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BY

PROF. FRANCIS BACON, M. D.

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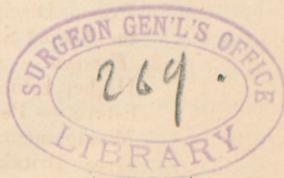
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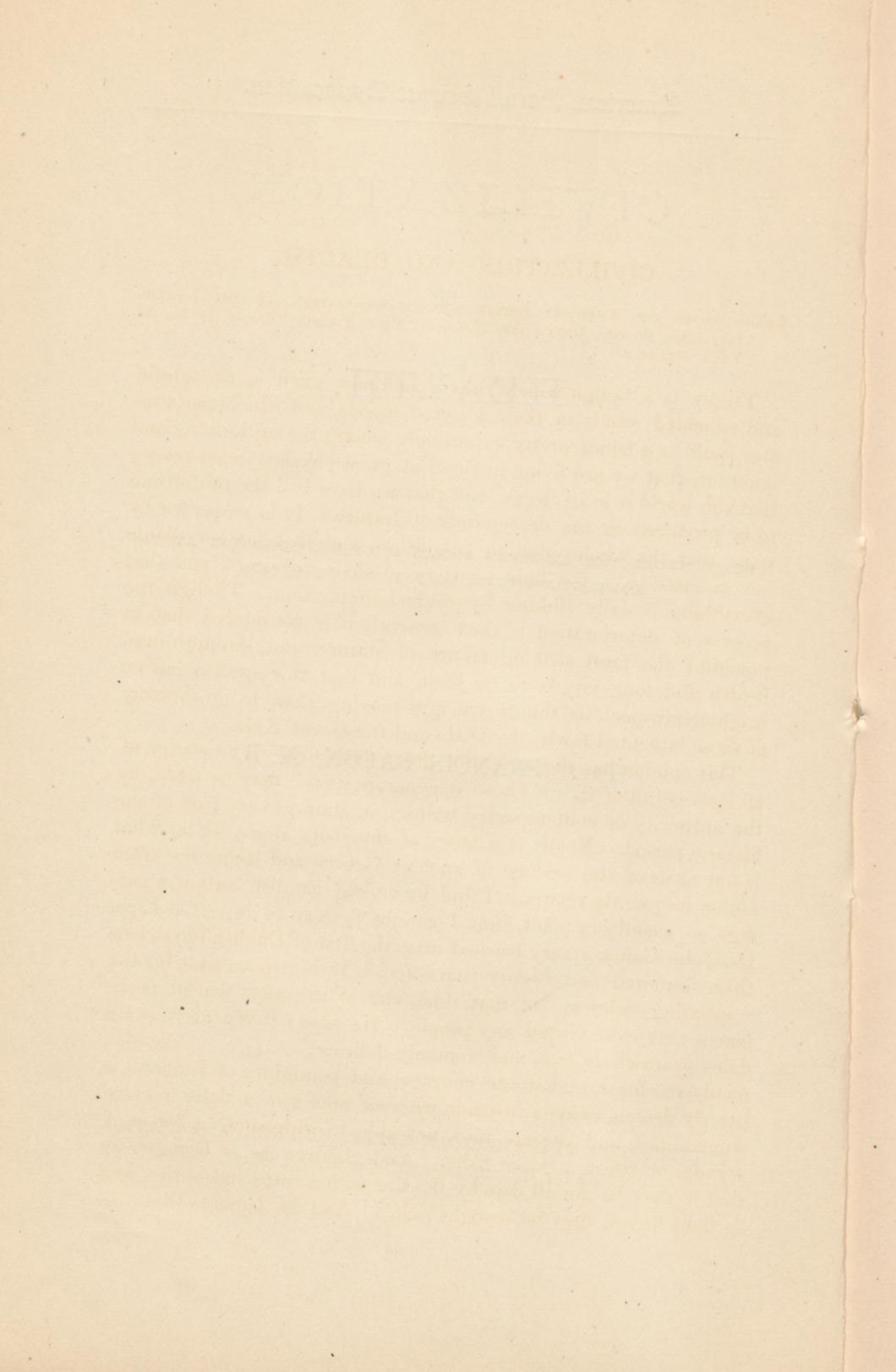
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CIVILIZATION AND HEALTH.

READ BEFORE THE AMERICAN SOCIAL SCIENCE ASSOCIATION, AT THE LOWELL INSTITUTE, BOSTON, MARCH 1ST, 1870. — BY PROF. FRANCIS BACON, M. D., OF YALE COLLEGE.

THERE is a notion which rises sometimes even in thoughtful and educated minds in their dejected moods, and which perpetuates itself as a belief pretty extensively among the unthinking and ignorant, that we are living in times of great physical degeneracy ; that the world is in its decay, and that we have had the misfortune to be produced in the decrepitude of Nature. It is suspected by some that the whole creation languishes, and that neither plants nor animals have the bulk or vigor of their ancestors, and that everything is daily sinking by gradual diminution. Though the process of deterioration is thus general, it is considered that in mankind the most striking failure of stature and strength and health and longevity is to be seen, and that this species has no brighter prospect, as things are now moving, than to go the way of those lamented fowls, the Dodo and the Great Auk.

This opinion has the weight of great antiquity. The poetry of all ages is full of it. "These degenerate days" may be fixed, by the authority of contemporary writers, in almost every part of the historic period. Nor is it a fancy of the poets alone, for in what is left to us of the science of ancient Greece and Rome the same notion frequently recurs. I find in an old English author a passage so exactly in point, that I cannot forbear to repeat it here. Dr. John Caius, a very learned man, the first of English physicians three hundred and twenty years ago, is trying to account for the "sweating sickness" of that time, one of the most fearful pestilences that ever visited any people. He says: "We are nowe a daies so unwisely fine, and womanly delicate, . . . the olde manly hardness, and stoute courage, and painfulness of England is utterly driven awaye; insteade whereof men now a daies receive womanlines, and become nice, not able to withstande a blaste of wynde, or resist a poore fishe. And children be so brought up that if they be not all daie by the fire with a toste and butire, and in their furies, they be straight sick." And he laments that peo-

ple no longer "lyve quietlie, friendlie, and merily one with another, as men were wont to do in the olde worlde, when this countrie was called merye Englande." Yet in spite of these consuming vices, bringing swift destruction with them, that dreadful pest has gone, clean gone, and has been seen no more for these three centuries, and the English people remains — remains to be scolded in the same round terms in this present year of grace; and to listen to tales of the lost prosperity and happiness of some golden age, fixed, if not wholly vague and dateless, in some period when, as Macaulay has said, in a passage familiar to all, "noblemen were destitute of comforts the want of which would be intolerable to a modern footman; when farmers and shopkeepers breakfasted on loaves, the very sight of which would raise a riot in a modern workhouse; when to have a clean shirt once a week was a privilege reserved for the higher class of gentry; when men died faster in the purest country air, than they now die in the most pestilential lanes of our towns; and when men died faster in the lanes of our towns than they now die on the coast of Guiana."

Sagacious minds may have often suspected this cherished grievance of the ages to be an imaginary one, but only in recent times has it been possible to show authoritatively how unfounded it is. The gathering and recording of great masses of facts relating to the duration of human life is a modern practice. There is no continuous record of this sort running back quite four hundred years. The well-known and often quoted Geneva records are the oldest that we have. No one, probably, can see the result of those records stated for the first time without a sense of astonishment. They show us that in a period of three hundred years, the average term of life was lengthened from 21.21 years to 40.68 years, an increase of almost 100 per cent. So surprising a statement as this might well be received with suspicion, were it not that all the evidence that we have (and of later years it has accumulated enormously and with extreme particularity of detail) goes to corroborate it. The temptation is strong to set before you some of the impressive arithmetic of the subject, and leave it there, but "the eloquence of figures" addresses itself rather to sight than to hearing; and, besides, many of you must have seen a statement of the facts, at once full and exact, given in an article in late numbers of the "Atlantic Monthly."¹ In short, we know that the expectation of life for those born in Christendom is greater now than

¹ "The Increase of Human Life," by Dr. Edward Jarvis. *Atlantic Monthly*, October, November, and December, 1869.

ever before since history began to be written ; that life is better worth having now than ever before ; that it is more respected, more fenced about with all safeguards of law, more secure. The growing reluctance to inflict death as a penalty, is a single indication of this fact. So, more indirectly, is the growing intolerance of the existence of bodily pain. Where now could spectators be found for an *auto da fe*, or a crowd of connoisseurs of the torture-chamber ? Since the divine discovery of anæsthesia has shown us that the worst and most hopeless of pains are unnecessary and preventable, we have had some education in this regard. It is still too early to estimate in full the moral effects of that discovery, nor is this the place to do it, but I shall scarcely be called fanciful for this suggestion of their importance.

Admitting then, as we must, this steady increase in the term of human life coincident with the progress of our civilization, it becomes us to know something in detail of the influences which have proved thus kindly and fostering. Can we simply say that all the new conditions to which man has been subjected in his progress from the primeval state up to the civilization of the present, have been to his advantage ? Far from it. Countless-myriads of men, some entire races, have been crushed and melted away in the working out of the great problem. "The world," says wise Sir Thomas Browne, "that took but six days to make, is like to take six thousand years to make out, meanwhile old truths voted down begin to resume their places, and new ones arise upon us." It is a slow process, our coming to a perfect understanding with Nature, so that, on the one hand, we take all that she has to give us, and get the good of it, and on the other hand, we do not interfere with her great changeless laws by our little housekeeping arrangements. Whenever we do this latter, whether by blunders in the way of our dwelling, or occupation, or food, or clothing, or medicine, we invariably suffer for it. She will not be defrauded. The history of civilization is a recital of experiments that prove this. The human individual is an infinitely variable quantity, and it takes a great while to complete and determine important experiments upon him ; so long sometimes that his own life is too short, and his heirs must carry on the process after him. A much longer period is needed to get the final results of similar experiments upon the human race. Now a steady succession of ever new experiments attends the progress of mankind, not only from absolute barbarism to civilization, but from one degree of civilization to another. When, for instance, the Irish people began to be fed with pure starch, — with

potatoes, — that easily cultivated and prolific root was found to give great returns to the poorest husbandry in the cold and damp soil which had before reluctantly yielded scanty crops of rye and barley. The people soon had a greater bulk of food than ever before to put into their stomachs, and the sense of distension thus produced was satisfactory as replacing habitual emptiness. Population increased, — not uniformly a symptom of prosperity, — and the new and abundant food was regarded as a great boon to the impoverished and ill-fed country. The potato gradually exterminated the grain crop. What the effect was then upon the health of the potato eaters, no one of that age seems to have observed. We know now, for Majendie and Lehmann and Liebig have taught us, that this sort of feeding was no better than disguised starvation; and, more recently, with the introduction of extensive potato culture into new countries, — New Zealand for example, — we have had the opportunity of seeing how certain diseases of mal-nutrition have multiplied there. But the potato speedily became almost the sole food of Ireland, and nobody ventured to speak a disrespectful word of the vegetable, until Wm. Cobbett did, after two centuries of its use; and he was well known for a surly iconoclast and impracticable revolutionist, whom nobody regarded. So the experiment went on, and we know only too well what has come of it thus far. In other countries when wheat has failed, the poor, though sorely pinched, have made shift with barley and rye, and, when these were gone, with buckwheat and roots; but where, in years of plenty, nothing stands between the people and death but the starvation diet of potatoes, what is the alternative when that fails? This is the awful question that has been put again and again to the Irish in successive potato famines, and which, after a despairing attempt at answering it with poor pot-herbs, and dulse and tangle from the sea, they have “given up” by myriads. The potato played this people false, not merely by melting into rottenness beneath their grasp, but, more insidiously, by slowly sapping their physical and perhaps moral powers through generations; so that when the time of stress and struggle came, nothing was left in reserve of strength and courage, and the famine-typhus found them a passive prey.¹ “All analogy,” says Dr. Farr, the Registrar-General of England, “proves that no exten-

¹ That saintly man, Father Matthew, said in 1846, “On the 27th July, I passed from Cork to Dublin, and this doomed plant bloomed in all the luxuriance of an abundant harvest. Returning 3d August, I beheld with sorrow one wide waste of putrefying vegetation. In many places the wretched people were seated on the fences of their gardens, wringing their hands and wailing bitterly the destruction that had left them foodless.”

sive or permanent degeneration of a race can be accomplished in less than two or three generations. The great change is as slow and insidious as it is certain. It is rarely perceived by its victims, who remain rooted and benumbed on the spot, unless they and the community are aroused by sudden and terrible catastrophes. That angel which it would seem it has pleased the Almighty Creator and Preserver of mankind to charge with this dread mission, is the pestilence. Wherever the human race, yielding to ignorance, indolence, or accident, is in such a situation as to be liable to lose its strength, courage, liberty, wisdom, lofty emotions, the plague, fever, or cholera comes, not committing havoc perpetually, but turning men to destruction, and then suddenly ceasing, that they may consider. As the lost father speaks to the family, and the slight epidemic to the city, so the pestilence speaks to nations, in order that greater calamities than the untimely death of the population may be avoided." We cannot say confidently yet, that we have seen the ultimate result of this potato experiment.

Take an instance, again, in the case of another vegetable unknown to the Old World, American, too, like the potato, but this time a tremendous narcotic.

Tobacco has been a factor in our civilization for about as long a time as the potato. Precisely what it has done to the human race, we are not yet authorized to say. Some of its effects are very subtle; but that it has had some great influence seems clear enough. When it is taken for the first time in a considerable dose, it produces symptoms which need not be described here, but of which we may safely say, that no physician could see them originating in any case without alarm, if ignorant of the cause producing them; and, having such properties, this drug is consumed by the human family at the estimated rate of nearly one thousand millions of pounds a year. Its effects cannot fail to have been great, however uncertain, and we have some good reasons for believing that in many cases they outlast the life of the individual in whom they are first manifested; that, for instance, what is impaired assimilation in the parent is arrested or perverted development in the child, — that nervous irritability and hypochondria in the one becomes paralysis and insanity in the other; and, in short, that this tobacco experiment is one of those already spoken of, that cannot be carried through in a single individual or a single generation. Undoubtedly posterity will know more about it than we do, and perhaps will wonder at our ignorance of what to them will be palpable facts.

Then, again, there are coffee and tea, still newer to our use. In the year 1610, Master George Sandys saw with astonishment in Constantinople the Turks "sitting most of the day and sipping of a drink called coffa (of the berry that it is made of) in little china dishes, as hot as they can suffer it, blacke as soote, and tasting not much unlike it, which helpeth, as they say, digestion, and procureth alacrity." And this, he speculates, is the genuine "blacke broth" of the old Spartans. In 1652 the first little parcel of it was brought to London and used. This present year, it is calculated, in Europe and America, something like one hundred and fifty thousand tons is consumed (three hundred million pounds). September 25, 1661, the worthy Mr. Pepys, a great fancier of novelties, makes the important entry in his diary: "I did send for a cup of tea, a China drink, of which I have never drank before." At the beginning of the last century the entire annual use of this "China drink," in Europe and America, did not amount to five hundred thousand pounds. Now it exceeds fifty millions. This is a wonderful change effected in the diet of Christendom; a change not without potent and permanent results in the physical nature of man. Whether any of these are seen in the apparent increase of certain forms of nerve disorders is as yet mere matter of conjecture, concerning which much pigeon-holing of statistics remains to be done, before it can be admitted even as a substantial opinion. It is held by some of the most judicious observers that these "subsidiary foods," as they have been called, have done a real service to modern civilization by enabling the performance of forced labor, and the support of undue fatigue, and increasing the vital resistance to morbid poisons; to say nothing of the view ingeniously urged by Lecky and others, that by "checking the boisterous revels that had once been universal, and raising woman to a new position in the domestic circle, they have contributed very largely to refine manners, to introduce a new order of tastes, and to soften and improve the character of men."

The steadily increasing list of diseases of artificers, inconsiderable as the numbers may be that suffer from each one, is a perpetual reminder to us to keep our petty plans properly subordinated to the laws of Nature. We liberate the imprisoned powers of Nature, her phosphorus, her mercury, her arsenic, and press them into our service: they turn upon us and take toll of our blood and bones. Curiously minute is the subdivision of these diseases; curiously exact their apportionment. The silk-weavers have theirs, there is another for the linen-weavers, and another for the

cotton-weavers ; painters have their sort of palsy and neuralgia, and type-setters theirs, and mirror-silverers theirs. The percussion-cap maker breaks out with certain eruptions, the match-dipper loses his jaw-bones. The blue dyer goes mad in one way, and the scarlet dyer in another, if we take Esquiro's word for it. Even that little toy-balloon, which is a new delight of childhood, could not be invented and made without giving us a new disease in the persons of the makers.

Time scarcely suffices even to hint at the effects upon mankind of the use of glass in building. This is assuredly entitled to rank among the greatest of the sort of experiments which we are considering. The ingenious statement has been made that we have no natural grown men now : that, like unseasonable lettuces, they are all raised under glass. The alternative, however, is not between glass and open air, as this statement would suggest, but between good shelter with light and possible cleanliness, on the one hand, and bad shelter with darkness and inevitable filth on the other hand, as one need not travel many miles in the south of Ireland to find out. Even so far as the admission of air is concerned, we find practically that ventilation is better where plenty of glass is used in building, however tight the walls may be, than when it is left to chance filtration through the chinks of a mud hut. The increased cheapness of glass is one of the great material gains of our time. The repeal of the English window-tax marks a distinct advance in the hygienic state of the English poor. If in the corn-laws the king came between the poor man and his bread, no less in the window-tax did he stand between him and the light of heaven ; and so long as that statute endured, the subject might, without affectation or cynicism, urge the request of Diogenes to Alexander.

In casting about for the causes which have produced the extension of human life, we are struck with the fact that some destructive agencies which make a great figure in history have been of variable activity, and that some have either for a long time completely disappeared, or have been restricted within much narrower limits. Not to mention other ancient pestilences, of which the imperfect descriptions left to us only permit us to say that they were of enormous fatality, there are three great diseases, once of wide prevalence and of conspicuous destructiveness, — the oriental plague, the scurvy, and the small-pox, — which have been comparatively recently relegated to the past, so far as the best civilization of Christendom is concerned. What is the practical significance

of this statement, to our own chances of life and health? It is hard for us fully to realize; we strain our minds in the attempt. It is easy to repeat the statistics of destruction, but few of us, I think, have the power to assimilate figures and convert them into emotions, as Defoe has done in his *History of the Plague in London*. I repeat some numerical statements of the ravages of the plague in Europe, taking by preference the more moderate, for the highest surpass our power of belief. When it appeared under the name of the "Black Death," in the middle of the 14th century, giving signs of peculiar malignity, it swept in about four years almost completely over the Continent, and destroyed, it is estimated, one fourth of the inhabitants. Venice lost one hundred thousand of her people; Florence, sixty thousand; Siena, seventy thousand; Avignon, sixty thousand; London, one hundred thousand; Norwich, fifty-one thousand; and this mortality, in each case, was usually produced within a year, sometimes in a few months. Though committing its most dreadful ravages among dense masses of population in the cities, the plague was by no means restricted to them; it spread through the open country as well, almost depopulating wide districts. The foundations of civil order were shaken; property was abandoned, inheritance was forgotten, ungathered harvests perished in the fields, ownerless herds died of starvation, ships with crews of corpses drifted through the Mediterranean, and thus famine was added to the pestilence. Though this destruction has never since been paralleled, the poison of the plague remained domesticated in many of the cities of Western Europe for centuries, not continually active, but always ready for favoring circumstances, and bursting out in virulent epidemics, at intervals of a few years. Just two hundred and five years ago, it slew in one year in the London of that time, — not a third of her present size, — sixty-eight thousand five hundred and twenty-six persons, and then disappeared completely, and has scarcely been seen since in Christendom. How should we feel, — how beyond all expression would our horror and consternation be, — if, here in Boston, in the coming four or six months, fifty thousand people should die of one disorder? And yet to have the plague in a city in the Middle Ages meant just this: and such a loss of life implied more misery to the survivors and a greater interference with industry and social order than it would with us, because our municipal organization is higher, our sources of supply vastly greater, more varied, and more accessible, and our power of repair of social damages more active.

I mentioned the scurvy as second of these obsolete diseases. It

is a curiosity to us nowadays ; many physicians have never seen a case, and it has scarcely a foothold left anywhere, except on shipboard in voyages of unusual length and hardship, or in an ill-provisioned army, far from its base of supplies, or in some Gehenna of an Andersonville, or a Belle Isle. But "during the 16th, 17th, and earlier part of the 18th century, the disease was endemic in towns, fortifications, camps, and armies." "Many thousands were often cut off within a few months in single armies and garrisons ; and it is probable that more seamen perished from scurvy alone than from all other causes combined, whether sickness, tempest, or battle." Take almost any voyage at random out of Hakluyt or Purchas, as a specimen of what those old sailors had to suffer in this way. Vasco da Gama, in doubling the Cape of Good Hope, lost one hundred out of his crew of one hundred and sixty. Jacques Cartier, in sailing to Newfoundland, had at the last only three sound men left among his one hundred and ten. Drake, and Cavendish, and Hawkins, and Anson, and all that glorious company, have the same dismal story to tell ; but Cook, who sailed a little later, when men had grown wiser, brought home, after a three years' voyage, a healthy crew, which, out of one hundred and twelve, had lost only one by disease. We know perfectly well now what all this history of destruction meant — that it was simply bad, ignorant, careless feeding. We know that a nation without a kitchen garden, like the English nation up to the reign of Henry VIII., must be consumed with scurvy.

Everybody knows that the small-pox has greatly abated since the present century began, and everybody knows how that abatement has been effected. The majority of those who are enjoying the immunity which vaccination confers know that small-pox is an odious and troublesome nuisance, but very few of them know fully from what they have been saved, and how inadequate any gratitude of theirs must be. We have got some idea of what the plague used to be : the small-pox was worse ! It was "the most formidable and fatal of all the diseases that afflicted mankind," say the cool statist. Its average annual death-rate, seventy years ago, in countries where it was most closely observed, was about three thousand to the million of population, and nearly one tenth of all who died, died from this disease. This would be at the rate, in Great Britain, at present, of more than sixty thousand deaths a year from small-pox. Many who did not die outright from it never recovered from its virulence, but were blinded, or deafened, or crippled, or thrown into lingering and fatal disorders. No watchful-

ness could guard against the infection, no bodily strength could resist it. The many centuries of its prevalence had not mitigated its baleful strength, nor impaired its power of propagating itself. Mankind lay an absolutely helpless prey before it, until Dr. Jenner, a name never to be pronounced without admiration and gratitude, introduced his wonderful discovery of vaccination. What have been the results of that? It has failed thus far, owing to the ignorance and slothfulness of men, to accomplish what Jenner devoutly believed it would, — the extermination of small-pox from civilized society. We find, alas, that, upon the voluntary system, “vaccination can be maintained only by having small-pox constantly before our eyes.” Where vaccination has been compulsory and thorough, we find such facts as these, which might be accumulated to almost any extent. “In Copenhagen, in twelve years before the introduction of vaccination, fifty-five hundred persons died of small-pox; from the year 1802 to 1818, a period of sixteen years after vaccination had been made compulsory, only one hundred and fifty-eight persons died of small-pox over the whole kingdom of Denmark,” out of a population of two millions and a half. In England alone, at the present time, fifty-six thousand lives are saved by vaccination each year. In view of such results as these, and of the devoted and unstinted labor that produced them, well might Mr. Coleridge exclaim: “Pronounce meditatively the name of Jenner, and ask, ‘What might we not hope, what need we deem unattainable, if all the time, the effort, the skill which we waste in making ourselves miserable through vice or error, and vicious through misery, were embodied and marshaled to a systematic war against the existing evils of nature?’”

Besides these three great destroyers of man, which have thus abated, there are certain other diseases which, under the influence of improved modes of life, of increased medical skill, and of efficient preventive measures, have lost something of their ancient virulence, and no longer swell the bills of mortality as before. The list of diseases recognized as preventable, — diseases which some time it will be disgraceful to have prevailing epidemically among us, — is continually lengthening with the progress of inquiry into their causes; and the recent labors of your own Bowditch go far to add another, and one of the most intractable and destructive of all, to that list.

Almost all those features that go to make the distinction of a modern city from an ancient one, are changes in the interest of health. The ancient city was a low and simple organization.

Like one of those microscopic monsters whose only function seems to be to swallow what is next to it, it took in everything, and gave out nothing. The ancient cities and towns were fortresses, too, often having for their nucleus some still more ancient castle, built in a position naturally strong against an enemy, but otherwise most inconvenient for human residence. The chief condition of continuance for the thorp thus huddled together was to surround itself with a high, unbroken wall of strong masonry, lest it should be swept out of existence in a day by some enemy. The space thus fenced in would, in the usual course of affairs, become constantly more and more densely packed. Light and air were the costliest of luxuries. Streets were by preference narrow and crooked, as a defense against arrows and other missiles; sewerage generally unknown; water supply commonly scanty, but perhaps sufficient for the limited use made of that fluid. Houses might crowd against each other, and encroach upon the streets, and throw out overhanging balconies and oriels and turrets, and rise to the height of a dozen stories, until the threadlike alleys below were completely shut in from sunlight. But with the city wall once built, no lateral expansion was possible for generations, or perhaps for centuries. The traveller still finds here and there a fragment left of such a city, towering grim and black, swarming with human life as with vermin, and oppressing the senses like a nightmare. These were the haunts of the mediæval pestilences. When fairs and festivals drew the people of the country within the walls for a while, or when the invasion of an enemy drove them there in hurrying and terrified masses, the accumulated materials of disease fermented and exploded in epidemics, destroying burgher and peasant alike. So it was at Jerusalem, when Titus penned up within its walls more than a million of people. Mannæus, son of Lazarus, did not stay to see the end, nor even the height of the pestilence, but fled to the besieging Romans when he had counted 115,880 dead brought out to be cast down through *one* gate, which he had kept from April to July. This was time of war and of unparalleled destruction, but even in peace and prosperity, in some, and probably in most, of these old cities, men died faster than they were born, and it was only by continuous absorption from without that the city could grow or even continue. Every city that dates its origin even a few centuries back has to struggle against this original vice of conformation. When, after a long period of prosperity and freedom from fear of invasion, the grim old city wall comes down which has so long shut in the people from the sight

of the open fields, and shut out the free breezes and the sunlight from the streets and houses, it not only illustrates the disappearance of the old conditions of civic life and the progress of new ideas, but it makes a blessed epoch in the sanitary state of the old intramural city. The engorged mass of humanity in the centre begins to stir, and to disperse at its edges into the belt of gardens beyond the old wall. The worst of the swarming old houses come down, the narrow and crooked streets slowly widen and straighten, and the sunlight, first and most genuine of disinfectants, strikes in for the first time in a thousand years. "Ring out," says Mr. Tenyson to the Christmas bells,

"Ring out old shapes of foul disease,"

but there are some of these shapes that should appropriately take their leave to a salvo of improved artillery. The first flash of Friar Bacon's explosive announced the disappearance of the walled cities of the old time, more remotely but none the less surely than the blast of Joshua's trumpets did the fall of Jericho. The old frowning battlements have given place to trim green earthworks, as daintily kept as a flower-garden, and, in time of peace, as free from all suspicion of danger.

Many, indeed most of our American cities are free from those faults of plan and structure which we see more ancient towns retaining as their inheritance from obsolete forms of civic life. Sooth to say, the spectacle of avenues and boulevards surpassing in grandeur those of modern Paris, staked out upon an otherwise unbroken prairie, with a place here for a university and there for a grand opera-house, and so on, has provoked unseemly levity on the part of the censorious traveler. And yet the want of some such happy union of the prophetic with the practical, has been the source of unnumbered inconveniences and detriments to the older communities.

Our American towns have their own peculiar obstacles to overcome in their progress toward that ideal low death-rate, which should be the ambition of every good citizen. The shameful recklessness of those who make haste to be rich, — a larger class here than elsewhere, — and that fatal and benumbing faith in the inherent tendency of all sorts of social mischiefs to turn good of themselves, which almost seems a national vice, are but two of these obstacles. The great American cities have had, besides, a very difficult and nearly unique problem set for them to solve, namely, to receive and to assimilate great hordes of people who are, in the first place, new to the climate, and liable to some special

dangers on that score (for acclimation is needed from east to west, as well as from north to south); who are, secondly, unused to and ignorant of the conditions of city life, and have neither acquired in their own persons, nor inherited at their birth, that kind of assuetude to those artificial conditions which is in itself a partial protection against their ill effects; and who are, thirdly, to a very great extent, bad representatives of even the low form of civilization which has originated them, and who are not easily weaned from all the vices of ignorance and habitual dependence. Thousands of people come annually into all our great cities, bringing with them the rude, ignorant, uncleanly habits, the ineptitude of learning new ways, the impatience of restrictions, the inflexibility of temperament, and, I will add, the low vitality, which belong to simple forms of pastoral and agricultural life. All their lives long they have been taken care of after a fashion, work has been provided for them, and they have been set to do it; they have never learned the lesson of independence. So the virgin forest and the unbroken soil of the prairie call to them in vain; they *will* swarm in where population is already thickest, crowd the rats out of the vilest cellars, and run up the majorities for ruffian aldermen and the class *zymotici* in the mortuary reports, in a way that makes shallow people who write for the English newspapers wonder at the degeneracy of the *American* people. Nowhere out of this country does this incubus so crush and throttle civic life; but even in English cities the name of "Irish quarter" is a synonym for filth and disease.

In the history of almost every considerable modern town, there comes a critical and dangerous period. It has ceased to be a rural community, its population has become close, perhaps even crowded; but those public works, and that strict police, and that sense of individual responsibility in the people, which are indispensable conditions of civic welfare, have not yet been established. The ample gardens which the elder citizens remember as once surrounding every house, have been divided and subdivided into narrow lots, and each lot has its buildings. Successive series of sinks and cess-pools have been used until the saturated earth about them would no longer imbibe their contents; then they have been abandoned and forgotten, and again new ones have been made. Complaints begin to be heard, perhaps, about the once excellent water of the wells. The tea-kettle gets incrustated in an unsightly way after a few days' boiling, and the soap curdles in the wash-tub. But this does not of necessity happen either, for

water sometimes becomes most dangerously polluted and yet remains clear, sparkling, and inoffensive to any of the senses. Thus, recently, at Bedford, England, Professor Miller found the very porous, gravelly subsoil completely honey-combed with alternate wells and cess-pools, the contents of each rising and falling with the level of the adjacent river, while the people continued to enjoy their excellent well-water, and wondered why they should die so with the typhoid fever. Some new comer in our thriving town tries to dig a new well for his house, and in the attempt opens into some ancestral cess-pool. If he is one of those irritable and implacable spirits, who are the ferment and purification of small and sluggish communities, he moves in a spasm of disgust to have some distant water brought for the supply of the town, gets it analyzed and declared purer than Croton or Cochituate (in every case, so far as I have observed), and carries his point at last, to the great indignation of the old inhabitants, who declare that the longevity of their fathers, who drank that well-water before them, was unparalleled, that they themselves have had time in sixty years' use of it to find out if it was bad, and that, aqueduct or no aqueduct, they will drink it while they live.

About this time there comes some sudden outburst of typhoid fever, or of intractable dysentery, the like of which the town has never known before. The water-works party, who have expected their achievement to be nothing short of the regeneration of the town, are dismayed; their conservative antagonists have at least the melancholy satisfaction peculiar to the conservative mind under such circumstances. Some clever man with a turn for investigation takes up the case, and finds that a river has been brought into the town, and distributed over and into the soil without any arrangements for carrying it out again; that the mass of organic waste matter which has slowly infiltrated into the earth during many years, has been quickened to pernicious activity by the saturation of that earth with moisture; that some of those who have discontinued the use of their wells have calmly turned the waste-pipes of their houses into them, to the certain empoisonment of their conservative neighbors, who won't use the aqueduct water. And, while he is in the way of investigating, he looks a little further, and he finds a good many pigs stied in the thick of the town, and some shocking performances in and about two or three rival slaughter-houses; and in some of the oldest and shabbiest houses, which have light and air shut out from them by later and loftier erections, he finds that the poor foreign people who work in

the mills and on the railroad have got up a surprisingly close imitation of the sixth ward in New York. And if he goes into the schools and looks at the childrens' arms, he will be sure to find a large proportion of them unvaccinated, and the pabulum for another pestilence thus kept ready for it whenever chance shall bring it that way. And he will find that all these things are, and are steadily accumulating and intensifying because, as the people say, the town is a small place, and is not to be governed by the same restrictions that are necessary in great cities. "Are we a sea or a whale that thou settest a watch over us?" O the struggles before this town can get itself sewerred! O the next to impossibility of making householders use the sewers when they are laid! O the internecine strife over the slaughter-houses! O the heart-burnings upon the pig question! Each one of the butchers is a selectman, several of the pig proprietors are deacons, and all are voters. What Spartan standing at bay for the dung-hills! What fervor of eloquence about natural rights and oppressive legislation! Our hardy reformers find themselves face to face with a desperate banditti, contesting every inch of the ground; not those wild fellows with sugar-loaf hats and cocks'-plumes, the terror of Italian roadsides and the delight of romantic childhood, Beppo, Tonio, Rinaldo, and all the names ending in *o*; but those others with names beginning with a great O, the less picturesque, but more formidable brigands of our own back alleys. This most persuasive dysentery, this thrice cogent typhoid fever must come again and again before their solicitations are fully heeded. It is the order of these divine messengers to make "not a perpetual havoc, but to turn men to destruction, and then suddenly to cease, that they may consider."

The case that I have put is not an imaginary one. Just such cases are presented frequently to students of the public health, with details most curious, varied, and instructive. At this moment there are, within cannon-shot of New York, two suburban villages, lovely for situation, conspicuous for their semi-rural beauty, skirted with princely villas, and intersected with ranges of comfortable and even elegant houses, whose annual death-rate is exceeded only by the very worst parts of the neighboring metropolis. In England the keen-scented inspectors to Her Majesty's Privy Council find the most exemplary collections of filth, the most incredible overcrowding, and consequently the most startling explosions of certain epidemics, not in London, nor Manchester, nor even in ill-famed Liverpool, but here and there in neglected towns of moderate size,

and even in little agricultural hamlets. In Greenock, for instance, eight years ago, they looked into the lodging-places of about four thousand working people, not selecting the worst localities, but taking a fair average, and they found that three quarters of these people "were living under conditions which could not be permitted in the worst parts of London." In London, a space of four hundred cubic feet has come to be recognized as the minimum allowance for each human being, and anything less is called intolerable. But here many were living day and night, in less than one hundred cubic feet, and some "in a space about the size of a street cab apiece," without the freedom of ventilation which that vehicle possesses. "After what has been said as to the construction of houses, the crowding of rooms, the general dirtiness and the retention of foul matters, the statement is almost superfluous that in every poor man's room in Greenock the atmosphere is fetid, the singular variety of stench being as remarkable as its general intensity," observes the inspector, and he is a connoisseur of stench. What wonder either, that two destructive fevers — typhus and typhoid — were thoroughly domesticated there? What inhabitant had a better right? It was noticeable here that the over-crowding in Greenock was not only among the vicious or the utterly poor, but that industrious and well paid workmen occupied these dens and paid high rent for them in the absence of any better lodgment. Well may Mr. Simon, the medical officer of Her Majesty's Privy Council, stop amid his labors to heave a sigh and to remark: "Though my official point of view is one exclusively physical, common humanity requires that the other aspect of this evil should not be ignored. For where overcrowding exists in its sanitary sense, almost always it exists even more perniciously in certain moral senses. In its higher degrees it almost necessarily involves such negation of all delicacy, such unclean confusion . . . as is rather bestial than human. To be subject to these influences is a degradation which must become deeper and deeper for those on whom it continues to work. To children who are born under its curse it must often be a very baptism into infamy. And beyond measure hopeless is the wish that persons thus circumstanced should ever in other respects aspire to that atmosphere of civilization which has its essence in physical and moral cleanliness, and enhances the self-respect which it betokens."

Take another case, still more strikingly illustrative of the point that I make. Three years ago, in the little strictly agricultural village of Terling, in Essex, numbering only nine hundred inhab-

itants, in two months' time three hundred people sickened with typhoid fever, and forty-one of them died. "That is to say, the one preventable disease killed in that short time a larger proportion of the population than all causes of death put together ought to have killed there in two years." Any expert knows full well what he may expect to find when such a case as this is reported. There was a miserably lodged and shamefully overcrowded people, living amid piles of filth upon a spongy soil saturated with filth, and drawing their water from wells sunk in that soil. All causes, all fostering conditions of that great disease of crowd and filth, were as strongly focussed in this hamlet as they could possibly be in the heart of the greatest city.

Sometimes, indeed not unfrequently, we see the same causes operating with equal intensity on a still smaller scale. Some lonely farm-house, or some villa standing in the midst of its own grounds, has half its inmates stricken with fever, and investigation reveals some unsuspected domestic depot of contamination which has escaped from its bounds, or has had its fatal energies roused by some chemical or organic stimulus. We have constantly in our blood poisons which will first benumb, and shortly slay us outright if we do not get rid of them; and after we are free of them, they may do a like mischief to other people unless they are set to do something else, and are thus deprived of their harmfulness. As we have already seen, it is not only when men are massed in great numbers that they suffer more or less directly from the effect of these poisons. Nor, on the other hand, is it inevitable, when they are thus massed, as in great cities, that they should suffer from these effects. Some large districts in London, some considerable districts even in New York, show a death-rate scarcely exceeding that of the most salubrious rural districts. It is clear that the great city of the future is to be a place where life is as long and as secure as anywhere else, and where physical development and health is as great in degree, however it may differ in kind, from that of the agricultural regions.

For to be in health does not imply a certain definite amount of muscular development, or a fixed degree of activity of the digestive or assimilative functions. Economically viewed, health is that state in which a person exists fully able, without suffering, to do what he has to do. There are various sorts of being in health, and each sort has its special usefulness. The plough-boy would not be helped in his vocation by having the brain and nerves of Emerson, nor does the poet need the brute muscularity of Heenan. Lord Brougham

and Mr. Gladstone, Graf von Bismarck and Count Cavour, Mr. Webster and Mr. Stanton, these men all astonish us with their endurance and power of labor through days and sleepless nights, year in, year out. But give any one of them Patrick's day's work of turf-cutting to do, and his mess of potatoes to do it on, or put him at Hans' plough-tail with the customary black crag of pumpernickel as a basis of operations, or let him take his turn with Sambo at the morning hoe-cake and the day-long swing of the cotton-hoe, and any one of those *adscripti glebæ* would leave him out of sight in the second hour. No—these men have served to them the choicest cuts from the stalled ox, fishes from the deep sea five hundred miles away, game from the distant mountains, fruit and vegetables from the forcing-house, tea and coffee from the antipodes, wine that has twice doubled the Cape, and nothing of all this is idle excess. It is all pure use. The mountainous accumulation of business, the watchful hostility of the opposition, the apathy and hesitation of friends, these are to them what the sight of the familiar course is to the thorough-bred race-horse, a stimulus and an added power. But take any one of that other set of workers and increase his daily toil by a fraction, and add to that toil anxiety, and harry his nights with unrest, and what comes of it? Very shortly, what we have seen come to an over-driven and abused ox, a creature patient and enduring up to a certain point, but slow and not to be hurried; he shows first, by irrational but most pathetic signs, that he vaguely feels that everything is wrong, and then, after a brief fury, he breaks down completely and hopelessly, and there is no rallying his broken forces.

I have taken extreme cases, by way of illustration, but there are infinite gradations between. Probably every medical officer of much experience in the late war had frequent occasion to observe, on a great scale, how huge-limbed and innocent-faced giants from the forests of Maine and the wheat-lands of the West would peak and pine, and give way to homesickness and the chronic ailments of the camp, and be overdone with picket-duty at night, and break down upon forced marches; while men of less bulk and stature and of paler skins, skilled workmen from factories, mechanics, and even clerks from the large towns, would take the same unaccustomed tasks with a cheerful alacrity, and endure them with hardihood, seeming none the worse for them when they were finished, but "coming up smiling" at the end, to use the expressive phrase of the prize-ring. The common opinion is that the quietude of an agricultural life, its freedom from civic turmoil, are peculiarly favor-

able to mental health and serenity, and that it is in the stir and uproar of cities that men lose their wits. Study the records of our insane asylums, and see how far the reverse of this is true, and how wisely Goethe spoke when he said that nothing brings us nearer insanity than holding ourselves aloof from others; and nothing preserves the even tenor of the understanding so well as a general intercourse with many people. And yet we are in the way of saying that the lumberman and the farm-laborer live natural lives, and that the town-dwellers live artificial lives. But there is as much idle and delusive talk about natural and unnatural modes of life as we have seen there is about health. It is natural for man, is it not, to gather food and to store it away, and to cook it with fire, and to season it with grateful condiments, — to collect a vast variety of substances for clothing and for ornament, and to fabricate and wear them, — to build a covert against the weather, and then a more comfortable and enduring dwelling, and then perhaps a mansion of splendor and delight, — to find out laws and govern himself by them, to surround himself with safety and strength and beauty.

What we call our sense of comfort is, when unperverted, simply our instinctive appreciation of those things and conditions which are most suitable for us, most conducive to our bodily welfare. Comforts are added strengths. The etymology of the word "comfort" hints at its true physiological significance; a significance which we cannot afford to overlook — an ascetic contempt of which, originating in ignorance and morbid conceit, and formulating itself in eccentric systems of dietetics and regimen, has at times wrought great mischief, and nowhere, perhaps, more conspicuously in our own time, than here in New England. The school-boy Shelley may declaim against the cooking of food, and Rousseau may denounce the brutality of eating meat, and we can still enjoy the poetry of one and the speculations of the other; but when pretended teachers, with nothing of Shelley except his green-sickness and his inexperience, and nothing of Rousseau but his audacity, delude ignorant youth into dyspepsia and consumption, it is time to interfere.

These cities of the future, with sunlight and fresh air and pure water coming to every citizen; with no man standing in his neighbor's way; with no noisome or pernicious occupation suffered within their limits; with all rain-fall and water-waste carried quickly away to the unharmed river, while all other refuse, at once more dangerous and valuable, goes with due dispatch to the hungry

soil ; with order and cleanliness and beauty in all the streets ; with preventable diseases prevented ; and with inevitable ones skillfully cared for ; with the vigilant government that does not stand apart and look coldly at ruthless greed and needy ignorance, and utter only an indifferent "Caveat emptor," but says to the butcher, "This trichinous pork, this pathological beef, goes to the rendering-vat, and not into the mouths of my children ;" and to the brewer, "Burn this cocculus indicus and lobelia, and let me see no bitter but hops hereafter ;" and to the apothecary, "Successor of Herod, you shall not poison my infants at wholesale with your narcotic 'soothing syrups ;'" and to the water company, "Your reservoir shows foulness this week to my microscope and my test-tube : let it continue at your peril," — these cities of the minimum death-rate, shall they not be our cities ? Are these things of impracticable costliness, say you ? Nothing is so cheap as health ; it is the truest economy ; it is cheaper — than dirt. "Dirt cheap" — what an abuse of language ! Dirt means waste and disease, death, widowhood, orphanage, pauperism, high taxation, costly production. Nothing costs so much. Besides, the objection, even if it were not unfounded, is unworthy. "All parsimony in war is murder," is the judicious maxim of the Maréchal de Belleisle. Not less, I say, when we fight against an impersonal foe of mankind.

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