, and living upon that part of it which the animal rejects as excrementitious; while the animal, in its turn, restores to the air the principle which constitutes the food of the plant, and subsists on that which the plant has rejected as no longer useful to it. In this manner these two great classes of organised beings renovate the air for each other, and everlastingly maintain it in a state of purity and richness. On this beautiful adjustment depends this further principle, equally at the foundation of all rational and efficient sanitary regulations—namely, that the very refuse of the materials which have served as food and clothing to the inhabitants of the crowded city, and which, if allowed to accumulate there, invariably and inevitably taint the air, and render it pestilential—promptly removed and spread out on the surface of the surrounding country, not only give it healthfulness, but clothe it with verdure, and endue it with inexhaustible fertility. These are great laws of nature, which are now well known to us; a due conformity with which would bring us health, plenty, and happiness, but which we cannot disregard any more than we can disregard any other physical law without suffering, and perhaps destruction. Do we act in conformity with these laws?'

To show that we do not, he then cites the immediately-preceding passage. The circumstances which have chiefly shown the valuable uses to which the impurities of a city may be applied, at the same time show how necessary general laws on such matters are for the protection of the public against the rapacious selfishness of individuals. It had been long the practice of some land-proprietors near Edinburgh to divert the contents of the sewers on their own lands for the purpose of irrigation. The system begun on a small scale, and was little noticed. It gradually extended, and with the extension of the city the supply of sewage liquid was of course enlarged. At length these wide fields of reeking morass, sending forth a sickening odour, attracted attention, and the citizens demanded relief from a nuisance both offensive and dangerous. It was found, however, that the proprietors had acquired a prescriptive right so to use the contents of these filthy streams, just as they might use any water passing through their lands. It was supposed that if the law allowed the proprietor to make what use he pleased of what was thus sent down to him, there was no law to compel the city of Edinburgh to discharge its impurities in that direction. But this had been guarded against. One of the proprietors was a member of parliament, and he took care, whenever a local police act for Edinburgh was passing through committee, to get a clause inserted, prohibiting the community from altering the direction of the sewers.

Now, if there had been proper laws for the public health, this arrangement would have been different in two important elements: 1*st*, Being at the disposal of the city, the refuse would have been employed in such a shape and at such a distance as would have prevented it from injuring the public health; 2*d*, The profit of the operation, instead of going to any individual rapacious enough to seize it, would have gone to the community. The irrigated meadows of Edinburgh were originally unproductive sands. When the abolition of the system was spoken of, the proprietors of these barren acres demanded £150,000 as compensation for being obliged to abstain in future from appropriating the natural property of the community. On this Mr Chadwick in his Sanitary Report remarks—

'If, then, in Edinburgh, the contents of the cesspools were carried by adequate supplies of water in drains from the houses into covered sewers, and thence in covered instead of open sewers to the lands at proper distances, where it might be distributed as manure by irrigation, it would be a mode of irrigation considered by Mr Smith of Deanston and other authorities on drainage and irrigation, whom I consulted, the best that is now apparently practicable — that is, the best means for removing quickly, and constantly, and the least injuriously, the matters which can only remain for removal by any other process at the expense of the public health; they concur in opinion that it would also be the most productive mode of distributing the manure.

'On the scale of the value set upon that portion of the refuse of Edinburgh that has been appropriated for irrigation by the occupiers of the land in the vicinity of the city, the value of the whole of the soil of the city (not one-third of which finds its way into the irrigated meadows), if it were made completely available by an appropriate system of town drainage, would be double or treble the amount, producing an income of £15,000 to £20,000 per annum for public purposes. On the same scale of value it would appear that, in the metropolis, refuse to the value of nearly double what is now paid for the water of the metropolis is thrown away, partly from the districts which are sewered into the Thames, and partly from the poor districts which are unsewered, where it accumulates and remains a nuisance until it is removed at a great expense.'

Since Mr Chadwick's report was presented in 1842, many curious things have been discovered relative to the application of sewage manure, of a nature to show that many more may yet be developed, and that we are but on the threshold of some great productive application of substances which have hitherto offended the senses, injured health, and polluted our clear streams. In a 'statement of the course of investigation and results of experiments as to the means of removing the refuse of towns in water,

and applying it as manure,' presented to the Sewer Commissioners by Mr Chadwick, there is much suggestive matter on this subject. It appears that much of what makes manure offensive indicates a waste of its valuable qualities, and that the appearances supposed to indicate its fitness for productiveness are in reality the offensive indications of defects. We are told that—

'Farmers who use town manures, which are too strong for immediate use in the solid form, are in the practice of fitting them for application by fermentation—that is to say, of weakening them by the process of decomposition, in which the loss of manure is proportionate to the length of the process. Instead of speaking of well-fermented dung, it would in general be more correct to say well-wasted dung. This waste is reprehensible enough when it takes place in the farm-yard, but unfortunately the process is too commonly allowed to take place amidst habitations, to the great injury of the population, and the prohibition of the practice is loudly called for; the remedy is in the engineering arrangements, by which the strongest refuse is immediately received in water, which is cold, and cold arrests decomposition, and to be conveyed away in covered conduits, to be kept in covered tanks, cool and protected from the influence of the sun. Instead of the manure being weakened by decomposition, it will be weakened, or rather extended and saved, by dilution, for application. It will be kept fresh, and its entire strength will be preserved, for application in the most convenient form.'

On the liquid form of manure it is stated—

'I find, that by the horticulturists, those who grow large produce and obtain prizes, invariably, so far as I have heard, do it by the application of the manure in the liquid form. I have obtained this further very important conclusion from such facts as I have collected, that an extent of dilution such as extinguishes smell, is about the best for absorption or assimilation by the plant; that all the progress is made by diluting more and more, and applying more and more frequently. A very able horticulturist, Mr Pince of Exeter, tells me that he has arrived at this point; that he applies the liquid manure twice a week, and with one of plain water, as he expresses it, in the interval between each watering with the liquid manure. He gets rid of fibrous matter, and, to use his own expression, "I give this water with the manure in it so clear, that if you were not to know what it was, you would not object to drink it." The two conclusions are in favour of frequent applications of manure in solution, and of getting rid as much as possible of fibrous matter.

'One practical reason for this course with horticulturists I find to be, the perception that not only does the fibrous matter tend to clog the pores of the soil, or in some way impede the least progress, but that every portion of fibrous matter is apt to become a *nidus* for animalcule. It commonly escapes the farmer's attention, that each mass of exposed dung becomes an *officina gentium* of devas-

tating insects, which he unwittingly in that form spreads over his fields, frequently with the seeds of unknown and inconvenient weeds. * * * *

'Liquid manure has been applied by surface watering in the kitchen-garden at Worsley, and, as I am informed, at a number of other places, with as marked an effect as upon grass-land. Mangel-wurzel, cabbages, and turnips have thriven remarkably upon it. A merchant of Philadelphia, United States, who was fond of horticulture, beat all competitors at a show there by the enormous size of his cabbages and other produce. His gardener was seen to draw a liquid from a large hogshead, and dispense it, from time to time, to the plants with the watering-pot. There was an intense curiosity to divine what might be the elixir which produced so wondrous an effect. The merchant informed me that he at length yielded to the importunity. He had the top of the hogshead taken off, and displayed the contents—the remains only of common stable-dung. He had had stable-dung put into the hogshead, filled it with water, and ordered his gardener to water the plants twice a week with the solution, renewing the water in the hogshead until no smell remained there from the dung. He had done no more than this surface-watering regularly twice a week.'

Some views are held out as to the possibility of conveying this food for plants beneath the soil, and in such a form as to render it both more effective and less offensive:—

'The observation of some casual examples of the increased vegetation marking strongly the course of house-drains which run close to the surface of lawns, suggested the inquiry whether irrigation might not be conducted in covered instead of open channels of distribution. I put this as a topic of inquiry to Mr Smith, who was of opinion that the object was practicable, but he has never worked it out. Such casual examples of subterranean irrigation on a small scale appeared to me to be demonstrative of the fact (shown experimentally by Sir Humphry Davy, when he directed the neck of a retort under the soil, and discharged gas into the earth, which displayed afterwards an increased amount of fertility) that plants are supported by manure, in combination with moisture in a gaseous state. This was also shown by the increased fertility of the vegetation of turf coverings over manure tanks, where the roots must apparently derive their whole nourishment from the moist or gaseous emanations.'

Then as to the reaction of such applications when under proper engineering on the state of towns, it is said—

'Further investigations appear to me to present grounds for advancing, as general correlative propositions, that whilst for the towns all offensive smells from the decomposition of animal and vegetable matter indicate the generation and existence of disease, and defective local administration, the investigations extended to the rural districts establish, as a correlative conclusion, that all offensive

smells from the decomposition of animal and vegetable matter indicate the loss of fertilising matter, the loss of money, and bad husbandry. Of the first of these two propositions, any one may convince himself, who will obtain a list of the places repeatedly afflicted with typhus, and other epidemic, endemic, and contagious diseases. He will find, as I found in traversing the wynds of Glasgow and Edinburgh, and the courts in York and other towns, that his own sensations would guide him to the seats of fever without any other direction. Amongst offensive smells are included those which are sickening, "depressing," or "deadening," as well as those which are pungent and offensive stinks. But though offensive smells—those especially which are distinguishable from the smells directly affecting the olfactory nerves, and which appear chiefly to affect the lungs by the depuration of the air by the admixture of irrespirable gases —always indicate danger, it does not follow that there is no danger where there are no such offensive or pungent warnings. The objects of the present paper are to indicate the evidence in support of the agricultural proposition, to state the improvements which have been made in the mechanical means of distributing manures, and to suggest further improvements for trial.

'The common observation on the statement of the encumbrance of towns with the refuse is generally short, and apparently simple— "Let there be an additional number of scavengers appointed, and well superintended."

'The expense of cleansing the main streets of the metropolis, and a mere pretence of cleansing the by-streets and courts, is estimated in round numbers at upwards of £50,000 per annum. If it could be done in no other way than by hand-labour and cartage, it would no doubt be cheap to pay a scavengers' tax for a more complete cleansing, and a comparatively quick removal of the surface refuse. The towns themselves, or the local administrative bodies, have not hitherto of themselves perceived the waste of money merely, and would be slow to adopt such an opinion against the supposed immediate pressure of so large an additional tax. Moreover, there would be strong objections to the increase of the number (requisite on such a plan) of such labourers. The hand-labour of removing filth is offensive, though less offensive than the retention of the filth: it is a necessary and beneficial labour, but it is still an offensive labour— it is ill paid, and wretched labour. A society has been instituted for promoting the cleansing of the streets, which has announced that in this way employment might be found in our chief towns for 10,000 labourers. I have no doubt that, at this sort of labour, employment might be found for a greater number of men: but it is a sort of labour which in a great measure creates the sort of labourers; and the creation of a large army of scavengers would be in itself a heavy payment, socially considered, for the performance of the extra labour required. I have been repeatedly solicited to join the association in question, but I have declined. If it were necessary to take a part, I should, as a question of philanthropy, prefer joining the Street-

Cleansing Company, using all the influence in my power for the introduction of the street-cleansing machine, by which such labour will be superseded by labour and labourers of a higher order, and better paid and conducted.

'Immense as would be the addition of labour requisite for the complete cleansing of the surface of the streets by hand-labour, a yet greater addition of "nightmen" and labourers, and expense, would be requisite for the better cleansing of the site beneath and between the streets, the more frequent emptying of the cesspools, and the removal of the refuse from the cesspools, and the drains and sewers, which in their present condition are only extended cesspools. The attainment of this object by nightmen would require for the metropolis an additional expenditure probably of upwards of a quarter of a million of money per annum. The experience in some Flemish and German towns, where the town manure is better applied to agricultural production, and more frequently removed than in our towns, and the constant pollution of the air there by the work of removal, shows, in respect to the cleansing of the subterranean refuse, good reason to doubt whether the sanitary benefits obtainable would well repay the expense.'

This branch of the subject may be concluded with an answer by Captain Veitch to an inquiry by the Commission on Large Towns:—

'What do you consider would be the cost of applying the sewage of Leeds to the purpose of irrigation, and what produce do you expect from that measure?—The expense for the main sewers above named was necessary to the health, comfort, and cleanliness of the town, independent of any cost of applying the sewage to the land. On this last subject I have to state that the town of Leeds proper, or that space which is pretty continuously and compactly built upon, and which includes parts of the townships of Leeds, Hunslet, and Holbeck, contains about 120,000 inhabitants, of which about 80,000 are located on the north side of the river, and about 40,000 on the south side; but the sewage of these two portions being entirely disconnected, it will be most satisfactory to estimate for the north side only, where it would be necessary to lift the water of the main sewer fifty feet by steam power in order to apply it to irrigation generally. The cost of steam-engine, tanks, pumps, &c. I estimate at £8000 or under, and the annual expense at £550, and throwing these with contingencies into an annual charge, the amount would be £1000 or under. On the other hand, assuming that I apply the sewage water from 80,000 inhabitants to 1000 acres of land, being at the rate of 80 to one acre, I am led to expect that after a lapse of some years for the due saturation and enrichment of the soil, a produce to the additional value of £10 per acre would arise, from which, after deducting the annual charge, a clear benefit of £9000 would be derived on the 1000 acres; but as a proximate and general estimate, I am inclined to consider the annual charge will prove about one-eighth of the net produce.'

PART VI.

MORAL INFLUENCES OF SANITARY REFORM.

GENERAL CONNECTION OF MORAL AND PHYSICAL PURITY—THE FILTHY AND UNHEALTHY PARTS OF TOWNS, ALSO THE VICIOUS—EFFECT OF EXTERNAL IMPROVEMENTS IN TEACHING THE LAWS OF HEALTH—POPULAR APATHY TO CAUSES DESTRUCTIVE OF LIFE—DEGRADING PURSUITS CREATED BY THE FILTH OF TOWNS—SOCIAL EFFECTS OF APPLYING PRECAUTIONARY MEASURES TO EPIDEMICS INSTEAD OF ISOLATION—QUARANTINE REGULATIONS—REVIVAL OF A FORGOTTEN AUTHORITY.

GENERAL CONNECTION OF MORAL AND PHYSICAL PURITY.

The physical and the moral evils of impurity have been well associated in the following descriptive lines:—

'I turned into an alley 'neath the wall,
And stepped from earth to hell—the light of heaven,
The common air was narrow, gross, and dim—
The tiles did drop from the eaves; the unhinged doors
Tottered o'er inky pools, where reeked and curdled
The offal of a life; the gaunt haunched swine
Growled at their Christened playmates o'er the scraps;
Shrill mothers cursed; wan children wailed; sharp coughs
Rang through the crazy chambers; hungry eyes
Glared dumb reproach, and old perplexity
Too stale for words.'*

The description might pretty accurately apply to that district in Edinburgh where Burke and Hare lived and pursued their murderous task. It stands to this day a worthy commemorator in its ghastly horrors of these deeds of twenty years ago. The houses are like great fungi that have grown out of the surrounding filth, and they gave growth to human beings as revolting and unnatural as their appearance.

It has been beautifully said by Bentham—'Between physical and moral delicacy a connection has been observed which, though formed by the imagination, is far from being imaginary: Howard and others have remarked it. It is an antidote against sloth, and keeps alive the idea of decent restraint and the habit of circum-

* Kingsley—cited in 'Sanitary Ramblings, by H. Gavin, M. D.'

spection. Moral purity and physical are spoken of in the same language; scarce can you inculcate or command the one, but some share of the approbation reflects itself upon the other. In minds in which the least grain of Christianity has been planted, this association can scarce fail of having taken root: scarce a page of Scripture but recalls it. Washing is a holy rite: those who dispute its spiritual efficacy will not deny its physical use. The ablution is typical: may it be prophetic! Alas, were it but as easy to wash away moral as corporeal foulness!'*

True, moral foulness cannot be so easily exterminated as corporeal, for it is dependent on more numerous and less potent causes. We cannot make the mind clean by washing and adorning the body, for vice often dwells in palaces and purple. But when we remove external filth and disorder, we withdraw one of the main causes of degradation and vice. However self-constituted and self-supporting the human mind may be, it is dependent on adaptations from without, and is bent and moulded by the physical circumstances in which it is placed. The personal cleanliness which every well-regulated mind strives after, makes a vain struggle with the accumulated impurities of a great city. That self-respect of which it is the external symbol gives way, and other kinds of self-respect follow it. The first part of the progress towards vice in such localities was thus described by Mr Hollins, who stated to the General Board of Health that 'he had frequently traced a gradual descent to the workhouse, from such property, of men whom he had once known, as respectable and comfortable in their position as operatives; unfortunately for themselves and for society they went, through necessity, to live in a house of this class, and he had generally found their hopeless poverty began with six or eight weeks' loss of time through fever, and illness caught in such places: then debts were incurred; rent, as a consequence, fell into arrear, goods were distrained, the man became disheartened, and the end was pauperism for himself and family: children once degraded into pauperism, rarely regained their former position among the working-people. He had no doubt but that proper sanitary arrangements would prevent much human misery and degradation, and also be a direct money-saving to the parish ratepayers.'

'The immoral influence of filth and discomfort,' says Dr Southwood Smith, 'has never been sufficiently attended to. That influence is in the highest degree anti-social. The wretched state of his home is one of the most powerful causes which induces a man to spend his money on strictly selfish gratifications: he comes home tired and exhausted; he wants quiet; he needs refresh-

* Works, iv. 158.

ments: filth, squalor, discomfort in every shape are around him; he naturally gets away from it if he can.'

Mr William Chambers, in a report to the Poor-Law Commissioners on the state of the Old Town of Edinburgh, observes—

'After a pretty extensive observation of the condition of towns both on the continent and in Great Britain, I am of opinion that this city is at present one of the most uncleanly and badly ventilated in this or any adjacent country.... In a word, the excrementitious matter of some 40,000 or 50,000 individuals is thrown daily into the gutters, at certain hours appointed by the police, or poured into carts which are sent about the principal streets. In all the narrow and worst ventilated closes this practice of throwing out every kind of liquid refuse into the gutters is universally prevalent. Scavengers are appointed by the police to sweep the streets and lanes daily, and clear away all that appears offensive; but this may be pronounced an impossible task. The evil is too monstrous for cure by any such superficial means. In spite of vigorous regulations to the contrary, the closes which are inhabited by the poorer classes continue in a most filthy condition both night and day; and there is an incessant exhalation of fetid substances, which I should consider highly injurious to health. Independently, however, of the insalubrity from this cause, I feel convinced that there is as great a moral evil. The eyes of the people, old and young, become familiarised with the spectacle of filth, and thus habits of uncleanliness and debased ideas of propriety and decency are ingrafted.'

THE FILTHY AND UNHEALTHY PARTS OF TOWNS ALSO THE VICIOUS.

Such is the natural result which, arguing from cause to effect, one would expect to see; and when we take the actual state of our cities, it is fully exemplified; for wherever we find filth and unhealthiness, there we are sure to find that the mendicants and idlers, the impostors, thieves, and prostitutes of a city congregate, just as wild beasts do in an Indian jungle, or rats in a foul drain. 'It is remarkable,' says Dr Smith, 'that the districts of which we have been speaking are not only the seats of disease, but the great seats of crime. I mean these places are the haunts and abodes of the great criminals; so that the seats of the most terrible diseases and the abodes of the great criminals of the country are identical. The worst place I know in the parish of Whitechapel is the place where the most dishonest and profligate portion of the population lives.' Mr Symonds, in his report as an assistant commissioner on the state of the handloom weavers, says of Glasgow—

'Though in point of wages the cotton handloom weavers are thus decidedly inferior to every other class of operatives, yet in point of physical and social debasement there exists a portion of the population in the district I have investigated very many degrees worse—I allude to the dense and motley community who inhabit the low dis-

tricts of Glasgow, consisting chiefly of the alleys leading out of the High Street, the lanes in the Calton, but particularly the closes and wynds which lie between the Trongate and Bridgegate, the Salt Market and Maxwell Street. These districts contain a motley population, consisting in almost all the lower branches of occupation, but chiefly of a community whose sole means of subsistence consists in plunder and prostitution. Under the escort of that vigilant officer, Captain Miller, the superintendent of the Glasgow police, I have four times visited these districts, once in the morning, and three times at night: I have seen human degradation in some of its worst phases, both in England and abroad, but I can advisedly say that I did not believe, until I visited the wynds of Glasgow, that so large an amount of filth, crime, misery, and disease existed on one spot in any civilised country. The wynds consist of long lanes, so narrow, that a cart could with difficulty pass along them; out of these open the "closes," which are courts about fifteen or twenty feet square, round which the houses, mostly of three storeys high, are built; the centre of the court is the dunghill, which probably is the most lucrative part of the estate to the laird in most instances, and which it would consequently be esteemed an invasion of the rights of property to remove.'

In a book called 'Arts and Artisans at Home and Abroad,' the same gentleman gives an account of a hunt after a housebreaker in these wynds, 'which are the resort of the vagabonds *par excellence*, and which constitute the St Giles of Glasgow. . . . Thieving and prostitution constitute the main sources of the revenue of this population. . . . All ages and both sexes are indiscriminately employed in the minor or major departments of plunder.' 'We continued our search,' says Mr Symonds, 'and ultimately discovered the object of our pursuit in bed, in a lodging-room containing about eight or nine other occupants, each of whom looked drowsily on at the accustomed visit of the police. "Sandy Gray, is that you?" said Captain Miller; "we want to speak to you at the office: come, Sandy, get up and dress yourself."'* Those who remember Mr Cruikshank's powerful series of engravings called 'The Bottle,' will readily be able to realise this scene. True to nature, the great painters of living manners, when they represent brutified man, exhibit him surrounded by all objects of degradation; and the scenery of Hogarth's 'Gin Lane,' of his 'Stages of Cruelty,' and of his 'Idle Apprentice,' may yet be seen in every large town where sanitary defects have not been remedied.

The testimony of the superintendent of police in Glasgow is no less expressively descriptive of the rotten heart of that city than his visitor's. Captain Miller, in a report on the state of crime in Glasgow, says—

* Pp. 116-117.

'It is of great moment, as affecting the state of crime, that the health of the lower classes of the community be strictly attended to. In the very centre of the city there is an accumulated mass of squalid wretchedness, which is probably unequalled in any other town in the British dominions. In the interior part of the square, bounded on the east by the Salt Market, on the west by Stockwell Street, on the north by the Trongate, and on the south by the river, and also in certain parts of the east side of High Street, including the Vennals, Havanna, and Burnside, there is concentrated everything that is wretched, dissolute, loathsome, and pestilential. These places are filled by a population of many thousands of miserable creatures. The houses in which they live are unfit even for sties, and every apartment is filled with a promiscuous crowd of men, women, and children, all in the most revolting state of filth and squalor. In many of the houses there is scarcely any ventilation; dunghills lie in the vicinity of the dwellings; and from the extremely defective sewerage, filth of every kind constantly accumulates. In these horrid dens the most abandoned characters of the city are collected, and from thence they nightly issue to disseminate disease, and to pour upon the town every species of crime and abomination.

'In such receptacles, so long as they are permitted to remain, crime of every sort may be expected to abound; and unless the evil is speedily and vigorously checked, it must of necessity increase. The people who dwell in these quarters of the city are sunk to the lowest possible state of personal degradation, in whom no elevated idea can be expected to arise, and who regard themselves, from the hopelessness of their condition, as doomed to a life of wretchedness and crime. Much might be done to relieve the misery, and to repress the crime, of this destitute population, by compelling attention to personal cleanliness, so as to remove and prevent disease; by placing the lodging-houses for the destitute under proper regulations; by preventing the assemblage of a large number of persons in one apartment; by opening up and widening the thoroughfares, and forming new streets wherever practicable; by causing the houses to be properly ventilated, and all external nuisances removed; and by an improved plan of sewerage for carrying away all impurities. Were it possible to adopt measures something similar to these, the health of the community would be greatly improved; and by the breaking up of the haunts of vagrancy, a happy check would be given to the spread of profligacy and crime.'

'I have not the slightest hesitation,' says Mr Davis, speaking from ten years' experience of the poorer classes, 'in affirming that there is a most decided direct connection betwixt confined districts, bad sanitary arrangements, and poverty and vice. In the districts above referred to, the moral state of the inhabitants is most deplorable: as the youth from these places grow to manhood, they become habitual paupers; brought up to no regular employment; grossly

ignorant and reckless, their time is spent between the Union workhouse and the jail.

'In conclusion, I can only say, that if the government wish to prevent the increase of a most debased and vicious population, they will take measures—if not to sweep away these nests of vice and disease already built, at anyrate to prevent similar places from being erected in future.'

It is one of the characteristics of those who live amid these vitiated elements that they suffer silently, their nature becoming soddened and stagnated, like the polluted gutters which surround them. They die uncomplaining and obdurate, like wild beasts who retreat to their dens, and lie down in grim silence when instinct teaches them that they are under a mortal malady. Many a heartrending tale would be unfolded could we open those closed bosoms, and discover all that had passed within and around before the stoniness of their desolation had come on, in personal sufferings, in the decay and death of near and dear relations, in the general gloom gathering around the future. But the revelations of this sort connecting the cause with the effect are so rare, that it is curious to have even the following brief dialogue, in which a working-man, John Brooks, details his experience to the Commission on the State of Towns:—

'How were you affected?—In my lungs; a violent pain in my chest, and great debility; a rearing of phlegm and hectic fever.

'Are you to be understood to say that you attributed your illness more to the state of the atmosphere within the house than to external annoyances?—Yes, in that particular part where I lived. I lived in a very good neighbourhood; but there are several localities in the town which are the very reverse, and where the great masses of the operatives congregated. In my own case I was situated very well; it was only the air in the room.

'How did the air in the room affect you?—By labouring in it from fourteen to sixteen hours, it was consequently vitiated; and having no means of ventilation except by opening the window, which would not be prudent, as our confinement makes us susceptible of cold, and if we expose ourselves we are always injured.

'You suffered much from draughts of cold?—Yes; we were obliged to keep the window closed.

'There was no ingress for the air except by the doors and windows?—No.

'Had you a fireplace in the room?—Yes.

'How were the rest of the family affected?—My mother died, I believe, partly through that.

'From the state of the atmosphere in the apartments?—Yes.

'That was your opinion?—It was the opinion of the surgeon.

'From consumption?—Yes.

'Can you recollect any circumstances particularly connected with

the origin of your own illness?—It first began by the stomach being disordered, and attacks every spring, a sort of fever, and a slight cough; from year to year it kept increasing.

'Your appetite gave way first?—Yes.

'And the other effects followed?—Yes.

'Were any others of the family affected?—No, not particularly.

'Were they engaged in the same employment?—Not so much as I was; being the oldest of the family, I laboured more hours than any of the rest.

'You stated that the ground in the immediate vicinity of the house was not well drained; was the water at all impregnated with any filth?—Yes, at the back of the house; the front was very well.'

This man was a weaver. In a subsequent part of his evidence we find the following passage:—

'Do the fireplaces effectually warm the rooms?—Not so much as they might do.

'Would not you rather have bad air which is warmed, than good air that is cold?—Yes, I generally prefer the warmth.

'Do you consider that that is the general feeling?—Yes.

'Then if warm air was applied abundantly, there would be no objection to opening the windows?—Not at all.

'Practically, are you to be understood that the state of the atmosphere in the apartments was the greatest grievance you laboured under, and the cause of your illness?—Yes; I do not know how it is, but when we become accustomed to this vitiated air we do not perceive it: it is only annoying in the morning, when we leave another air and come into it, and observe the contrast with good air.

'Have you been in the habit, when not at work, of opening the windows to let the fresh air in?—Not so much as should be done: many of the fathers and mothers are prejudiced, and do not know the evil that springs from it: they never observe it. When I have mentioned the injurious effect that this vitiated air had upon my constitution, that I felt it exhausting my strength, it was looked on as a sort of nonsense, and a newfangled notion that was not worth attending to.'

EFFECT OF EXTERNAL IMPROVEMENTS IN TEACHING THE LAWS OF HEALTH.

It has not been the object of the writer of these remarks to recommend too close an official interference with the people, as the best means of securing the great object of sanitary reform. On the contrary, he believes that all minute personal interference, were it tolerated, which it ought not to be, would react by undermining the spirit of self-respect, and the habits of self-support and self-direction, which are guarantees for the good and wise tendency of the general habits of the community, far stronger than legislation or executive management can assure us of. But

though personal regulations may neither be just nor practicable, there is little doubt that the effective prosecution of sanitary measures, though this should take place entirely outside of the dwelling-places of those whose wretched condition demands the sympathy of persons better provided for, will have a strong influence on the habits of those classes. As it degrades them to be driven into a mass of external filth when the exigencies of their employment, or any other motive, sends them to the worst districts in large towns; so, if they have acquired bad habits from this or any other cause, a contact with well-cleansed streets, and generally with external purity, will create and increase a distaste of the degradation and filth within.

Of the strange, callous indifference, one might almost say diseased horror, which a large portion of the working-classes have of good air and ventilation, the information supplied in the various sanitary inquiries affords curious instances. Nor would it be correct to say that the superstition is confined to these classes, since, had the better-educated portions of society really known the mischief that was in action through the neglect of simple remedies, they must have held forth a helping hand to the sufferers. Dr Willis, in the following conversation with the Commission on the State of Large Towns, gives an account of some popular fallacies on this point, which it will be the undoubted function of sanitary operations, by the facts they show, and the knowledge they spread, to remove or mitigate:—

'Have not the poor, generally, a very great horror of the entrance of cold air into their apartments in winter?—Yes; they are very careful to exclude it. One great difficulty in attending them during illness is to get their places well ventilated. My old teacher, Dr Gregory of Edinburgh, in visiting the poor, used often to begin his prescription by breaking a pane or two of the window with his walking-stick, which he made good again at the end of the illness.

'If means could be arranged whereby air could be introduced that was warm, that would diminish the horror of ventilation?—Unquestionably; and would be attended with immense benefit to the health of the people.

'In the infirmary itself you attended, what was the state of the drainage?—It was a new house, and, as I stated, virtually a dispensary. There were no beds there at the time I was physician. The drains were good, and there was plenty of water in the house. The funds never admitted taking in patients and providing beds in my time. There is one considerable cause of mortality among these poor children which I have not named: this is in consequence of the mothers going into a rank of life a little or a good deal better than their own, in order to wet-nurse some other person's child. The child who is left all but inevitably perishes: it is very rarely

reared. I used often to observe great apathy in a certain class about the death of their children. They did not seem to look on death to the young as the great evil which it is commonly regarded; they said, "God took care of young children who died; that their deaths did not much matter; that life was full of hardships and misery; and that the child was provided for when it died." This feeling I found to be rather common.

'Where death does not ensue to the children, when the mothers leave them to go nursing elsewhere, is not the child often disabled for life?—The child is almost sure to die; so that if there is one child reared in the better ranks of life, there is another in the poorer ranks that died. The system of wet-nursing, in regard to the child that is left, is one of the most cruel of the many vicious customs sanctioned by society.

'Do you consider that there is a general want of information as to the regulation of the state of the atmosphere in ordinary habitations?—Yes, universal; not confined to the poorer, but extending over all classes of society. In the best houses we are often stifled for want of fresh air.

'Do you consider it important that means should be taken for diffusing a knowledge of the elementary principles of ventilation, and such other subjects as apply practically to the regulation of the state of the atmosphere in ordinary dwellings?—I do. Let any man go to a fashionable or unfashionable evening party, and if he has at all a delicate chest, he cannot fail to feel for some days afterwards the effects of breathing an atmosphere contaminated by the breaths and exhalations of a hundred or a couple of hundred people crowded into a relatively small room, with half-a-dozen gas-lights or Argand oil-lamps burning, and where no means for securing a renovation of the air are provided. Let him visit a milliner's work-room (the milliners are a most cruelly-oppressed class of the community), or a large tailor's shop, and he will be surprised to find human beings doomed to pass their days in such atmospheres. I lately visited the shop of a tailor in extensive business, on the mind of the proprietor of which I had been urging the necessity of ventilating the place. On entering this shop my spectacles immediately became dim, so that I could see nothing. I asked, "What means do you take to warm your shop?" He said, "Oh, there is no necessity to take particular means to warm it; the animal heat brings it up high enough." The smell produced by the application of hot irons to woollen cloth, when moistened with saliva, as is the custom among tailors, in addition to the effluvia emanating from a crowd of human beings seated together in a confined space, will scarcely fail to make the strongest person recoil. The proprietor of the establishment I allude to, for he is a kind-hearted and an intelligent man, told me he had gone to considerable expense in endeavouring to secure the proper ventilation of his workshops, but that the men stopped up the apertures by which it was meant to be effected.

'Is it not found to be the invariable practice among workmen

that they stop ventilation?—I believe it is; but the means taken to effect it are often faulty, and even objectionable.

'Those observations would induce you to think that it is desirable that information as to the proper ventilation of crowded places should be more diffused?—Yes; such information would certainly prolong the sum of human life.

'Would it not prove an economical measure in your opinion, from the degree in which it would prevent loss of time by colds, ill health, and deficiency of power?—Certainly it would, and loss of life too; and it would also spare the industrious and the healthy; for the family of the labourer and artisan is thrown upon the community if he be incapacitated by ill health, or be prematurely carried off by disease.'

'Without specifying the localities,' says the Rev. Mr Fearon of All Saints, 'I think I have observed moral improvements in particular families in a very short time when means of additional personal cleanliness have been given them. Their self-respect has been increased. In very unfavourable localities I think I have seen the people striving against filth. Those were persons of well-constituted minds, who revolt at the condition of the neighbourhood, while others sink down into a state of apathy and indifference. The wish of the people for improvement has been sufficiently shown by their thankfulness for the recent exertions of the town authorities acting under the Nuisances Removal Act.'

POPULAR APATHY TO CAUSES DESTRUCTIVE OF LIFE.

In the instances of some classes of workmen, it is a strange and melancholy fact that unhealthy occupations are preferred because their deadliness is supposed to confer a monopoly. Sir Arnold Knight, in the Report of the Children's Employment Commission, says of the dry grinders of Sheffield, whose occupation is peculiarly formidable to vitality:—'Grinders who have good constitutions seldom experience much inconvenience from their trade until they arrive at about twenty years of age. About that time the symptoms of their peculiar complaint begin to steal upon them; their breathing becomes more than usually embarrassed on slight occasions, particularly on going up stairs or ascending a hill; their shoulders are elevated in order to relieve their constant and increasing dispnœa; they stoop forward, and appear to breathe most comfortably in that posture at which they are accustomed to sit at their work—namely, with their elbows resting on their knees. Their complexion assumes a dirty, muddy appearance; their countenance indicates anxiety; they complain of a sense of tightness across the chest; their voice is rough and hoarse; their cough loud, and as if the air were driven through wooden tubes.' It appears that the *dry* grinders generally die at from twenty-eight to thirty-two years of age, while the wet

grinders live to forty. This is a melancholy picture, yet, strangely enough, more melancholy to the bystanders than to the victims, since, according to the same authority, they set their face against efforts to render their occupation less unhealthy, and 'view with jealousy any precaution to prolong life, as a means of increasing the supply of labour and lowering wages.' If we apply to this state of matters the views elucidated in the first and fourth parts of this book as to early deaths, the quantity of orphanage and widowhood which all this fatality must deposit on society would make the mind that can realise all its miseries shudder. The small addition to the dying men's wages will faintly indicate the cost of their slow self-murder to the country and their employers, and the value of the sacrifice must be seen expanding in mendicants and young criminals—in workhouses and jails. But, true to the instinct of all classes where life is shortened, the dry grinders are the most careless of human beings, and prepare the least honey in the hour of sunshine for the gloom that they are drawing on. With more of the butterfly than the bee, they act up to the rule of a short life and a merry. When trade is brisk, and the sort of monopoly they have created resolves itself into high wages, all vanishes in fleeting pleasures, and they have been known to keep packs of harriers and to drink champagne. They are thus alluded to in the General Sanitary Report:—

'When trade was good, they would only work a part of the week; they spent the remainder in the riot and the dissipation characteristic of soldiers after a siege. Many of them each kept a hound, and had it trained by a master of the hunt, and their several hounds formed a pack, with which they hunted lawlessly, and poached over any grounds within their reach. The grinders' pack is still kept up amongst them. They became reckless in their marriages. "The more destructive the branch of work," says Dr Holland, "the more ignorant, reckless, and dissipated are the workmen, and the effects may be traced in the tendency to marry, and generally at exceedingly early ages." He further observes of one class of them, that amongst them "nature appears not only precocious, but extremely fruitful."'

The general apathy on the proper laws and conditions of healthy life, which prevents the manufacturer or the house-owner from providing for his own safety as well as that of others, was happily characterised by Dr Neill Arnott when he was asked by the Commission on the State of Large Towns, 'Do not you find that there is considerable difficulty in getting persons suffering from deficient ventilation to take the trouble that is necessary to understand the subject?' His answer was—

'Yes; they may tell their medical man, when he makes any repre-

sentation to them on the subject, "that ventilation is a hobby of his, and that hitherto people have got on very well without attending to it." If they hear of such occurrences as that in the first American war, of 2000 British seamen dying in one fleet from fever and want of ventilation, it is not their case, and they cannot understand it. Thus also, a few years ago, when in the great charity-school at Norwood, containing 700 children, the greater part of these fell into ill health, and many died, really from imperfect ventilation of the house, it was believed by the public that the children were dying for want of food, and there was consequently a great outcry against the well-meaning man at the head of the establishment for not feeding the children properly. In truth he was feeding them better than the other proprietors of schools of the same class around London, but he shared the common ignorance of the subject of ventilation, and having so great a number of children in his establishment, the ill effects became more evident. The children recovered their health when the faults in respect to ventilation were pointed out and remedied. There were two or three medical men who commenced the outcry, showing that among medical men there were some who had not studied the subject sufficiently.'

We are but little accustomed to associate danger and death with the humble and peaceful occupation of making clothes. The tailor squatted on his board, and urging his glittering needle, is the personification of citizen innocence, peace, and security. The young maiden who has been for a moment dazzled by the brilliant apparition of a warrior lover, sighs as she hears the retreating sound of the drum, remembering the perils and hardships to which the object of her fleeting admiration is devoted, and in sober reflection weighs against it the less brilliant but more secure lot of sharing existence with the peaceful citizen who handles the goose and the needle. But there is an insidious worm at the root of existence, making the life of the man of peace more precarious even than that of the bold warrior. Dr Southwood Smith, in connection with the habits of this class, tells us—

'I find it stated, for example (and the description here given of one occupation, that of the journeyman tailor, is applicable to many), that in a room 16 or 18 yards long, and 7 or 8 yards wide, eighty men worked together; the men were close together, nearly knee to knee. In summer-time the heat of the men and the heat of the irons made the room 20 or 30 degrees higher than the heat outside; the heat was then most suffocating, especially after the candles were lighted. "I have known young men," says this witness, "tailors from the country, faint away in the shop from the excessive heat and closeness; persons, working-men, coming into the shop to see some of the men, used to complain of the heat and also of the smell as intolerable. The men sat as loosely as they possibly could, and the perspiration ran from them. It is of frequent occurrence in such

workshops that light suits of clothes are spoiled from the perspiration of the hand, and the dust and flue which arise during the work. I have seen £50 worth of work spoiled in the course of the summer season from this cause. In winter these places are still more unhealthy, as the heat from the candles and the closeness is much greater. Any cold currents of air which come in give annoyance to those who are sitting near the draught. There is continued squabbling as to the windows being opened; those who are near the windows, and who do not feel the heat so much as the men near the stoves, objecting to their being opened. The oldest, who had been inured to the heat, did not like the cold, and generally prevailed in keeping out the cold—that is, the fresh—air. Such has been the state of the atmosphere, that in the very coldest nights large thick tallow-candles (quarter of a pound candles) have melted and fallen over from the heat. This state of the place of work produced a very depressing effect on the energies of the workmen. Many could not stay out the hours, and went away earlier: those who were not accustomed to the place generally lost appetite. The natural effect of the depression was, that we had recourse to drink as a stimulant, gin being taken instead of food. I should say the greater part of the habit of drinking was produced by the state of the place of work; because when men work by themselves, or only two or three together, in cooler and less close places, there is scarcely any drinking between times. Nearly all this drinking proceeds from the large shops, where the men are crowded together in close rooms: it is the same in the shops in the country. In a rural place, the tailor, where he works by himself, or with only two or three together, takes very little of the fermented liquor or spirits which the men feel themselves under a sort of necessity for doing in towns. The closer the ventilation of the places of work, the worse are the habits of the men working in them." A large mass of evidence has been collected to show that a similar state of things prevails in other occupations.'

And how little all this carelessness can be attributed to a calculating selfishness is shown by what follows:—

'It appears that no inconsiderable sum is raised annually by the united contributions of the masters and journeymen in this trade for the benevolent purpose of affording assistance to destitute workmen in sickness and old age. There is a benevolent institution for the relief of aged and infirm tailors, to which the annual subscriptions of the masters amount to £800, and the annual subscriptions of the journeymen amount to £525, making a sum-total of £1325 annual subscription. This sum is distributed in the relief of sickness and of the infirmities of old age; but no contribution is raised to prevent the production of sickness and premature infirmity, by the removal of the causes of sickness and of early superannuation. Yet a comparatively small sum, expended under scientific direction in the ventilation of the places of work, would prevent sickness, and retard the period of superannuation.'

DEGRADING PURSUITS CREATED BY THE FILTH OF TOWNS.

The degradation produced by filth and misery is not confined to those who suffer. The human being, whether pursuing his business or his pleasure, must work on the physical materials that are near him. Thus the existence of great masses of offensive matter creates a set of beings who pursue disgusting trades, and are as mentally impure as the garbage they handle. Mr Chadwick gives in his report a striking picture of these classes:—

'In Paris, the interests of turbulent bodies of men, the water-carriers, and another class of men called the chiffonniers, who live by raking for what they can find amongst the refuse cast into the streets, are opposed to any change which will reduce the charge of imperfect cleansing, and the disease promoted by filth. The general practice in that metropolis is to cast all the rubbish of the house into the street on the over-night, or before seven o'clock in the morning, when men attend with carts to sweep it up and remove it. In the night-time, however, the chiffonnier comes with a lantern and rakes amongst the refuse, and picks from it bones, rags, or whatever may have been thrown away by accident, or the carelessness of the servants. The offensive filth of their persons and their occupation makes them outcasts from other classes of workmen; they sleep amidst their collections of refuse, and they are idle during the day; they are, like all men who live under such circumstances, prone to indulgence in ardent spirits; being degraded and savage, they are ready to throw away their wretched lives on every occasion. There are nearly 2000 of the chiffonniers alone in Paris, and they and the water-carriers were conspicuous actors in the Revolution of 1830. During the administration of Casimir Perrier, the householders had complained of the inconvenient mode of cleansing the streets by large heavy carts drawn by three horses, which, during their slow progress throughout the day, obstruct the public thoroughfares, and occasion great inconveniences, especially in the narrow streets.

'In the beginning of the year 1834, when the cholera broke out, the attention of the authorities was directed to sanitary measures, and the municipality decided that the cleansing of the streets should be done by contract by a quick relay of carts of a smaller and more convenient shape, drawn by single horses; and in order to diminish the inconvenience of the presence of these improved vehicles, the contractor was allowed to collect one load for each of his carts on the over-night, which would have led to a practice similar to that of London, where the dust-carts take the refuse direct from the house without any deposit in the streets. But in this arrangement an important interest had been overlooked: the chiffonniers, who were said to have been aided and directed by the owners and men belonging to the superseded vehicles, rose in revolt, attacked and drove away the conductors, broke to pieces the new carts, threw the fragments into the river, or made bonfires with them. Unfortunately at that time the cholera had broken out at Paris. The mobs of chiffon-

niers which collected on the following day were swollen by other crowds of ignorant, terrified, and savage people, who were persuaded that the deaths from the strange plague were occasioned by poison. "My agents," says the then prefect of police in an account of this revolt, "could not be at all points at once to oppose the fury of those crowds of men with naked arms, and haggard figures, and sinister looks, who are never seen in ordinary times, and who seemed on this day to have arisen out of the earth. Wishing to judge myself of the foundation for the alarming reports that were brought to me, I went out alone and on foot. I had great difficulty in getting through these dense masses, scarcely covered with filthy rags: no description could convey their hideous aspect, or the sensation of terror which the hoarse and ferocious cries created. Although I am not easily moved, I at one time feared for the safety of Paris—of honest people and their property." In fact the riot was one of the most dangerous that had been witnessed in that city, and it was not suppressed without great exertions and some loss of life. The anxieties which it occasioned to the minister, Casimir Perrier, and his disgust at the political use made of it, were considered to have contributed to his death. He was himself attacked with the cholera, and died a few days after. Shortly before his death, when expressing his disgust, he said to the prefect, "My friend, we are harnessed to a vile carriage." "Truly so," replied the prefect; "and the ways are dreadfully dirty." The material ways of the city continued as they were: the prefect seeing that the introduction of the new carts became "a motive to discontent and collision," took upon himself to set aside the contract with the contractor, who, he states, received no other compensation for his losses than a permission, which he could not use, to collect the refuse during the day, and the chiffonniers continue to the present time in the exercise of their wretched vocation at the expense of the public health and cleanliness.

'The course of the present inquiry shows how strongly circumstances that are governable govern the habits of the population, and in some instances appear almost to breed the species of the population. Conceiving it probable that the amount of filth left by defective cleansing had its corresponding description of persons, I made inquiries of the Commissioners of Metropolitan Police. From returns which they obtained from their superintendents, it appears that of the class of bone-pickers, mud-rakers, people living on the produce of dung-heaps in mews, courts, yards, and by-lanes insufficiently cleansed, 598 are known to the police. From an observation of the proportion of filthy children and adults who appear amidst refuse whenever there are new buildings and an unusual quantity of rubbish, and from other circumstances, I believe that, were the refuse of houses daily cast into the streets in London in the same manner as at Paris, London would soon have as large and as dangerous a population of the chiffonnier class. I am informed by Sir Charles Shaw, the chief commissioner of police at Manchester, that there are 302 of them known within the police jurisdiction of that town also.

He complains that they have heretofore been licensed in their occupation; that the children are pilferers, and occupy the attention of the police, and furnish a large quota to the stock of juvenile delinquents and the population of the prisons. I am informed that in Bath there are about 100 of them known; and in other towns and places I have little doubt that they would be found in like proportions, which approach the proportions of the stated numbers of chiffonniers to the population of Paris. These degraded creatures are also found amongst the inmates of the workhouses; and the close identity of their habits with those of the chiffonniers of Paris, affords a striking proof of the similarity of the population produced by similarity of circumstances. They are thus described to me by an eye-witness:—"The bone-pickers are the dirtiest of all the inmates of our workhouse; I have seen them take a bone from a dung-heap and gnaw it while reeking hot with the fermentation of decay. Bones, from which the meat had been cut raw, and which had still thin strips of flesh adhering to them, they scraped carefully with their knives, and put the bits, no matter how befouled with dirt, into a wallet or pocket appropriated to the purpose. They have told me, that whether in broth or grilled, they were the most savoury dish that could be imagined. I have not observed that these creatures were savage, but they were thoroughly debased. Often hardly human in appearance, they had neither human tastes nor sympathies, nor even human sensations, for they revelled in the filth which is grateful to dogs and other lower animals, and which, to our apprehension, is redolent only of nausea and abomination."'

SOCIAL EFFECTS OF APPLYING PRECAUTIONARY MEASURES TO EPIDEMICS INSTEAD OF ISOLATION.

It would be a great omission, in contemplating the moral effects of sanitary legislation, to overlook the social influence of preventive and precautionary measures against epidemics, when compared with the old attempts to flee before the pestilence, or to impede its progress by isolation. The former brings out all the kindly, generous, sympathetic elements of the human heart—the latter all that is selfish, hard, remorseless. In the sketch of the history of celebrated epidemics given in the second part, an account will be found of the desperate measures from time to time adopted by the selfish and the powerful, in the vain hope of protecting themselves from the terrible visitation.

It is worthy of remark, that the system of isolation was not countenanced by the ancient physicians, who rather supported the principle that heroism and humanity demanded the healthy to assist the diseased at whatever risk; and this principle was enforced by Procopius, who, a close observer of the chief epidemics of the sixth century, asserted that it did not travel by contact. The practice of isolation arose in the middle of the great epidemics

of the fourteenth century. Hecker, in his 'History of the Black Death'—a believer, it will be seen, in the efficacy, and even the necessity of the practice—thus describes its progress:—

'The first regulation which was issued for this purpose originated with Viscount Bernabo, and is dated the 17th January 1374. "Every plague-patient was to be taken out of the city into the fields, there to die or recover. Those who attended upon a plague-patient were to remain apart for ten days before they again associated with anybody. The priests were to examine the diseased, and point out to special commissioners the persons infected, under punishment of the confiscation of their goods, and of being burned alive. Whoever imported the plague, the state condemned his goods to confiscation. Finally, none, except those appointed for that purpose, were to attend plague-patients under penalty of death and confiscation."

'These orders, in correspondence with the spirit of the fourteenth century, are sufficiently decided to indicate a recollection of the good effects of confinement, and of keeping at a distance those suspected of having plague. It was said that Milan itself, by a rigorous barricade of three houses in which the plague had broken out, maintained itself free from the "great mortality" for a considerable time; and examples of the preservation of individual families, by means of a strict separation, were certainly very frequent. That these orders must have caused universal affliction, from their uncommon severity, as we know to have been especially the case in the city of Reggio, may be easily conceived; but Bernabo did not suffer himself to be deterred from his purpose by fear; on the contrary, when the plague returned in the year 1383, he forbad the admission of people from infected places into his territories on pain of death. We have now, it is true, no account how far he succeeded; yet it is to be supposed that he arrested the disease, for it had long lost the property of the Black Death, to spread abroad in the air the contagious matter which proceeded from the lungs, charged with putridity, and to taint the atmosphere of whole cities by the vast numbers of the sick. Now that it had resumed its milder form, so that it infected only by contact, it admitted being confined within individual dwellings as easily as in modern times.

'Bernabo's example was imitated; nor was there any century more appropriate for recommending to governments strong regulations against the plague than the fourteenth; for when it broke out in Italy in the year 1399, and still demanded new victims, it was for the sixteenth time, without reckoning frequent visitations of measles and small-pox. In this same year Viscount John, in milder terms than his predecessor, ordered that no stranger should be admitted from infected places, and that the city gates should be strictly guarded. Infected houses were to be ventilated for at least eight or ten days, and purified from noxious vapours by fires, and by fumigations with balsamic and aromatic substances; straw, rags, and the like were to be burned; and the bedsteads which had been used set

out for four days in the rain, or in the sunshine, so that by means of the one or the other the morbific vapour might be destroyed. No one was to venture to make use of clothes or beds out of infected dwellings, unless they had been previously washed and dried either at the fire or in the sun. People were likewise to avoid as long as possible occupying houses which had been frequented by plague-patients.

'We cannot precisely perceive in these an advance towards general regulations; and perhaps people were convinced of the insurmountable impediments which opposed the separation of open inland countries, where bodies of people connected together could not be brought, even by the most obdurate severity, to renounce the limit of a profitable intercourse.

'Doubtless it is nature which has done the most to banish the Oriental plague from Western Europe, where the increasing cultivation of the earth, and the advancing order in civilised society, have prevented it from remaining domesticated, which it most probably was in the more ancient times. In the fifteenth century, during which it broke out seventeen times in different places in Europe, it was of the more consequence to oppose a barrier to its entrance from Asia, Africa, and Greece (which had become Turkish), for it would have been difficult for it to maintain itself indigenously any longer. Among the southern commercial states, however, which were called on to make the greatest exertions to this end, it was principally Venice, formerly so severely attacked by the Black Plague, that put the necessary restraint upon the perilous profit of the merchant. Until towards the end of the fifteenth century, the very considerable intercourse with the East was free and unimpeded. Ships of commercial cities had often brought over the plague; nay, the former irruption of the "great mortality" itself had been occasioned by navigators. For as in the latter end of autumn 1347 four ships full of plague-patients returned from the Levant to Genoa, the disease spread itself there with astonishing rapidity. On this account, in the following year, the Genoese forbad the entrance of suspected ships into their port. These sailed to Pisa, and other cities on the coast, where already nature had made such mighty preparations for the Black Plague, and what we have already described took place in consequence.

'In the year 1485, when, among the cities of Northern Italy, Milan especially felt the scourge of the plague, a special council of health, consisting of three nobles, was established at Venice, who probably tried everything in their power to prevent the entrance of this disease, and gradually called into activity all those regulations which have served in later times as a pattern for the other southern states of Europe. Their endeavours were, however, not crowned with complete success, on which account their powers were increased in the year 1504, by granting them the power of life and death over those who violated the regulations. Bills of health were probably first introduced in the year 1527, during a fatal plague which visited Italy for five years (1525—1530), and called forth redoubled caution.

'The first Lazarettos were established upon islands at some distance from the city, seemingly as early as the year 1485. Here all strangers coming from places where the existence of plague was suspected were detained. If it appeared in the city itself, the sick were despatched with their families to what was called the Old Lazaretto; were there furnished with provisions and medicine; and when they were cured, were detained, together with all those who had intercourse with them, still forty days longer in the New Lazaretto, situated on another island. All these regulations were every year improved, and their needful rigour was increased, so that from the year 1585 onwards no appeal was allowed from the sentence of the Council of Health; and the other commercial nations gradually came to the support of the Venetians, by adopting corresponding regulations: bills of health, however, were not general until the year 1665.

'The appointment of a forty days' detention—whence quarantine derives its name—was not dictated by caprice, but probably had a medical origin, which is derivable in part from the doctrine of critical days; for the fortieth day, according to the most ancient notions, has been always regarded as the last of ardent diseases, and the limit of separation between these and those which are chronic. It was the custom to subject lying-in women for forty days to a more exact superintendence. There was a good deal also said in medical works of forty-day epochs, in the formation of the fœtus, not to mention that the alchymists expected more durable revolutions in forty days, which period they called a philosophical month.'*

These desperate and cruel efforts to place a partition wall, as it were, between the stricken and the healthy, stand forth as melancholy examples of human selfishness. And the system on which they proceeded, like many things done under the blind impulse of selfish terror, was as short-sighted as it was heartless. While it doomed the unfortunate victims to perish in horrible isolation, unpitied and unassisted by their kind—whose flight from their presence was of that hasty and hideous sort which became proverbial, as that of 'men shunning the plague,' yet the breath of the departed, impregnated with the poison of the grave, pursued the living with retributory certainty; and the more completely the stricken were isolated and abandoned, the more was the air impregnated with new poison, to strike the callous deserters of their species. It is but the other day that a more benign and wise philosophy has arisen, teaching that the safety of society in general consists in the safety of all its individuals; that protection from the ravages of epidemics is a better policy than efforts to eradicate them; and that the best protection that the rich can have for themselves, is in the protection of their poor neighbours, who,

* Epidemics of the Middle Ages, pp. 62–65.

as the weakest and most sensitive part of the social body, are ever the most likely to afford an opening to the disease.

But not only does this appear, but it is farther manifest that those who, in a careful, and at the same time confiding spirit, aid the sick, and minister to their wants, are not so liable, as the old selfish spirit inferred, to the ravages of the disease. The whole of our experience, indeed, in these matters shows more clearly that benign arrangement of nature which identifies our own safety with that of our fellow-creatures, and makes us find that it is not only our duty but our interest to do unto others as we would they should do unto us.

On this subject results of varied and extensive observations made by Dr Bowring during a sojourn in Egypt—that great hot-bed of the plague—were read by him to the British Association in 1838, and published with the title, 'Observations on the Oriental Plague, and on Quarantines.' He had there ample opportunities of witnessing and of enduring the oppressive regulations—oppressive to the community at large, as well as to the wretched victims of its ravages for isolating the plague. 'The pecuniary cost,' he said, 'may be estimated by millions of pounds sterling in delays, demurrage, loss of interest, deterioration of merchandise, increased expenses, fluctuations of markets, and other calamitous elements; but the sacrifice of happiness, the weariness, the wasted time, the annoyance, the sufferings inflicted by quarantine legislation—these admit of no calculation—they exceed all measure. Nothing but their being a security against danger the most alarming, nothing but their being undoubted protections for the public health, could warrant their infliction; and the result of my experience is not only that they are useless for the ends they profess to accomplish, but that they are absolutely pernicious; that they increase the evils against which they are designed to guard, and add to the miseries which it is their avowed object to modify or to overcome.' One of the most rigid quarantine operations had just taken place before his arrival at Alexandria, and the proceedings, with their effect, were thus described to him by Dr Laidlaw:—

'As soon as the disease was ascertained to exist in the town, all the European inhabitants put themselves in quarantine, and nothing was received into their houses without being previously smoked or passed through vinegar and water. The most abominable system of annoyance to the inhabitants was adopted by the sanitary police, in the hope of stopping the propagation of the malady. Every house in which the disease was discovered was instantly closed, and guards placed around it, the miserable inhabitants being removed to the Lazaretto. One of the first cases of plague occurred in the European hotel, and which was frequented by great numbers of Euro-

peans. The sanitary police, with a large body of soldiers, blockaded the house at the usual hour for dining, and actually seized, in defiance of all law and justice, upwards of forty persons, the great majority of whom had only entered a few minutes previously for the purpose of dining, and carried them off to a miserable lazaretto, where no sort of comfort, and scarcely the necessaries of life, were afforded them, to perform an expurgation of forty days. The surgeon also who had attended the patient was put in quarantine.

'Notwithstanding, however, the severity with which the police regulations were enforced under the despotic and irresponsible direction of a Board of Health—notwithstanding that every vessel coming from a suspected port was subjected to a strict quarantine, in order to prevent any new importation of the suspected virus—still the epidemic steadily pursued its course, just as it had always done before, when none of these precautions were adopted, daily increasing the number of its victims as the season favourable for its propagation advanced, until it was found that the shutting up of infected houses was worse than useless, and the pacha, more humane than the infatuated Europeans who advised him, ordered that all further attempts to stop the progress of the disease by sanitary regulations should be abandoned. It is not unreasonably conjectured that during the above-mentioned period great numbers of persons died of plague, and who were buried in their dwellings by their relatives, in order to avoid the nuisance of quarantine, and from the decomposition of their bodies a new contamination was constantly added to the vitiated atmosphere. Thus ended a most decided attempt, backed by all the authority of despotic power, and exercised with the most merciless severity, to arrest by quarantine the progress of the disease. If these measures had been put in force when the disease was on the decline, and the altered condition of the atmosphere was no longer genial to its propagation, as was the case at Malta in 1813, they would have appeared to have succeeded, because, whether they were adopted or not, it would have ceased, as it did here, after all measures had been abandoned; but in this case, having commenced the shutting up at the very first breaking out of the epidemic, a fairer trial of the efficacy of this much-extolled means of safety was afforded, and the result has shown that its boasted efficacy was futile, and that the disease was not to be confined within bounds by any guards or sanitary cordons.'

In fact Dr Bowring found, what so much inquiry and experience has confirmed, that to suppress or stop the plague, you must uproot the physical evils which nourish and propagate it. 'The regions,' he says, 'in which plague commits its most terrible ravages will be found to be these: where no provision is made for the cleanliness of houses or their inhabitants—in the towns where filth is allowed to congregate—where animal and vegetable matter is putrified and decomposed without any interference—in low and swampy places—in the neighbourhood of marshes and lakes—near

subterranean waters—in a word, where unwholesome vapours and pestilential miasmata are perpetually exerting their baneful influences. In the spots where the value of human life is at the lowest—where the average of mortality is the highest—where common diseases are greatly aggravated, and the more alarming become almost universally mortal—where there are no floors for rest or rain-proof roofs for shelter, nor wholesome food for sustenance, nor sufficient clothing for protection; there will the plague be found an almost permanent inmate during certain seasons, withdrawing only for a few short months, to return inevitably with the return of another year.'

And while all experience showed that the rigid and isolating methods by which mere clumsy coercive human art endeavoured to stop the scourge were ineffective, it was as clearly shown that those whom the dread of the disease did not drive to a hardened selfishness, might exercise works of charity and mercy to their stricken fellow-creatures, and yet be safe to remember with satisfaction that they had alleviated human misery. The following instances, brought from the same centre of disease and misery, came under the experience of the medical gentleman who, in the passage already cited, described the inefficacy of isolation:—

'Case 1—*Feb.* 7, 1835.—The female servant of Mrs Hume was attacked with plague. Mrs Hume's family consisted of only this servant and one lodger, and they were in the strictest quarantine; no one being allowed to enter or go out of the house, and every article of provisions, which were the only things admitted, was passed through water, and every paper carefully smoked. I was called in to see the patient, and prescribed for her, and she was afterwards removed to the Lazaretto, and got well. Mrs Hume, the lodger, and myself were the only persons who were in contact with her, and we all continued in health during the epidemic.

'Case 2—*Feb.* 18, 1835.—Mr G. Sceriha was attacked with plague, and I was called in to attend him. This patient died sixty hours after he was first attacked. The whole of his family, consisting of his mother, two brothers, three sisters, and an Arab woman-servant, as well as myself, were constantly about the patient, as much in contact with him as in cases of ordinary disease. A few hours before he died I cut all the hair from his head, to endeavour to relieve the delirium. The family removed to another dwelling, and no one was attacked at the time; but the elder brother died of the plague about six weeks afterwards during the height of the epidemic. The three sisters, mother, brother, Arab nurse, and myself, escaped.

'Case 3—*Feb.* 24, 1835.—My servant Mohammed was attacked with the plague. I attended him, and did everything I could to assist him, and he ultimately recovered. He was in every way in as complete contact with me as possible, making my bed, brushing my

clothes, and waiting upon me. During his illness many of his friends came to see him, and showed no hesitation in assisting him in every way. I never could ascertain that any one of these was attacked with the disease; it was certainly not the case with several upon whom I kept my eye during the epidemic. One man, whom I employed especially to look after the patient during his illness, I found one morning fast asleep with his head reclining upon the bed of the patient: I know that this man did not contract the disease.

'Case 4—*March* 8, 1835.—The master of the English brig *Delight*, in the harbour of Alexandria, was attacked with plague; I was sent for, and went on board, and afterwards visited him twice a-day till he recovered: the case was a very severe one, and the patient was delirious before I was called in. I bled him, and treated him precisely as if he had not been suffering from a pestilential disorder. The cabin-boy, who attended upon him, slept in the same cabin with him, and not three feet distant from the bed. The mate of the vessel slept in a berth next to the main cabin, and with which there was a constant communication; he frequently assisted the sick man in changing his linen and in arranging his bedclothes. Upon visiting the patient one day I found the master of another vessel sitting close to the bedside; and when he went away he shook hands with him. These three individuals I anxiously watched to see if they would receive the infection, but they all remained in perfect health.

'Case 5—*March* 24, 1835.—The carpenter of the brig *Patriot*, lying in the harbour of Alexandria, was attacked with the plague. This patient died on the eleventh day. The vessel in which this case occurred was full of cotton, and a round house had been built on the deck for the accommodation of the seamen. This round house was only about 14 feet long by 10 in breadth, and was fitted up all round with berths for the men, one above the other: in this small space the whole crew were crowded, and the ventilation was very imperfect. The crew of the vessel lived and slept in this place five days and nights along with the sick man, and it is impossible to conceive any plan by which they could have been placed more immediately in contact, or by which infection or contagion was afforded a more favourable opportunity of developing itself; yet of all the persons thus exposed, only one person was afterwards attacked with the disease, and he recovered after a few days' treatment.

'Case 6—*April* 5, 1835.—The captain of the brig *Elliott*, in the harbour of Alexandria, was attacked with plague in its most virulent form. His ship was loaded with cotton, and he was on the eve of sailing, and taking on board two passengers for England, a man and his wife, who lived in the same cabin with him, and assisted him in every way in their power, until he was brought ashore to the hospital, a period of several days. I attended him, and he got gradually better. On the 15th May the sloughing of the plague-bubo in the groin opened the femoral artery; and to prevent his bleeding

to death, I was obliged to tie the external iliac artery, and he ultimately recovered. The passengers, his mate, several of his seamen, and his cabin-boy, the latter sleeping in the same room with him during his illness, were of course as much exposed as could well be, yet no one became sick.

'Case 7.—A young lad in my own house was attacked with plague, and died in a few days. My family consisted of a gentleman who resided with me, a European man and his wife, as servants, and the lad. The two servants concealed from me the circumstance of the boy's illness till he became insensible, in the hope that he would recover. No precautions were taken, and the servants who slept in the same room with the boy were in constant communication with myself and my friend: no one was attacked.'

And yet, when the plague is found following its natural course into the places prepared for its reception in defiance of the artificial isolation, men with a perverted ingenuity too common when a theory is once adopted, have only found that the isolation should have been carried farther, and have set about the solution of the difficulty through such suppositions as are thus given by Dr Bowring:—

'The plague breaks out in a house—the strictest quarantine has been kept—invention is immediately on the rack to discover how the disease has penetrated. In cases reported to me at Alexandria and Cairo, where it was not pretended that the door had been entered, or any communication taken place within the town, the entrance of the plague was thus accounted for:—First, in an instance where a very timid person, an alarmed contagionist, who was attacked and died of the plague, had shut himself up in his chamber, it was found that his son had, for his amusement, let up a kite from the roof of the house, and it was supposed that the kite-string had been touched by a bird, which bird was imagined to come from the infected quarter of the city: the plague entered the house down the string of the kite, and the son's father became the victim. In another case where the plague penetrated a house kept in the strictest quarantine, a cat had been seen to spring into a basket of clothes returning from the wash-house, and thence to leap into the window of the house in question. It was said the clothes belonged to some family which had probably had the plague; but at all events the cat was the only intruder who had violated the cordon, and was therefore the introducer of the disease. In a third instance an Arab girl had hung a shirt out of a window to dry; the plague attacked the house; and I was told there could be no doubt that somebody in passing the street had touched the shirt, and was thus the cause of the introduction of the malady. Often have I heard its introduction attributed to stray dogs, cats, rats, and even flies. And then comes a natural question: if the plague be thus introducible, *what* quarantine regulations can guard against it? Must

they not be utterly unavailing against so invidious, so omnipresent an enemy?'

Along with these instances, it may be not uninteresting to peruse some others published nearly a century ago by Dale Ingram, of whom mention will hereafter be made:—

'The first authority on which contagion is founded is from Alexander Benedictus.* He says, in the city of Venice, a feather-bed that had been thrown aside in a remote corner of the house (being suspected to hold the plague in it), being shaken seven years after, spread the disease, of which 5900 people died in twelve weeks. Another instance he gives of the pestilential contagion shut up in a rag for fourteen years. Forestus,† Book vi. Observation xxxii., tells us of a young man being seized with this disease only by thrusting his hand into an old trunk wherein was a spider's web, which in an instant made a plague-sore. Another was seized with the plague by holding a bit of thread. Hieronymus Fracastorius, an Italian, and Forestus, both physicians, speaking of the effects of contagion, say that about the year 1511, the time when the Germans were at Verona, the plague arose among the common soldiers from putting on a leathern coat, and those twenty-five who put it on died one after another, and 10,000 persons fell by the plague before the cause was found out. Afterwards the coat was very prudently burnt. At Breslau,‡ in 1542, 5900 died of the plague in twenty-two weeks. The infection was spread by some linen that was moved, after it had been laid by for fourteen years. At Justinoples§ in Italy, some cords that had been made use of in burying the dead at the time of the plague, being found behind a box by a servant twenty years after, the servant was not only infected, but 10,000 died of the distemper. A woman of Zealand removed into Almeria in Germany, having exposed some clothes to the sun, some children playing on them received the infection, and all died. Dr Hodges, who wrote on the plague which happened in England in 1665, says he visited a lady seemingly in good health; nay, she had ate a very hearty dinner that day, but died in the afternoon. Her death he imputes to her receiving the infection from his garments, as he had visited several ill of the plague that day. A man dropped down dead of the plague by standing on a Turkey carpet. A lady, by smelling at a Turkey handkerchief, died of the plague on the spot.'

When the plague broke out in Leghorn early in the present century, there was no kite-string, or cat, or rat, or bird, or bee, or bale of cotton that could be charged with giving it a passage over the sea. But a mummy which had been for some time in the town was unrolled for the sake of being examined, and it was believed that this mummy had locked up the plague for two thousand years, and let it loose again when opened!

* De Peste, chap. iii.
† Forestus on Contagion, lib. iii. chap. 7.
‡ Senect. de Febre.
§ Trincavet, lib. iii. consil 17.

In this country we have now a preservative against the plague which renders it unnecessary for us to form such childish theories of how it comes, since it never does come; and if we may trust to the negative experience of nearly two hundred years, never will. Filthy, noxious, degraded, insalubrious as are many portions of our cities, and liable as they are to the ravages of typhus and cholera, it mercifully appears that there is not a sufficiently uninterrupted mass of filth, degradation, and misery among us to make our country a proper dwellingplace for this most terrible of all epidemics.* When we notice the haunts of deadly reptiles, we find that each has its peculiar locality: the centipede subsists in the rotting timber of Sierra Leone; the rattlesnake and the cobra di capello bask under the burning sun of America and Africa; the crocodile rolls in the warm slime of the Mississippi and the Nile. It is not that they are generated by the inanimate elements of their place of residence, but that such being the spots in which it is their nature to be nourished, there will they ever be found. So it seems to be with epidemics: science has not yet traced their more immediate productive sources, but let it once be known that they are in existence, and it will point out where we are to find them. The locality of the plague is fortunately no longer in London, Bristol, or Edinburgh. We are no more afraid of it being propagated into this country by bales of cotton and the flight of birds, than of the centipedes of Sierra Leone or the rattlesnakes of America being similarly imported. Yet it has been the practice in this country to act as if the plague might thus come among us, and to endeavour to stop its course by a series of quarantine regulations, not only expensive, but detrimental to commerce, and restrictive of personal freedom. If these regulations really did save us from any disease which we would be likely to incur, the expense and annoyance attending them might not be grudged. But they have undoubtedly the bad effect of leading the attention of the public, and the public guardians, from those precautionary sanitary measures at home which are effective in awarding or mitigating diseases in general, and directing our efforts to these vain attempts to shut out the epidemic like some evil visitor—attempts which are uselessly applied to save us from epidemics which will not take seat among us, and are ineffective to protect us from those which the sanitary condition of our population tends to encourage. During the late invasion of cholera, the quarantine was so absurdly applied, that when the disease was raging in Hull, vessels coming from other places where it had broken out were, before entering that port, subjected to the

* See above, p. 122.

delay, the loss, and all the miseries of quarantine, including the chance of their crews or passengers dying without medical aid.

As it is of the utmost moment that the public should know the full truth on these matters, the following extracts are given from the portion of the Board of Health's Report where they show how utterly incapable any preventive regulation must be to protect us from epidemics which can be carried about by individuals, or packed in bales of cotton:—

'It has been justly observed by Dr Maclean, that, taking for granted the correctness of the received doctrines, and assuming that the degrees of susceptibility of all articles, as laid down in the quarantine laws of the kingdom, are founded upon ascertained data, it must of course happen that "in cargoes from Turkey generally there will be a great many of the articles enumerated in the first class as being the most susceptible of imbibing contagion. These cargoes are necessarily composed of the produce or manufacture of various parts of the country, packed and shipped at various periods, some of these periods being pestilential, and some not. A ship, therefore, sailing with a clean bill of health, might have her cargo foul, as having been packed and shipped during the prevalence of plague; whilst a ship sailing with a foul bill of health might have her cargo clean, as having been packed and shipped previous to the commencement of pestilence. This would necessarily frequently happen, supposing always the doctrine of pestilential contagion to be true; or rather it would be the most common course of things, for it could not be prevented by any practicable vigilance. Let us suppose cotton to be packed in the interior of Egypt or of Turkey by persons having the plague upon them, and this cotton to be shipped at Alexandria or Smyrna, with clean bills of health, the usual period of forty days from the cessation of the plague, conferring this privilege, having elapsed. It is contended by medical men that plague virus may remain in cotton for an indefinite period; but there is not any one conversant with the trade of Turkey and of Egypt who can deny that this case very frequently happens; and hence it is plain that cotton would often be shipped from those countries full of contagious virus, if such a thing there were, and furnished, too, with a clean bill of health."

'There is positive evidence that this constantly happens to a vast extent. "During the plague of 1835," says Dr Laidlaw, "which preserved its epidemic character from the beginning of January till the commencement of June, and during which period upwards of 9000 persons in the town of Alexandria (it is computed that 200,000 persons fell victims to the disease in the whole of Egypt within this period of time) alone must have suffered from the disease, vast quantities of cotton-wool were embarked on board British merchant vessels, and sent to England. The cotton so embarked was taken from the government cotton-stores, where the plague raged most fearfully; it was pressed on board the English vessels, so as to ren-

der it convenient for stowage by the crews, assisted by working parties of Arabs, who came from the shore, and who returned home to sleep: there was nothing like a quarantine observed by any of the English captains, and the English sailors were constantly at work at the cotton-store, shipping off the bales in their boats. In fact there was the most perfect communication and contact which any reasonable experimenter could have desired, and no precautions, no fumigations, no airings, were adopted; the cotton was stowed away in the holds of the ships, screwed into as small a compass as possible, the hatches closed, and thus it was conveyed to England. In some of the ships the plague broke out among the crews during the time they were loading, but the work of stowing the cotton went on notwithstanding; communication between the infected ships and those which had no sickness on board was unrestricted, and the disease did not spread to any extent among the former, nor was it communicated apparently to the latter. The exportation of cotton-wool from Alexandria during the year 1835 amounted to 98,502 bales, all of which was sent to Europe in the following proportions:—

To England,	31,709 bales.	To Leghorn,	424 bales.
To Marseilles,	33,812 ...	To Holland,	150 ...
To Trieste,	32,362 ...	To sundry ports,	45 ...

A bale of Egyptian cotton consists generally of about 200 lbs. weight.

"The English vessels which cleared out from Alexandria, with cotton cargoes on board for England, during the same year were in number about 25—namely, the

	Date of Clearance.		Date of Clearance.
Hero,	Jan. 18	Arion,	June 23
Beatrice,	Feb. 28	Astrea,	June 18
Pursuit,†	March 13	Kate,	June 28
Patriot,†	April 7	Hortensia,	July 6
Rapid,†	April 7	Lucy,	July 3
Elliotts,†	April 18	Mars,	July 17
Delight,†	April 29	Moslem,	July 25
Martha,†	April 25	Livorno,	July 27
Apollo,	April 30	Frederick Young,	Aug. 29
Lady Keith,	April 30	Cuba,	Aug. 31
Celt,	May 15	Hopewell,	Sept. 7
Portia,	May 12	Jane,	Oct. 31
Newham,†	June 9		

"At the period when these ships sailed, the plague was raging most violently in all quarters of the town. The ships' names which are marked thus (†) had the plague on board among their crews.

"Let us now see what are the conclusions to be drawn from the above data. Here we have twenty-five British ships clearing out from Alexandria during a year of epidemic plague, and carrying into Great Britain no less than 31,000 bales of goods, supposed to be capable of contamination in the highest degree; of these twenty-five ships, seven actually had the disease among their crews during the

time they were loading. All these vessels, when they arrived in England, had to perform a long quarantine, for the supposed purpose of purifying the cotton from the latent fomes it was supposed to contain. If the quarantine officers did their duty, all these bales of cotton should have been ripped open and freely handled, first by the crew, and afterwards by porters and other persons appointed for such duties in the presence of a quarantine guardian ; and if no person were attacked during this expurgation, and after a period of forty days or more, according to circumstances, the ship's company were entitled to pratique."

'By order of council, cap. xxxii., it is regulated that "all bales of cotton shall be opened from one end to the other, and so much taken out as to leave room for handling daily the interior of the bale ;" but the evidence given before the committee of the House of Commons in 1824 shows that this order is not obeyed. If the cotton, imported under the circumstances described by Dr Laidlaw, were really impregnated, as quarantine assumes, with plague virus, the following statements will show the amount and value of the means which quarantine has provided for the security of the country :—

'Mr Sanders, superintendent of quarantine, is asked—"Are there any of the first class of goods ever left without the probationary airing?—Yes.

"Is it not as necessary that the whole should be aired as any part?—So it would appear ; but in the case we had within these few days, of a ship from Alexandria with a thousand bales of cotton, it would have been impossible to air those within fifteen days upon deck.

"The bales of cotton are cut open?—They are.

"And the cotton is aired upon the deck?—Yes ; the cotton is ripped open from one end to the other, and some of the interior removed.

"Is the whole of the interior of the cotton opened to the air?—Not with a clean bill of health."

'In Ireland, however, whether the vessel arrives with a clean or a foul bill of health, there appears to be no airing of the cargo whatever. Mr James M'Neil, superintendent of quarantine at Carlingford, in his evidence before the committee states—"There is no floating lazaretto, nor any lazaretto on shore at Carlingford. There is no other place to air goods than the deck of the vessel in which they come. In the last three years there have been forty-two vessels. They never do more than hoist the bags upon the deck, as many as they can get at near the hatches. There is no means of examining or airing the cargo with a foul bill of health : believes the bags have never been opened : the captains have always stated to him that it was impossible to do it : has never heard of any sickness at Carlingford. There have been arrivals from Smyrna, and he believes with hides and skins from Africa. There is no physician within ten or twelve miles. Vessels with foul bills of health, he understands, have repeatedly arrived at Carlingford. In point of

fact a bale of cotton is not opened at any time. There has sometimes been much cotton and rags."

"We submit," say the Board in continuation, "that such considerations as we have here presented preponderate in determining the question as to any system of prevention against the introduction and spread of epidemic diseases which it may be deemed reasonable to continue or adopt; that they assign the reason of the great practical truth to which we have so often adverted, that the only real security against epidemic disease is an abundant and constant supply of pure air; that they prove with reference to quarantine that its regulations must be ineffectual, since by all of them this primary and essential principle is overlooked, and that they clearly lead to the conclusion that if, as has been stated, the general result of modern investigation and experience be that confinement in a foul atmosphere can convert common fever into pestilence, and that ventilation and dispersion can dissipate any contagion, the entire basis of quarantine is gone, and the system must be abandoned as useless, and even injurious."'

During the visitation of cholera in 1832, the belief in the sufficiency of measures of isolation still lingered so far, that among the orders in council then issued it was provided that 'all intercourse between any infected town and the neighbouring country must be prevented by the best means within the power of the magistrates, who will make regulations for the supply of provisions: that measures of a coercive nature may be rendered expedient for the common safety, if, unfortunately, so fatal a disease should ever show itself in this country in the terrific way in which it has appeared in various parts of Europe; and it may become necessary to draw troops, or a strong body of police, around infected places, so as utterly to exclude the inhabitants from all intercourse with the country.'

There were proposals, as of old, for locking up infected houses, and dropping food at the door, which the inmates were to take in by machinery; and from the privy-council down to the humblest parochial board, the prevailing spirit was that of isolation and repulsion.

The circumstance that cholera is preceded by premonitory symptoms, and that when we find these premonitory symptoms appearing on an epidemic scale, we have the seeds of cholera planted, but still capable of being uprooted, prompted the adoption of active intervention instead of isolation in 1848. The difference of the two systems cannot be better developed than by comparing the following history, from the Report of the General Board of Health for 1849, with the practice of the quarantine and other isolating systems already referred to:—

'While directing the attention of the guardians to the most avail-

able means of prevention, we endeavoured to prepare them for the measures which would be necessary if they should unhappily experience a visitation of the disease. Of these, we regarded the organisation of the means for detecting the existence of the disease in its premonitory stage as among the most important. This stage being in general of short duration, in some instances not exceeding a few hours, and the symptoms which denote its commencement being commonly so slight as to appear trivial to those who are ignorant of their signification—an impression favoured by the general absence of pain—no dependence could be placed on the information and prompt action of the individuals most in danger. It was necessary that the disease should be sought out in the localities in which it might be present and actively developing itself, though even its existence might be unperceived and unsuspected. The whole tenor of the evidence presented to us showed that if the medical practitioner waited until the individuals affected applied of their own accord for assistance, in large numbers of instances, and especially before the extension and fatality of the disease had excited considerable alarm, his services would not be called for until they could be of no avail. Acting on this experience, we represented to the local authorities in our first notification, that in case of an outbreak of cholera, it would be incumbent on them immediately to provide a sufficient medical staff to enable a daily house-to-house examination to be made of the infected locality.

'But former experience, particularly at Edinburgh, where the expedient was first tried during the epidemic of 1832, had shown that in some of the worst localities, and in the most filthy and overcrowded houses in which cholera was actually prevailing, the removal of the inhabitants from their wretched abodes was absolutely necessary; the probability being, that if allowed to remain there, they would become the next victims. The opening of Houses of Refuge for the temporary reception of such persons appeared, therefore, to be a highly-important auxiliary measure of prevention.

'The agency for carrying out an efficient system of house-to-house visitation necessarily involved some expense and trouble, but we came to the conclusion that it would be our duty to enforce the adoption of this system in any case in which it might seem to be required. The first place in which we were called upon to issue an order to this effect was in the town of Dumfries. Dumfries had suffered more severely from this pestilence on its invasion in 1832, perhaps, than any other town in Great Britain, and knowing that little sanitary improvement had been effected in the interval, and consequently that the inhabitants must be in as great danger as before, we called the attention of the authorities to the special regulations of the Board. To our recommendations the parochial Board paid no regard. The disease meantime went on committing its former ravages. Thus within the first twenty-nine days after its outbreak there occurred 269 deaths out of a population of 10,000. No efforts being made on the part of the local authorities to check

this great mortality, it appeared to us that this was a case requiring a stringent enforcement of the regulations of the Board, and we sent one of our medical inspectors (Dr Sutherland) to organise a plan of house-to-house visitation, to open dispensaries for affording medical assistance by night as well as by day, and to provide Houses of Refuge for the temporary reception of persons living in filthy and overcrowded rooms where the disease was prevailing, and who, though not yet attacked, were likely to be the next victims. The result of the adoption of these measures was, that on the second day after they were brought into operation the attacks fell from 27, 38, and 23 daily, to 11; on the fifth day they diminished to 8; on the ninth day no new case occurred; and in another week the disease nearly disappeared.

'That this remarkable and rapid cessation of the disease was not the consequence of the natural exhaustion and termination of the epidemic, is proved by the fact, that the premonitory diarrhœa did not diminish proportionally with the diminution of cholera; but that, on the contrary, while cholera steadily decreased, diarrhœa went on, and even increased, thus showing the continued action of the epidemic poison upon the system; while the true cause of the diminution of cholera was, that the visitors detected it in its diarrhœal stage, and at once arrested its further progress.

'A similar but still more rapid suppression of the disease was effected at the small village of Nordelf in Norfolk, where, out of a population of 150 souls, there occurred no less than 50 cases of cholera. When Mr Bowie, whom we requested to go to the assistance of these poor people, arrived at the village, he found it in a state of filth almost unexampled, the people in consternation, the sick without nurses, and the single medical attendant nearly exhausted with fatigue. Mr Bowie immediately arranged a plan for the daily visitation of every house, obtained additional nurses and medical aid, carried out extensive cleansings, caused the removal of nuisances, and suggested improved means of ventilating the sick chambers. From the time that these measures were brought into operation only four new cases of cholera occurred; but here also the premonitory diarrhœa went on: every case, however, being promptly attended to, was prevented from passing into the developed stage, and hence the rapid disappearance of cholera.

'The success which thus attends these measures when applied to small populations within the control of a moderate visiting staff, led to their adoption at Glasgow. But here the difficulty was much greater. For the purpose of ordinary medical relief, Glasgow City parish being subdivided into seventeen districts, and the Barony parish into six districts, it was deemed expedient to base the preventive measures on the existing system of medical relief rather than to lose time in organising another machinery. The entire population of the seventeen districts of the City parish is, in round numbers, 152,000, and of the six districts of the Barony parish about 127,000. The task was, to arrange an easy and effectual system of daily house-

to-house visitation over the whole of the affected localities containing this large, and, in the most susceptible districts, shifting and migratory population. The details of the plan will be found in Dr Sutherland's Report. It was briefly this:—The existing districts being preserved, each district surgeon, in addition to his ordinary duties, was required to undertake the office of superintendent within his district. There were thus in the two parishes twenty-three district superintendents, and under each of these officers were placed a few advanced medical students or qualified practitioners to visit from house to house. These visitors were provided with medicines to administer on the spot to all persons suffering from premonitory symptoms, a practice which had been found most beneficial in Dumfries and Nordelf. Advantage, as has just been stated, was taken of the circumstance that Glasgow is a university city, to select qualified young men from the more advanced medical students as visitors. The entire working out of the system was placed in the hands of a general superintendent for each parish. General instructions, giving all needful details of the plan, were printed and circulated among the superintendents and visitors. For the City parish there were 40 visitors, and for the Barony parish 28, in all 68 visitors. Dispensaries were opened night and day for all necessitous applicants, and a cholera hospital and Houses of Refuge were provided. A system of sanitary inspection was likewise introduced into the large manufactories by the aid of the Secretary of State for the Home Department, through Mr Stuart, the Inspector of Factories in Scotland, with the view of detecting and treating immediately all premonitory cases that might occur among the work-people; and in one district in the Barony parish a body of lay-visitors at 2s. 6d. per diem was employed with success.

'At the time when these arrangements were completed, the epidemic had attained its height. On carrying them into operation, the first result obtained was the discovery of a number of corpses of persons who had died of cholera without having received any medical aid whatsoever; the number discovered amounted to fifty; but there is reason to fear that such deaths were still more frequent at an earlier period of the epidemic.

'The second result was the discovery of a great number of cases of fully-developed cholera, which were going on wholly without medical assistance. Some of the visitors found as many as twelve of these each day for some days after the visitation commenced, and the visitors concur in stating their belief that in these instances neither the individuals nor their friends would have applied for medical relief.

'The third result was the discovery of great numbers of premonitory cases in various stages of progress, not only without the application of any means to arrest them, but without the slightest consciousness on the part of the affected persons of the danger they were in. The first return showed the existence of 273 cases of diarrhœa to 68 of cholera; and of these diarrhœal cases, 35 had the peculiar

rice-water appearance which marks the close approach to the fully-developed stage; but as the working of the visitation became more complete, the proportion of the premonitory to the developed cases daily increased. The tables of general returns, reports Dr Sutherland—"Show, that throughout the entire districts under visitation, the proportion of the premonitory to the developed cases amounted to nearly 600 per cent.; in the City districts it was 504 per cent., and in the Barony districts 685 per cent.; but when the districts are taken individually, the proportions are still more striking. They vary from under 200 per cent. to above 2000 per cent., and in one instance (Barony district, No. 1) the premonitory cases amounted to the enormous cipher of 2379 per cent. of the cholera cases. During particular days in the course of the epidemic a much larger proportion of diarrhœa and other premonitory cases were discovered than during others. This partly arose from the greater comparative success of the visitation, and also partly from the course which the disease happened to take at the particular period. The per-centage of premonitory cases on these occasions rose as high as 2000, 2800, 3700; and on one day in the Barony parish it was 3850 per cent. of the cholera cases.

"The total number of premonitory cases treated during the continuance of the house-to-house visitation, from December 31, 1848, to February 26, 1849 inclusive, was no less than 13,089; and if to this be added the number of unreported cases already alluded to, it is not improbable that about 15,000 such cases were brought under treatment by the parochial medical officers and visitors. During the height of the epidemic, indeed, all Glasgow appears to have been affected. The number of cases treated by private practitioners also was very large. One gentleman prescribed for about 1100 such cases in the denser parts of the city, and many cases of diarrhœa occurring in the better parts of the town were found to be extremely obstinate in their character. It is to be feared that among the richer classes not a few lives were lost by delay in applying for medical aid."'

REVIVAL OF A FORGOTTEN AUTHORITY.

As the question of the non-contagiousness of the plague, the cholera, and other great epidemics, has lately become one of great importance in this country, it may perhaps be interesting to the reader to afford some information on the history of the contagion controversy not generally known. The theory of non-contagion was adopted and vehemently supported in 1824 by Dr Maclean, but it did not then receive sufficient support to become of public moment. It is not generally known, however, that this view was adopted, and pursued with great talent, so early as the year 1754, by Dale Ingram, a surgeon who had travelled extensively in Eastern countries, and acquired much practical acquaintance with epidemics. Although his scientific knowledge will of

course be found subject to the usual defects of the period, yet his views on this subject are so practical and enlightened, and are so strikingly in accordance with those sanctioned by the highest science of the present age, that a very long quotation from his work is offered to the reader, in the belief that it will be acceptable:—

'After a strict inquiry, I cannot find that either the Greeks, Arabians, or Italian physicians have said one word of the plague ever being transported from one nation to another in any sort of merchandise. It is certain they were the most curious compilers of medical history; therefore, if any such thing had happened at any time, it could not possibly have escaped their notice; for facts of this nature are too obvious to pass unobserved by men less curious in observing the causes of diseases. Rhazes and Avicenna, Arabian physicians, are silent on this head, although the former practised nearly 100 years; and Mercurialis says, "After I had made a most particular search among the writings of ancient physicians, for the plague being communicated by a fomes, I never could discover any such thing among them."

'If we search into earlier times, we shall find that the Turks, Persians, and Arabians wore silk, cotton, and furs; that they traded in these commodities all over the Indies, and great part of Europe; and yet we cannot learn that any such fatal commodity as the plague was sold with their goods. Naples, Sicily, Genoa, Germany, Flanders, Copenhagen, Stockholm, Holland, and Amsterdam, have all been attacked with the plague, and we have received many ships from those places laden with linens, flax, hemp, &c. at those seasons, yet no ill consequences followed, though their voyages were performed in a less time than from the Turkish empire. Certainly, then, if the seeds of contagion could be so conveyed, we should have received them very warm, and more especially in those days when no quarantine was used. The first Europeans that traded with the Turks were the Venetians: they had no notion that the plague could be received in traffic till very lately—that is, till the affair of Trent—though they continued their commerce for a long series of years, and grew very rich.

'About 160 years ago, our English merchants entered into the Turkey trade, since which it has not been fairly proved by Dr Mead, or any writer, that the plague was ever brought from thence. Some of our merchants have resided long in those countries, even when the plague raged with great violence at Aleppo, Scanderoon, Smyrna, Constantinople, &c. and made vast devastations, nay, before the year 1665. Surely, then, if it could have been at all brought over, these early periods were the most probable seasons for such misfortunes, because the nation did not guard against the infection, as now, for we had no apprehensions of its being conveyed in goods.

'About thirty-seven years ago, the plague at Aleppo carried off 90,000 in half a year, but we never perceived any effects of it here,

though several ships arrived with cotton, &c. from that port. Before the plague in London, we imported many thousand bags of cotton, and since that time some millions, even from infected places, yet we have never heard that any inquiry of this kind was made; and even the bale of cotton, so much talked of in 1665, as having conveyed the infection into London, is not uncontroverted, for we are told that the king being in council, was informed that the president of the Royal College of Physicians affirmed that the plague began in St Giles's by flax. It is very probable that this was the place where the plague first appeared, since the poor in all nations are first afflicted; for unwholesome meats, drinks, tainted flesh, stinking garbage, and uncleanliness, do not a little contribute to the propagation of pestilential distempers; for whenever there is a distemperature in the air, the human body is, by these causes, predisposed to receive the infection. The poor were always the first sufferers in all countries, if you believe the learned, because their fluids are poor and weak, and consequently the solids less able to resist putrefaction. Accordingly, Mr L'Estrange takes notice that the plagues in 1625 and 1636 broke out in Whitechapel; a probable place, not only from the poor in that neighbourhood, but from the slaughter-houses, since more beasts are killed there than in any other parish in London; and consequently more animal filth and nastiness is there to be found. I know that the plague is generally believed to have been brought to Marseilles in a Turkey ship, and the people in England believed it, not only at that time, but even now, for it was then, and is to this day said, that a bale of cotton introduced the infection.

'The first ship suspected of importing the contagion to Marseilles came from Sidon, Tripoli, Syria, and Cyprus. She was commanded by Captain Chataud, and arrived on the 20th of May 1720. Her patents or clearance certified that there was no contagion in those places; she sailed the 31st of January, which was before the plague broke out in any of them, for which reason she had a healthy patent, it being at least a month before the plague usually appears in those countries; and I conceive it will be granted, that if a ship loads at a port free from a plague, she cannot receive an infection by contact. Dr Dedier says none of the goods of the other ships before-mentioned, not so much as a bundle or parcel, were brought into Marseilles, consequently the plague could not be conveyed from those ships, even if the disease had been on board. Messrs Chiconeau, Verny, Soulier, and Dedier, all very eminent men in physic, publicly declared against the possibility of the plague being transported in goods. The plague I am speaking of began among the poor, and its first appearance was on the 9th of July, six weeks after the first ship's arrival.

'This narrative would incline one to believe that the plague of Marseilles was neither brought nor propagated by any merchandise from Turkey; but it arose from an insalubrity of the air. Sanctorius could never conceive that the plague could be conveyed in goods, and

says, "The infection can last only so long as the remote or immediate causes subsist; for if any one of them fails, the malignity stops, as the movement of a clock ceases as soon as there is a failure in the smallest tooth of any of its wheels." I cannot, therefore, give up my own opinion to a late author* who has, by his authority, countenanced the relation of the rise of the plague from cotton imported. We are ready to swallow French modes and French tales, and I am apt to believe that this wonderful conceit was imported from the French, and that this is the only plague ever brought to us by men and apparel. Suppose a ship took in her lading at any port at the time when the plague raged there (which, I am certain, has often been the case), and suppose, too, that the merchandise had imbibed the contagion at the time when it was put on board; if it should be so circumstanced, we should be all frighted at the entrance of so dangerous a guest, but to be frighted would be our only evil; for it is evident that it must be impossible for the plague to be so conveyed to us, because it is of a nature contrary to the disposition of our climate; for during a great part of our summers, we have either northerly winds, that are in their nature very dry, and of a nitrous quality, which is very healthy, as physicians have observed, or accompanied with moisture and continued rains. But even then the gales proceed from the north and western parts, and such rains are different from the damps or wet weather in Turkey; for in those countries the rain falls after great droughts, in hasty showers, and is succeeded by scorching heats and southerly winds.

'It must be granted that we are situated in a very unsettled climate; the winds never continuing long in any quarter; nor is our weather certain for months together, like that of Turkey, where they have but two regular seasons (stated winds)—one of near eight months, with continual north-east gales; and the other with southerly winds. Besides, we have no deserts, great lakes, swamps, or extensive rivers in our neighbourhood, nor high barren mountains, scorching sands, or spacious wildernesses, inhabited by wild beasts, innumerable reptiles, insects, &c. in which they perish. Neither do our herbage rot and stink on the surface of the earth, consequently our atmosphere cannot be predisposed to receive and nourish so unwelcome a guest; for the very same cause which hinders the plague from continuing all the year in any one city in Turkey, prevents its entrance into England. But here the air abounds with nitre, the chief resister of putrefaction. Besides, we want that intense heat with moisture which is necessary to putrefaction; for without these agents—heat and moisture—nothing can putrefy.

'I have said before that heat rarefies all bodies more or less; it weakens the contact of substances, lessens the cohesions, and gives space for moisture to penetrate them, both which acting at the same time, prepare bodies for solution and putrefaction. Indeed England would be as subject to the plague as Grand Cairo, if it was situated

* Dr Mead.

in a neighbourhood of the same nature. But this cold latitude defends us from frequent and violent pestilences, by affording us an air of almost the same nature as that which attends the Etesian blasts, which are remarkable for checking and extinguishing all pestilential diseases in every part of the world. If the plague cannot show itself in its mother country, when the air is fanned with north-east blasts, certainly it cannot gain admission in that clime of which the atmosphere abounds with principles so directly opposite to its nature. This island has, indeed, variety of seasons, but they are all colder than those in Egypt, and our lands are everywhere better cultivated. We have no woods to screen the sun from the earth, nor moist exhalations to poison the atmosphere; and therefore, when I am convinced that the natural insects of those countries can live, breed, and enjoy health in England, I then shall believe that mohair and cotton may convey the plague to us, and that it is possible for this distemper to remain here for years.

'*The Nature of Lazarettos and Quarantines considered.*—These methods have been in use in most nations subject to this infectious disease, but never with success. Marseilles being persuaded to the Italian practice of fires, guards, quarantines, &c. followed their methods to the destruction of the subjects. Let us now see whether we have any reason to follow them for the future. We may, for once, suppose a summer like that in 1665, attended with great heat, moisture, and southerly winds; that some merchandise from Turkey was capable of imbibing the seeds of the plague; that it was possible for it to be brought and spread in any part of England; and that our air, as well as the bodies of the inhabitants, were predisposed to receive the infection. Now, as the plague is propagated by hot and moist air, how is it possible to think that walls should be able to intercept the passage of this fluid? I should as soon imagine that the wall round Hyde Park would prevent the rooks from building in the oaks, or the small birds in the bushes; for birds have wings, and fly; so can the plague. The wings of the plague are the winds, and therefore it can soar higher than the towering superstructures of men. Besides, lazarettos and quarantines, shutting up houses, fires burning in the streets, lines, intrenchments, guards, and shutting up whole cities have been tried over and over, for ages past, to prevent the spreading of this disease; but I never could learn that any, or all of these methods, ever hindered it from going forward. Probably, then, the merchants will think themselves somewhat burthened by the heavy expenses they are now obliged to suffer in performing quarantine, whilst the poor sailors grieve to undergo an undeserved imprisonment. But the nation, whenever it is thought proper, may prevent their suffering any longer these inconveniences, and with safety save the expense of building offices for such purposes. At Leghorn, and other ports, where lazarettos have been established, the usual method is to open every bale of merchandise from one end to the other, and then the porters thrust in their naked arms every day, to let in fresh air. This is the common practice. Now I conceive that if the

merchandise was infected, these porters, one time or other, must, according to Mead's doctrine of contagion, receive the distemper, of which we should have some accounts; besides, the porters would refuse this employment as soon as instances could be produced of any of their fellow-servants dying by an infection received in this business. It is also much to be questioned whether our English porters would be persuaded to work of this nature. Nay, I am afraid that even convicts would rather choose to finish life at Tyburn, if they were sensible of such danger.

'It must seem strange that we have but lately insisted on quarantines, after a long, constant, and extensive traffic to every part of the Levant, without such care or any injury. If goods may retain the seeds of contagion, it would be very dangerous to open the bales, and expose the goods to the air; for the circumambient air would naturally kindle the fuel of the distemper, and, as it were, light it into a flame; for air is the food of fire; it kindles everything flammable, and without it no fire can subsist. Air is the immediate cause of all fermentation and putrefaction, and can produce fire from moist bodies. As, for instance, a ship had taken in her lading of saffron-weed at Salonica: on her voyage, this commodity being moist, fermented and heated; the captain of the ship very injudiciously took up the pumps to let in the air, and this fresh air caused a new fermentation. The weed soon after took fire, and burnt the ship and cargo. Much the same event happens to stacks of new hay when they are put up with much moisture. The method taken by the Indians to produce fire is by rubbing two hard pieces of wood together, which puts the intervening air into a violent motion; and this in some measure proves that air is necessary to produce fire.

'If Turkey wares brought to us could infect the nation, the persons most subject to receive the infection would be the mariners, because when the hatches are first opened there arise very warm and hot steams. They would be endangered likewise by removing the cotton, and as it is impossible to unload these vessels without breaking the packs, insomuch that abundance of it is to be repacked. In the next place, the customhouse officers, and warehouse-keepers, and every person employed, would be in danger of catching the distemper. Permit me, therefore, to say, that if the plague in 1665 had been the Turkish disease, it must certainly have first broke out somewhere about the customhouse, instead of St Giles's, Clare-market, or Westminster. Besides, London would not have been the only city infected; Norwich, Manchester, nay, Spitalfields, and other towns and places where the cotton was manufactured, would have also received the infection. Since neither lazarettos nor quarantines have ever stopped the rage of the disease, and since the notion of the plague being transported to us is so strongly rooted in our minds, I shall consider a few of the many disadvantages such practices will produce. *First*, Encouraging the running of Turkish merchandise from France and Holland. *Secondly*, A great hazard of having the plague (if the disease can be imported) smuggled into the nation.

Thirdly, Disabling this branch of trade from procuring sailors to work the ships; for if they are to be imprisoned on their return home, they will naturally shun the employment. *Fourthly*, Such places of imprisonment would be storehouses of contagion; for if goods cannot be healthy after a six weeks' voyage, a quarantine (in forty days) cannot purify them. Besides, another very great inconveniency will attend the lazarettos, for ships continually arriving with goods tainted must, when brought into it, infect anew both the goods and men that were there before; so that the sailors would receive the contagion again. This would be adding forty days to forty more; and when the sailors would be clean enough for another voyage, or the merchandise fit for market, who can say? *Fifthly*, Such storehouses of contagion are most likely to propagate the plague amongst us (if the seeds of contagion can remain in goods), for the whole lazaretto will be diseased, and the air seizing it, will spread it to the adjacent towns and villages, and fresh goods will be a continual supply so long as we trade with the Turkish dominions. I am not single in this opinion, for Dr Mead (p. 34) corroborates what is here advanced by the following passage:—"For while contagion is kept up and nursed in lazarettos, and continually increased by daily additions and supplies, 'tis impossible but, by degrees, the air should become tainted." And again, page 56:—"For confining people, and shutting them up together in great numbers, will make the distemper rage with augmented force, even to the increasing it beyond what can easily be imagined." *Sixthly*, If this trade should suffer for want of men to navigate the ships, a decrease of the customs follows, and a deficiency of the funds. *Seventhly*, Injury in trade brings discredit; discredit, poverty and discontent, and the starving of ten thousand artificers, &c. not forgetting the fears and frights which will expose us to a long train of mischiefs. * * *

'It seems strange, that although neither a captain, sailor, nor any officer of a Turkish ship, after his arrival, was so much as found distempered, or any persons hired to unload have died, yet we should tremble at this phantom, and imagine that ships can convey an infectious disease without infecting the mariners or passengers. It has never been proved, nay, never alleged, that any such persons were ever infected, or ever died of the plague; and I believe no history can show one instance of it in England. However, if there was any foundation for this opinion, that the plague is imported by shipping, many experiments might have been tried to prove its validity; and the only reason why some experiments have not been offered, must have been, that the mariners never complained of any such disease. Neither Wapping, Limehouse, Ratcliffe, nor Rotherhithe can produce so much as an old woman's story of her son or grandson dying of this distemper. Since, then, no proof, by way of trial, has ever been made to convince the world that Turkey ships were healthy, permit me to lay the following experiment before you:—Dr Mead and others have said that malignant diseases are capable of being conveyed in the plumage of birds; also dogs, hogs, &c.

have been killed by it; therefore the experiment I now offer is: on the first opening of the hatches, to let fly some small birds, or put some animals of any other species into the hold, and to let them continue there some time, and afterwards confine them, if they prove sickly, die, or recover; from thence we may, with some confidence, form a judgment. This is an operation highly in favour of contagion, since hot air confined will almost kill any animal; therefore the balance must here incline, as it ought, to the safest side of the question. If such experiments should not be approved of, I should conceive that inspectors should be appointed to go on board those vessels, and to examine the goods in the hold, and with naked arms pull the cotton out of the bags, smell to the mohair, sponge, skins, and other merchandise, that has been suspected to hold the seeds of that distemper. The inspectors ought to be those who have a perfect knowledge of the disease, because they should examine every officer and sailor before they make their report. Since, then, the plague is a distemperature of the air, it cannot be strange that neither lazarettos nor quarantines never has nor never can intercept its course, therefore the experiments of birds, animals, and the reports of inspectors of health, may pacify the minds of obstinate bigots, since they will confirm us in a belief that neither the plague in England in 1665, nor that of Marseilles in 1720, proceeded from commerce; for if they ever did, they will again; but then some of the officers or sailors will be diseased, or the birds or animals become distempered, all or any of which cannot escape the notice of proper inspectors appointed. * * *

'From this view of the indisposition of the atmosphere, and a numeration of the various countries through which the plague travelled in a short time, I apprehend that these nations could not be distempered by a communication from person to person, for these countries are vastly remote from each other. If, then, this should be granted, it follows that neither the English nor Marseilles pestilence were brought in merchandise, but sprung, originally and solely, from an infection in the air. To which if we say that these foreign kingdoms had not, at that time, even seen Indian or Turkish goods, nor had any current commerce with these nations so early as four hundred years ago, it will greatly strengthen my opinion, as well as support my intention, of pacifying the minds of my readers.

'We may carry these considerations still further by saying, if cotton, &c. were capable of retaining the seeds of the plague, household linen, cotton goods, flannels, bedding, and woollens, are equally dangerous. But if we look into any of the histories of the plague, we shall find it just the reverse; for after the great plague in London in 1665,* the people who had retired into the country were so little afraid of the infection being preserved in linen or household goods, that on their return to town they, without any scruple, entered the room of

* *Vide* Hodge's 'Account of the Plague in London in 1665.'

the sick before the people were quite dead, and went into the beds where the dead expired even before they were cold, and before they were cleansed from the stench of the diseased; but yet none caught the distemper. I conceive that more instances might be produced of people escaping this disorder after approaching the sick than of those who catch it. Let us particularly consider the condition of physicians, apothecaries, surgeons, and nurses. The question is, then, whether more of these people in the plague of London did escape with life, or died? According to what I have read, scarce any of them died, which shows that the cause of the plague spreading was more from the air than contact.* * * * *

'As to the story told by Benedictus of a feather-bed retaining the poison of a plague for seven years, and killing afterwards 5900 people, and that of a rag containing the seeds of the infection for fourteen years; Forestus' history of an old trunk, with a cobweb in the corner of it, making a plague-sore; a person seized with this disease by handling some thread; Fracastorius' tale of a leathern coat killing twenty-five Germans, who wore it after each other, and 10,000 men being destroyed by the contagion retained in it; the relation of a lady who dropped down dead of the plague by smelling to a Turkey handkerchief; the account of a man who lost his life by standing on a Turkey carpet; and many other melancholy stories, I believe, were in a great measure the foundation of fixing the belief of this disease being propagated by contagion.

'I could answer every one of these recited stories separately and satisfactorily, but I am confident few, if any, will think them of any consequence, since those merchants who have lived in Turkey can inform us, that after the plague has ceased, they or their servants do handle and smell to the cotton, &c. without receiving any injury; for the malignity does not continue in these loose and spongy goods to such a degree as to infect the Turks or Armenians after the plague season is over; if it did, those nations would never be free a month from the distemper.

'Every one who has been in Turkey well knows that stevidores and sailors often work naked in stowing the cotton. This is a laborious employment, and the hold of the ship is excessively hot. Further, the cotton packs or bales are continually handled and tumbled about to fix the pieces of wood† on, to facilitate their storage. The labourers, too, are often barefooted, therefore they cannot help treading continually upon the merchandise brought aboard. Nay, I have seen the sailors breakfast, and others sleep on these bales of cotton, &c. Surely, then, if the seeds of contagion were lodged in cotton, these men could not escape.

* We have an account of five physicians that died during the plague. This number is but small in proportion to those employed in attending the afflicted.

† To every bale of cotton are fixed several long pieces of wood, called *longeters*. They are managed to form the bale like to a cone, and where a strong man can but just force in both hands, one of these packs is heaved in by the strength of a windlass. The force is so great, as often to raise the decks and sides of the vessels, and it is allowed to be the most curious operation in loading.

'From what has been advanced, I conceive that this Turkish endemial disease, this supposed effluvia, vapour, imperceptible steam, cannot any longer support its credit, unless we are resolved to pay no attention to the force of evidence, and to shut our eyes against conviction; for is it possible to bring a sick person from Turkey, to continue sick all the voyage, and afterwards to infect London? This cannot easily be done, because every person sick of the plague either dies or recovers in three or four days. For the same reason towns have not been infected by sick persons, because the violence of this fever is so great, as to disable the afflicted from travelling to distant villages. In ships sailors eat, drink, work, and sleep, in a very small compass, but it has never been proved that any ship had the disease after a fortnight being at sea. Suppose, upon the ship's departure, any one was to fall sick, even then the distemper would not spread further, unless the same corrupted state of air should exist through the various latitudes. We know the plague ceases in every city on a certain change of the air: as it is produced by its corruption, so it will be stopped by opposite qualities. If this was not the case, we should never conceive how the plague ever can cease after any town is attacked, unless with the destruction of every inhabitant. Again, if cotton could imbibe any contagious effluvia, it then must abound with the active putrid salts and highly-attenuated oils; the very essence of the malignity would be packed in such bales. The consequence, then, would be no less than the death of most, if not of all, the ship's crew, for they are the people that must suffer first, for reasons very obvious. These salts and oils so adhering to cotton must be, in their own nature, moist; and the hold of a ship, so stored with goods, is known to be very hot. We have here the primary and secondary causes of contagion; it follows, then, that a putrefaction must succeed; for the heat of the ship would rarefy the poisonous effluvia, and spread them to the neighbouring goods, which they would penetrate, and consequently an increase of the malignity must ensue, insomuch that all the effects in the hold would be more or less poisoned, and the malignity heightened to a contagion. This would certainly be the case could the cotton imbibe from the air the pestilential *miasmata* of the disease, and most of our sailors using this trade would die in the voyage, and the Turkey merchants would find a hard task to get men to work the ships; but no such misfortunes have happened, nor do the sailors apprehend that such mischiefs can befall them.

'We must now conclude, that if this disease can be conveyed in merchandise from one part of the world to another that is very remote, the distemper must be very frequent in our ships, or, since it is not frequent, that it cannot be so transported; and we need not be at the expense of lazarettos, or at the charge of performing quarantines. If the first is true, then the merchants ought publicly to declare that more sailors annually die in the Turkey trade than in any other in proportion to the number of men they employ. And they also should let us know whether in the voyage, or on opening

the hatches, any such ill effects have happened; and be very particular in this last, because, on unloading the vessels, some steams will ascend; therefore, if they contain the seeds of pestilence, they must appear as dreadful as those which arise from mines, wells, or the famous Grotto del Cani. But if we have lost no more men in the Levant than in other trades, we may presume that the disease cannot be brought over. Here are two points of great consequence, and much stress must be laid on the one or the other; the merchants who have long resided in those countries, as well as captains who have been for years employed in the trade, when called upon or examined, are qualified to give satisfactory answers. In the meantime, I can safely say, whilst I was in Turkey, that the sailors were as healthy as in any other nation where I have travelled.'

THE END.

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