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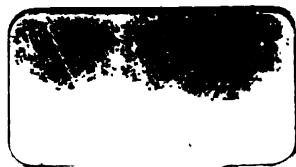


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THE EFFECTS

OF THE PRINCIPAL

ARTS, TRADES, AND PROFESSIONS,

AND OF

CIVIC STATES AND HABITS OF LIVING,

ON

HEALTH AND LONGEVITY:



WITH A PARTICULAR REFERENCE TO

THE TRADES AND MANUFACTURES OF LEEDS:

AND SUGGESTIONS

FOR THE REMOVAL OF MANY OF THE AGENTS, WHICH PRODUCE
DISEASE, AND SHORTEN THE DURATION OF LIFE.

By C. TURNER THACKRAH.

LONDON:

PUBLISHED BY LONGMAN, REES, ORME, BROWN, & GREEN.
LEEDS, BY J. BAINES & CO.

1831.

628.

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THE EFFECTS, &c.

MAN, in his several relations, is assuredly the most interesting subject for examination and reflection. His external form, his internal structure, the number and complexity of organs, their harmony and mutual support, the surprising power which restores injured parts, the organs which, connecting man with his fellows and the world, are the agents of social relation,—these exhibit the first animal in the universe—the work of a Creator all-wise and benevolent.

Though we cannot rival the agency of superior wisdom ; though we can neither make man, nor improve his original organization ; we *may* reduce his character, weaken his frame, and bring on him premature decay and death. It is one thing, indeed, to view this being, as God made him : it is another, to examine him in a state of moral and physical degradation.

Pliny, in the affecting and powerful exordium to his chapter on Man, paints human miseries with a pencil of gall. He refers especially to the connate evils of our physical state, as contrasted with that of the brute. But had he lived in an age of physiological knowledge, he would rather have admired those structures and arrangements, which give man a decided superiority over the bulk of the animal creation. He afterwards refers to the intellectual and moral evils, which

reduce our happiness. Here he brings conviction. “ *Uni animantium luctus est datus,—uni luxuria, & quidem innumerabilibus modis & per singula membra: uni ambitio, uni avaritia, uni immensa videndi cupido.* * * * * * Nulli vita fragilior, nulli rerum omnium libido major, nulli pavor confusior, nulli rabies acrior.” He then animadverts on the opprobrium of man, his hostility to his own species; and concludes,—“ *At hercule homini plurima ex homine sunt mala.*” This might be a text for my paper.

If we turn our view from man to his works, we see the wilderness converted into towns and cities, roads cut through mountains, bridges carried over rivers and even arms of the sea, ships which traverse the globe, lakes converted into corn fields, forests made into pasture, and barren rocks covered with timber;—in a word, we see the face of the world changed by human will and human power.

If we look immediately at home, we observe the wonders which science and art have effected. We see large buildings, manufactures of almost every kind, and substances so changed, reformed, and combined, that nature could scarcely know her own productions. We admire the inventions of science, alike in their minuteness and their size, their accuracy, and their extent of operation. We see wool converted into cloth, in establishments so numerous and extensive as almost to supply the civilized world: we see the slight blue-flowered product of the field formed, in the same mill, into the thread which passes through the eye of the needle, and into the canvass which bears our ships to every region of the globe: we see rough and massive minerals drawn from the bowels of the earth, converted, on the one hand, into instruments which surpass in power the united strength of the largest animals, and on the other, formed into the finest and most delicate pieces of mechanism.

These, and works like these, are assuredly wonderful. But while we admire, let us examine. What are the effects of

these surprising works—effects, I mean physical and moral? I say nothing of the wealth they produce or have produced, for wealth is good or evil according to its application: I refer to the health of fifty thousand persons, who spend their lives in the manufactories of Leeds and its neighbourhood, or in allied and dependent occupations. I ask, if these fifty thousand persons enjoy that vigour of body which is ever a direct good, and without which all other advantages are comparatively worthless? I ask, if the duration of life is as great here as in the agricultural districts?

To the first inquiry, the mere appearance of our population affords a reply. Take indifferently twenty well-fed husbandmen, and compare them with twenty manufacturers who have equal means of support, and the superiority of the agricultural peasants in health, vigour, and size will be obvious. Medical men, moreover, have daily proof of the ill effects on the human constitution, which our employments produce. They find a number, a variety, and a complexity of diseases, which are little known in country practice, and which, though not directly fatal, greatly reduce the powers of life.

The second inquiry will be most satisfactorily answered by reference to the bills of mortality.

In the Returns of Population for the year 1821, as taken according to the Act of Parliament, we find the following statement in reference to the three Ridings:—

Allowing 20,000 Persons in each Riding, there were living in 1821,

Under 5 Years of Age.	5 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	80 to 90	90 to 100	100 and above.
Under 5 Years of Age.	10	15	20	30	40	50	60	70	80	90	100 and above.
East Riding	2870	2573	2260	1977	3079	2306	2007.4	1393.2	914.0	474.4	125.7
North Riding	2775	2643	2331	1999	2914	2306	1843.7	1420.2	1103.7	629.6	204.6
West Riding	3381	2769	2370	2083	3026	2267	1702.9	1204.5	815.3	377.9	94.22
										7.43	.09

This Table does not show the proportion of children who die under the age of five years; but on other periods its

bearings are important. We find that though the number of children living at the time of the calculation, is considerably greater in the West than in the other Ridings,—about six of the first class in the West to five of the same class in the North, the disparity gradually diminishes as we proceed to the succeeding classes: in other words, we find that considerably more persons die before they arrive at manhood, in the West-Riding than in the North or East. As we advance farther, we observe that in the ages between forty and fifty the scale turns still more evidently against the West; for, though, as we know from other sources, the births in the West-Riding considerably exceed those of each of the other Ridings, the number of persons between the age of forty and fifty is actually less in the West than in either the North or East. The same decreasing ratio we find to continue till we arrive at the term 80—90; and though the estimate of more advanced periods is, probably from the comparative paucity of numbers in the returns, rather irregular, yet the West-Riding is still below either of the others. It is therefore evident that the *duration of human life is considerably less in the West-Riding, the manufacturing district, than in other parts of Yorkshire.*

To come more immediately home,—let us compare the mortality in Leeds with that of a town destitute of manufactures; and afterwards with that of a merely agricultural district. I take at random Ripon and Pickering Lythe. In 1821, the population of the town and borough of Leeds was 83,796, and the burials were 1516, or one death in 55 persons. In the liberty of Ripon at the same time, the population was 12,131, and the burials were 180, or one death in 67 $\frac{1}{2}$. But Ripon being subject in a degree at least to the evils of a town, we are required to compare the mortality at Leeds with that of an agricultural district, where the people and their habitations are not crowded. Pickering Lythe returned in 1821 a population of 15,232, and the number of burials 205; one death consequently in 74 persons. Taking, then, the mortality at Picker-

ing Lythe as the natural one, there was an excess of 321 deaths in the borough of Leeds during the year 1821. And allowing for the increase of population since that period, we may fairly say that at least 450 persons die annually in the borough of Leeds, from the injurious effects of manufactures, the crowded state of population, and the consequent bad habits of life! We may say that every day of the year is carried to the grave the corpse of an individual whom nature would have long preserved in health and vigour;—every day we see sacrificed to the artificial state of society one, and sometimes two victims, whom the destinies of nature would have spared.

The destruction of 450 persons year by year in the borough of Leeds cannot be considered by any benevolent mind as an insignificant affair. Still less can the impaired health, the lingering ailments, the premature decay, mental and corporeal, of nine-tenths of the survivors, be a subject of indifference. Assuredly, an examination into the state of our manufactures has long been demanded, alike by humanity and by science.

The object of this paper is to excite the public attention to the subject. Myself and my pupils have personally and carefully inspected the state of the artizans in most kinds of manufacture, examined the agencies believed to be injurious, conversed on the subject with masters, overlookers, and the more intelligent workmen, and obtained many tables illustrating the character of the disorders prevalent in the several kinds of employ. From these sources collectively, I have drawn up statements, which, though avowedly imperfect, must, I conceive, approach to the truth. It will be remembered that the *subject is new*;—that the West-Riding manufactures have not before been examined in their important relations to health and longevity, and that scarcely any thing has been published even on the employments common to England at large. I have had therefore to enter a new track without guide or assistance.

The effects of professional life, the physical state of the upper orders, as produced by their pursuits and habits, are so familiar to a medical practitioner, as to require no direct investigation. They are not, however, the less important. The evils, indeed, of a too artificial state of society are more strongly marked in the upper than in the lower classes. They will therefore form a part of this paper.

In reference to the state of both these classes, I wish to make the examination as fair as possible,—to notice as well the circumstances which are favourable, as those which are unfavourable to health, to remove unfounded apprehensions, as well as to expose the real agents of disease.

After all, I am aware that health is to most persons a disagreeable subject of inquiry, whether it relates to the individuals themselves or the community. It implies a distrust of our sanity. We dislike especially such gloomy inferences as the returns of population and burials afford. We do not wish to see that there is a greater mortality in our own neighbourhood, than in other parts of the country; and hence we try to avoid the annoyance, and preclude investigation, by supposing either the inferences erroneous, or the causes which produce this excess of mortality, irremediable. Is this wise—is this manly? Is it the part of reason to shrink from inquiry?

Either diseases are artificially multiplied, or they are not. If inquiry prove the affirmative, surely self-interest, as well as benevolence, demands a full investigation into the causes of the evil:—if the negative, we shall rest contented, gratified with the idea that our employments are not baneful, and that the excess of mortality is the infliction of Providence, not the agency of man.

Most persons, who reflect on the subject, will be inclined to admit that our employments are in a considerable degree injurious to health; but they believe, or profess to believe, that the evils cannot be counteracted, and urge that an

investigation of such evil can produce only pain and discontent. From a reference to fact and observation I reply, that in many of our occupations, the injurious agents might be immediately removed or diminished.* Evils are suffered to exist, even where the means of correction are known and easily applied. Thoughtlessness or apathy is the only obstacle to success. But even where no adequate remedy immediately presents itself, observation and discussion will rarely fail to find one. We might even say, that the human mind cannot be fairly and perseveringly applied to a subject of this kind, without decided effect.

When, moreover, an evil is kept before the public attention, other investigations, or the advance of science in other departments, often provide a remedy. Thousands of lives have been lost by explosions in coal-mines; and thousands more would have perished if the properties of the gases had not been examined. Yet the miner, no doubt, has often said before the invention of the safety-lamp,—“These explosions are certainly very shocking occurrences, but we cannot prevent them. They are inseparable from the nature of the employ.” Such, indeed, will ever be the sentiments or the language of those who are either too distrustful of the resources of science, or too intent on the pecuniary character of their undertakings, to investigate the causes of a great and concomitant evil.

For the convenience of our inquiry, we may divide the inhabitants of Leeds and its immediate neighbourhood into four

* Robertson, in his book on Medical Politics, makes the following statement:—“The principal general sources of disease in this, and perhaps in every other country, I believe, with very few exceptions, to exist in external, and for the most part removable causes; but, from our familiarity with numberless circumstances which are unquestionably injurious to our comforts, and even destructive to our constitutions, we, in the common bustle of life, insensibly so overlook them, as scarcely ever to regard them in a just point of view. Many are willing to allow that these sources are injurious to their comforts, but few believe them capable of ruining their constitutions.”

great classes, viz : I. Operatives, II. Dealers, III. Master-manufacturers and Merchants, IV. Professional Men. In examining the state of these severally, we shall advert to the atmosphere they breathe,—the muscular exercise they take,—the postures of body they maintain,—the variations of temperature and humidity to which they are exposed,—their diet and habits of life, and finally, in some classes, the state of mind.

We shall begin with those operatives who approach nearest to the perfection of the physical state.

1. They are men of *active habits, and whose employments are chiefly in the open air.**

BUTCHERS stand at the head of this division. They are much in the open air, and take strong exercise. Most of the masters ride on horseback to the neighbouring markets, and often traverse the surrounding country to buy cattle. They are well known to ride fast, and to take often long journies.

Drovers of Cattle for the butchers, though their action is generally less violent, have great distances to travel. They walk 20, 30, or 40 miles a day. Butchers, and the Slaughter-men, their wives, and their errand-boys, almost all eat fresh-cooked meat, at least twice a day. They are plump and rosy. They are generally also cheerful and good-natured. Neither does their bloody occupation, nor their beef-eating, render them savage, as some theorists pretend, and even as the English law presumes. They are not subject to such anxieties as the fluctuations of other trades produce ; for meat is always in request ; and butchers live comfortably in times as well of general distress as of general prosperity. They are subject to few ailments, and these the result of plethora.

* This section includes, with the employments in the open air of Leeds, some in which a greater or less degree of *country air* is enjoyed. Hence the butchers who travel, the cattle dealers, gardeners, &c., have an advantage over other persons who, though they carry on active employment out of doors, are still confined to the vitiated atmosphere of Leeds and its immediate neighbourhood.

The atmosphere of the slaughterhouse, though sufficiently disgusting to the nose, does not appear to be at all injurious to health. The mere odours of animal substances, whether fresh or putrid, are not apparently hurtful; indeed, they seem to be often decidedly useful. Consumption is remarkably rare among the men employed in the slaughterhouse. If we see a phthisical youth in the fraternity, we shall generally find that his parents, aware of an hereditary disposition to consumption, brought him up to the business with the hope of averting this formidable malady. The atmosphere of the slaughterhouse, imbued with a foreign admixture, is moreover less susceptible of those natural changes, which produce epidemics. From this circumstance, conjoined with their diet and habits of life, butchers are less subject than other trades to Cholera and Dysentery. To the same favourable combination, we attribute their comparative exemption from diseases, considered as infectious or contagious. Of 520 patients taken to the House of Recovery in this town, during the last year, only one was a butcher, and his was a case not of typhus, but of simple fever.*

Notwithstanding the favourable circumstances in which butchers are placed, longevity is not greater in them, than in the generality of employments. I suspect it is even shorter than among most other men, who spend as much time in the open air. Butchers in fact live too highly, not too highly for temporary health, but too highly for long life. Is every man gifted at birth with a portion of the pabulum of life, which he cannot increase, but which he may prematurely consume;—in other words, does nature endow us with a vital patrimony, which we may exhaust, not only by profligate indulgence, but even by regular draughts too frequently repeated? Or rather does not

* Dr. Tweedie, in his late publication on Fever, has a similar remark: “ Though almost every description of mechanics has been at some period or other admitted last year into the Fever Hospital, I do not recollect a single instance of a butcher being sent to the establishment.”

high living, (for I speak not at present of excess or intemperance)—does not high living produce that plethoric state which gradually leads to disease? I believe the latter. Congestion of blood, affecting chiefly the vessels of the abdomen and head, shortens the lives of numbers who are plump, rosy, and apparently strong.* The preventive is obvious.

CATTLE AND HORSE DEALERS, leading an active life in the open air, are generally healthy, and would be almost exempt from ordinary maladies, were it not for their habit of drinking. Wet and cold would rarely produce even temporary ailment to temperate men in an employment so conducive to vigour. Horse-dealers' grooms or riders are a sickly set of men. Their appearance indicates those diseases of the stomach and liver which result from a debauched and irregular life.

FISHMONGERS, who bring fish from the coast, are of course greatly exposed to the weather. They are not, however, subject to rheumatism or other inflammatory disease. Generally hardy and temperate, they enjoy health, and attain considerable age. Different is the state of the retailers of fish, in towns. These are often addicted to dram-drinking, and are consequently sickly and short-lived.

CART-DRIVERS, though exposed to atmospheric vicissitudes, are healthy in proportion to their temperance and the nourishment they take. Their wages, however, are low; they are often indifferently fed; and many, particularly among the coal-leaders, congregate and spend at the alehouse that money,

* My very intelligent friend, Dr. Murray, of Scarborough, concurs in the statement relative to Butchers. "The high living of Butchers assuredly leads to plethora and premature dissolution." He adds—"Thus coal meters, &c. of London rarely, if ever, attain the age of forty, though men remarkable for muscular bulk and strength. They work most laboriously, perspire immensely, and supply such waste by extraordinary and almost incredible potations of porter, which ultimately, without much positive and actual intemperance, brings on irregularities of the digestive system, structural changes, and death."

which would be better employed in buying solid food. The attention of masters might do much to correct the evil.

LABOURERS IN HUSBANDRY, SAND LEADERS, AND MEN EMPLOYED ON THE ROADS, would be healthy, were their means of subsistence adequate to their wants. A man who has himself, his wife, and family to support on twelve or sixteen shillings a week, cannot be well fed. Hence this body of men are far less robust in figure, than we should expect from the nature of their employ. They are subject to disorders of the digestive organs, and generally suffer also greatly from epidemics.

BRICKMAKERS, with the advantage of full muscular exercise in the open air, are subject to the annoyance of cold and wet. These, however, appear little, or not at all injurious. Brickmakers, half naked, and with their bare feet in the puddle all day, are not more liable to catarrh, pneumonia, and rheumatism, than men whose work is under cover and dry. Of twenty-two brickmakers of whom we made personal inquiry, only one had been affected with rheumatism, or could state himself subject to any disease. All declare that neither rheumatism, nor any inflammatory complaint, is frequent among them. Individuals of great age are found at the employ.

CHAISE-DRIVERS, POSTILLIONS, STAGE-COACHMEN, and GUARDS OF COACHES, with an equal advantage of fresh air, are differently situated in reference to exercise. Postillions, of course, have great and continued exertion; but the kind is objectionable. Their position on the saddle is bad, and they use the arms unequally; hence curvature of the spine. They are moreover said by Morgagni to be particularly subject to aneurism of the aorta. The drivers of chaise and hackney-coaches have more moderate and equal exercise; but their position subjects them to popliteal aneurism. They, as well as postillions, suffer from irregular living, and the habit of frequent potation. They are subject to disorders of the head

and the stomach. Still worse is the state of stage-coachmen and guards. With an equal or greater degree of intemperance, they have less muscular exercise to counteract its effects. In addition to morning sickness, and other affections, indicating gastric disease, they have venous congestion of the abdomen ; then of the head ; finally apoplexy and palsy.

The atmospheric vicissitudes to which all drivers are exposed, are thought to produce rheumatism and inflammation of the lungs. I conceive, however, that these diseases would rarely occur to abstemious men. It is intemperance which gives the susceptibility to such maladies ; and it is intemperance which produces much greater, the fatal affections which we have just mentioned. I scarcely need add, that the whole class is short-lived. They generally die before they reach the age of 50. Among all the Leeds men, we could find only three individuals who are old, and two of these have the character of great temperance.

Gentlemen's coachmen often suffer from excess of nourishment : they eat more than they work. Having often to wait for their masters,—to use Dr. Good's phrase,—“ They fill up their time, by filling up their stomach.” They also take ale too frequently. And from these united causes, they become plethoric, have the venous systems congested, and the secretions consequently impeded. The fault of these men, though much less than the dram-drinking practised by their brethren of the stage, certainly tends to the production of gout and serious affections of the brain.

COACH-BUILDERS may be divided into three classes,—carpenters, smiths, and painters. In the first, the only injurious circumstance is the common atmospheric impurity of a town. The men work in open sheds, have full and varied muscular exertion, and are temperate in their habits. They are consequently healthy, and frequently attain advanced age. The smiths are often drunken, and neglect their work for days at once. They labour, consequently, under

disorder of the digestive organs, and die comparatively young. The painters, steady in their habits, suffer, though in a less degree, from the disorders which we shall have to notice when we speak of house-painters.

CARPENTERS, JOINERS, WHEELWRIGHTS, and MILLWRIGHTS, appear to receive no injury from their respective employments. I must state, however, that although temperate millwrights are healthy, and continue their employ to a great age, often even to that of 60, there is another class, who fit up the shafts and wheels to convey the power from the steam engine to the machinery, and who suffer from their debauched habit of life. These men earn high wages; take much of that pernicious compound called ale, and sometimes even drams in addition, and are moreover off work at the pothouse two or three days in the week. Such men, of course, are unhealthy and short-lived.

COopers have good muscular exercise. When lads enter the employ, the stooping posture affects the head; and the noise, the hearing. This, indeed, is often permanently, though not greatly impaired. The men are annoyed also by pain in the loins, the result of posture. On the whole the employment is healthy.

ROPEMAKERS, though they have exercise in the open air, suffer inconvenience from their stooping posture. A similar observation applies to GARDENERS.

PAVVERS are well known to have strong muscular exercise in the open air of the town. Though exposed to the weather, they are not subject to acute diseases. Their chief complaint is pain in the loins, which increases with their age. It is probably the effect of long standing and labour. Though addicted to dram-drinking, they often live to an advanced period.

2. The next division of the labouring class is that in which *the employments are carried on in an atmosphere confined and impure.*

We scarcely need remark that the air of a town like Leeds is always in an unnatural state.* The excess indeed of carbonic acid gas is said to be very trifling ; but our skins and linen prove an abundant admixture of charcoal itself. Ammoniacal and other vapours from manufactories, sewers, and places of refuse add to the general impurity.† This state of atmosphere affects in a greater or less degree all the inhabitants. The complexion is pallid ; and the tongue shows that

* Hippocrates in his book, *Ἱπποκράτειον*, never alludes to the effects of an atmosphere artificially impure. Observant of the effects of the different winds on the human constitution, of the situation of dwellings, the qualities of the water, the epidemics and endemics, he would undoubtedly have been equally or more attentive to the effects of an artificial state of atmosphere, had it existed to a considerable extent. Yet cloth was then made. We read of woollen garments, Amorgian stuffs, garments of Achian Byssus, &c. We know also that there were extensive manufactories in Athens ; and we may infer their existence in other states and islands around.

† From the low price of coals and the abundance of factories, the air of Leeds appears to be fouler than that of other places of equal size. I should suppose, indeed, the centre of this town to have an atmosphere as vitiated as that of the centre of London. The extent also of a polluted atmosphere is much greater than the public believe. It is known that many delicate plants will not thrive within ten miles of London ; and though I am not aware of the distance from Leeds which such plants require, gardens in the vicinity never flourish. The vegetables brought to the Leeds market are chiefly grown in the neighbourhood of Wakefield, Pontefract, &c. From the fleeces of sheep, as well as other circumstances, I conceive that, generally speaking, the air is vitiated in a greater or less degree for four miles round Leeds. This will not surprise those who are aware that the smoke from a fired substance will diffuse itself through a space of 4 or 500,000 times the size of the substance which produced it. “ If half a grain of very pure gunpowder be laid on a piece of tin, a glass vessel placed over it, and the gunpowder fired, the smoke will fill the whole cavity of the glass, though its base were eight inches, and its perpendicular height above 20.”

digestion is disordered and imperfect. I should think that not 10 per cent. of the inhabitants of towns like Leeds enjoy *full* health. Were we to ask, indeed, those we see around us, the major part would say that they are quite well. But a close examination would prove that there are few individuals who have not either disease of some organ, or an evident disposition to disease.

The lungs, however, suffer much less from the air of towns than we should expect. Bronchial affections indeed are common, but other acute diseases of the chest, as pleurisy and inflammation of the lungs, are, I think, neither so frequent nor so severe as in the agricultural districts. Cases of consumption also are not comparatively numerous; nor is their progress so rapid in smoky towns as in the purer air of the country and the mountains. I speak of the *general* atmosphere of towns; for we shall hereafter see that the atmosphere of certain manufactories excites consumption to a very lamentable extent.

Though all inhabitants of large towns suffer in a greater or less degree from the impurity of the atmosphere, yet it is obvious that those who are most crowded together will be chiefly affected, particularly if ventilation be imperfect. A serious addition to the evils of a confined atmosphere is the defect of muscular exercise. Certain classes of muscles are for twelve or fourteen hours a day scarcely moved, and postures maintained injurious to the proper actions of the internal organs.

TAILORS are very unfortunately situated in this respect. Sitting all day in a confined atmosphere, and often in a room too crowded, with the legs crossed and the spine bowed, they cannot have respiration, circulation, or digestion well performed. The employment, we must admit, produces few acute diseases. But disorders of the stomach and bowels are general, and often obstinate. Pulmonary consumption is also frequent. Some of the men state their liability to pains of

the chest ; but the majority make no complaint. It is nevertheless apparent, even from observing only the expression of countenance, the complexion, and the gait, that the functions of the stomach and the heart are greatly impaired, even in those who consider themselves well. We see no plump and rosy tailors ; none of fine form and strong muscle.* The spine is generally curved. The reduction in the circumference of the chest is not so much as we might expect. The average of our measurements presented 33 to 34 inches, while that of other artizans is about 36. The capacity of the lungs,† as evinced by measuring the

* As these sheets pass the press, a young tailor presents himself labouring under extensive disease of the right lung, which percussion and the stethoscope prove to be hepatization. He is 19 years of age, wretchedly meagre and sallow. He came from the country six years ago blooming and healthy. But since this period he has lived in Leeds, been confined to his baneful position from morning to night in a small low room, in which thirteen other tailors are at work. He cannot take more exercise than about half a mile's walk a day, except on Sundays. This case presents nothing rare. It is adduced as a fair specimen of the lamentable state of a great number of artizans.

† For examining the capacity of the lungs, we use a large graduated glass jar inverted over and filled with water. The person blows through a tube, the lower end of which is under the jar,—making, however, but one expiration at each trial. The air, bubbling up, displaces of course the water at the upper part of the vessel, and as this is marked with pints and half pints from above downward, the subsidence of the water indicates the quantity of air expired. This mode, it will be observed, does not show the *mere capacity* of the lungs. The result of the experiment is the compound of the capacity of the air cells and the power of the respiratory muscles. Hence when the latter are weak, as in convalescence from fever or other acute malady, the quantity of air thrown out at an effort will be small, though the capacity of the lungs may be large. But allowing for the state of the muscular system, the test affords useful information in diseases of the lungs, as well as a ready index to the native power of the respiratory organs. It would afford an important assistance, I conceive, in examining recruits for the army. We examined soldiers as a standard of persons in health. Nineteen individuals from the 14th Light Dragoons gave an average of $7\frac{1}{2}$ pints a man. Nine were

air thrown out at an expiration is not less than common. The average of six individuals was $7\frac{1}{2}$ pints. The prejudicial influence of their employ is more insidious than urgent, it undermines rather than destroys life. Apprenticed at an early age, tailors have their constitution modified to their employment. But its native vigour, drawn off in youth to this adaptation of organs to external circumstances, gradually declines, and finally ceases before the natural termination of life. Of 22 of the workmen employed in Leeds, not one had attained the age of 60; 2 had passed 50; and of the rest, not more than two had reached 40. We heard of an instance or two of great age, but the individuals had lived chiefly in the country.* The evils attendant on the employment are in many cases greatly aggravated by bad habits. Like other men whom circumstances have physically depressed, the tailor often seeks the baneful comfort of ale and ardent spirit. The time of relief from work is generally spent, not in invigorating

officers; and the average of these was $8\frac{1}{2}$; four musicians, who used wind instruments, and the average was $7\frac{1}{2}$; six privates, $8\frac{1}{2}$. The largest expiration we have known, was from a tall young cornet; it was $10\frac{1}{2}$ pints. Husbandmen we have not examined.

* I am favoured with a note on this subject by Mr. Dobson, formerly a zealous pupil of mine, now a surgeon in Arabella-row, Pimlico, London:—"Shultz and Co. tailors, of London, employ 334 men. Of these 6 are above 60 years of age; 14 about 50; and the greater number of the remainder about 40. Three men of the above six above 60 have curvature of the spine. They are so subject to anal fistula that they have a 'Fistula club.' Their most common affections are dyspepsia, diarrhoea, and dull headache, with giddiness, especially during summer. They attribute their complaints to two causes; one of which is, the posture, the body bent for 13 hours a day; the other, the heat of the shop. I examined the temperature of the rooms on Monday, the 7th June, 1830. It was 98°, while in the open air the thermometer stood at 76°. On Tuesday it was 100°, and in the open air 84°. Tailors are the most intemperate set of men in London. A large proportion die annually of phthisis."

the animal frame, but in aggravating his complaints, and converting functional into organic disease.

Can we correct these evils? The position of the tailor might be amended. He now sits cross-legged on a board; because in the ordinary sitting posture he could not hold a heavy piece of cloth high enough for his eyes to direct his needle. Let a hole be made in the board of the circumference of his body, and let his seat be placed below it. The eyes and the hands will then be sufficiently near his work; his spine will not be unnaturally bent, and his chest and abdomen will be free. I am aware that old workmen will be unwilling to regard this or similar suggestions; for every man is formed to his habits. If however masters and medical men would urge an alteration, and if especially boys apprenticed to the trade were taught to work in the posture recommended, tailors would assuredly become much more healthy. The practice of drinking might also be easily reduced, if masters discharged from their employ every man who absented himself a day without proper cause.

STAY-MAKERS are exposed, though in less degree, to the same physical evils as the tailors. We do not find, however, that they are equally intemperate. Though health is impaired by confinement, life is not apparently shortened. Among the few stay-makers who live in Leeds, there are several instances of considerable age.

MILLINERS, DRESSMAKERS, and STRAWBONNET-MAKERS are often crowded in apartments of disproportionate size, and kept at work for an improper length of time. Their *ordinary* hours are ten or twelve in the day, but they are confined not infrequently from five or six in the morning till twelve at night. The bent posture in which they sit, tends to injure the digestive organs, as well as the circulation and the breathing. Hence girls from the country, fresh-looking and robust, soon become pale and thin. The constant direction of the eyes also to minute work, affects these organs. Sometimes it induces

slight ophthalmia, and sometimes at length a much more serious disease, palsy of the optic nerve.

In stoving strawbonnets sulphur is largely used. The fumes, in some houses, spread through every apartment, and the inmates even sleep in an atmosphere impregnated with these offensive vapours! Sulphurous gas, I need scarcely add, greatly affects respiration. It induces at the time a violent cough, and the irritation, if frequently repeated, tends to the development of pulmonic disease. Might not the sulphurous fumes be absorbed or confined in the process? Water in a large shallow dish would take up a considerable proportion. A small outbuilding for the operation would be a more decisive remedy. This indeed is used by some strawbonnet-makers.

Remedies for the other evils to which this class is exposed, are obvious,—ventilation, reduction of the hours of work, and brisk exercise in the open air. The great cause of the ill-health of females who make ladies' dresses, is the lowness of their wages. To obtain a livelihood, they are obliged to work in excess.

SLUBBERS of cloth,—men who form the carded wool into tough loose threads,—and **SPINNERS**,—men who make these threads finer and stronger,—have a very active employment. While the arms are fully exerted, one by turning the wheel, and the other by pulling the beam, the muscles of the other parts are successively brought into action in stooping and extending the trunk, and walking backwards and forwards. Enabled, moreover, by the wages they earn to live well, these men are remarkably strong, robust, and healthy. Their countenances, when cleaned from the impurities of oil and dye, are often even florid. The children employed as “pieceners” have moderate labour, and, notwithstanding their blue and greasy skins, are found to be generally free from disease. Indeed they appear stronger and plumper than any other children in towns.

CLOTH-DRESSERS or **CROPPERS**, working at the shears,

seem to be little injured by their employment ; they are, however, too much crowded, and hence they occasionally suffer from disorders of the stomach. Affections, termed rheumatic, are also rather prevalent. We found few cloth-dressers aged ; indeed in one large establishment they were almost all lads. This, however, results chiefly from the introduction of "cutters" or the dressing cloth by machinery, in which old men are rarely employed. By the confinement, indeed, rather than by the nature of the occupation, is health affected. Two exceptions, however, must be stated. In the use of the French machine, the brushes produce great dust ; and hence the men who attend solely to this department suffer considerably in the air-tube and the lungs. The second exception occurs in the preparation, of ladies' pelisse cloths. These, before dyeing, are "perched," that the pieces most suitable for delicate colours may be selected. The cloth brought for examination has been *once* cut, but not brushed, and hence contains innumerable croppings, which, as the piece is perched in the driest state possible, afford a cloud of woollen dust. This of course greatly distresses the respiratory organs.

WEAVERS have a confined atmosphere, and, though the limbs are fully exercised, the trunk is kept comparatively fixed, and the chest is not expanded. This stooping, however, is somewhat diminished by the mode of casting the shuttle with a string, instead of the hand. When weaving is carried on at home, the rooms are often small and ill ventilated ; and among the Irish we find a sad want of cleanliness. Fever is rather frequent among weavers, but other acute diseases are rare ; the men, however, seldom enjoy health. Digestion is imperfect, asthma and other affections of the chest are common.* They complain of the smell from the oil-lamps.

* Dr. Murray remarks, "that soldiers disbanded and resorting to weaving, or other confined and sedentary employments, speedily became

This no doubt annoys the lungs, but their reduction of health is attributable chiefly to the confinement. The susceptibility to fever may arise from the frequent defect of proper nourishment. The weavers of stuffs have low wages, and are often out of employ. There are more old men in the occupation of weaving than in most others.

BURLERS, always females, are kept in an irksome posture, and often in rooms too small. We have found 106 in one chamber, long indeed, but very low, and deficient in ventilation.* The spine is much bent forward. This inconvenience is however somewhat lessened by the practice of sitting and standing alternately. The eyes often fail when women continue the employ for years.

FRIZERS, who raise a "nab" on the cloth, though they have not a fixed or injurious posture, are kept in a close room often 16 to 18 hours in the day. The process goes on without interruption, and relays of men consequently work by night. The noise of the machinery and the confinement at first affect the head and impair the appetite, and a continuance of the employ finally renders the hearing obtuse. A dust rises from the cloth, but not in such degree as to annoy the men. Frizers are intemperate, unhealthy, and short-lived. We could not hear of one aged man at the employ. Frizers fortunately form but a small class.

CLOTH-DRAWERS, men who with needles draw up minute

remarkably affected with dyspepsia and gastrodynia, however moderate their habits may be. Others of the same class, who enjoy comfortable pensions, and who even indulge freely in spirits and malt liquor, still, if they are but little confined within the house, will retain their florid complexion, and the firmness and tension of their muscles, and are in good health, though seldom destined for long life."

* Mr. Henry, in the proceedings of the Manchester Board of Health, recommends for crowded apartments the supply of oxygen, from manganese. Some such means might be advisable where the division of the work-people and sufficient ventilation are impracticable.

holes or repair injuries in the cloth, are kept almost all day with the spine curved, and the abdomen consequently compressed. In "lettering" especially, the men are obliged to lean forward. Cloth-drawers sometimes sit, with short intervals only for meals, from five in the morning till eight at night. The air they breathe is often too confined; and occasionally, when working low-priced goods, they are annoyed with the dust from fuller's earth.

Cloth-drawers are generally delicate, short-breathed, and subject especially to stomach complaints and head-ache. These indeed we found to affect in a greater or less degree more than one-half the men we examined. The eyes frequently become inflamed, particularly in drawing scarlet. No cloth-drawers live in health to a great age. Cloth-drawers earn high wages, and, though occasionally required to work closely and for an improper period, they have frequent intervals in which not half the day is devoted to labour. These intervals, instead of being employed in exercise in the open air, which would greatly diminish the effects of bad posture, and invigorate the constitution, are too generally spent at the alehouse.

SHOEMAKERS, it is well known, are placed in a very bad posture,—a posture second only to that of the tailors. The abdominal viscera, and especially the stomach and liver, are compressed. Lads put to this employ, often suffer so much from headache and general indisposition that they are obliged to leave it; and men who have been able to bear it for years, lose appetite and strength. Digestion and circulation are so much impaired, that the countenance would mark a shoemaker almost as well as a tailor. We suppose that, from the reduction of perspiration and other evacuations, in this and similar employments, the blood is impure, and consequently the complexion darkened.* The secretion of bile is generally unhealthy, and bowel-complaints

* *Nam vitium capit sanguis, ni moveatur corpus; unde illius excrements in cute resistant et universus corporis habitus defecatur.*"—*Ramassini de Morbis Artificum.*

are frequent.* The capacity of the lungs in the individuals examined we found to average six and one-third, and the circumference of the chest 35 inches. In the few shoemakers who live to old age, there is often a remarkable hollow at the base of the breast bone, occasioned by the pressure of the last.† Are shoemakers subject to Popliteal Aneurism? Morgagni asserts this; but I am not aware that a similar observation is now made. Much as posture injures shoemakers, bad habits injure more. Working late on Saturday night, they often lie in bed all Sunday morning, lounge in listlessness during the afternoon, drink all Monday, are sick and taking physic on Tuesday, and return to work on Wednesday. Surely the interference of the masters might prevent half the disease and wretchedness for which the shoemaker is remarkable. Exercise in the open air is urgently required for the relief of this as well as other employments, which we have yet to examine; but to prevent repetition I shall make some general remarks on this subject at the close of the paper.‡

CURRIERS and LEATHER-DRESSERS are subjected to no injurious agent, except the bent posture in the process of "shaving." This affects the head. The smell of the leather produces no disagreeable effect. The men are generally very healthy;§ and a considerable proportion live to old age.

* Merat, in the *Dictionnaire des Sciences Médicales*, says that Shoemakers are subject, not only to chronic inflammation of the stomach, but even to cancer of this organ.

† In Edinburgh, the makers of balls for the game of golf, are stated to suffer from pressure on the pit of the stomach, which induces subacute inflammation of the mucous membrane, obstinate gastralgia, &c.

‡ Merat, in the *Dictionnaire des Sciences Médicales*, recommends, as a preventive of the evils which afflict shoemakers, the introduction of the English Machine,—"pour fabriquer les chaussures." What does he mean?

§ Widely different is the account given by Merat.—Curriers, he says, are commonly pale, emaciated, and bloated, affected occasionally with putrid and malignant diseases, and generally with the maladies of debility. He mentions also malignant pustules and carbuncle. He seems to ascribe all these evils to the smell of the skins and leather, "odeur nauseabonde." On

SADDLERS are obliged to lean forwards, and are confined to this position. Hence they are subject to head-ache and indigestion.

PRINTERS are kept in a confined atmosphere, and generally want exercise. Pressmen, however, have good and varied labour. Compositors are often subjected to injury from the types. These, a compound of lead and antimony, emit, when heated, a fume which affects respiration, and are said also to produce partial palsy of the hands. Among the printers, however, of whom we have inquired, care is generally taken to avoid composing till the types are cold, and thus no injury is sustained. The constant application of the eyes to minute objects gradually enfeebles these organs.* The standing posture long maintained here, as well as in other occupations, tends to injure the digestive organs. Some printers complain of disorder of the stomach and head; and few appear to enjoy full health. Consumption is frequent† We can scarcely find or hear of any compositor above the age of 50. In many towns printers are intemperate.

BOOKBINDERS AND POCKET-BOOK MAKERS are similar employments. The work is remarkably easy, and keeps no muscles fixed, nor demands excessive action from any. The workmen suffer no annoyance, except occasionally from close atmosphere, and from the smell of the putrid serum of sheep's blood, which they use as a cement. The selection of this substance is unwise, since white of egg or other albuminous matter would answer the purpose, without offending the senses.

The Pocket-book makers have high wages, and are not compelled to keep hours. Hence they are often

reading his remarks, we went again to the curriers, and re-examined the subject. The result, however, was a confirmation of the statements in the text. Curriers are good-looking, healthy, and long-lived. The exceptions to be found are almost solely among intemperate individuals.

* *Lumina hebecunt cum suffusionibus, &c.—Ramazzini.*

† Ramazzini mentions also continued fever, pleurisy, and peripneumony.

very dissipated. One master informed us that several of his people have died from consumption. This, however, I should attribute, not to the employ, but to intemperance.

CARVERS AND GILDERS are kept in a confined atmosphere, and often for long periods in a leaning posture. Hence they sometimes suffer from headache. Though the pallid appearance, general among these workmen, indicates a reduction of health and vigour, life is not abbreviated in a marked degree.*

CLOCKMAKERS have little objectionable in their occupation; for though the making and fitting up are carried on in the house, the posture is varied, and the men are frequently travelling to repair clocks in the country. They are generally healthy, and attain often advanced life. **WATCH-MAKERS** have a much worse employ. They sit all day with the trunk bent forward. The digestive organs almost always suffer, and the lungs are sometimes affected. The close and continued application also greatly injures the eyes. Many youths apprenticed to watchmaking are obliged to leave the employ, and the individuals who remain rarely live to old age.

SMITHS have an employment remarkably conducive to muscular power. The use of the large hammer powerfully excites all the muscles, and especially those of the arms, throwing on them a large supply of blood, and consequently producing their enlargement. Exertion like this, moreover, has a considerable effect on the circulation in general, and the functions with which it is connected. For youths of strong constitution, no labour is better than that of the smith. For those however naturally delicate, the exertion is too great,

* Looking-glasses are not generally made in Leeds by the carvers and gilders, and hence the great danger from mercurial vapour is avoided. Persons who are employed in this process are liable to a severe nervous affection, the *tremblement des doreurs*, of the French.

and young men of scrofulous constitution are particularly liable to sink under the employ. Smiths are subjected to high temperature, and frequent changes of temperature, but with no obvious injury. They are rarely affected with rheumatism and catarrh.* The employ subjects the eye to the annoyance of smoke, and to excitement from the glow of the heated iron. But our examination of the smiths in this neighbourhood does not prove them subject to ophthalmia; nor does it show that vision is impaired by the excitement of the retina.† When smiths are ill, the cause is most frequently intemperance. They do not however arrive at great age. We could hear of but one old smith in the town of Leeds.

CABINET-MAKERS are generally healthy, though employed within doors. The labour is good; and there is no hurtful accompaniment, with the exception of the dust, which is produced by sawing certain kinds of wood.

PATTEN-MAKERS are subject to no other inconvenience from their employ, than the bending posture required in cutting the sole or clog.

HOUSE-SERVANTS, from their confined situation in a smoky town, are rarely in full health. We find them often affected with disorder of the digestive organs and of the head,—the latter particularly frequent. Girls from the country soon lose their ruddy complexion, and suffer more than the natives

* My intelligent friend, Mr. Overend, of Sheffield, states that of the cases of rheumatism which have fallen under his care, farriers and blacksmiths have presented a large proportion. My own observations and inquiries, however, do not accord with this remark.

† Ramazzini states, that smiths suffer frequently from lippitude and ophthalmia. In the classic authors we find allusions to the same effect. "Ardentis massa fuligine lippus," says Juvenal. To many parts of this paper such extracts from the classics might be affixed. Devoid, however, of practical importance, they will be omitted. The curious may find them abundant in Ramazzini.

of the town. Kneeling produces in housemaids a swelling of the bursa, near the patella, which produces considerable inconvenience, though seldom serious disease. Footmen who stand long behind carriages, are said to be frequently affected with hydrocele.

WAITERS at inns, irregular and dissipated in their habits, are generally unhealthy. They die comparatively young.

The last operatives I shall here mention are COLLIERs and WELL-SINKERS,* though their situation is such as not to fall with strict propriety either into this, or any other class.

COLLIERs have considerable muscular labour, chiefly in the sitting or kneeling posture, and with the body bent often to the greatest degree. They work in an unnatural atmosphere, and with artificial light. They are exposed to changes of air, and occasionally they work with their feet in water. Perspiration at other times is so great as to cause them to be almost naked. They generally work from four a. m. to four or five p. m. and take little food while in the mine. Colliers are generally spare men, the spine is almost always curved, and the legs are often bowed. The skin, of course, is loaded with dirt; and when this is removed, the complexion seems sallow and unhealthy. Their eyes appear small, affected with chronic inflammation, and intolerant of full light. Colliers are subject to disorders of the head, muscular pains, particularly in the back, to rheumatism and asthma. They are well known to be liable to severe accidents from the fall of parts of the mine, and to much more dreadful effects from the explosion of the carburetted hydrogen. The air they commonly inspire is adulterated with hydrogen and other gases. That of carbonic acid has, in certain cir-

* It may be remarked that several employments are mentioned in this paper, which are not strictly those of towns; e. g. that of Colliers, that of Husbandmen, who live at the outskirts of towns, mentioned with Sandleaders, at page 11, &c. They are, however, so connected with civic life, as to claim notice in an inquiry like the present.

cumstances, been so largely developed by the accidental burning of the coal as to produce fatal or dangerous effects.*

Boys enter the pits at the age of six or seven, and are employed in opening the trap-doors, driving the horses, propelling the trucks, &c. ; and finally, when of sufficient age, they become colliers. Sickness and vomiting sometimes affect persons at their commencing the employ ; and many, after a few years' trial, are obliged, by the injury which their health has sustained, and especially by the weakness of their eyes, to leave the mines. Colliers are not habitually intemperate ; but in this neighbourhood they have a periodical debauch, formerly once a fortnight, now once a month. They do not generally exceed the age of fifty, though many exceptions are to be found. We saw one asthmatic individual, seventy years of age, who had worked fifty years in the mine.

The prevention of danger in coal-pits is so well known as to require no detail. I need only mention the use of the safety-lamp, the examination of the state of the air, especially in pits re-opened, and the practice of ventilation. If the overseers and workmen practised what they know, accidents would be comparatively rare.

WELL-SINKERS have great labour, and are frequently obliged to respire carbonic acid and other gases found in wells. While working in such impure atmosphere, they feel dizziness and a sense of suffocation, and if the injurious agency be in great degree, animation is suspended, and sometimes destroyed. By a less degree, when continued for some time, health is affected. The men complain of headache, sickness, and loss of appetite, and are unable to work for days or weeks.

* See in the *Edinburgh Medical Journal*, vol. 32, a short but interesting paper by Mr. Watson, of Wanlock Head, on a case of this kind. Headache, giddiness, tingling of the ears, vomiting, tremor, with extreme debility, succeeded to the partial or general insensibility, which the gas had produced. Three or four individuals appeared afterwards in a state of intoxication.

The evils of the employ, care would in a great measure obviate. Every workman knows that a light will not burn in the foul air; yet the simple experiment is often neglected. The introduction of fresh air by bellows into wells, thus found to be dangerous, has but a partial effect. A more promising plan is recommended in Rees's Cyclopaedia, Art. *Well*.

* * In closing this section I may state a remark of Dr. Murray's, though it is less applicable, I believe, to Leeds, than to many other towns. "Living or working in cellars, or confined and damp rooms, produces occasionally *purpura simplex*, *purpura hemorrhagica*, and *erythema* of the lower extremities, and more frequently abdominal congestion, with consequent organic disease, sometimes muscular atrophy, and sometimes peritoneal inflammation."

4. We have next to examine the *employments which produce dust, odour, or gaseous exhalations*. They may be divided into those in which the vapour, odour, or dust is not apparently noxious; those in which it appears to be even beneficial, generally or partially; and those in which it is decidedly injurious.

(1.) In adverting to the first of these classes, viz. *that in which the dust, odour, or exhalation seems to be harmless*,—I would observe that any addition to the natural atmosphere must be absolutely noxious in a greater or less degree. Every artificial change must be a deterioration. And health would immediately suffer, were not the injurious impression counteracted, though in a manner we cannot explain, by that vital principle, that conservative power of the animal constitution, which accommodates functions to circumstance and situation. This principle, however, unlike many others, seems to become weaker from exertion. The more we draw, the less balance we leave in our favour. And hence the circumstances of civil life, which for years inflict no perceptible injury, may

and probably do shorten the duration of life ; in other words, health, I conceive, is often preserved at the expense of that vital power, which in a more natural state, would have carried us to age. This remark has a general application to the subject of the paper, as well as to the particular class of operatives which now falls under our notice.

All men, whose employments connect them with animal substances, are subject to atmospheric impurity. The workers in wool and leather, the butchers, even the provision dealers, and cooks, must, in their several occupations, breathe air different from that which nature has provided. But the effect among these, is not important enough to detain us.

The manufacture also of vegetable substances produces odours and exhalations, and still more frequently the evolution of dust. In this neighbourhood, the former effect is so slight as to require but a short notice.

STARCH-MAKERS are exposed to a fetid acetous odour, which rises from the fermenting wheat, or rather from the water in which the wheat has been steeped. The rooms are wet and cold. The men do not apparently suffer from the employ.*

RECTIFIERS OF SPIRIT, AND MEN ENGAGED IN WINE AND SPIRIT VAULTS, are subjected to a vapour which, though it sensibly affects those who are not accustomed to it, does no evident injury to those who inhale it daily.

BRICKLAYERS, and particularly their Labourers, are exposed to lime-dust. This frequently excites ophthalmia and cutaneous eruptions, but not internal disease.†

* I state of course what we observed ; but the number of Starch-makers in Leeds is comparatively small. Merat says that if the odours be in great quantity, they produce cough, difficulty of breathing, palleness, and emaciation.

† We hear an adage in the mouth of the workmen, that "Brick-layers and Plasterers' Labourers, like asses, never die."

The remark applies also to **LIME-WORKERS AND LEADERS OF LIME***.

PLASTERERS AND WHITEWASHERS, who are also of course exposed to lime-dust, suffer from it no sensible injury. They are however more pallid and less robust than the men last noticed. They complain of the ammoniacal gas evolved from the glue; but I doubt its injurious effects.

WOOLSORTERS are occasionally annoyed with dust from the lime, which in some kinds of wool is employed for separating the fleece from the skin. No sensible effect is produced on health.

TURNERS, when employed on bone, receive into the throat and air passages a considerable portion of dust. This, however, is said to be rather grateful than noxious.

TOBACCO-MANUFACTURERS are exposed to a strong narcotic odour, and in the stoving department to an increase of temperature. Yet the men appear healthy. Here, as well as in several other employments, we admire the agency of that conservative principle, to which I lately referred. Men breathe an atmosphere strongly impregnated with a poisonous substance, yet become insensible to its influence. The only ill effect we can find is from the heat of the stoving department, which all men cannot bear.†

* "Oculos (calx) mordet, et vocem aspirat."—*Ramazzini*.

† M. Pointe, of Lyons, has lately made some interesting statements relative to Tobacco Manufacturers. Not having access to the original Tract, I quote from the *Lancet*.

"The number of workmen who were the subject of M. Pointe's observations amounted to five hundred; they were employed at one manufactory, and, although occupied in different ways, were all of them in continual contact with tobacco. The affections to which they seemed subject, were principally pulmonary consumption, inflammation of the eyes, anthrax, and furuncles, the two latter of which generally appeared on the trunk, were extremely tedious, and unless the occupation of the patient was changed, hardly ever admitted of permanent cure; but the affection

SNUFF-MAKING is more pernicious. The fine dust of the tobacco, combined with muriate of ammonia, and other sub-

which seemed to prevail most was purpura haemorrhagica, and a disposition to scurvy. On the other hand, it is worthy of remark that tobacco manufactories, in some degree, appear to be exempt from certain affections, viz. intermittents and scrofula, which are very common among the inhabitants of Lyons, the latter being remarkably prevalent in other manufactories, especially in those of silk. Itch, against which tobacco has often been asserted to possess prophylactic powers, was very frequent; but trembling and nervous affections, to which persons who are much in contact with narcotics, are said to be very liable, was in no instance observed as the effect of continued employment in the manufactory in question."

In the Edinburgh Medical Journal, vol. 33, is a reference to a valuable paper by MM. Parcut, Duchatelet, and D'Arcet, on this subject. It is contained in the Annales d'Hygiène Publique and de Medicine Legale. The general results of this extensive examination, are accordant with the observations in the text.

It is amusing to read the opinions on the *use* of tobacco, held a century or two ago by some eminent physicians. Bonetus quotes from Augustinus Thonerus, that a certain court-physician, not contented with smoking in the day, would have a lamp with wax-candles and pipes suspended to his bed. Dying a year after, and his head being opened, "res stupenda!" the whole brain was so dried that it scarcely exceeded the magnitude of a nut. Pauvius mentions the dissection of a robust and healthy young man, whose brain was tinged with a black smut. He accounted for the fact when he found the man had been a confirmed tobacco-smoker. Mention is made of a military officer aged 73, who had been addicted to tobacco from childhood. He smoked and chewed incessantly. On dissection, Krantrius found adherent to the cranium much of a dense substance, resembling chimney soot in appearance as well as taste. All the mischief was attributed to the tobacco. Bonetus, Diemerbroeck, and others, thought it necessary to counteract this opinion by the relation of a number of negative cases, as amusing in their details as those I have quoted.

We are often asked if the *use* of tobacco is injurious? Viewing the question in the abstract, we should answer, Yes. To a person in full health, nothing is required but pure air, food, and drink: every thing else is superfluous, and consequently oppressive to the constitution. A narcotic substance must be more than oppressive, because it makes a direct attack on the nervous system. It affects the stomach and the brain.

stances, produces disorders of the head, the air-tube, and the stomach.*

(2.) We next advert to the employments in which the *substances or odours evolved seem to be beneficial generally or partially*. To assert the existence of such an effect may seem a contradiction to the statement before made, that whatever alters the natural constitution of the atmosphere, must be proportionately injurious. But it should be remembered that injurious agents sometimes counteract each other. Medicine is in itself an evil. Remedies often induce unnatural states, but these states supersede others much more serious and permanent. To man in a perfectly healthy condition, no substance arising from manufacture can be useful; but men living in a large town, and with the habits of civil life, are generally unhealthy; and hence certain vapours or other substances may be decidedly beneficial in exciting their languid powers, or correcting the disposition to disease.

But viewing man as the creature of civilization, subjected hourly to excitement foreign to his nature, and injurious to his health, narcotics, by allaying nervous excitability, may, in certain circumstances and constitutions, be really useful. We would not therefore deprive the smoker of his consolation, but we would keep the practice from excess. We would guard especially against that unnecessary potation, to which the practice so frequently leads. Drinking is a great and positive evil; smoking is at best but a slight good. If the two must be associated, banish them as decidedly inimical to health and reason. Smoking can never be proper before the middle period of life. For young men to parade the streets in the evening, with cigars in their mouths, is either affectation or something worse.

* Ramazzini, though he calls snuff " *Nasorum deliciae*," strongly states the annoyance it caused, not only to the workmen, but to the neighbourhood in which it was manufactured. Nay, he thinks it sufficiently important to state that the mill-horses shook their heads, coughed, and snuffled!

Snuff-taking, when frequent and regular, must be more or less prejudicial, inasmuch as it ultimately diminishes the discharge from the nostrils.

RAPE and **MUSTARD CRUSHERS** inhale a peculiar odour from the seeds which they grind. This seems to act as a stimulant on the nervous and circulatory systems: for men fresh to the employ find their appetite and vigour increased. The heat of the room is considerable, often reaching 80° in summer. Though addicted to intemperance, the men employed in oil-mills are generally healthy.* We remarked one man between 70 and 80 years of age, who had been all his life at the employ, and was remarkably strong and robust.

BRUSHMAKERS have a sedentary occupation, but their arms are actively exerted. Some dust arises from the bristles; and sometimes carbonic acid gas is rather freely evolved from the charcoal fire which heats the pitch. But the chief peculiarity of the employ is the vapour of the pitch. This has a sanative effect in bronchial affections, as chronic catarrh, and in some forms of asthma. The workmen are generally free from disease. Several in Leeds have been at the employ for thirty years; and instances are mentioned of brushmakers reaching the ages of 80 and 90.

GROOMS AND HOSTLERS daily inhale a large quantity of ammoniacal gas generated in the stables. This appears beneficial rather than injurious. They have, moreover, full and varied muscular exertion; and if they took a more moderate diet, would be almost universally robust. **HOSTLERS, PORTERS, AND UNDER-MALE SERVANTS** at inns, are generally sickly, and labour under congestion of the vessels in the abdomen and head. Their state evidently results from the ale and spirits they take so frequently.

GLUE AND SIZE BOILERS are exposed to strong putrid and ammoniacal exhalations from the decomposition of animal

* At one mill we were informed that rheumatic affections are frequent, and that men a day or two absent from work are particularly subject to pains in the joints, but we did not find this observation confirmed at other places.

refuse. The stench of the boiling and drying rooms is indeed well known to be highly offensive, even to the neighbourhood. Yet the men declare it agrees well with them—nay, many assert that on entering this employ, they experienced a great increase of appetite and health. All the glue and size boilers we saw, were remarkably fresh-looking and robust. Though exposed to frequent and considerable changes of temperature, to sudden changes also from an atmosphere of hot vapour to the dry cold air, they are not subject to rheumatism, pulmonary inflammation or catarrh. The only complaints we could hear of, were occasional pains in the loins and limbs, attributable to posture and exertion.

BUCKRAM MANUFACTURERS are exposed to the odour of the glue. This is well known to be so great as to offend the neighbourhood of the manufacture. Yet the men make no complaint of ill-health, and reach considerable age. Of the seven men employed at the Buckram-house, in Water-lane, one is 51, another 58, a third 68, and the fourth 76; and these individuals have been at the employ from an early age.

TALLOW-CHANDLERS, subjected to an offensive animal odour, enjoy health, and attain a considerable age.* During the plague in London it was remarked that this class of men suffered much less than others.

TANNERS, it is well known, are subject to disagreeable odours. They work in an atmosphere largely impregnated with the vapour of putrifying skins, and this combined with the smell of lime in one place, and of tan in another. They are exposed constantly to wet and cold. Their feet are scarcely ever dry. Yet they are remarkably robust; the countenance

* Ramazzini talks of stuffings of the lungs, “*infarctus pulmonum*,” as resulting from the offensive animal exhalation,—difficulty of breathing, headache, and especially nausea and vomiting. Merat describes chandlers as generally pale, bloated, and respiring with difficulty. In Leeds, however, we have not seen or heard of such effects from the employ.

florid ; and disease almost unknown.* Tanners are said to be exempt from consumption ; and the subject has of late been repeatedly discussed in one of the medical societies of London. We have carefully inquired at several tan-yards, and could not hear of a single example of this formidable disease.

We do not find *old* men actually in the employ ; and the reason assigned is, not the decline of health, but the inferiority of men past middle age, in undergoing the labour of the process. Persons however in advanced life, yet healthy, are found in other occupations, who have before been for many years in the tan-yards, and have not apparently suffered from the long continued exposure to their offensive odour. Hence we may infer that this employ, while it invigorates the constitution in youth and middle age, does not sensibly shorten life ; does not, in other words, give temporary health at the expense of premature decline.

Ramazzini tells us that at Padua the tan-yards were permitted only in the suburbs. Here also, as the stench would be considered a nuisance, tan-yards are at the outskirts. As a matter of medical police, however, we see no occasion for their exclusion from the town.

The observations under this head apply also to Slaughter-

* Very different is the account, which Ramazzini gives of the tanners in his day. He describes their countenance as cadaverous, subumid, lurid, and their respiration quick and short. He says they are subject to the spleen, and not a few are dropsical. Was the process different from ours ? Or did Ramazzini take but a cursory glance at the tanpits, and describe what he had previously expected to find, rather than the result of unprejudiced examination ? Or was it the squeamish state of his stomach, that produced the malediction ? In another part of his treatise, referring to the state of the tanners, oilmen, butchers, fishmongers, tallow-chandlers, &c. he says, “I confess that wherever I have put my foot into places of this sort, I have suffered no light subversion of stomach, nor for a long time could I bear the frowardness of the odour (*odoris pravitatem*) without pain in the head, and some discharging of my stomach.” Aware how seldom literary men are disposed to forego their dinners, we cannot wonder at the Professor’s spite.

men, but their employ was mentioned with that of the Butchers at page 8.

(3.) We have next to examine a class whose *employments produce a dust or vapour decidedly injurious.*

CORN-MILLERS, breathing an atmosphere loaded with the particles of flour, suffer considerably. The mills indeed are necessarily exposed to the air,—the number of men is comparatively small, and the labour is good. Yet Millers are generally pale and sickly; most have the appetite defective, or labour under indigestion; many are annoyed with morning cough and expectoration; and some are asthmatic at an early age. The average circumference of the chest in ten men, whom we measured, was 36½ inches; and the quantity of air thrown out by a full expiration was somewhat less than seven pints. Though we found several who had borne the employ from boyhood to the age of 50 or 60, the individuals were by no means robust; and we could not find an instance of an aged and healthy Miller.*

The preceding statements do not apply to the men who drive the corn and flour carts, nor to the porters who unload the grain. These persons are little exposed to dust, labour chiefly in the open air, and are generally selected for their muscular power. They are, however, like other men who carry great weights, subject to Hernia.

The hours of work in the King's Mills, in Leeds, are from 12 to 12. Night work does not sensibly affect the health.

The evils of the employ might be much reduced by the men's taking exercise in the open air. It is apparent that working from 12 to 12, they have time to enjoy a pure atmosphere for several hours a day. In this, as well as other

* Heinsius, in his Oration "De Laudibus Pediculi," speaks of Millers as most honoured by such visitors. And Ramazzini says, "Observatione dignum est, quod molitores *** Pediculari morbo ut plurimum laborent, adeo ut vulgus pediculos per jocum, pulices albos molitorum appelleat."

employments, we remark with regret the men's inattention to health, their indifference to the prevention of disease. They think nothing of injurious agents till their health is destroyed, and the time for prevention is past. The dust might, I conceive, be removed, or greatly diminished, by a current of air under the floor. The ill effects on Hearing, of this and other noisy occupations, might be diminished or prevented by putting cotton in the ear passages.

MALTSTERS are exposed to much dust, particularly in the grinding and screening departments, and to sulphurous fumes from the coke. The heat of the kiln is of course great. We have found the atmosphere in the drying-room above 80°, and the malt on the floor 140°. The men are frequently affected with bronchial inflammation, and many become asthmatic for life. The exertion is so great that it obliges some to leave the employ at an early age, and it is much too severe for the old. Hence we find no labouring Maltster advanced in years.

TEA-MEN, in removing tea from the chest, are much affected by the dust, especially by that from the green. But as this annoyance is occasional only, we can scarcely suppose it capable of producing permanent injury either to the nervous system or the lungs.

COFFEE-ROASTERS are affected by the odour, which the heat eliminates from the berry. And those who have been thus employed for years, are said to become asthmatic.* The vapour is greatest when the coffee is stirred or shaken during the time of cooling. The heat of the process is of course great,

* "Asthma," and "Asthmatic," are used in different parts of this paper, as the comparatively loose terms of old Nosologies. Though aware of the important distinctions of Laennec, and accustomed to regard them in practice, I have found a general application of the stethoscope to men at their work, and especially to artizans in the mills, very inconvenient, and often, from the noise, quite impracticable. My examination, as far as it has extended, gives me the opinion, that most of the maladies, which they call asthmatic, are cases of chronic bronchitis in some of its forms,—the chronic pulmonary catarrhs of Laennec.

and leads often to immoderate potation. Men when they enter the employ, complain of oppression at the chest, difficulty of breathing and cough,—of headache and indigestion.

SNUFF-MAKERS suffer from the fine dust of their employ ; but this department of the Tobacco-manufacture was noticed at page 32.

RAG-SORTERS are frequently distressed with dust, but the injurious agent is seldom applied long enough to produce a morbid effect.

PAPER-MAKERS also, particularly the aged, are unable to bear the dust, which arises from cutting the rags. Young persons, however, are not generally sensible of much inconvenience ; but few remain for years at the employ. Might not rags be cut by machinery, and this machinery enclosed in a box ? The rags are afterwards shaken in a cylindrical wire cage, so enclosed as to prevent the escape of any considerable portion of dust.

WILLIERS in Cloth Mills, persons who attend the machine which shakes and breaks the dirty rags, have a similar annoyance ; and this continued. Hence they suffer greatly in the respiratory organs. Young men indeed bear the dust better than the aged, and for a time seem to suffer little injury ; but no one can remain at the employ for several years without the destruction of health. The evil is diminished by a casing of wood ; and might probably be almost entirely prevented, were attention called to the subject.

SPINNERS OF WORSTED inhale a fine dust ; but this is not in such quantity as to produce a marked effect.

WORKERS IN FLAX, from their number and the effect of their employ, deserve particular attention. In the Flax-mills, all the departments, with the exception of the spinning and reeling, produce dust. The roving-rooms have a little, and the dry-house has a varying quantity. The carding-rooms are also dusty ; but the worst department is certainly the heckling.

This, in some mills, is carried on by hand, and in such the rooms are greatly clouded. In other mills, where the process is effected by machinery, the quantity of dust is considerably less. Still, however, it is such that a visitor cannot remain many minutes without being sensible of its effects on respiration. Children and a few overlookers are here the operatives; but in the old mode, I believe, men only are employed. Though attention is generally paid to ventilation, and the rooms for the several departments are spacious, they are not sufficiently lofty. A suffocating sensation is also often produced by the tubes which convey steam for heating the rooms. Persons in the dusty departments are generally unhealthy. They are subject to indigestion, morning vomiting, chronic inflammation of the bronchial membrane, inflammation of the lungs, and pulmonary consumption. The dust, largely inhaled in respiration, irritates the air-tube, produces at length organic disease of its membrane, or of the lungs themselves, and often excites the development of tubercles in constitutions predisposed to consumption. There is little doubt that a considerable quantity is also swallowed with the saliva, and deranges, in a greater or less degree, the functions of the stomach.*

The majority of operatives in the great flax-mills are

* Accordant observations have been made by my friend Dr. Murray at Knaresbrough, where there is a considerable linen manufacture. He remarks further that at Edinburgh the makers of balls for the game of golf, suffer considerably from the feathers affecting the air tube and lungs.

Ramazzini has a short chapter on the diseases of the flax, hemp, and silk carders. "Pulvis enim teter ac noxious ex hac materia evolat, ut per os fauces, Pulmones subiens, operarios ad continuam tussim compellat, ac ad asthmaticam passionem sensim ducat. * * * * Colore faciei pallido, tussiculos, asthmaticos ac lipos." Merat gives a similar statement. Les broyeurs de chauvre respirent cette poussière (detritus de chauvre, &c.) qui leur donne des picotemens de poitrine, de la toux de l'enrouement, et à la longue les rend asthmatiques et même phthisiques.

young women, girls, and boys. In 23 of these taken indiscriminately as they came from the mills, we found the air exhaled at an effort, to average 6 pints in males, whose ages averaged 18 years; and $3\frac{1}{2}$ in females, whose ages averaged 19 years. The younger operatives, who are generally of the age of from 7 to 12, were not examined.

As the stethoscope could not be satisfactorily used in the place, and I wished to examine the health of such as have worked in the dusty departments for an unusually long period, and still continue the employ, I requested a few such individuals to be sent to my house for inspection. Six came; and in each I found the lungs or airtube considerably diseased.*

* G. P., a heckler, aged 39, has been in the employ, with some intermissions, for 25 years. His general health is not remarkably impaired. Percussion elicits a natural sound at the upper parts of the chest on both sides; but one unnaturally solid at the base of each. Respiration is heard by the stethoscope over the upper lobes, but is very deficient, and generally, inaudible over the lower. He breathes short; indeed respiration seems to be performed with the upper lobes only, of the lungs. On examination with the jar of water, he exhales $5\frac{1}{2}$ pints.

2. J. C., 48 years of age, has been employed as a band-loosener and a heckler from boyhood. He was formerly intemperate. The man is emaciated, has a hectic flush on his cheeks, and expectorates purulent matter. His digestive organs are impaired. Respiration short and irregular. Subcrepitating rale on the right base of the chest. Pectoriloquy distinct over the right mamma. Bronchophonism over much of the right side, and especially below the axilla. Sonorous rale heard over portions of the left lung. Pectoriloquy heard below the left clavicle, but less distinctly than on the other side. He exhales $6\frac{1}{2}$ pints.

3. J. J., aged 50, has been a heckler for 32 or 33 years; he was some years ago rather intemperate. He is thin and meagre, looks sickly and aged. His gait is weak. His respiration is remarkably short and laborious; he suffers continual palpitation. He complains of cough, but more of difficulty of breathing, and this particularly at night. Percussion elicits a sound more distinct than common on the left side, and especially below the axilla. Here the respiration is scarcely audible. It is noisy over the mamma. On right side respiration deficient at the lower parts; puerile above. Sound of the heart praeter-naturally extensive. He exhales $4\frac{1}{2}$ pints.

The process of heckling flax is generally the most injurious to health. A large proportion of men in this department die young. Very few can bear it for 30 years, and not one instance could we find of any individual who had been 40 years either in this or any of the dusty rooms.

4. W. R., aged 40, commenced heckling 12 years ago, but since that time has been eight years at sea. He has been occasionally intemperate. He is a tall muscular man, with rather a healthy aspect. Before he had been six months at the employ, his skin was extensively affected with tumours, which, from his description, appear to have been Furuncles. He never had shortness of breathing till the last four years. In addition to this symptom he has now cough, particularly in the morning, and, occasionally, vomiting. He has suffered also from pain in the right side of the chest. His chest sounds well on percussion, except at the lateral portions. Respiratory murmur generally weak. Small crepitating rale of the infraclavicular region of the right side. In the right lateral parts of chest, respiratory murmur is scarcely audible. On the left side, it is distinct below the clavicle; deficient in the lateral portion. He exhales $8\frac{1}{2}$ pints.

5. A. K. aged 23, entered the flax mill at 11 years of age. She was six years employed in the dusty departments; the rest of the time, with the exception of one year, she worked in the reeling room. She is of low stature, and of a sickly appearance; she complains of pain in the right side of the chest, and the right iliac region, of cough, and of headache. Expectorated matter is sometimes tinged with blood. She was affected with these maladies, though in a less degree, soon after she entered the employ. Her general health is bad. Percussion elicits a dull sound from the upper parts of the chest; louder and clearer from the lower, especially below the left axilla. Respiration short and interrupted: on the right upper part, distinctly bronchial, on the left anterior part, noisy. Below the left axilla, where percussion elicits a dull sound, respiration only audible when forced; scarcely perceptible in the left posterior region. She exhales $3\frac{1}{2}$ pints.

6. S. J. aged 33, is a back minder: i. e. a person placed at the back of the roving machines. She has been 15 years in the flax-mills. She was healthy when she entered; but soon was attacked with cough and vomiting, which have increased and continue. The cough, she says, comes on in paroxysms, like the whooping cough. The matter she expectorates, is frothy, and sometimes purulent. Her respiration is habitually oppressed, but occasionally so much worse, especially in winter, that it is

We find, indeed, comparatively few old persons in *any* of the departments of the flax-mills. On inquiry at one of the largest establishments in this neighbourhood we found that of 1079 persons employed, there are only 9 who have attained the age of 50; and besides these only 22 who have reached even 40.

Formerly heckling was effected by hand. Now it is performed chiefly by machinery; and fewer men and more children are employed.

The substitution of children for adults produces less apparent and immediate evil. Young persons are observed to bear the occupation much better than those of full age. They do not manifest serious disease in the lungs. They are, indeed, very sickly in appearance, and their digestive organs become impaired; but they make no urgent complaint, and are able to pursue their labour with little interruption. At 13 or 14 years of age they are dismissed from the mill, or transferred to another department; and thus they avoid the effects of bronchial irritation, which, at a later period, might have led to consumption,—a disease known to be most fatal between

with difficulty she can walk from the mill to her lodging, a quarter of a mile distant. She is tall, stoops much, and is of a very sickly appearance. Her digestive organs are impaired. She complains of a pain across the base of the chest, with occasional, but great, swelling at the pit of the stomach. Chest sounds well on percussion. Puerile respiration is heard over the major part; and on the right anterior base, a subcrepitating rale. On the left lateral part, mucous, sonorous, and, occasionally, sibilant rale. She exhales $4\frac{1}{2}$ pints.

The coughs of the persons waiting to be examined, were so troublesome as continually to interrupt and confuse the exploration by the stethoscope.

It will be remembered that the individuals here examined were persons at their work, not patients applying for relief. They were selected only as examples of those who had been long at the employ. The length of time during which most of these individuals had been in the mills, is extraordinary.

the ages of 18 and 30. I am by no means convinced, however, that young persons escape without ultimate injury to the lungs. Children from 7 to 15 years of age go to work at half-past five in the morning, and leave at seven in the evening,—or at half-past six, and leave at eight,—and thus spend twelve hours a day, for five or six years, in an atmosphere of flax dust. Serious injury from such employment, we should expect at any age, but especially during the period of growth. The stethoscope teaches us that respiration is great,—the air-cells largely expanded in proportion to the early period of life; and, as anatomists, we know that at the same period the mucous membranes are comparatively thicker, more vascular and sensitive. Why then, it may be asked, is not the effect of the dust in such circumstances, marked and immediate? The *vis vitæ*, we may reply, the conservative principle, is particularly active in children. It heals the wound of a member in them, much more readily than in adults. The same superiority of activity or power we may expect to be manifested in reference to internal lesions. The conservative principle long struggles against injurious agents; and at the period referred to, seems especially to resist the baneful impression of air mechanically vitiated. But the principle itself must suffer. We have before remarked that it appears to become weaker from exertion. The power which, in a natural state, would carry the body to the age of 70 or 80, is prematurely exhausted; and human beings, like our horses, when worked at too early an age, may be said to decay before they arrive at the term of maturity.*

* Impressed with the opinion that children brought up in flax mills can rarely be formed into strong adults; that though they may drag on a sickly existence for years, they do not finally reach the common duration of life, I endeavoured to trace the individuals who, 10 or 20 years ago, left the heckling or other dusty departments at the age of 14, and went to some of the less noxious employments of towns. But such individuals were not easily found; and consequently I have been unable to verify or refute the opinion.

The employment of young children in *any* labour is wrong. The term of physical growth ought not to be a term of physical exertion. Light and varied motions should be the only effort,—motions excited by the will, not by the task-master,—the run and the leap of a buoyant and unshackled spirit. How different the scene in a manufacturing district! No man of humanity can reflect without distress on the state of thousands of children, many from six to seven years of age, roused from their beds at an early hour, hurried to the mills, and kept there, with the interval of only 40 minutes, till a late hour at night;* kept, moreover, in an atmosphere impure, not only as the air of a town, not only as defective in ventilation, but as loaded also with noxious dust. Health! cleanliness! mental improvement! How are they regarded? Recreation is out of the question. There is scarcely time for meals. The very period of sleep, so necessary for the young, is too often abridged. Nay, children are sometimes worked even *in* the night.

The time of labour in the flax mills is excessive. The people are now (Nov. 1830) working from half-past six in the morning till eight at night, and are allowed only an interval of forty minutes in all that time. Thus human beings are kept in an atmosphere of flax dust nearly thirteen hours in the day, and this not one, but six days in the week. The wages for this labour are by no means great. Hecklers, indeed,

* In the Report of the Manchester Board of Health, published in 1805, the committee remark that, "They have still to lament the untimely and protracted labour of the children employed in some of the Mills, which tends to diminish future expectations, as to the general sum of life and industry, by impairing the strength, and destroying the vital stamina of the rising generation; at the same time that, in too many instances, it gives encouragement to idleness, extravagance, and profligacy in the parents, who, perverting the order of nature, subsist by the oppression of their offspring." This evil has since been remedied by a law, which applies, however, only to the cotton-mills.

earn from 15s. to 20s. a week ; but women cannot earn more than 8s., and often indeed not more than 6s. per week.*

The duration of labour is the opprobrium, rather of our manufacturing system, than of individuals. The masters with whom I have conversed are men of humanity, and willing, I believe, to adopt any practicable proposal to amend the health, and improve the state of their work-people. But they are scarcely conscious of the extent of mischief. We underrate evils to which we are accustomed. The diminution of the intervals of work, has been a gradual encroachment. Formerly an hour was allowed for dinner ; but one great manufacturer, pressed by his engagements, wished his work-people to return five minutes sooner. This abridgment was promptly adopted at other mills. Five minutes led to ten. It was found also that breakfast and "drinking" (afternoon meal) might be taken while the people were at work. Time was thus saved ; more work was done ; and the manufactured article consequently could be offered at a less price. If one house offered it at a lower rate, all other houses, to compete in the market, were obliged to use similar means. Thus what was at first partial and temporary has become general and permanent. And the unfortunate artizans, working before in excess, have now to carry labour to a still greater and more destructive extent. The sound of the steam-engine anticipates the cock-crowing of the morning. Nay, often it is heard throughout the night. This, however, is not peculiar to flax mills. It is indeed less frequent in them, than in other manufactories. In cloth-mills it is by no means uncommon.

So established are the hours of work, that no individual master can, without loss, liberate his people at an earlier period. A legislative enactment is the only remedy for this, as well as the other great opprobrium of our manufactures. Were a Bill

* The poor woman, S. J., one of the cases referred to at page 42, an orphan without relatives, is obliged, out of the sum of 6s. a week, to provide herself with food, clothes, washing, and lodging.

drawn up to limit the duration of labour, and prevent the improper employment of children, I feel assured that it would be well supported by petitions, not only from the public, but from the masters themselves.

The other evils of flax mills more directly destructive to health,—dust, and accidents, the masters have endeavoured to diminish. In the rooms where tow is prepared the machines are covered by boxes, which collect a large quantity of the dust;— and the new machines for roving the tow produce less dust than the old ones. Accidents too are rendered much less frequent, in all the departments, by the casings of the wheels. But although something has been done to save the workmen from the injurious effects of their occupation, more remains to be done.

May I suggest a plan for carrying off the dust? Let channels, about a foot in breadth, be made in the floors, each with one end opening into the room, and the other outside of the building. Over the former let a light broad wheel, attached to the machinery, be made to revolve rapidly. A current of air will thus be produced, and this entering the channel, will draw down the greater part of the dust, and carry it out of the building. If the plan succeed in the flax mills, it would avail also for removing the dust of corn and malt-mills, indeed of all the manufactures, which affect the lungs by mechanical irritation. A subject of such great importance to health and longevity, will receive I trust the attention of those, who are not only much more conversant than I, with contrivance and invention, but more directly obligated by social principle, to improve the state of the operatives, by whose labours they are enriched.

CABINET-MAKERS suffer from the dust, when they saw African, cam, rosewood, and Spanish mahogany. The first of these is most injurious. Its dust produces sneezing, headache, sickness, and sometimes vomiting. This wood, however, is rarely used. The other kinds are more fre-

quently worked. They occasion indigestion, and sometimes diarrhoea.*

TURNERS OF WOOD suffer from the dust of the species just mentioned, but are not annoyed by that of common timber.

The removal of wood-dust would not, I conceive, be difficult. A current of air might be made to take it out of the building. See the plan suggested for the expulsion of flax dust.

MASONS inhale particles of sand and dust, which arise from chipping the stone. They often use great muscular exertion in lifting weights; they are exposed also to vicissitudes of the weather; they are addicted to intemperance. We promptly find the effects of these circumstances on their physical state. From their exertion in the open air, their face has colour, and the figure is muscular and robust: inhaling dust, the bronchial membrane is often in a state of chronic inflammation:† dissipated in their habits, they become susceptible of atmospheric changes, and hence are frequently affected with pains in the limbs: finally, from the combination of these injurious agents, dust and dissipation, and the mutual reaction of morbid states thus induced, Masons are short-lived, dying generally before they attain the age of 40.‡

* Ramazzini says that workers in wood are subject to no inconvenience from the nature of their material, except when employed in cypress. This produces headache.

† Diemerbroek relates that in dissecting the bodies of masons, dead from asthmatic affections, he found heaps of sand in their lungs, and in dividing the pulmonary substance, he seemed to be cutting a sandy body. Is this statement correct? If so, were the heaps of sand inhaled, or were they not rather the calcareous deposits formed by the disease?

‡ Ramazzini remarks on the effects of the dust, "tabidi (Lepicida) flant." And Merat says, "L'espece de phthisie qui resulte des fragmens de pierre avalés—attaqué ces ouvriers avant quarante ans." We are informed by one master-mason of Leeds, that men who work within doors reach 45 or 50; while those who are out of doors rarely exceed 40.

The subject leads me to refer to the state of MINERS, though their occupation is not strictly a part of my paper, nor one which I have had the opportunity personally to examine. In the mines in the North of England, the workmen, I am informed, suffer considerably when employed in ore in the sandstone, but are sensible of no inconvenience where the ore is in limestone. I am indebted to an intelligent friend for the following information. "The reason they assign is, that the latter is full of vertical and other fissures, which allow the superincumbent beds of water to percolate through the roof of the mine; whilst the sandstone strata, which are impervious to water, preserve the mine quite dry; consequently, the minute particles of rock formed by blasting or the pickaxe, are kept in a dry state within the sandstone mine, forming, as it were, an atmosphere of dust, which the miner is constantly inhaling. In the limestone mine, the particles, on the contrary, are laid as they are formed, by the continuous oozing, dropping, and splashing of the insinuating water. Some miners account for the difference by the solubility of the limestone. Miners rarely work more than six hours a day, yet they seldom attain the age of 40. They take immense quantities of ardent spirits, not with the view of enabling them the better to sustain their unhealthy employment, but confessedly to drown the ever-recurring idea that they are, from their occupation, doomed to premature disease. Last year, there were in the village of Arkendale, (in the heart of the mining district) not less than thirty widows under 30 years of age. The prevalent maladies appear to be affections of the lungs and bowels. Smelting is considered a most fatal occupation. The appearance of the men is haggard in the extreme. The Alstone Moor miners repair annually in great numbers to Cartmel Holywell, where they derive great benefit from that saline water."

The latter part of this statement is surely melancholy enough to call forth the active sympathy of all who witness

the facts. If the injury to health and life result from the dust of the sandstone, could not the simple remedy of water be applied? If water will not percolate through sandstone, might not the frequent use of a common watering-can prove a substitute?

A parallel case to that of the miners occurs in the GRINDERS of Sheffield. Dr. Knight, in the North-of-England Medical Journal, states that the fork-grinders, who use a dry grindstone, die at the ages of 28 or 32, while the table-knife grinders, who work on wet stones, survive to between 40 and 50.

MACHINE-MAKERS are divided into several departments. The foundry produces only the slight and temporary annoyance of dust from the charcoal sprinkled on the mould. The men, in Leeds at least, are generally healthy. Dressing the iron, technically called "fettling," seems to be equally innoxious.

Turning, boring, and grooving wrought iron present nothing remarkable. But the *turning of cast iron* is so laborious, that the men can scarcely bear it for the whole of the day. The particles of iron cast off in the process are large, and do not consequently affect the lungs in a sensible and great degree.

Draw-filing cast iron is a very injurious occupation. The dust is much more abundant, and the metallic particles much more minute, than in the filing of wrought iron. Does this difference arise from the texture, the degree in which the particles are united in wrought and cast iron; or does it arise from the manganese and magnesia contained in the latter?

The particles rise so copiously as to blacken the mouth and nose. The men first feel the annoyance in the nostrils. The lining membrane discharges copiously for some time, and then becomes preternaturally dry. The airtube is next affected. Respiration is difficult on any increase of exertion; and an habitual cough is at length produced. At the same time, the digestive organs become impaired; and morning vomiting, or an ejection of mucus on first rising, is not infrequent. The disorder

varies of course with the constitution of the individual; but the common termination, when men pursue the employment for years, is bronchial or tubercular consumption. The frequency of these fatal diseases is easily explained. The sensitive membrane lining the airtube and aircells is irritated by the particles of iron inhaled at every breath: chronic inflammation becomes established; the constitution is seriously injured by the quantity of muco-purulent matter which is discharged, by the want of a full purification of the blood, and by the exhaustion which habitual cough produces: hectic fever and emaciation succeed. More certainly fatal is the case, where there exists in the constitution a predisposition to the tubercular form of the disease. The researches of the French pathologists, as well as our own observations, prove the cartilaginous bodies, called tubercles, to be very frequent in the human lungs, to be slow in assuming a destructive character, and often to remain crude or latent for an indefinite period. The subject of the present paper scarcely requires a detail of the progress of these bodies, as affected by external agents and internal excitement,—their augmentation, coalescence, change of hue, softening, the final purulent expectoration, by which successive masses are removed, and the effects produced on the lungs, the airtube, and the constitution. Suffice it to urge, that a great proportion of our population is born with tubercles, or a disposition to the formation of these bodies; that various agents in civil life tend powerfully to excite their development, and none more than irritation of the bronchial membrane. This membrane is affected by gaseous agents; but much more by palpable substances. Dust of every kind irritates, but not in an equal degree. Much, I conceive, depends on the size and figure of the particles which enter the airtube. The dust from the roads produces no apparent mischief, while the mason's chippings from the stone occasion serious and often fatal injury to his lungs. The dust from old iron, which is thrown off so copiously as to deposit a thick brown layer on

the dress of the dealers in this article, produces no inconvenience ; while the less apparent detachment of particles by the file, is decidedly baneful to the workers in iron. It is then the *form* rather than the material, the spiculae, the angular, or pointed figure of the particles detached, which we conceive the chief cause of injury. The bronchial membrane is mechanically irritated or wounded ; and from the daily repetition of this injury, the lungs at length become seriously diseased.

On examining the chest of 17 machine-makers, we found the average circumference $38\frac{3}{4}$ inches, and the average quantity of air expired at an effort $7\frac{1}{2}$ pints. The figure of the chest, and the power of its muscles, do not therefore appear to suffer from the employ. Machine-makers seem to suffer only from the *dust* they inhale, and the consequent bronchial irritation.

The Filers are almost all unhealthy men and remarkably short-lived. One instance only in this neighbourhood can we find, of a man's following the employ for 20 years. At two of the principal machine-manufactories of Leeds, there are only two Filers of the age of 48 ; and in neither case, I believe, has the individual pursued the labour uninterruptedly from boyhood. The mortality among machine-makers is not the result of intemperance ; for the men, in this neighbourhood at least, are generally steady. It is not the result of error in diet, clothing, or exercise. It can be ascribed only to the nature of the employ, and the train of baneful effects to which I have adverted.

What can be done to prevent this lamentable waste of life ? Magnetic mouth-pieces, which attract the particles of iron inhaled in respiration, and thus greatly diminish the quantity which would enter the air-tube, were many years ago introduced in Sheffield, and ought ere this to have been tried in Leeds. But there is a strange apathy both among the men and the masters. Though very intelligent, and conversant

not only with the science of their manufacture, but often also with knowledge in general, they are remarkably thoughtless on a subject which most deeply concerns them. Man after man dies of decay in the prime of life, and no warning is taken by the survivors. Machine-makers, indeed, are generally unwilling to admit the fact of excessive mortality. They naturally dislike the idea of being more subject than their neighbours, to disease and death. They will rarely admit that they labour under disorder, till consumption is established, and its effects apparent to every observer. To our general questions they reply, "We are all pretty healthy." * And it is only by examining each workman that we find the deception. Had they the providence and the courage fairly to examine this important subject, some measures would be devised for correcting the evil. Magnetic mouth-pieces,† or some contrivance still more effectual, would be speedily adopted. Though their own knowledge is much more likely to avail than any suggestion of mine, I would ask, if a change can be made in the smelting of iron, or advantage obtained by further purification? The working of wrought iron we find to be much less injurious to health, than that of the cast. Could wrought iron be used for *all* purposes? It is well known to be most suitable for common implements. Would it serve for large wheels, cannon, and the like? Does

* Ramazzini speaks of Metal-workers, &c. in very different terms: "Persope miseros artifices audias medicos ipsos orantes, ut vel occident vel liberent." Many of the statements of this author appear to me exaggerated.

† For a particular description of Mr. Abraham's mouth-piece, and other contrivances for the prevention or diminution of the dust of dry grinding, and of needle-pointing, see Transactions of the Society of Arts, Vol. XL. 136. The statements, particularly in reference to Redditch, give a strong representation of the evils attendant on some kinds of manufacture, evils moral as well as physical, yet easily susceptible of great diminution, perhaps of complete removal. Pliny says that the workers in Minium covered their mouths with loose bladders. A more modern writer states that the men in the mines of arsenic, wear glass masks.

the comparative softness of this substance present an objection? The expense, however, I apprehend to be the great obstacle.

The grindstone used by Machine-makers produces much dust. This, though it occasions little inconvenience to the young and healthy, greatly affects the aged and asthmatic. Some cover the face with a handkerchief, but a more effectual plan might probably be adopted, viz. that suggested for the flax-spinners. A channel might be made under the floor, with one end opening beneath the grindstone, and the other outside the room, and through this channel the dust be conveyed.*

The preceding remarks apply chiefly to the iron-work in the making of machines. The *Brass* work must also be noticed. The *Founders* suffer from the inhalation of the volatilized metal. In the founding of *yellow brass* in particular, the evolution of oxide of zinc is very great. It immediately affects respiration; it less directly affects the digestive organs. The men suffer from difficulty of breathing, cough, pain at the stomach, and sometimes morning vomiting.† We did not find one *Brass*-founder more than 40 years of age; though we have since been informed that there are two *Brass*-founders in the neighbourhood, of the ages of 60 and 70, who have con-

* A contrivance of this kind, I have since learnt, is adopted at Sheffield with success. My friend, Mr. Overend, in answer to my inquiry on the subject, states, that "there is a funnel-shaped wooden spout, with the wide inlet placed over, and on the back part of the grinding-stone, the narrower outlet terminating on the outside of the building, directly through the wall. The current of air arising from the velocity of motion of the grinding-stone, drives the floating particles of every description into the inlet of the spout, and the same current carries the whole through the tube to without. This plan is found to keep a clearer atmosphere, and since its introduction the workmen have been less liable to dyspncea and pectoral complaints."

In France the grindstone is worked in a wooden trough of water, which is lined with lead. By this contrivance the stone cuts better, and the particles are absorbed by the water.

† *Halitus quidem viroci ex aere per os subeunt stomachum ac pulmones.*—*Ramsey.*

tinued at the employ from boyhood. The *Turners*, *Filers*, and *Dressers of Brass* do not seem to be more unhealthy than the generality of our townsmen. We observe among the filers the hair of the head changed to green.

BRAZIERS are subject to the noxious exhalations from the solder; but their employments are so varied as to preclude exposure to its influence, for a considerable time at once.

COPPER-AMMETERS are considerably affected by the fine scales which rise from the imperfectly volatilized metal, and by the fumes of the "spelter," or solder of brass. The men are generally unhealthy, suffering from disorders similar to those of the brass founders.

TINPLATE-WORKERS are subjected to fumes from muriate of ammonia, and sulphureous exhalations from the coke which they burn. These exhalations, however, appear to be annoying rather than injurious; as the men are tolerably healthy, and live to a considerable age. **TINNERS** also are subject only to temporary inconvenience from the fumes of the soldering.

PLUMBERS are exposed to the volatilized oxide of lead, which rises during the process of "casting." The fumes frequently induce vomiting at the time; and men who are much in this department, are soon seriously injured. The common working of the metal also seems to be deleterious. A sweet taste is often perceived in the mouth during the beating of lead; and fumes arise from the application of the solder. Plumbers, however, though sickly in appearance, do not generally complain, nor are they in this neighbourhood at least, where casting is rare, frequently off work from illness. We were informed that in a sick club containing 25 members, two individuals only have applied during the last year for assistance, and one of these had been burnt by accident. It is nevertheless apparent that the occupation undermines the constitution, for plumbers are short lived. I learn that there are but two individuals in Leeds and the neighbourhood, who have regularly pursued this employ beyond the age of 40.

Is there no substance which, being volatalized at the same time, would combine with the oxide of lead, so as to produce a less injurious compound?*

HOUSE PAINTERS are almost constantly subjected to the deleterious agent, to which plumbers are but occasionally exposed. The effects are most immediately felt during the process of "flattening," or finishing the dead colours with turpentine. The exhalation produces first dizziness, and afterwards, in many individuals, vomiting. Painters are unhealthy in appearance, and do not generally attain full age. Their maladies are evidently the result of an impression on the nervous system, through the medium of the membranes of the nostrils and the airtube. The more serious and permanent evils of working in paint are colic and palsy. Is the mineral absorbed, or are the effects produced by an impression on the cutaneous nerves, and through them on the nervous system in general?

Some of the men believe that no harm would arise from the exhalation of the lead, were it not combined with turpentine. If this be true, some less exceptionable article might be substituted.

CHEMISTS AND DRUGGISTS are exposed to various odours,

* Since this was written, Mr. Horner, of Otley, left with my friend, Mr. Atkinson, a preparation of lead, which he said had "*the poison taken out*," by a secret process. In appearance and chemical properties, this preparation resembled common carbonate of lead. Mr. A. and I examined its agency on animals. The fowls, to which he administered the new preparation, died as soon or sooner than others to which he gave the common carbonate. In my experiments, Mr. Horner's article produced on dogs the poisonous effects of lead, but they were less in degree and less quickly fatal, than when the common carbonate was given. I greatly regret that we cannot speak more favourably of the process, which, if it answered the expectations of the discoverer, would not only diminish the ill health of plumbers, painters, &c., but remove the far greater misery and mortality of the manufactures in which white lead is prepared. If Mr. Horner's process be founded on a correct principle, it may be brought at length to effect its object.

In Dr. Christison's recent work on Poisons, there is much important information on the subject of lead.

and the evolution of gases, many of which are injurious.* Hence the persons employed in laboratories are frequently sickly in appearance, and subject to serious affections of the lungs. They are often consumptive. Few old men are found in laboratories. Care on the part of the men, and ventilation practised as much as possible, would considerably diminish the effect of the baneful agents.

The *men employed in the manufacture of Gas for lights*, are not aware of any injury resulting from the process. Even the individuals engaged in the purifying department, and exposed consequently to abominable evolutions of sulphuretted hydrogen, say they are well and hearty. The manufacture, however, being of a comparatively recent origin, does not afford us the opportunity of seeing its full and ultimate effects.

The *men employed in cleaning Sewers* are often affected by the fetid gases, and sometimes so severely as to suffer suspended animation. They are not, however, as far as we could ascertain, subject to any serious disease;† nor are they short-lived.

* An apprentice to a chemist in this town, while employed in precipitating sulphur, and consequently exposed to the evolution of the gas, was observed to incline over the vessel, and remain in this posture. He was found to be insensible. On his removal however to the open air, animation was soon restored. Merat discusses, with interest, the noxious agencies to which Chemists are exposed. He classes them under the heads of 1. Study ; 2. Injurious odours ; 3. Dust from minerals ; 4. Acid and Saline vapours, (this class, he says, does most mischief) ; 5. Tasting deleterious substances ; 6. Accidents from detonating ; 7. Experiments on themselves ; 8. Mistakes, (Qui pro quo.) Their principal maladies, he says, are dry cough, spitting of blood, and at last phthisis.

† It is probably a worse employment in other places. Ramazzini had his attention first drawn to the diseases of artizans, by observing the wretched appearance and anxiety of a man who was cleaning out a shore. The eyes, Ramazzini says, suffer greatly. It appears from the Emperor Trajan's punishing a certain class of offenders by appointing them to the cleansing of sewers, that their occupation was then considered one of the worst.

On opening an envelope of decaying animal matter, gases arise which

The injury to which **STOVERS OF STRAW BONNETS** are exposed was mentioned before, (page 19.) The **STOVERS OF WOOLLEN ARTICLES** are also exposed to the evolution of sulphurous vapour; but as the process is generally carried on in an outhouse with closed doors, and as the air is freely admitted before the men enter to remove the goods, the annoyance is but slight and temporary.

Among minor and less permanent causes of injury from additions to the natural atmosphere, I may mention the Prussic-acid vapour, which annoys **DYERS** engaged with Prussian blue, sometimes distressing to the lungs, but more frequently producing slight tenderness of the eyes.

4. Having now adverted to the principal occupations which affect health by the noxious substances which they offer to respiration, we next refer to those which *injure or annoy by acting on the skin.*

POTTERS suffer from the lead used in "glazing." Immersing their hands in a strong solution of this mineral, they are often attacked by colic; and if kept in this department, they at length become paralytic.* Potters are remarkably subject to constipation of the bowels. Of seven individuals

have noxious effects similar to those of sewers, and are probably of a similar nature.

Ramazzini gives a story of a sexton, who was tempted to plunder a corpse which he had interred. He entered the sepulchre, removed the stone, and stripped off the clothes which had excited his cupidity. But scarcely had he effected his object when he fell dead on the corpse.

Ramazzini and Merat have each a considerable article on the diseases of sextons. They state the liability of such men to catch contagion from the dead.

* Ramazzini represents the Potters of his day as affected with tremors, paralysis, disease of the spleen, cachexy and loss of teeth; and he remarked that almost every man in this employ had "a cadaverous leaden face." But I suspect that the preparation of the lead was then

taken indifferently, we found five affected with this complaint.* The intemperate men, however, are those who chiefly suffer from the employ. In the Leeds Pottery we remarked nothing injurious but the department of glazing.

Could not the process be effected without the immersion of the hands in the metallic solution? Or could it not be effected by a machine? Or could not some article less noxious be substituted for the lead? On visiting the Derby Pottery, some years ago, I learnt that little lead is used in the composition for glazing, and that the workmen consequently are not injured.†

The total disuse of lead in glaze is highly desirable. Independently of the injury sustained by the workmen, the consumers of the article may suffer from this mineral. The glaze of common earthenware is "slightly soluble in animal oil, and more copiously in the acids of our common fruits, especially when their action is assisted by the heat necessary

more operose, and the men exposed to the mineral fumes, which rose into the mouth and nostrils, as well as to the composition with which their hands were constantly besmeared. He says, "Plumbum in vasis marmoreis molunt."

* One of these had been without an evacuation for 6 days, another for 8, and a third for 11.

† "In an extensive lead factory in the vicinity of the metropolis, in which the colic peculiar to such places was formerly very prevalent, that disease has become so rare, that medical assistance has not, for some years past, been required. Many have supposed that the fumes of the lead induced the disease; but the remedy was found by tracing the cause to a more direct source. Workmen are seldom very strict in regard to cleanliness. The probability of particles of the mineral being conveyed from the hands amongst the food was suggested, and an order enforced that before any of the workmen should leave the factory to go to meals, their hands should be thoroughly washed, and that nail-brushes should be used to prevent any of the lead remaining where it was most likely to adhere. The success of this plan, under strict superintendence, has been complete."—*Alcock on the Education of the general Practitioner.*

for cooking these articles. Many of the obscure visceral diseases of the poorer classes are greatly to be attributed to this little-suspected source ; and the temporary removal of the pain occasioned by them, is one of the many motives which tend to the habitual use of distilled spirits." This remark is made in the preface to the 40th vol. of the Transactions of the Society of Arts ; and in the same volume is an account by Mr. Meigh, of a substitute for this noxious glaze,—common red marl, ground and mixed with water. There are, I believe, other articles, which might avail where this cannot be conveniently procured. I am told, indeed, by an intelligent manufacturer of earthenware in Leeds, that the comparative cheapness of the leaden glaze is the chief recommendation. Surely humanity forbids that the health of workmen, and that of the poor at large, should be sacrificed to the saving of half-pence in the price of pots.

HATTERS have their hands frequently immersed in a solution of sulphuric acid, which is employed in the process of " Felting ;" and hence their nails and the cuticle of their fingers, are often corroded and sore. This inconvenience might perhaps be prevented by the use of some oily substance.

GROCERS, having their hands frequently in sugar, become affected often with a cutaneous eruption—a variety of either impetigo or eczema. Lime produces a similar disease on the hands of BRICKLAYERS. Flour irritates the skin in BAKERS,* and occasions a scale—a variety of psoriasis.

CHIMNEY-SWEEPERS necessarily suffer from the soot, with which they are covered. The skin assumes frequently a malignant disease—Cancer scroti. Ophthalmia is produced by the irritation of soot in the eyes : and the lungs suffer from the substance drawn into the air-tube. From this injury to the lungs, children however seem to be comparatively exempt. Though daily inhaling a large quantity of charcoal,

* " *Crassescunt manus. Nemo inter mechanicos operarios est, qui manus habet crassiores.*"—*Ramassini.*

sulphur, and ammonia, they frequently remain for some years free from urgent disorder; like the children in the Flax-mills, who inhale dust for a considerable period, with apparent impunity. But as these ultimately suffer, so also the wretched inspirers of soot, become at length seriously diseased.

The evils of the employ are doubled by intemperance. The sweeps who travel through the country are especially drunken; and lads acquire a craving for liquor from their habit of receiving beer at every house they serve. Many chimney-sweeps die in youth; few live to the age of 50. Surely this shocking and unnatural occupation ought to be abolished!

There are other trades, in which the surface of the body is affected though in a less degree, by the peculiar substances applied: but without entering into further detail, I would urge the necessary effect of almost all the occupations of a manufacturing town in fouling the skin. When we consider the functions which this organ is known to perform, independently of those which physiology suspects, but has not ascertained,—when we refer to the natural products of the skin, insensible perspiration, sweat, unctuous matter, &c.; we wonder how men can endure the compound crust of soot, dirt, and secretions, with which they are enveloped. Throughout the whole of the labouring classes, and indeed among the majority of the middling and upper, this subject is strangely neglected. Cleanliness is practised in a very imperfect manner; the whole surface is seldom washed; and in most persons the body, with the exceptions of the hands and face, is cleaned only by the removal of those impurities, which adhere to the linen. Bathing is rarely used in any form. On inquiry at the Leeds baths, I learn that during the four summer months, about 50 persons bathe daily; and in other parts of the year, not more on the average than two or three. We may conclude, as these are often the same individuals, that not more than 200 or 300

of the inhabitants of Leeds frequent the establishment; and if we suppose that double the number plunge in the river, we cannot estimate the persons who bathe, even in the summer months, at more than 800 or 900; and this of course is a very small proportion of our crowded population.

Vain, at present, would be the attempt to revive the discipline of the ancient bath, or to import the practice of the East. We cannot join the Hindoo or Mussulman in connecting the idea of internal sanctity with external purification. We are equally indifferent to the advantages which the Greek and Roman derived from the system, in the augmentation of muscular power, the increase of bodily and mental comfort, and the diminution of the calls of hunger. We can scarcely spare time for a plunge into the water, much less for operose and varied bathing, friction, and inunction.*

A part, however, of the ancient practice, we find adopted without design in the manufacture of wool. This article is so moistened with oil, that the exposed skin of the workmen is always greasy. The effect, if we can speak of it separately from other circumstances which act on the health, is decidedly good. The men, the young women and children in this employ, are more robust than other artizans; and when the dye and dirt are removed from the skin, have really the complexion of health. Individuals too, and especially children, who have been injured by the dust of other kinds of manufacture, and hence have been obliged to leave such employ, become hale and vigorous on their removal to the woollen. I would not, however, be understood to attribute the improvement solely, or even chiefly, to the application of oil to the skin.

* If any improvement be made in popular practice in reference to bathing? medical men must draw attention to the subject. A careful examination of the statements of the ancient Physicians, would probably lead them to a practical and personal examination. The medical agencies of different temperatures and changes of temperature, of moist and of dry air, of oil, and other substances, applied to the skin, are now undeservingly neglected.

This article has a more important effect in preventing the formation of dust. Yet still, when we compare the state and appearance of workmen in other manufactures, where the dust is trifling, and other circumstances nearly equal,—if we compare these men, with the plump and rosy Slubbers, we cannot but ascribe a beneficial agency to the oily state of the skin. The subject is of practical importance.

5. We have next to advert to *wet and steam*,—water about the temperature of the atmosphere, and water vaporized by heat.

SCOURERS OF WOOL are all day in a wet room, inhaling steam, exposed to currents of cold air, and with their hands and arms in water. Yet they are not sensible of any ill effect: they are not more subject than others to rheumatism, catarrh, or pulmonary inflammation.

DYERS are exposed to the same agents, with the addition of ammoniacal and other exhalations. Though a few are affected with feverish maladies, and others complain occasionally of pains in the chest and the limbs, they are, as a body, healthy and long-lived. Of 51 men in one dyehouse, only two reported themselves subject to any disorder; and both cases were slight and casual. The employ is pursued with little interruption from boyhood to full age, and many instances may be found of individuals who have been dyers for 40 or 50 years.

BRUSHERS OF CLOTH BY STEAM, chiefly boys, are immersed all day in dense vapour. Where they stand, we found the index of an hygrometer to point at 100, the degree of extreme moisture, and the thermometer at 85°; when the former in the open air was 70, and the latter 60. On another occasion, and in another steaming-room, the hygrometer was at 100, and the thermometer 91; when the former in the open air was 50, and the latter 62. There is no toil in this employment; as power from the engine applies the brush, and the attendants are required only to prevent the creasing of the cloth.

The brushers often suffer distress in breathing, and are consequently obliged to have a current of cold air through the room. They are more permanently afflicted with disorder of the bowels; the appetite also is generally impaired, and vomiting is not uncommon. The lads have a very sickly appearance. We could not find, however, that they suffer more than others from rheumatism, catarrh, or pneumonia.

MILLERS OF CLOTH are exposed to cold and wet, yet they are generally healthy. In the *boiling* of cloth the men are exposed to steam and currents from the open air. Yet the instances of serious illness are rare.

GIGGERS, men who dress cloth by machinery, are also exposed to wet and vapour, but make no complaint. They often carry on their shoulders pieces of cloth soaked with water. Yet rheumatism is almost unknown.

HATTERS are exposed to vapour from the vat, as well as to considerable atmospheric variations. They are subject to asthma, but not, as far as we could find, to any acute disease. They are often intemperate and short-lived.

BREWERS, of course, are subjected to steam and wet. As a body, they are far from healthy. Under a robust and often florid appearance, they conceal chronic diseases of the abdomen, particularly a congested state of the venous system. When these men are accidentally hurt or wounded, they are more liable than other individuals to severe and dangerous effects. The ill-health of Brewers is, however, evidently attributable to their habitual and unnecessary potation of beer. There is no reason to believe them injured by their employ.*

PAPER-MAKERS work in very wet rooms. In preparing or washing the rags, the arms and feet are exposed to cold water; and at the vats, the arms are alternately dipped in warm water and exposed to the air, while a dense steam generally

* Though Ramazzini says "Capitis doloribus, vertigine, anxietate tentari solent."

fills the room during the process of forming and pressing the paper. The men have only the shirt as a protection to the arms. In the drying-rooms, which are open to the weather on both sides, they are without any additional clothing; and the same individuals are at one time over the warm vapour of the vat, or perspiring at the press, and at another, at the cold employ of putting up the paper to dry. An animal odour arises from the sizing, but this produces no injury. More considerable is the annoyance of a previous part of the process, that of preparing the rags; but this department has already been noticed at page 39. Pressing, of course, is great exertion; but this is excellent in kind. Bleaching distresses the lungs of the workmen by the suffocating fumes, which arise during the process. No persons, however, are constantly employed in this department, and the suffering consequently is but temporary. Working at the vats is said to produce asthma occasionally; but individuals bear the employ to the age of 70. Paper-makers sometimes complain of pain in the limbs, and are occasionally, though rarely, affected with such swelling of the joints as to incapacitate them for work. They are not, however, subject to rheumatic fever, or inflammation of the lungs. In the mill which we examined, no one had been off work from such cause, in the memory of those of whom we inquired.

In examining the effects of wet and vapour, we have chiefly noticed the men who work under cover, and are consequently subjected not only to a moist atmosphere, but to frequent and considerable transitions from moist to dry, and the reverse. I must also refer the reader to the men who are in the open air, and are subjected consequently to less frequent and sudden transitions,—as husbandmen, milkmen, cart-drivers, drovers, butchers, coachmen, postboys, &c. No men, however, exhibit more strongly the agency of wet in the open air, than

brickmakers. We have adverted to their state under another head (page 11); as well as to that of husbandmen, coachmen &c.

Whether we examine the agency of moisture on men in the open air, or those under cover, we find it much less than common opinion would expect. In this country almost all our maladies are ascribed to the agency of wet, or to "taking cold." Medical men adopt this notion. It is constantly heard in their expressions; it constantly appears in their writings. The people of course have gradually adopted the medical doctrine, and carry it even further than its founders.*

A reference, however, to the history of cases attributed to wet and cold, and an examination of the reasoning of the patients, are enough to expose the insufficiency of the evidence and the incorrectness of the inference. We might show, moreover, that persons most "careful in avoiding cold," protecting themselves with every variety of clothing, and shrink-

* If a man suffer to-day from headache and sickness, the effect of yesterday's debauch, he ascribes them to the cold he took in returning home. If his bowels be irritable from the annoyance of undigested aliment, he has "taken cold." If he suffer from an epidemic, he is sure it arose from "sitting with his back to an open window." If he have an attack of gout, it was from "going out in a hazy day." Nay, the unhappy victim of hereditary consumption, ascribes his illness to "sleeping in a damp bed." This subject is surely important in Preventive Medicine. If we err in the causes of disease,—if we attribute our disorders to agencies which could not produce them, we overlook the agencies which *do* produce them. A man who believes his stomach-complaint to arise from cold, is not likely to correct that dietetic fault, which has occasioned the disorder. He who ascribes the affection of the head, which from its recurrence and severity threatens to produce at length serious disease, to his standing in the warehouse without his hat, or some such petty exposure daily committed with impunity, will not surely be disposed to forego that excessive application of mind, which is really the cause of the cerebral excitement.

Old Parr, we are informed, was in the habit of sleeping in wet sheets as his cure for a cold.

ing at every change of weather, are not exempt from the evils which they fear. In fact, they are far more subject to catarrh, to pulmonary inflammation, and other disorders commonly attributed to "cold," than persons who habitually expose themselves. Finally, a reference to the situation and employment of several classes of society, decidedly shows that wet and cold, without other agencies, do not produce the disorders ascribed to them.—Look at the brickmaker, who is subject neither to rheumatism nor catarrh, though his bare legs are immersed all day in a puddle,—at the dyer, on a wet floor, and subject to great atmospheric changes both of humidity and temperature almost every moment,—at the bricklayer, who is exposed to every vicissitude of weather, and is generally careless of protection,—at the paper-maker, one hour perspiring at the strong labour of the press, in an atmosphere of warm vapour, the next, standing in the same dress, in a room open on both sides to the wind, and merely putting up sheets of paper to dry,—at the wool-scourer, the miller of cloth, and men in similar employments. Individuals, indeed, in these departments sometimes complain of pains, which they call rheumatic. But such complaints we find in all occupations and classes of men. The nature of these pains is obscure. They appear to be affections of the muscles. True rheumatic inflammation of joints is not frequent in any of the employments I have mentioned. Though we find instances, these are not more numerous than among corn-millers, and less than among croppers. In our examination of the several classes, we have particularly asked, "Are the men, so much exposed to wet and cold, frequently laid up with rheumatic fever?" The answer has always been a negative. Of other acute diseases ascribed to cold, as inflammation of the lungs, pleurisy, &c. the men generally appear quite ignorant.

I am far, however, from maintaining that vapour, wet, and cold never produce disorder. In certain circumstances, and when long-continued, they certainly do. The re-action

that ensues advances to fever or inflammation. But cases of this kind are rare. I contend that in the daily instances of common life, cold is not the great cause of disease, and that even in those which are considered as exhibiting indisputable evidence of its effects, a morbid predisposition has generally been formed by the person's habit of life, as influencing the state of the circulation and secretions. Rheumatism, I presume, is the malady which the believers in the common opinion would adduce as the strongest objection to my views:—it is the malady which I most readily adduce, as affording the strongest support to these views. The men who are subject to rheumatism, are not the active and temperate, heedless of wet ground, and out in all kinds of weather,—but the indolent, the comparatively sedentary, or men who habitually or frequently take more liquor than the constitution requires, and especially fermented liquor:—men with a large abdomen, and a feeble and sluggish circulation.* Such persons are constantly predisposed to disease: they are constantly open to the influence of atmospheric changes. And wet or cold may excite in them, rheumatic inflammation of joints, as readily, perhaps more readily than catarrh or pulmonary inflammation. I conceive, therefore, that the state of the constitution is the *predisposing*,—wet, cold, or atmospheric vicissitude the *exciting*, cause. The observation is probably applicable to a few other maladies besides rheumatism, but by no means to the bulk of diseases which are supposed to be the effect of wet or cold. I would urge my conviction that in nine-tenths of these diseases, wet or cold is no more the cause, even the *exciting* cause, than Tenterden steeple of Goodwin sands.

* The gorged state of the system of the *vena portae*, and the consequent depravation in the functions of the abdominal viscera, is the great point at which I look both in the prevention and treatment of rheumatism. The principle is applicable also to many other chronic diseases.

The inferences, then, from our examination of particular employments and classes of men, as well as those deduced from general practice, are 1st. That "wet and cold," as they occur in ordinary life, are rarely adequate to the production of disease. And 2nd. That in the few cases in which they have such agency, they are only the *exciting causes of disease.**

In reference to the agency of mere aqueous vapour,—of steam I mean, without frequent and considerable changes of temperature, our best subjects of observation are the men and boys employed in brushing cloth. See page 63. That this vapour should affect principally the stomach and bowels, is a circumstance which we should not have expected.

6. We have next to examine the health of men exposed to a *high temperature, or to great variations of temperature.*

BAKERS are generally pale and unhealthy.† The temperature in which they are placed is seldom below 80°, and often as high as 100°. The heat of the oven is rarely lower than 180°. Bakers are subject to disorder of the stomach, to cough, and rheumatism.‡ The two former of these affections arise, I conceive, from the dust which is largely inhaled.

The two former of these affections arise, I conceive,

* Whatever opinion may be entertained of the reasoning which objects to the old and popular theory, the *facts*, I believe, will be found correct. Any one, however, who is disposed to repeat the investigation must not be content with the loose statements of thoughtless and prejudiced workmen. He must ask the most intelligent, and even these, he must cross-question closely. He must ask them, less for their opinions, than for their *observations*—their own personal knowledge. He should ask for the particular instances, and these he should himself examine.

† Ramazzini remarks that they are more sickly than other townsmen. Merat says a great number of Bakers are in the hospitals.

‡ Raucidines, gravedines, ac pectoris morbi, ut pleuritides, peripneumonie."—*Ramazzini.*

from the dust which is largely inhaled. In the bakers plague of Venice, we find from Mercurialis, that and other persons in similar employments, suffered most. In the Dict. des Sciences Médicales, it is stated that during the plague at Marseilles, in 1720, all the bakers died. The debility produced by great heat probably induces this susceptibility to disease. Bakers work by night, and from this change in the time of sleep, they have been supposed to suffer as much, as from the dust of the employ.* Observation, however, on the health of watchmen and others, does not support the opinion.

COOKS AND CONFECTEURS† are subjected to considerable heat. Our common cooks are more unhealthy than housemaids. Their digestive organs are frequently disordered, they are subject to headache, and their tempers rendered irritable.‡

WOOLCOMBERS work in apartments which, from the fire employed to heat the combs, are kept at the température of about 80°. The fires are made of charcoal. A light dust

* " Mais encore de Chabitude du travailler la nuit au lieu du jour, de sorte qu'ils jouissent rarement de la chaleur solaire et de la lumière ; ce qui peut contribuer autant à les étioler que la farine qu'ils avalent, et qui cependant doit nourrir un peu."—*Merat*.

† Ramazzini speaks of corrosive halitus from sugar.

‡ Merat says of Cooks, that a great number die of apoplexy, a few of asphyxia, and almost all miserably. He refers, of course, not to the females who, as with us, are only part of their time in this department, but to men wholly engaged in the art. He speaks of them in rapturous terms. It is the *glory* of France to furnish the cooks of gourmandizing Europe—to be the source of unspeakable pleasures—"jouissances indicibles de nos gastronomes ;" "a sublime talent, almost divine." He pathetically laments that a man, (veritablement précieux) who give a *savour* to existence, should sacrifice himself for the gastronomic empire, who sees his danger (viz. apoplexy) and braves it always. "What Decius can be compared to him?" "A master capable of estimating the value of a good cook ought to cherish him, fold him in his arms, &c." The article ends with "immortal gourmand." This is really too much for a grave discourse in a Dictionary of Science.

arises from the wool. The lungs suffer so much, that many persons cannot pursue the employ. The men, however, whom we found in the rooms, appeared quite healthy; and we were informed that out of 100 individuals, only two or three were absent from illness. Two winters ago, typhus prevailed among woolcombers; but this was attributable, I conceive, not to the employ, but to the low rate of wages, and, consequent defect of nourishing food. The heat of the apartments, does not appear to shorten life. We saw at work men of 64, 68, and 70 years of age.

The MEN in the DRYHOUSES of CLOTH are subjected regularly to a hot and dry atmosphere. The thermometer in their rooms ranges from 110 to 130°; and we found the index of our hygrometer 10 degrees below °, the mark of extreme dryness.* The employment requires the men to be almost incessantly walking and carrying cloth from one part of the room to another, and lifting frequently the iron tenter frames. They are therefore almost entirely naked. They complain of languor, drowsiness, dizziness, perspiration, thirst, and defect of appetite. The heat takes the colour from the fresh men, and rapidly reduces the bulk of the plethoric. They have, however, no urgent ailments, though the tongue is white, and digestion more or less impaired. Several of the men are affected with rheumatism, but this rarely I believe in the acute form. They are not subject to pulmonary inflammation, though they take little care in passing from these hot rooms into the open air. Even in the coldest days of our winters they constantly make this transition, without apparent effect either temporary or permanent. The heat and the labour form a cause or a pretext for their frequently taking ale, or a liquor called by that name. The stomach and liver become at length

* The extreme point of dryness in the hygrometer we use was obtained by placing the instrument in a close receiver on mercury, covered with subcarbonate of potass. The method, though imperfect of course in indicating the extremes, was sufficient for the purpose of our comparison.

disordered by this practice, but in a less degree, I believe, than when similar potations are made by men whose occupations do not subject them to heat.

We rarely find an old man in a dryhouse, for few can bear the employ after the age of 40. The labour and heat seem to exhaust the nervous energy, rather than induce organic disease. When unable to bear the fatigue of the dryhouse, the men enter into other departments.

MEN EMPLOYED IN SINGING CLOTH are exposed to a high temperature, and to some dust which arises from the scorched wool. A thermometer held at the distance the men commonly stand from the red-hot cylinders, indicates from 130 to 140 degrees of heat; while the temperature in other parts of the room declines to that of the general atmosphere, and currents of cold air from the open doors, fall on the half-naked workmen, as they pass from one part of the room to another. Our hygrometer near the cylinders, stood at $^{\circ}$; being the point of extreme dryness. The digestive organs often suffer; but the men are not subject to urgent maladies. There are few old men in the employ.

GLOSSERS, who smooth cloth by carrying over it heavy and heated plates of iron, are, of course, subjected to high temperature and great labour. Their work too is generally in the summer. They sweat profusely, are sallow in complexion, and appear unhealthy. We could not hear however of any particular ailment. Like the other men of this section, they are addicted to drinking. We found no old men at the employ, either in glossing, or in the comparatively light labour of brushing. Some youths cannot bear the employ; and therefore leave it early: some who persist, die in their prime: and scarcely any bear the toil after the 45th or 50th year. Glossers, fortunately, are not a numerous class.

STUFF-PRESSERS carry heavy plates of iron heated to redness. The temperature of the room is from 70° to 90° , and in

summer, much higher.* For several hours a day, they have great muscular labour in this heated atmosphere. They perspire consequently in a profuse degree ; and to quench their thirst, drink daily five or six pints of public-house ale. In the evenings too, they often take liquor. The pulse rises during their labour, from 80 to 120 ; and the tongue is habitually white. They say that they are healthy ; but most seem to have at least a disposition to disease. They are subject, particularly as they advance in years, to rheumatic pains in the limbs. Stuff-pressers commence generally at the age of 14 to 16 ; and in consequence of the heat and labour, many are so reduced in health as to be driven to other occupations ; and not a few, we are informed, die consumptive. Nevertheless, among those who remain in the press-shops, life is not abbreviated in a marked degree. Many men bear the employ for 20 or 30 years, and a few even for a longer period.† There are, I learn, about 100 stuff-pressers in Leeds : of these, 60 are under the age of 35 ; 20 between 35 and 50 ; 20 above the age of 50 ; 3 or 4 (invalided, I suppose) about 70 years old. Hence, though we find but a small proportion of aged persons in the press-shops, the circumstance is attributable not to the destruction of those who have pursued the labour for years, but to the diminished strength and activity of the aged, and their consequent unfitness for the brisk exertion required in stuff-pressing. Contraction or inflexion of the fingers, especially of the two last, is not infrequent among stuff-pressers. They attribute it to the use of the tongs, in carrying the hot plates.

CLOTH-PRESSERS have a similar employment.‡

COTTON AND SILK SPINNERS are not numerous in Leeds, for there is but one mill. The rooms of this establishment

* Sept. 18, 1829, the following numbers appeared on the thermometer in a press-shop : at 12 o'clock, 69° ; 12 $\frac{1}{2}$..70 ; 1...72 ; 1 $\frac{1}{4}$..71 ; 2..71 ; 3..70 ; 3 $\frac{1}{4}$..84 ; 4...82 ; 4 $\frac{1}{4}$..76.

† We know one individual who has been forty years at the employ ; but he has always drank much less liquor than his fellow pressmen.

‡ As woollen cloth is a staple production of this neighbourhood, a list

are kept in a high temperature by steam-heated tubes, for the purpose we learn of favouring the play of the rollers, and maintaining the fluidity of the oil employed in the machinery. We found the thermometer to stand at 70°; but we are informed that in other mills it is as high as 75—80°; and at Manchester, where fine threads ("fine numbers") are spun, it reaches, and sometimes exceeds 90°. The carding-room is dusty, but much less so than similar rooms in the flax mills.

Adults, who have been long in the employ, not infrequently suffer from affection of the lungs, but they are not subject to urgent diseases. The young suffer less than the adult. The work-people indeed rarely complain, except that the noise of the machinery affected the head on their entering the employment. It is stated that of the 300 individuals in this establishment, not more than 10 in a year are incapacitated for work. Still there are few old men in the employ. The majority of the work-people are girls. The age at which these persons are employed, prevents the development of disease; and though they must suffer in some degree from the confined atmosphere, the effect is not seen, because they generally in a few years marry, and leave the mill. On examining

is given of the several processes, in order to mark those which are injurious:—

PREPARATION OF WOOL.		Page.	Page.
Sorting,	31	Weaving,	20
Battling, .....	...	FINISHING THE CLOTH.	
Scouring,	63	Scouring, .....	...
Dyeing,	63.58	Burling,	20
Picking, .....	...	Milling,	64
Willying,	39	Gigging or Raising,	64
Tucking, .....	...	Boiling,	64
Scribbling, (as Slubbing.)	19	Drying,	71
Carding and Piecening,	19	Cutting,	19
Slubbing,	19	Singeing,	72
PREPARATION OF THE YARN.		Glossing,	72
Spinning, .....	...	Pressing,	72
Warping, .....	...	Brushing,	63
Sizing, .....	...	Steaming,	63

Of these processes, there are few which seem injurious to health. A reference is made to the pages of this paper, at which they are examined.

ten young women by the jar, we found the average of expired air to be $3\frac{1}{2}$ pints.*

GLASS-WORKERS are in a high temperature. This at Hunslet, is about 70° in the middle of the room; but the men are exposed to a heat considerably above 100° , when they approach the furnace. Hence though the muscular labour is not great, they are generally bathed in sweat. We could not learn, however, that they suffer serious injury from the heat. Catarrhs and coughs are frequent; but not pleurisy and pneumonia. The polishing department, in which arsenic is part of the compound employed, is prejudicial: but as this labour is not constantly carried on by the same individuals, no permanent injury results. A fine dust occasionally rises from the furnace; but this does not produce any marked effect.

Glass-Workers are addicted to drinking large quantities of public-house beer; and individuals among the most intemperate are known sometimes to take as much as two gallons in the day. A practice like this, though probably less injurious than in occupations where the heat is moderate, produces disorder of the digestive organs. With the exception, however, arising from this habit, the men are in good health, and attain considerable age. Cases are stated of individuals remaining at the employ till the age of 70 and 80.

It is remarked that Glass-blowers sometimes die suddenly. Is this the result of disease in the large blood vessels ?†

* For a very favourable account of cotton-mills, by the *conductor*, and a proprietor, I believe, of the Lanark Mills, see a letter, dated Feb. 1796, in the proceedings of the Manchester Board of Health.

† Ramazzini says that the Glass-makers, in his time, worked six months only in the year, and retired from the employ at the age of forty. He states the process to be highly injurious to health. He descants chiefly on the heat and transitions to which Glass-workers were subject, and adds—"Non possunt quin gravibus noxibus afficiantur." Throughout his learned work, *De Morbis Artificum*, we find many examples of his disposition to determine the diseases of artizans, rather from à priori reasoning, than from actual observation and large examination. He seems to

IRON-FOUNDERS have been mentioned before, as part of machine-makers. There is, however, another and a larger body of men, out of the district of Leeds, and which is differently situated, particularly in reference to temperature. This is the operatives at the great iron-works of Bowling, Low-Moor, &c. In the several departments there is great muscular labour. The men are exposed to high temperature, and great changes of temperature. They approach so near the fires and furnaces, as to feel a heat of 130°—150°, and immediately recede into the open air. The casting, and indeed most departments, produce profuse perspiration. The dress of course is slight ; and in summer, the men are frequently quite naked above the middle ; yet, in this state, and sweating excessively, they cool themselves in the open air, habitually and without precaution. Indeed they are continually passing and repassing from the furnaces to the entrance or outside of the sheds. In coke-making the men, though exposed to less heat, endure the vicissitudes of the weather at all seasons, and are also subjected to smoke and sulphurous fumes. In the moulding department, a dust rises from the charcoal, and smoke from the drying of the moulds. In most of the departments, the eyes are exposed temporarily, and in the “puddling” constantly, to an intense light. The men drink large quantities of beer. One man admitted that in summer, he often took as much as six or seven quarts a day. The liquor taken at the works, does not produce sensible or immediate disorder.

As the founding is carried on from Monday to Saturday, the men work by night ; but are not, as far as we could learn, injured by the change of hours. Notwithstanding the great transition to which founders are exposed, we did not

have viewed a process, felt himself the inconvenience of a new situation, and thence inferred the evils which the regular workmen suffered. “ Men so situated *must* be affected with serious disorders,—“ non possunt quin necesse est &c.” The same disposition to error, I have repeatedly detected in myself.

find that they are particularly subject to acute diseases. We were informed that they are rarely off work, except from intemperance. Consumption is said to be exceedingly rare in the neighbourhood of the iron-works. The men are, however, generally thin,—thin not from muscular defect, but from cellular absorption. Their countenance is almost always pallid. The appetite is often impaired; but this is more a temporary, than a permanent effect. In the sulphurous and smoky departments, the respiration is affected. Though the men do not complain of acute disease, and rarely even of chronic maladies, our observations lead us to suppose them short-lived. In the establishment at Bowling, we were informed of one man of 80, who had recently left the employ, but we saw none that approached that age. We saw no men even of 50, though it is probable a few such may be in the establishment. If life be not shortened, the strength, at least, is so reduced as to disable men who are past the middle period of age. Most of the founders, and particularly the puddlers, complain of tenderness of the eyes, and some of short-sightedness, induced by the employ. We do not find, however, that they become blind. Accidents, especially burns from the fused metal, are frequent.*

There are several other classes of artizans in this neighbourhood, who are subjected to high temperature and transitions of temperature,—as smiths, brass-founders, hat-makers, and oil-crushers. These have been mentioned in former parts of this paper; and there are others of similar kind, which present no diversity of effect, worthy of notice.

* Dr. Macturk, of Bradford, who, from his vicinity to the iron-works, is well acquainted with the subject, has been kind enough to review these observations. He states them to be correct. He thinks that consumption, though "the peculiar scourge of Bradford and its neighbourhood," is comparatively rare among iron-founders. He adds his opinion that rheumatism, and affections of the head, are frequent among these operatives.

The high degree of temperature, which the human body can sustain without injury, is surprising. I scarcely need refer to the well-known experiments of Blagden and Fordyce, Tillet, &c.*

A part of the subject, of more practical importance, is an examination of the effects of heat long continued and alternated with cold; an examination of the state of men, who have for years been half the day in a temperature considerably above that of the atmosphere, and the rest of their time exposed, like other men, to the ordinary cold and vicissitudes of our climate. From my observations on persons thus situated in this neighbourhood, I may draw the following inferences:

1. That operatives habituated to high temperature, daily feel effects similar to those felt by persons who occasionally place themselves in this temperature. Habit seems to have little power in rendering the body insensible to heat. The men daily have an excitement of pulse,—perspiration proportionate to the degree and continuance of the heat, and its complication with muscular labour,—thirst,—and languor. The complexion is rendered pale; and the digestive functions are impaired.

2. Persons exposed by their labour to great and frequent variations of temperature, are not more subject to inflammation of the lungs, or of the bronchial membrane, to pleurisy, or fever, than other men. Even the founders and dryhouse-men, who, many times a-day, make sudden transitions of temperature,

* The English experimenters walked in rooms heated to 260°, where eggs were roasted in 20°, and beef-steaks dressed in 33°. In France, the bakehouse girls enter ovens heated often to 300°, and sometimes it is stated even to 400°. Tillet relates one experiment in which a girl remained in a temperature of 325° for five minutes, without injury. These, and similar observations, made long ago, clearly prove that the human body can sustain, for a short time, a vast increase of temperature. Such interesting information abounds in systematic works.

equalling often 100°, or 120°, are neither sensible of inconvenience at the time, nor subject to pulmonic disorders.*

3. Affections termed rheumatic are, I think, frequent in this class. If the *exciting* cause of such complaints be referred to great and sudden changes of temperature, may not the *predisposing* cause be attributed to the unhealthy state of the abdominal viscera, induced by the excessive potation of fermented liquor?

4. Though the digestive functions are impaired, and perhaps the muscular power reduced, organic disease does not speedily result. Men working in high temperature are not often incapacitated for work.

5. Is life shortened by habitual exposure to great heat? I cannot yet form a decided opinion. Though the operatives of this section do not live as long as husbandmen, they do not, on the whole, appear to be shorter-lived than the bulk of townsmen.

* The effect of changes of temperature in the production of catarrh and bronchial affections, is not easily ascertained. Systematic writers, from the Greeks to Cullen, have not, as far as I am aware, advanced any thing satisfactory. Good, from observation, demurs to the opinion of Cullen, that cold is the constant cause of catarrhs. In 1822, the Société de Mèdecine de Montpellier, proposed for its annual prize the following question:—"Quelle a été l'opinion des Anciens et quelle est celle des Modernes sur le catarrhe? Quelles sont les maladies qui en dépendent essentiellement, et par quel traitement respectif peut-on les combattre?" M. Duges obtained the prize for his reply. But in his paper we cannot find any novel or satisfactory information as to the *causes* of catarrh. His statements are chiefly these:—"L'inspiration d'une vapeur irritante, d'un air chargé de particules pulvérulentes, l'ingestion de substances stimulantes, &c. produisent par fois un état catarrhal bien évident à la conjunctive, à la pituitaire, à l'arrière bouche, dans les bronches, dans l'estomac ou les intestins, si l'on veut toutefois regarder comme tels, pour ces derniers, l'état gastrique et la diarrhée. Un virus peut produire sur la conjunctive, la pituitaire, la membrane auriculaire, ou celle de l'urètre, des effets analogues. Le froid, appliqué aux membranes muqueuses, produit par fois un effet semblable; il la produit par la réaction qui suit ordinairement la torpeur qu'il a d'abord occasionné." How does this doctrine, the common one of the schools, accord with the facts in this paper, with

The remedies which may be suggested for the evils referred to in this section are,

1. Diminution of the muscular labour which is performed in hot rooms. Raising the iron tenter-frames in the dry-house ought to be effected, and the hot plates of the stuff-pressers conveyed, by machinery. These, and similar modes of relief, are more worthy of mechanic ingenuity, than most of the ends to which this ingenuity is devoted. The men, moreover,

the state especially of the operatives referred to in the present section ? The only reply I expect is, that habit has rendered the individuals proof against the agencies, which would otherwise have induced disease. But the men, of course, once *entered* the employ. Did they *then* suffer severely from catarrh, or bronchitis, or gravedo ? We cannot find that they did.

In reference to catarrh in general, I might urge, were it part of my subject, that this disorder is often prevalent when the atmosphere is comparatively mild, and when there have been no great variations of temperature. I might also urge the fact of bed-ridden persons being attacked with catarrh, when no change has been made in the temperature or ventilation of their rooms. I might also repeat the general remark, made in a former page, that those persons who take most care to avoid atmospheric transitions, are not least, and are often indeed most, liable to catarrh and bronchitis ; while those, on the contrary, who expose themselves most freely, are least and most rarely affected.

The inhabitants of this country are brought up from childhood in the fear of taking cold. It is the bugbear of our youth ; it haunts us us through life. Few have any distinct ideas of the nature of this frigorific agency : few have fairly examined their experience : and few indeed are aware of the fallacies of experience ; scarcely any have made either direct experiment or close observation. Yet all speak with decision on the subject. Hence workmen, when interrogated on the effects of change of temperature in producing coughs and catarrhs, commonly reply from their prejudices, rather than their observation. " *We must take cold : we are always in heats and cools.*" But on cross-questioning them, I have not been able to satisfy myself, that men subjected to the greatest changes, are especially liable to catarrhs and bronchial inflammation. We do not hear more coughs in the Foundries, Dry-houses, or Press-shops, than in other places. The men, it is clear, are not particularly subject to consumption ; and if the heat or transitions of their employ frequently excited bronchial inflammation, a pathologist would surely expect the prevalence of that fatal disease.

should be less active, and carry lighter weights. In other countries, heat is considered a sufficient cause for the reduction of labour; while in England, operatives employ all their strength, as well in a temperature equal to that of the tropics, as in the open air of our winters. 2. The drinking lemonade, or other diluent during the time of labour, rather than the noxious compound called ale. 3. The use of stimulants with the food, after labour. 4. The reduction of the *period* of labour.

Having thus examined the effects of the principal occupations of the labouring classes, we proceed to the second great class,

II. *Dealers.* These are chiefly **SHOPKEEPERS**, who live in a confined atmosphere, and whose employments are a compound of the active and sedentary, with generally, however, more of the latter than the former. The character of their occupation is modified by the articles in which they deal; but, with some slight exceptions, they are subjected to no deleterious effluvium. They are, however much too confined. Standing behind the counter all day, or sitting in a small back parlour, with eyes directed through an inner window, to watch for customers,—taking their meals at broken times,—all day on the move, yet never in exercise,—closing their shutters at 9, and afterwards sorting and replacing their goods till 11 or 12, they present a sad picture of an unnatural life—a life which sinks alike mental and corporeal energies. To them, the elements and seasons are indifferent, except so far as bad weather diminishes the number of their visitors. Intent on their occupations, they neglect the care of health. Week after week passes, without affording them one pure inspiration. Often, also, they have not exercise even in the open air of the town; a furlong's walk to church or chapel on Sunday being

the extent of their rambles. When they have the opportunity, they want the inclination for exercise. The father is anxious about his trade and his family ; the mother is solicitous about her children. Each has little taste for recreation or amusement.

They are generally temperate in their diet. They injure health, not by direct attacks; not by the introduction of injurious agents, but by withholding the pabulum of life, a due supply of that pure fluid, which nature designed as food for the constitution. Be it remembered that man subsists upon the air, more than upon his meat and drink. Numerous instances might be adduced of persons existing, for months and years, on a very scanty supply of aliment, but it is notorious that no one can exist for an hour without a copious supply of air. The atmosphere which shopkeepers breathe is contaminated and adulterated; air, with its vital principles so diminished, that it cannot fully decarbonize the blood, nor fully excite the nervous system. Hence shopkeepers are pale, dyspeptic, and subject to affections of the head. They drag on a sickly existence, die before the proper end of human life, and leave a progeny like themselves. One exception to this general statement refers to youths employed as shopmen, who are more active, less anxious, and take occasional excursions into the country. They are, therefore, proportionately more healthy. But even these have the blood impure. They are particularly subject to headache. The rosy country youth becomes, in a few months, pale and sickly; and if he do not take every opportunity of going out in the fresh air, the constitution is permanently impaired. Another exception to the general statement, has reference to the habits of shopkeepers. Though temperate as a class, there are many lamentable examples of improper potation. The tradesman, after a day behind the counter, spends his evening at the tavern or dram-shop. He says he only takes a sober glass with a friend or two. He has been closely confined all day, and surely he may enjoy himself for an hour in the evening.

This would be well, if society could be enjoyed with eau sucré, or lemonade. But it is *not* well, when brandy, whiskey, or gin is necessary to conversation. The stomach, the liver, and the brain soon suffer. No constitution can long sustain the daily potation of ardent spirits, in addition to the evil of confinement in a polluted atmosphere.

COMMERCIAL TRAVELLERS have greatly the advantage of shopkeepers. Well fed, riding from town to town, and walking to the houses of the several tradesmen, they have an employment not only more agreeable, but more conducive to health, than almost any other, dependent on traffic. But they destroy their constitutions by intemperance; not generally by drunkenness, but by daily taking more liquor than nature requires. Dining at the traveller's table, each drinks his pint or bottle of wine; he then takes negus or spirit with several of his customers; and at night he must have a glass or two of brandy and water. We cannot refer to such conduct, except in terms of the strongest reprobation. The illiterate poor take ale at the public-house on the Saturday evening, and often get drunk; but the traveller, who is or ought to be better informed, and has, moreover, less temptation, daily takes what would intoxicate a temperate man. The result is disease; first an affection of the stomach and head,—frequently a variety of nervous and hypochondriacal feelings; subsequently, congestion of the additional veins; finally, organic disease of the liver. And if the drinker be not suddenly taken off by apoplexy, or other affection of the brain, he merges into drapay, and the bloated mass sinks into an early grave. Few commercial travellers bear the employ for thirty years,—the majority, not twenty. Thus, an occupation in itself so healthy, that a man might follow it from boyhood to eighty, in health and vigour, is corrupted to the production of disease, and the destruction of at least half the term of human existence.

III. We proceed next to the class of MERCHANTS and MASTER MANUFACTURERS. Spending most of the day in the counting-house or the mill, they are subjected, not only to the impure atmosphere of a large town, but occasionally also, in a varying degree, to the dust or effluvium from the manufacture. These evils are, of course, considerably diminished by residing at a distance from the mill or warehouse, and especially by sleeping in the country ; for thus, exercise and a better atmosphere, for a portion of the day, are secured.

But most mercantile men have, unfortunately, a disposition to have their house and warehouse within a stone's cast of each other ; and five or six days a week, they take scarcely any more exercise than walking this short distance. Occasionally, indeed, they have a day's shooting, or drive on business to a neighbouring town ; but such exercise, of course, is very inadequate.

The way in which men of business take their meals is also highly injurious to health. It is far too hasty. Many seem to be always travelling by the stage, and expecting every moment the summons of the coachman. The Arabs say, that " he who does not take care to chew his victuals, hates his life." And the adage is too often verified in this country, by the gastric disorders which result from a want of mastication.

Other mercantile men, though they spend more time at their meals, are engaged in close thought. They taste neither meat nor drink. The nervous energy which the stomach requires for digestion, is abstracted by the mind. They think when they ought to eat. The animal operations are sacrificed to calculation, speculation, and commercial arrangement. The state of the bowels is also neglected ; and thus a foundation laid for serious disorders.

But of all agents of disease and decay, the most important is *anxiety of mind*. When we walk the streets of large commercial towns, we must be struck with the hurried gait and

care-worn features of the well-dressed passengers. Some young men indeed we may remark, with countenances possessing natural cheerfulness and colour, but these appearances rarely survive the age of manhood. Cuvier closes an eloquent description of animal existence and change, with the conclusion that "Life is a state of Force." What he would urge in a physical view, we may more strongly urge in a moral. Civilization has changed our character of mind as well as of body. We live in a state of unnatural excitement; unnatural, because it is partial, irregular, and excessive. Our muscles waste for *want* of action: our nervous system is worn out by *excess* of action. Vital energy is drawn from the operations for which nature designed it, and devoted to operations which nature never contemplated. Though we can scarcely adopt the doctrine of a foreign philosopher, "That a thinking man is a depraved animal,"—we may without hesitation affirm, that inordinate application of mind, the cares, anxieties, and disappointments of commercial life, impair the physical powers, and induce premature decay. The various disorders, generally known under the name of indigestion, disorders dependent on a want of circulation of blood through the bowels, biliary derangements, constipation, and headache, are well known to be the general attendants on trade, closely pursued. Indeed in almost every individual, this absorbing principle produces one or other of the various maladies to which I have alluded. More marked is the effect, when anxiety is added. This greatly reduces the functions of the stomach; it produces flatulency, and often diarrhoea; it sometimes affects even the kidneys; it almost always, when long-continued, produces permanent disease of the liver. Cancer of the stomach, moreover, and other malignant diseases, occur most frequently among the victims of mental depression and care.

The physical evils of commercial life would be considerably reduced, if men reflected that the success of business may be prevented by the very means used to promote it. Excessive

application and anxiety, by disordering the animal economy, weaken the mental powers. Our opinions are affected by states of the body, and our judgment often perverted. If a clear head be required in commercial transactions, a healthy state of the body is of the first importance ; and a healthy state of body is incompatible with excessive application of mind,—the want of exercise and of fresh air. But subjects like this find no entry in the books of our merchants. Intent on their avocations, they strangely overlook the means necessary for pursuing them with success. They find, too late, that they have sacrificed the body to the mind.

And why this perversion of nature? Why do we think and toil? To obtain wealth, and thus increase our means of happiness. But will wealth compensate for the evils which attend it? Its acquisition produces—will its possession remove, functional or structural maladies? Will it banish those thousand nervous and hypochondriacal feelings which produce more misery than even organic disease? And when we have sacrificed health and abbreviated life for the acquisition of property, what happiness have we got in exchange? Every moralist tells us, nay, rather reminds us, of the insufficiency, the vanity of riches. The subject is trite and hacknied: truth is admitted, approved, and forgotten. Nay, the very moralists, who most repeatedly urge moderation of our desires, are not always the men to practise the lessons they teach. Seneca gives a receipt for the acquisition of wealth,—and this receipt is the reduction of our desires; and in every page of his epistles is a pithy sentence of a similar character. Yet Seneca was the usurer of millions. Could the ancient philosophers rise again, and assemble our youth around them,—were Zeno or Epictetus heard in the haunts of commerce,—some impression might be made. Or, were the principles of a greater Teacher impressed on the mind, medical men would have merely to direct, not to enforce.

For the individuals in mercantile life who are really,

permanently, practically, convinced that health is preferable to riches, and who are hence resolved, not only to hear, but to act on the maxim, a word may be said on the principal means which counteract or diminish the physical evils of our civic state. Exercise in the open air is obviously important; and two hours a day is quite as little, as it claims in a town like this. Walking should be brisk, to be efficient. Riding on horseback is generally preferable. But, as neither of these exercises brings the muscles of the arm into full action, an hour's labour in the mill or warehouse, or digging in the garden, or in the use of the broad sword, would be an useful addition. Quoits and cricket are excellent, but these recreations unfortunately are confined to youth. Hunting is admirable exercise for strong men; but its violence, and the comparative infrequency of its occurrence, prevent our generally recommending it. It is subject, moreover, to the serious objection of that excess in eating and drinking, which generally closes the day.

A word of caution on sudden and great exertion. Persons of sedentary habits have been known to induce serious and even fatal disease by such efforts. A race for a wager, the lifting of a great weight, a run to overtake the stage, &c. have occasioned disease of the heart or arteries, which has made the imprudent person miserable for life, and shortened its duration,—or affections of the brain, more promptly fatal.

If mercantile men had a taste for natural history, the acquisition of specimens would be a recreation not only delightful, but also highly useful.

Without entering on dietetic detail, I may briefly remark that slow eating, and an hour's rest after dinner, are important. Sleeping in an airy apartment,—in a word, having at all times the atmosphere we breathe as pure as possible, is particularly required in the neighbourhood of smoke and soot. My recommendations as to general conduct, here as well as elsewhere, may appear superfluous, because they are generally such as

would suggest themselves to every reflecting mind. But, it should be remembered, that to repeat and urge what is forgotten, is sometimes as important as to state what is unknown. The object of this paper is utility.

Bons Vivants—a class, large in many towns, is formed by men, who, from inherited or acquired property, live independently of business. It includes moreover some mercantile and many professional men. The habits and character of these persons exhibit great variety; and the only circumstance to which I would advert, is that on which is founded the name.

The proper culture of the stomach is certainly not only to be allowed, but enjoined. The kinds of food, and the modes of its preparation, afford a study by no means unworthy of science; and works like Kitchener's deserve a place in every library.

But assuredly the art is carried by many to a lamentable extreme. Cookery becomes the minister of gluttony. The palate is stimulated to excess,—the stomach is consequently gorged,—its powers are weakened—and venous congestion of the abdomen, with all its attendant evils, is established. The disposition and power for muscular exertion are greatly reduced: the brain, and the whole nervous and vascular systems suffer from the improper quantity and quality of the circulating blood.

The evil of refined and excessive eating is not new. Livy complained that, in his day, cookery had become an art, a noble science,—that cooks were gentlemen, “Venter, Deus.” Another ancient remarks of the Rhodians, that “they built houses as if they were immortal,—but they feasted as if they meant to live but a little time.” Seneca justly observes, “Multos morbos, multa fercula fecerunt;” and again, “Innumerabiles esse morbos miraris? Coquos numera.” No medical man of the present day could have given a more dismal picture of the effects of excess than the 95th epistle of this philosopher. But without referring further to the faults of other nations, or to the monstrous excesses of individuals like Soliman the Calif,

and Maximus the Roman Emperor, I would remark on the character of Britons. The English, it seems, have always been remarkable for full living; "Ampliter viventes," says Polydore Virgil, "in prandiis et in coenis." And in Scotland, it appears from Holinshed, that a law was made in 1433, "for the restraint of superfluous diet." We afterwards find Jeremy Taylor inveighing against the luxurious tables of his day. "Strange that for the stomach, which is scarce a span long, there should be provided so many furnaces and ovens, huge fires, and an army of cooks, cellars swimming with wine, and granaries sweating with corn; and that into one belly, should enter the vintage of many nations, the spoils of distant provinces, and the shell fishes of several seas."

Gastronomy is now more refined, but not less pernicious. As large a quantity of food is provided, but this is divided into a greater number of dishes and of compounds. Stimulants are largely added; and condiments especially we have largely imported from our Eastern possessions. Taking wine at dinner, and sometimes also liqueurs, we have added to the excesses of our ancestors,—while, at the same time, we have diminished that muscular exercise, which counteracts the effects of high living.

I need say little, of course, on a subject so plain as the prevention or cure of the evil. All I would urge on the Bon Vivant is a consideration of his own happiness. He eats for pleasure: Let him remember that for pleasure he must also refrain. He is called an Epicurean. But Epicurus, though he is generally believed to have understood and practised the art of enjoyment, disdained costly entertainments.* He knew well that pleasure is incompatible with excess, and that subjection to the senses is utterly subversive of cheerfulness, serenity, and health.

* Feeding sweetly on bread and water,—*πλει, υδατι και αρτω χρωμενος.*

IV. PROFESSIONAL MEN, and PERSONS engaged in LITERATURE, form the last class for examination. All, of course, are men who work by the mind more than the body.

1. Some have *mental application conjoined or alternating, with considerable exercise in the open air.*

CIVIL ENGINEERS, SURVEYORS, and ARCHITECTS belong to this division. Though confined to the desk occasionally, yet they travel frequently through the country, and thus enjoy fresh air and muscular exertion. They are, indeed, occasionally exposed to wet and cold; but these agents seldom injure persons in motion. Few individuals in this department are unhealthy; except those who are irregular in their habits, and addicted to high living.

MINISTERS of RELIGION have a similar alternation of study and exercise. The latter, however, is too gentle or restricted for muscular men. Their situation and the ideas attached to it, unfortunately prevent their joining in sports or amusements, which produce a full circulation of the blood, and a full action of the viscera. Hence, congestion of the venous system of the bowels is a frequent occurrence.

The individuals of this class who are hard students, may be referred to the section of literary men. Clergymen, who preach long, frequently, or with vehemence, as well as orators, actors, public singers, and persons who play much on wind instruments, are subject to pains in the chest,* spitting of blood, and diseases of the larynx. Aædema of the glottis is particularly mentioned by Merat.†

* Fallopius says that bass-singers, and cowled monks, who shout much (continuè clamitant), are subject to hernia. A like observation is made by Mercurialis, but he adds that old singers, who attend to the management of the voice, and the practice of bathing, are less affected. Ramazzini observed hernia more frequent among nuns and monks, than other persons.

† Street-cryers are often affected with laryngial consumption.

PRACTITIONERS of MEDICINE and SURGERY must next be noticed. Our office requires that a considerable portion of time be daily devoted to study, and the rest to professional visits. These, of course, afford exercise in the open air, and thus tend to invigorate the health,—while, on the contrary, the application of mind to study and research, tends to impair it. Night-calls are generally thought to be very injurious. I think the evil less than the public and the profession suppose; for, if we observe those who have for thirty or forty years been much engaged as accoucheurs, we shall find them as robust as others.

Anxiety of mind does more, I conceive, to impair health, than breach of sleep, nocturnal exposure, or irregularity in meals. The body suffers from the mind. That sense of responsibility which every conscientious practitioner must feel,—the anxious zeal, which makes him throw his mind, and feelings, into cases of especial danger or difficulty,—break down the frame, change the face of hilarity to that of seriousness and care, and bring on premature age.* As a profession, we are by no means healthy. Indigestion is general, and diseases of the lungs and blood-vessels are frequent. I am aware that several instances of great age will be immediately remembered; but while referring to cases like these, we forget the number who die in middle age and youth. Inquiring occasionally after those whom I knew as students, I have been often surprised at the number of deaths. Among the youth of our profession, in an especial manner, is the mortality great. Pupils sent to distant medical schools at the end of their apprenticeship, and thus placed

* Ramazzini speaks very differently on the subject. He says that medical practitioners are comparatively exempt from ordinary diseases, in consequence of their good exercise, and their *hilarity* of mind, when they go home with their fees in their pockets,—“ *Dum bene nummati lares suos repetunt.* ” He adds, that medical men are never so unwell, as when no one else is unwell. The professor remarks, however, that they are subject to hernia from going up stairs, and catch dysentery from sitting besides their patients !

suddenly in a scene of dissipation, without governor or adviser,—mixing too with a large mass of youths similarly situated,—suffer from the evils and disease, which irregularity produces. While the steady youths, attending the hospitals, dissecting, hearing various lectures, and preparing for examination,—obliged, too, be it remembered, to acquire, in a couple of winters, that various knowledge which ought not to be acquired in triple the time,—are severely injured by the great application of mind. Hence, the students who come out of the lecture-room at the end of the session, we should scarcely recognize as the healthy young men, who entered it a few months before. Complaints of the stomach and bowels are common, and pulmonary consumption is by no means infrequent. The effects of wounds in dissection are well known to be very serious, and often fatal.

A remedy might be provided for most of the evils to which the medical student is exposed. Scientific education might be conducted in a great measure in the country, and under the eye of masters; and youths might obtain the knowledge necessary for the practice of their profession, more fully, more slowly, and therefore more securely.

2. We have next to refer to *persons who have much mental application, without adequate exercise of the body.*

CLERKS, BOOK-KEEPERS, ACCOUNTANTS, &c. suffer from confined atmosphere, and a fixed position. Spending most of the day in one apartment, they breathe impure air. Their muscles are distressed by the maintenance of one posture, and they especially complain of pain in the chest. This affection is not dependent on the state of the thoracic viscera; for neither the general symptoms, nor percussion and the stethoscope, indicate disease. Neither do we find the size of the chest considerably diminished. It is less, indeed, than in the soldier and the husbandman, but scarcely less than in the average of townsmen. The capacity of the lungs, as indicated by the jar over water, is not at all less. In Clerks and Book-

keepers, the digestive organs suffer most ; a fact apparent even from the countenance and tongue. The circulation is imperfect. The head becomes affected : and though urgent disease is not generally produced, yet a continuance of the employment in its full extent, never fails to impair the constitution, and render the individual sickly for life.* I scarcely need mention the simple and effectual remedies, fresh air, and full muscular exercise.

SCHOOLS demand our particular attention. Children are crowded in rooms of disproportionate size. The air, consequently is greatly contaminated, and the vital power is more or less reduced. Even where attention is paid to ventilation, the evil must, in a greater or less degree, exist in *large* schools. I mention, as an instance, that excellent institution the Leeds Lancasterian school. Children, and very young children, are kept, too, for many hours daily, in a state as nearly motionless, as it is possible for the masters to produce. The time devoted to amusement is much too little. Instead of two or three hours a day being allowed for play, only two or three hours a day should be devoted to confinement and labour. To fix a child in a particular posture for hours, is vile tyranny, and a cruel restraint on nature. The practice in Infant Schools is admirable ; for here the muscles and the mind are suitably and alternately exerted. The diet at boarding-schools is often much too scanty. The meals are neither as numerous nor as plentiful, as the growth and nourishment of the body require. Neither is the diet sufficiently animal. The exertion of mind also greatly, though indirectly, impairs the corporeal *vigour*. Learning, or what is called learning, absorbs the nervous energy which is necessary for the body. School-boys have, in winter, too little fire, or are kept too far from it. Hence they suffer a general depression, and are often

* "Viscerum obstructiones, uti Hepatis, Lienis, stomachi cruditates, crurum torpor," &c.—*Ramazzini*.

affected with chilblains.

The inmates of schools, though not often attacked with urgent disease, are rendered delicate. Scrophulous complaints are developed, and the vigour of the constitution remains frequently impaired for life.

Young ladies especially suffer from habits of schools. Their exercise is much too limited. They walk out, it is true, but scarcely at a rate sufficient to warm the feet. Their time for amusement is too little ; and full romping exercise, exercise which brings all the muscles into play, is discouraged. It is vulgar to use the limbs as nature designed ; it is vulgar to take the food which nature requires ; and young ladies must not do any thing that is vulgar. Sitting, moreover, for hours at needlework, or in learning what are called accomplishments, they leave a numerous class of muscles wasting for want of exercise. The muscles of the back are especially enfeebled,—and the spinal column in youth, comparatively soft and flexible, bends under the weight of the head and arms. The spine yields, because the muscles, which closely connect the bones, and by their action keep them in a proper line, are too weak. We are often asked, why are spinal complaints so common ? We answer, that a principal cause is the want of full exercise ; we say that young persons are obliged to acquire what is of little or no use in after-life, while they neglect what is necessary to the establishment of the body in health and vigour ; in short, we have daily to lament that muscular exercise is sacrificed to accomplishments and to learning. If it be asked, why are girls more subject to distortion than boys ? We reply, because they do not romp like boys. The amusements of boys are far more active than sedentary ; those of girls, are more sedentary than active.

When girls leave school, the same system of muscular quietism is enforced. They must keep up their accomplishments by practice. Several hours a day they must devote to music, and frequently a considerable time to the more injurious

occupation of drawing ; most of the remaining day, they spend in finger occupations. Little time is devoted to exercise in the open air, and the exercise they *do* take is such as to chill, rather than invigorate the circulation. Need I urge that half the disorders of the young arise from the errors I have mentioned ? Need I advert to remedies and preventives ? They are obvious.

I must notice, however, a practice which produces a marked change in the form and health of young females. It is the use of tight stays. This excessive support tends to the production of spinal complaints, by superseding, or at least rendering inactive the muscles. This principle, though not generally known, is easily illustrated. Put a weight on the head of an awkward girl, and you remark with surprise the vast change in her appearance. She seems to have suddenly acquired strength and grace. The improvement is effected merely by the muscles of the back strongly contracting on the spinal column, and thus bringing the vertebrae into the line best calculated to support the weight. The muscles of the spine, like all other muscles, become remarkably enlarged and powerful by action. Excite them often, and thus throw blood into their vessels, and they grow large and vigorous. Leave them without this natural excitement, or apply some machine or dress to supersede their action, and they become almost bloodless, thin and weak, and finally dwindle to fibres more cellular than muscular. No wonder the spine should then fall into an improper figure ; for the vertebrae are kept together only by ligament, and, I may add, by that artificial support, which indirectly destroyed the muscular power.

Not only does the use of tight or strong stays injure the spine, but it considerably diminishes the capacity of the chest. Extensive examination shows that men can exhale, at one effort, from six to ten pints of air, whereas, in women, the average is two to four. We examined the expiration in ten females, who were labouring under no disease, and whose ages averaged 18 $\frac{1}{2}$. The quantity of air thrown out averaged 3 $\frac{1}{2}$ pints. At a

former page (41) it was stated that 23 young people from a flax-mill were examined ; the males averaged 18 years of age, and six pints of expired air: the females averaged 19 years of age, and $3\frac{1}{2}$ pints of expired air. This remarkable difference of respiration in the sexes, is attributable *chiefly* to the lacing of the chest.

The Profession of the Law, in most of its branches, is sedentary. Solicitors' and other clerks are kept, from morning to night, in a bad position, with the limbs fixed, and the trunk bent forward. Five young men whom we examined gave an average of 34 inches for the circumference of the chest, and $8\frac{1}{2}$ pints for the expiration. This capacity is nearly as great as the best standard, viz. that of the officers of dragoons ; but the circumference of the chest is comparatively little. If further observation should show this to be general, are we to infer that by such employments the chest is deepened, not diminished ?

Many of the legal profession indulge too much at the table ; and almost all neglect exercise and the state of the bowels. They are first annoyed with muscular pains, the result of posture ; then they find the functions of the stomach decidedly injured. The tongue is almost always foul ; the face pale or sallow. The appetite however is not generally reduced ; often indeed it is too great. Some become plump ; but this state is not health, but plethora, founded on a congested state of the abdominal veins. The blood in the system I believe to be decidedly impure. Affections of the head, too, we observe to be frequent among professional men. Such disorders originate less, I conceive, from mental excitement, than from the state of the blood, and the want of vigorous circulation.

These evils would be greatly lessened, could we induce the practitioner of the law to ride or walk briskly for a couple of hours in the day, and to accommodate his diet to situation ; or, in plainer terms, eat and drink no more than required by an office of so little bodily exhaustion.

Barristers have their time more at their own disposal, and

generally take more exercise than attorneys. They are, however, addicted to the pleasures of the table. In those who distinguish themselves at the bar, we remark the effect of excessive mental exertion. The complexion and features strongly indicate gastric disorder. Affections of the digestive organs are frequent, and often severe.

We have now arrived at the last class of society,—*persons who live in a bad atmosphere, maintain one position most of the day, take little exercise, and are frequently under the excitement of ambition.* This class includes individuals from the several professions, as well as the men devoted to science and literature.

The position of the student is obviously bad. Leaning forward, he keeps most of the muscles wholly inactive, breathes imperfectly, and often irregularly, and takes a full inspiration only when he sighs. He generally lives, too, in an impure atmosphere, and neglects the common means of relief. The circulation is enfeebled ; the feet become cold. The appetite is less frequently reduced than we should expect. Often indeed it is too great. But whether moderate or excessive it is greater than the power of digestion : for the application of mind too great or too long, absorbs that nervous energy, which digestion requires. The stomach becomes foul, the secretion of bile is impaired or vitiated, the bowels are sluggish, and constipation, with its attendant evils, progressively succeeds. As sanguification is imperfect, nutrition is imperfect, and the body either wastes, or becomes plethoric with impure blood.* The

* The general idea that study *always* makes men thin, is erroneous. A man of the most extraordinary reading I have met with, and one who was well known in the scientific world from his mechanical improvements, was so fat as to be obliged to subsist generally on rice and water. His fat of course was disease, and this disease maintained or aggravated, if not produced, by his sedentary habits.

brain becomes disturbed. Congestion first occurs, and to this succeeds an increased or irregular action of the arteries.

The effect is vastly increased by the ambition, which generally distinguishes the ardent thinker. Plato, in his *Timæus*, adverts to that ambitious strife which affects the literary character, and dissolves the constitution of the body. St. Jerome calls the philosopher “*Gloriæ animal*.” D’Israeli, in his essay on the literary characters, represents, in strong terms, the excitement generally felt by celebrated men, an excitement I may add which always injures, by its intensity and repetition, the functions, and finally the structure of the brain.

Chronic Inflammation of the membranes of the brain, ramollissement of its substance, or other organic change, becomes established; and the man dies, becomes epileptic or insane, or falls into that imbecility of mind, which renders him an object of pity to the world, and of deep affliction to his connexions. Say not this is an exaggerated picture,—“*Quæque ipse miserrima vidi.*” Of common disorders, moreover, of the stomach and bowels, ardent students have fully their share; and of diseases of the liver, the lungs and heart, more, I believe, than an average proportion.*

* A life of contemplation and abstraction must indeed, from its opposition to nature, be always unhealthy. “*Tristes Philosophi et severi*,” is the expression of Varro; and daily observation shews them to be safflow and melancholy. We see minds almost without sense, and bodies almost deprived of blood and nerves. We find no *buxæna* rosy-faced thinkers. Celsus intimates that the close connexion between medicine and general science, arose from the wants and sufferings of literary men. “*Literarum disciplina **** ut animo præcipue omnium necessaria, sic corpori inimica est. Primoque medendi scientia, sapientiae pars habebatur, ut et morborum curatio, et rerum naturæ contemplatio sub iisdem auctoribus, nata sit scilicet his handa maxime requirentibus, qui corporum suorum robora inquieta cogitatione, nocturnaque vigilia minuerant.*” Zimmerman relates, in his amusing book on *Experience in Physic*, that he was “called to a lady in the country who was at length become mad, after having been long in a profound melancholy. The curate of the parish, who happened to be with her, ascribed her disorder altogether to too much read-

The duration of life among the ancient philosophers, was great. Modern philosophers, though by no means short-lived, do not obtain the same age.* They pay less regard to their physical habits: they are less attentive to the due regulation of appetite: they seldom use the bath: they take less muscular exercise. The ancient philosophers were almost all peripatetics, in practice, travelling from country to country, disputing and inquiring in their walks, or in open places. The moderns, on the contrary, fix themselves to the desk. The duration of life among literary men appears to be less than among philosophers. Homer, Plutarch, indeed, and several of the ancients, attained a great age; but the moderns have not been so fortunate. Of 1700 recorded cases of persons in all classes of society who have reached the age of 100, only one was a literary man, viz. Fontenelle.

In stating the evils which result from improper or excessive application of mind, I would not be thought to object to study itself. If they were twice as numerous and afflicting, they ought not to check the advance of knowledge; for knowledge has become essential to our social state. "If," as Evelyn strongly remarks, "If, under heaven, there be any thing great that approaches eternity, it is from their hand who have

ing. "It would seem then," said Zimmerman, "that you read but little." "Very little, or not at all," replied the good curate, with a very moderate tone of voice; "take my word for it, Sir, that all those who read much, go mad in the end." Tissot gives the most lively examples of perverted minds from mental application. See his book *De la Santé des Gens de Lettres*. There is much interesting matter in the well-known book, Burton's *Anatomy of Melancholy*.

* Thales reached his 90th year; Anaxagoras, 72; Plato, 81; Xerxes, 82; Epicurus, 73; Pyrrho, 90; Democritus, 100, &c.—See Brucker's *Historia Crit. Philosophiae*, the most interesting work on the ancient systems of knowledge, and on the lives and characters of philosophers. Bacon reached his 64th year; Galileo, 70; Harvey, 88; Boyle, 65; Leibnitz, 70; Newton, 84; Boerhaave, 69; Linnaeus, 71; Davy died comparatively young. The average duration of life seems considerably in favour of the ancients.

managed the pen." If there be any thing useful, I would add, any thing which conduces to the comfort and convenience and happiness of life, we owe it to science. The philanthropic medical man objects, not to the cultivation of the mind, but to its intense and continued excitement. He objects to the hours of abstract thought, which destroy the health of the mathematician; to the nights of passion, the excessive excitement of the imaginative faculties, and irregularity of living, which destroy the poet; he objects to the days of reading, which break the health of the student; he objects especially to that ambition which, though highly useful to society, (for "contemptus famæ, contemni virtutes"), is the bane of the individual who feels it. He objects to that emulation, which accompanies ambition, and especially to that envy, which Socrates aptly terms the *saw* of the soul, and which the medical man would call the *saw* of the body also.

The evils attendant on literary and scientific pursuits may be greatly diminished by measures of a very simple, though decided character. First, The quantity of study should be reduced. It should engage but a moderate and definite proportion of the day. Three or four hours, I think, enough for close reflection,—others perhaps would allow a longer period; but six hours certainly ought not to be exceeded; more cannot be employed with effect. We hear indeed of men reading or writing 12 or 14 hours a day. They may be at their books during this time, but I doubt their being engaged in study. The faculties cannot support such exertion. The mind and body require relief and alternation. Change is the character of the universe. Every thing has its rise, acme, and decline; and man is subjected to this law, alike in his physical and intellectual character. The mind, long applied, loses its power. The ideas become confused, and invention ceases. The brain is then strained, rather than exerted, and its work is aptly said to smell of the lamp. Let, then, the student bear in mind that, even without reference to health, long continued application of

mind is unwise. He defeats his object by the earnestness with which he pursues it. Let him remember the remark of Pope Ganganelli,—“ There is scarcely any book which does not savour of painful composition in some part of it ; because the author has written when he should have rested.”

Alternation of pursuits affords some relief. But this principle cannot be a substitute for rest, still less can it be as substitute for that muscular exercise in the open air, which is the

2nd Remedy we have to notice. This remedy, indeed, is as obvious as the first, and yet quite as much neglected. By muscular exercise, I do not mean a walk at the rate of a funeral procession ; or a ride on horseback, at the pace of a market woman : I mean such exercise as healthy boys take when liberated from the school-room, or as sportsmen take when in pursuit of game ; exercise, which produces full circulation, and a free state of skin. The gymnastic practice is highly to be commended.* Gardening is also a valuable recreation, and one which may be used, when the age for more strenuous exertion is past.

A third remedy, to which I have more than once adverted in other classes, and which, from its importance, I would enforce, though at the risk of repetition, is attention to the state of the digestive organs, and especially to the time and mode of eating. When food is taken at irregular times, and in a hasty manner, the stomach must suffer. The gastric juice is not constantly secreted ; and the period of its abundance is determined by the habits of the individual. If a man, accustomed to dine at two, defer the meal till five, he finds his appetite and power of digestion to be less. In fact, the stomach secreted gastric juice at its usual period ; but receiving nothing for this solvent to act on, was obliged to absorb it ; and was not able to effect a fresh

* “ He who vehemently applies himself to the mathematics, or to any other dianöetic exercise, should also employ the motion of the body, and be familiar with the gymnastic.”—*Taylor's Plate*.

production, equal in quality and quantity to the former. The meals, then, should be taken at regular and accustomed hours.

We are far from approving of frequent meals. They do not allow sufficient rest for the stomach. Still less should food and study be so mixed together, as to leave no time for digestion.* The quantity of food should be considerably less than usually taken. This rule is of more importance than a reference to quality.

Some literary men have been in the habit of taking vinous or spirituous liquors.† But this practice is decidedly injurious. The intellectual excitement it produces at the time, is more than counterbalanced by the subsequent depression; and ruin of health, and the abbreviation of life, are the ultimate results.

Tea and coffee are much better and safer stimulants. They have been highly prized by Harvey, Pope, Voltaire, Napoleon, and others. Their moderate use may be commended; but the student should be informed at the same time, that their abuse—the drinking, I mean, of tea and coffee of great strength, or several times a day—decidedly impairs the tone of the stomach. Fermented liquors are injurious.

The state of the intestines is important. When these are neglected, the digestive functions are imperfect, and a train of bodily evils necessarily succeed. The mental faculties are in many persons affected even immediately by the state of the bowels.

* Poor prick-eared Prinne, a man of immense reading, fell into both these errors. "About every three hours," says Aubrey, "his men went to bring him a roll and a pot of ale, to refocillate his wasted spirits: so he studied and drank and munched some bread, and this maintained him till night."

† Gorlenius, a German Professor, drank Rhenish wine, to support, him in his studies. Ben Jonson "would many times exceed in drink, canarie was his beloved liquor; then he would tumble home to bed, and when he had thoroughly perspired, then to study." Sheridan, when composing, had a large glare of light, and took copious libations of claret. Lord Byron, it is well known, wrote much of his poetry under the inspiration of gin.

As pure air is important to the student; the country is of course preferable to towns. I may repeat also the general recommendation of morning as the best time for mental application. When there is much excitement and continued labour the frequent washing of the head with cold water affords great relief, and tends to prevent that irregularity in the circulation, on which is founded disease of the brain.*

In stating the evils attendant on a life of study, the pursuits of the naturalist and antiquary have not been mentioned; for in these there is little to reprobate, and consequently little to amend. They give exercise in the open air, and cherish that state of mind, in which there is much hope and little disappointment. They preclude the disposition to intemperance. Evelyn, indeed, speaks with contempt of him, "that goes a madding after medals and curiosities, and spends his time in raking a tinker's shop for a rusty piece of copper." And Akenside ridicules the virtuoso, who "could tellen if a mite were lean or fat,"—"and read a lecture on the entrails of a gnat." But a moralist would reply, in the words of Cowper, "he seeks his proper happiness by means,—Which may advance but cannot injure thine." He acquires enjoyment which leaves no remorse. He often effects general good: he never produces injury to society, and rarely even annoyance to individuals. Evelyn makes an observation to the effect, that a good gardener cannot be a bad subjeet. We may add, that a man addicted to pursuits like that, the various pursuits I mean of natural knowledge, can scarcely be a bad man. A judicious parent would be far more anxious to give his children a taste for natural knowledge, than for literature. They might gain neither present nor ultimate fame, but they would obtain that moderate and serene enjoyment, that "tranquillitas animi," the "animus

* Ramazzini writes nearly two columns in recommending wigs for literary men, or, as he precisely describes them, "Capillamenta ex alienis capillis contexta, tanquam capitis vagina."

sine perturbatione," to which Seneca repeatedly and justly refers, as the greatest of temporal blessings.

Having examined *seriatim* the principal employments of large towns, we may now offer a recapitulation or abstract of the effects of these employments on health.

In the progress of our inquiries, we have repeatedly remarked the errors of general opinion, and particularly in reference to certain agents considered as highly injurious.

I. In this summary we first notice the agents, which our examination leads us to believe are *comparatively harmless*.

1. The chief are *wet, vapour, and changes in the humidity of the local atmosphere*. In pages 63—69 we have adduced proof that these agents, in temperate persons, produce little injury.

2. Neither have changes of *temperature* a marked effect in the production of acute disorders. We refer to the state of dryhouse-men, stuff-pressers, glass-blowers, &c., pages 71—75.

3. The *exhalations from vegetable decomposition* we have not found injurious; but we had not the opportunity of making observations sufficiently numerous and correct, to warrant a decided opinion. Starch-makers seem to suffer no annoyance; and certainly brush-makers are not injured by the vapour of tar.

4. The *natural odours of vegetables*, manufactured in this neighbourhood, with the exception of coffee, appear to be innoxious. Tobacco-workers (I am not including snuff-makers) do not sensibly suffer from the fumes of their material: and the crushers of rape and mustard seem even benefited by the odours, which these seeds exhale.

5. The influence of a *change in the period of sleep* is less than we should have expected. We do not find that millers, watchmen, and coachmen, are sensibly affected by night work.

II. We next refer to certain agents or circumstances connected with our employments, which appear to be *directly or indirectly beneficial*.

1. *Animal exhalations*, even the most offensive to the senses, and generally supposed to be very prejudicial, our examination shows to be really useful. We refer to the health of glue-makers, buckram-stiffeners, tanners, slaughter-men, tallow-chandlers, curriers, leather-dressers, grooms, &c.*

2. *Oil or grease, applied to the skin*, appears to have a beneficial effect. We refer to several branches of the woollen manufacture, as slubbing, carding, and the children's employment of "piecening." See page 19.

III. We last recapitulate the agents which our examination leads us to believe, are *decidedly injurious*. These, varying in the organs or systems they affect, require us to attempt an accordant arrangement.

1. AGENTS INJURIOUS TO THE DIGESTIVE ORGANS.

a. *Excess of food*, absolute or relative, in butchers, gentlemen's servants, gourmands, many professional and literary men.

Result, Plethora.

β. Defect of proper food, in men on the roads, cart-drivers, labourers in husbandry (at the present time), weavers, woolcombers, and other persons employed in the manufactures, when trade is reduced,—children at school.

Results, Certain painful affections of the stomach—Reduction of strength and flesh—Change, I believe, in the state of the blood.

γ. *Bent sitting posture*, in tailors, shoemakers, watch-

* The influence of putrid exhalations is shown also by the effects of a dissecting-room. Students are at first annoyed with diarrhœa; but subsequently, if they be steady and temperate, and avoid wounds from the hook or the scalpel, sometimes become robust. We have remarked several pupils to look best and eat most, when they are dissecting.

makers, milliners, weavers, saddlers, &c. in all persons engaged in reading and writing.

Results, Defect in the blood's general circulation—Congestion especially of the system of the *vena portæ*—Functional disorder of the liver—Indigestion—Diarrœa, and other diseases of the mucous membrane of the intestines—piles—fistula.

The great and primary evil which the bent sitting posture produces is, I believe, the injury or remora of the circulation through the abdominal viscera. This is *directly* produced by the descent of the chest, and the consequent compression of these parts between the lower ribs, the lumber vertebræ, and the pelvis. It is *indirectly*, and perhaps in a less degree, produced by the abstraction of that exercise of the body in general, which supports and augments the local circulation. A constant supply of fresh or purified blood, we well know to be necessary to every vital function: and if the veins of the bowels, or their large trunks be compressed, the foul contents of these vessels cannot be expelled with sufficient rapidity, and consequently a supply of pure blood from the arteries cannot be freely admitted into the capillaries or radicles whence the veins arise. In proportion to the degree of the congestion thus induced, will the functions of the stomach and liver, and the bowels be impaired; and in a secondary manner will the pulmonary organs, the brain, and indeed every part of the body suffer. The subject, I conceive, to be of great importance in the treatment of much of the disease, which towns present. To a speedy and scientific cure, the *vena portæ* must be unloaded more directly than by the ordinary means.

3. *Long standing?*—in the bulk of active employments.

Result, By keeping the stomach pensile, it has been thought to affect digestion.

e. Great muscular efforts, in lifting weights, &c. in porters, millers, &c.

Result, Hernia.

g. Steam, in brushers of cloth.

Results, Bowel complaints, indigestion.

If such be the common effects, how are they produced?

n. High temperature, in bakers, cloth pressers, glassmen, and in all the operatives mentioned between pages 69 and 79.

Result, Impaired appetite.

i. Common atmospheric impurity, affecting, of course, all townsmen, but especially shopkeepers, artizans, and those working late at night, and who burn oil for light.

Result, Impaired digestion.

λ. Dust and gaseous impurity of the atmosphere, in millers, flax-spinners, miners, workers in metal, &c. Pages 37 to 58.

Results, Vomiting, loss of appetite, impaired digestion.

μ. Anxiety, and mental application, in merchants, professional men, students, &c.

Result, Disease of the stomach and liver.

2. AGENTS OR STATES INJURIOUS TO THE RESPIRATORY ORGANS.

α. Dust, in corn-millers, maltsters, snuff-makers, flax-spinners, fullers, some dressers of cloth, rag-sorters, willyers, miners, grinders, masons, machine-makers, workers in certain kinds of wood, &c.

Results, Inflammation of the bronchial membrane, inflammation of the pulmonary substance, consumption, asthma.

β. Steam, in cloth-brushers.

Result, Difficulty of breathing (temporary?)

γ. Lifting great weights, in warehousemen, porters, &c.

Result, Hæmoptysis?

δ. Confined state of the chest, in females from wearing tight stays.

Result, Defect of respiration and circulation, with its effects on the whole economy.

3. AGENTS INJURIOUS TO THE CIRCULATORY SYSTEM.

a. *Posture*, in hackney coachmen, postillions, &c.

Result, Aneurism.

Bent sitting posture. See 1. γ .

γ . *Long standing, with great muscular exertion*, in various operatives.

Result, Varicose veins, particularly of the legs.

δ . *General excitement from high temperature.*

4. AGENTS AFFECTING THE NERVOUS SYSTEM IN GENERAL.

a. *Peculiar atmospheric impurity*, or the addition of noxious gases or vapours in the air respired ; as the fumes of lead to plumbers, painters, &c., fumes of zinc to brass-founders, fumes of muriate of ammonia, &c. to tin-workers, of sulphur to straw-bonnet-makers, sulphuretted hydrogen, &c. to gas-workers, fumes from coke, &c.

Results, Difficulty of breathing, debility, headache, consumption in some classes, debility in others.

β . *Poisonous substances, which act through the medium of the skin*, as solution of lead applied to the hands and arms of potters ; the types, to printers ; mercury, to the makers of looking-glasses ; &c.

Results, Constipation, palsy.

γ . *High temperature of the atmosphere*, in stuff-pressers, glossers of cloth, founders, smiths, tobacco-manufacturers, bakers, men in dry-houses, cloth-singers, wool-combers, cotton-spinners, glass-workers, &c.

Result, Debility.

δ . *Anxiety and mental application*, to merchants, professional men, students, &c.

Results, Disease of the brain, of the liver and stomach, of the heart.

ϵ . *Cerebral congestion*, induced by that congestion of the system of the vena portæ, noticed under the agents acting on the digestive organs.

Results, Oppressive headache, apoplexy, palsy, &c.

ζ. *Declination of the head for long periods*, in carvers and gilders, shoemakers, clerks, &c.

Result, Congestion of the vessels of the head.

5. **AGENT INJURIOUS TO VISION.**

α. *Close application to minute objects*, in watchmakers, workers for linen repositories, milliners, burlers, &c.

Results.—Ophthalmia (slight), short-sightedness, palsy of the nerves of the eye.

β. *Mechanical annoyance to the eyes*, as lime-dust to lime-burners, bricklayers' labourers, coal-dust to colliers, soot to chimney-sweeps, &c.

Result.—Inflammation of the conjunctiva.

6. **AGENT INJURIOUS TO HEARING.**—Noise of machinery, as in frizers, cotton-spinners, buckram-stiffners, corn-millers, &c.

7. **AGENT AFFECTING MUSCULAR SYSTEM.**

α. *Posture and great muscular exertion*, in pavers, coopers, quarrymen, &c.

Result.—Pain in the loins, &c.

8. **AGENTS INJURIOUS TO THE SKIN**, as flour, in bakers ; sugar, in grocers ; sulphuric acid, in hatters ; lime, in bricklayers ; &c.—page 60.

Result.—Cutaneous diseases.

Though we have attempted to classify the agents of disease, we are well aware that the arrangement is open to objection. It cannot indeed be perfect. Most injurious agents affect all the systems of the animal economy, and it is often difficult to distinguish the primary and secondary disorders.

Atmospheric impurity we should, à priori, suppose, would affect, in the first place, the respiratory organs ; observation shews it to affect, in the first place, the digestive and nervous systems ; much later, and in a far less degree, that of respiration. The effects of steam, also, on the respiratory organs, are less remarkable, than those produced on the stomach and bowels.

Employments which oblige men to lean

forward, we should expect to diminish the size of the chest, and its capability of expansion. But such effect we have not found in a marked degree. The mensuration of the chest by the line, and the capacity of the lungs by the jar of water, shew comparatively little difference between clerks, tailors, shoemakers, &c., on the one hand, and carpenters, soldiers, and slaughtermen, on the other. Two inches by the line, and one-third of a pint by the jar, are the differences shewn by our averages, in favour of the active employments. On reflection it will appear that the posture which curves the spine, affects the abdomen, not the chest; for this is protected by the ribs, while that has no firm support except at the back. The regions of the navel and stomach sustain the pressure which a bent posture produces. Hence stomach and bowel complaints are chiefly prevalent among artizans of this class. And in accordance with this observation, we find pulmonic disorders by no means frequent among tailors, shoemakers, clerks, &c., while they are prevalent among operatives, who have the free motion of the chest and its muscles, but inhale dust and mineral spiculae,—as persons in the flax-mills, iron filers, &c.

The affections of the lungs and airtube induced by dust, are the most urgent of the maladies which result from our employments. In these the effect is soonest apparent, and the progress of the disease most marked.

But by the majority of agents, health is rather undermined than attacked. The nervous system is depressed; the digestive organs are disordered; the circulation and respiration are rendered irregular; in a word, all the systems become progressively impaired, and vitality seems at length exhausted. Let us take, for example, printers and smiths, in whom old age is about equally rare. In the first, I conceive, vitality to be gradually reduced by functional disorder, and by the abstraction or diminution of vital air, and muscular exercise;—in the latter, to be more directly subtracted by great and continual labour.

In examining factories, we have

frequently asked, “Where are the *old* men?” In fact, our principal employments contain but a small proportion of the aged,—no such proportion as we find in the pursuits of husbandry. In the employments, moreover, which *do* present a considerable number of old workmen,—weaving, for instance, these individuals are by no means robust. They are vastly inferior in strength and appearance to old peasants. Though life may be protracted, it is not *full* life. On the whole, our inquiries shew that some artizans are cut off by severe maladies; but that the majority have their constitutions so impaired by premature labour, by subsequent excess of labour, or by intemperance, that they fall under comparatively slight attacks of disease, attacks which the constitutions of countrymen would resist. And of those who survive to advanced life, the majority are so enfeebled as to be unfit for the labour to which they have been accustomed, and are obliged in consequence to seek a scanty livelihood in easier employments, as those of stall-keepers, hawkers of light goods, under-servants, petty shopkeepers, &c. Finally, not a few who have been improvident, are found in the workhouse, prematurely aged.

The *disproportion of wages* is a great evil of our system. The high wages allowed in some departments, induce drunkenness and improvidence; while the low wages, frequently given to weavers, wool-combers, burlers, milliners, road-men, &c., prevent a supply of proper nourishment. Diseases result from both extremes; chiefly chronic diseases, to the intemperate, acute, to the ill-fed, and gastric disorders to both. The transitions, moreover, in many departments, from high to low wages, according to the demand for the goods, and price of the material, have an injurious effect on health. Workmen accustomed to high living, suffer of course from sudden reduction, though

to a diet on which other persons differently brought up, live in comfort and health.

Accidents from Machinery claim our notice. These are less frequent than we should expect. The masters are generally attentive to surrounding with wood the shafts, the wheels and other parts likely to entangle the dress. Every year, I believe, diminishes the proportion of killed and maimed. In a flax-mill where 1097 persons are employed, only two fatal accidents, we are informed, have occurred within the last five years; and at the woollen manufactory at Bean Ing, where 1100 persons are employed, it is stated that no fatal accident has occurred within the last twenty years, nor a case to require amputation. Still, however, we find that in various parts of the country serious or fatal injuries are occasionally produced by machinery. Scarcely one would occur, I believe, if proper care were taken to case the dangerous parts.

Deformity, as an occasional result of manufactures we must briefly notice. In this town and neighbourhood we frequently see not very marked deformity, but such a degree as to affect the figure and capability of motion. Many operatives have an absolute defect of exertion. The smaller muscles only are brought into full activity. The limbs consequently, and especially in the growing youth, take the form which is induced by the weight of the body and the posture required in the employ. The spine evidently suffers. Wanting the action of its extensor muscles, it falls into curves, and these by altering more or less the situation of the upper extremities, produce decided deformity. Such is the natural result of

defect of muscular exertion. But many operatives have an excess. In some of these, however, this excess is partial. One set of muscles is immoderately and almost constantly exerted, while another wastes for want of action. The general figure is consequently depraved.

Though there are numerous exceptions in the kinds of employment respectively, as well as among individuals in each, we may make a general remark that the labouring classes, if muscular and well-fed, are massy without regularity, and often without proportionate power;—if “light-made,” they are not remarkable for promptitude or adroitness of action. Some years ago, in examining recruits for the army, I particularly remarked the frequency of deformity. In fact, a really fine figure is rarely to be found among our artizans.* In the upper classes, we make a different remark. Though young ladies are often deformed from the want of proper exercise, their brothers are generally well-proportioned. The sports and license of youth give them a decided advantage, not only over the sedate sex, but also over the factory boys and the apprentices of sedentary artizans.

The grand bane of civilized life is *Intemperance*. Greater in towns than in the country, it dreadfully aggravates the evils of our employments; and it produces evils of its own, tenfold more urgent, more rapid, and more deadly. Not a class of

* Abbé du Bos, after visiting England, has made respectful mention of the beautiful proportions of our swine, bulls, and other quadrupeds, but not a word has he said of the beautiful proportions of our men and women. On the other hand, we read when schoolboys, that St. Gregory was so struck with the fine appearance of some English slaves in the market at Rome, that he exclaimed, “Non angli, sed angeli.” Opposite facts and opinions may easily be adduced on such a subject. But, on the whole, it seems probable that when our country had few arts and manufactures, the figure as well as health of its inhabitants, was better than at present.

artizans, and scarcely one of professional men is to be found, in which intemperance may not be discovered. Sometimes it is grossly apparent,—often partially concealed; in the first case, as it were, taking the constitution by storm, in the latter, proceeding by sap; in both, utterly destroying health, personal comfort, and domestic happiness. Intemperance, however, is far less in the upper, than in the lower classes of Leeds. The most striking effects are to be seen among the artizans. The man takes, during the hours of labour, more drink than he requires, and this generally the compound sold under the name of ale. Instead of spending the evening with his family, he joins frequently some friends to take a pint at the public-house. To ale, a glass of spirit must afterwards be added. At length he is frequently drunk at night; and in the progress of the case, we find him occasionally so unfit for work the next morning from disordered stomach, that he must have some spirit before he can crawl from his house. One glass leads to a second, and the man becomes intoxicated even in the morning,—is obliged to give up the idea of going to work;—and then his habits and feelings lead him to spend the day, not in freeing his system from the effects of his debauch, not in abstinence, fresh air, and repose, but in aggravating the evils from which he suffers. He spends the day in the public-house! To day is a repetition of yesterday, and to-morrow will probably be spent in sickness and in bed. There is another class in whom the vice is less apparent, though equally fatal. The artizan, not content with the more than liberal allowance of ale which he has had during the day, calls for his glass of spirit as he comes home in the evening. It is but pence, he says, and he can well spare this. At five or six in the morning again he takes his usual dram as he sets out fasting to his work; and takes it consequently at the time most likely to injure the stomach. A craving for the noxious stimulant at length urges, I had almost said physically compels him, to increase the frequency and the dose. Thus a practice rapidly destructive to

health and life, becomes established generally without the knowledge of the master, for the man attends his work regularly almost to the last, and almost without the consciousness of the individual, for the moral sense becomes blunted, and habit hides the sin. More shocking is the case, when the evil is found among females;—when the wife is led to imitate her husband. Most shocking, when children, when young children, nay infants, are taught to sip with the mother, and thus acquire a taste for the bane of life and health. But I must not enlarge on subjects to which Temperance Societies are most laudably drawing public attention. I must not advert to the moral and political effects of intemperance,—to the sense of shame, degradation, and remorse, or the evils brought on the wife and family,—want, disease, and the workhouse. Suffice it briefly to notice the effects on the animal economy, which drunkenness and dram-drinking produces. The head is oppressed; the appetite diminished; the secretions are depraved; the strength is reduced. The wretched individual at length has morning vomiting. Chronic inflammation of the mucous membranes of the stomach and intestines is established, and often also a similar and apparently consecutive disease of the bronchial membrane. The liver becomes changed in structure; and at length either dropsy gradually removes him to a premature grave, or inflammation of the brain or apoplexy makes a more suddenly fatal seizure.

I. The vice of the operative reflects on the master. Much, very much, might be done to reduce this wide-spread evil. Let the master discharge from his employ every man who “breaks work;” nay, let him admonish, and afterwards discharge every man who spends his evenings at the alehouse, or calls at the dram-shop. This in fact is the great point; for the evil is curable at the beginning. A master can, a master

ought, to interfere. He has a right to inquire into the way in which his men spend their evenings, because on this depends their future usefulness to himself. Benevolence and public spirit also urge his interference. To examine the habits of workmen, is indeed less agreeable to most persons, than a subscription for the relief of distress. We had rather attempt a remedy for the greatest of human ills, than take measures to *prevent* them. We had rather contribute liberally to the support of institutions, excellent indeed in intention, but generally inadequate in practice, and at best but partial in their operation, than exert a little personal attention, which can scarcely fail to be efficient, for the prevention of those demoralizing habits, which render such institutions necessary.

We scarcely need advert to the drunkenness and immoderate potation,—the first of which is very rare, and the second, I trust, becoming less frequent—among the *upper* classes of this neighbourhood. If persons of property have not *self*-restraint, they are above all restraint. If persons of education be not convinced of the evils of intemperance, they never will be taught. They must be quietly abandoned to liver-disease, gout, apoplexy, and death.

II. *Fresh air* is obviously important to townsmen in general. We have repeatedly adverted to this subject; and we might with propriety have urged it on every class of operatives, as well as on merchants and most men in professions. Send a delicate clerk or a pallid artizan, for a month into Wharfdale, and we have a living summary and corroboration of all that has been said on the subject,—a change of countenance and appearance, which furnish a stronger recommendation than any which the pen could produce. Notwithstanding the distance to which the atmospheric impurity of Leeds extends, a mile or two has a sensible effect on health. A man who has lost his appetite for breakfast while working in the centre of the town, will often immediately regain it, when he enters a similar employ at the outskirts.

The importance of ventilation is well known and generally regarded; but in mills, and among many classes of operatives, the rooms are too low, and there are too many persons in each. In such circumstances, though ventilation be recommended, workmen slightly clad are not willing, nor indeed able, to bear windows open close to their shoulders. The rooms in flax-mills ought to be more lofty; cloth-weavers should be less crowded; burlers, tailors, &c. should be more divided, or work in larger apartments. Among operatives, the importance of domestic ventilation is generally overlooked. Lodging-rooms especially, are frequently filled with foul air. Not only should the windows be open all day, but partially also, in close weather, during the night.

III. *Bathing*, if practised regularly, would be a highly valuable preventive of disease. To persons in every situation it is important; but to the inhabitants of towns it is essential. Cleansing the skin from the various impurities it contracts, is one useful agency: an impulse given to the circulatory and nervous systems, is another. The cold or tepid bath should be taken twice or thrice a week; and every morning also the body should be washed all over and rubbed afterwards with a rough towel or the flesh-brush. In an evening, after fatigue, or when catarrh or other slight inflammatory affection is apprehended, the warm bath is at once grateful and useful. When perspiration is particularly required, the spirit-air-bath is remarkably efficient.

IV. Proper *muscular exercise* is essential to health. From our observations at pages 112 and 113, it is apparent that even the operatives whose employments are most laborious, generally want exercise, or at least a balance of exercise. Still more urgently is muscular action required for the sedentary. Were this obvious remedy regarded, we should see much less frequently the pallid and meagre countenance of the student, of the merchant who confines himself to the warehouse, and the

professional man who seems fixed to the desk. In addition to field-sports, the gymnasium, &c. we may mention, among common exercises, the practice of singing. This calls into full action the muscles of respiration, opens the lungs for the transmission of blood, and thus tends to promote a full circulation of the vital fluid. The degree of health enjoyed in religious houses, has been ascribed, not without reason, to the singing and chaunting. The danger of *excess* in this practice has been noticed before. Dancing is an excellent winter's evening amusement, and we regret that it is almost confined to one order of society, almost to one age; and taken even then at irregular periods, and often at long intervals. In each family, among the upper classes, there should be an hour or two's dance every night. The same recreation should be practised by artizans, who, as they have not generally the convenience at their houses, might meet in small parties in some hired room, unconnected with the alehouse. Gymnastic exercises would be particularly useful, and we regret that instructions for them should be so little attended in Leeds. In summer, games in the open air, as cricket, quoits, bowls, &c. are very desirable. They might be more strongly urged, were we sure that they would not lead to the alehouse. In this, however, as well as other things, the influence of the master would prevent the faults of the workman. If the master would promote games in the open air for the summer's evening, and provide a room in a mill or warehouse for a dance in the winter, the work-people, and especially the young, would soon pursue the amusement with spirit and pleasure. And if, at the same time, he would strongly reprobate the resort to an alehouse, these amusements would produce unalloyed benefit. Each master, however he may be inclined to slight the remark, or blame its repetition, has in a great measure the health and happiness of his workpeople in his power. He can, if he will, make them good members of society,

comparatively cheerful, robust, and long-lived. The faults and misery of mankind, result chiefly from the conduct of the upper classes.

V. One remedy urgently demanded, is a diminution of the hours of work. Most operatives in this country prematurely sink from labour, if they be not destroyed by acute disease. "Worn out" is as often applied to a workman as a coach-horse, and frequently with equal propriety in reference to premature decay. "But how are we to earn a living, without working long hours?" would be immediately asked by the operatives; "Our wages are now so low that we can scarcely support our families." When wages were higher, families were not, I believe, in general much better supported; nor was health more regarded. Intemperance unhappily did more injury, than a diminution of labour relieved. But without further remark on this subject, we would urge that the artizan, in common with his master, has numerous artificial wants; that his diet is often higher than the demands of nature; and that the dress of his family is far more expensive than necessary. In fact, society, in every grade, has advanced to a degree of luxury which is directly and indirectly baneful to health and happiness. We must, in a measure at least, return to nature. We must reduce our unnecessary expenses, and devote one-third of the day to recreation, if we wish to live comfortably, and attain the age of man. The practice of returning to work almost immediately after meals, greatly interferes with digestion, particularly if the employ require the standing posture, or much muscular effort.

Another important reason for the reduction of the time of labour, I may be allowed to mention, if Plato's remark be admitted, that ignorance is the greatest of all diseases. I refer, of course, to mental improvement. Living in an age of science and liberality, we surely need not adduce arguments for the diffusion of knowledge through every class of society. But, though no direct check is now attempted to the

improvement of mankind, the circumstances of civil life present often a powerful though indirect one. Men, who work from an early hour in the morning till a late one at night, can spare but an hour or two for knowledge ; and even this, when the energies of the mind have, in most persons, sunk beneath the labours of the body. That many mechanics do study after the toil of the day, is highly creditable to their zeal ; but that they should have no more or better opportunities, is a great reflection on our manufacturing system and our social feelings.

VI. Finally, attention must be paid to health. This obvious rule is strangely neglected both by workmen* and masters,

* There is a general reluctance in consulting a medical man on ailments which are not urgent. "I have had a slight cough some time," says one to his friend ; "it does not go off, but I suppose I keep taking fresh cold. The weather is unsettled ; when it becomes settled, I shall soon be better." Without adverting to the fallacy of such hopes and opinions, I would urge the remark, that bronchial inflammation is the most frequent excitant of pulmonary consumption, particularly among persons exposed to dust ; and since this inflammation is quite curable in the early stage, consumption might often be prevented even where tubercles exist in a crude state, and would almost always be prevented, where tubercles do not exist, were attention paid to the first disorder. "I am not well," says another ; "I feel weak, and I think I get thinner, but still I have nothing particular to complain of. It can be no use taking advice." "Your not knowing the cause or state of your complaint," an intelligent friend would reply, "is an urgent reason for your seeking the opinion of one who does, or should know. You cannot become thinner without some serious cause."

The unwillingness of artizans to submit to a *course* of treatment, is mentioned in a work where we should not expect to find such a subject, Plato's Republic. "A smith, when he falls sick, thinks it fit to take from his physician some potion, &c., but if any one prescribe for him a long regimen, he quickly tells them that he has not leisure to be sick, nor does it avail him to live in this manner, attentive to his trouble, and negligent of his proper work ; and so, bidding such a physician farewell, he returns to his ordinary diet ; and if he recovers his health, he continues to manage his own affairs ; but if his body be not able to support the disease, he dies, and is freed from troubles." Need I expose the error, the fault, and the selfishness, of such sentiments and conduct ? The error is analo-

and by the majority of mankind, in all ranks of society. We rarely think of health till we lose it. It is especially incumbent on masters to regard the health of the persons, they employ; to examine the effects of injurious agents, to invent and provide remedies, and to enforce their application. This, to me, appears not only a call of humanity, but a direct duty. The attention of masters is too exclusively engaged with the manufacture itself—the means of effecting it at the least expense—and the market for its productions. The work-people are less thought of, than the machinery: the latter is frequently examined to ascertain its capabilities—the former, is scarcely ever. Care is seldom taken that the animal machine sustain as little injury as possible, and that it will bear the work imposed. Enough if the man, the woman, or the child be at work the requisite time, and perform what is required. If persons be disqualified for labour, fresh hands are promptly found. The master rarely knows what becomes of the persons dismissed, or the cause of their dismissal. This may be change of situation, or drunkenness, or broken health. In our inquiries on the health of several employments, we have found the statements of the masters and the individual workmen, more frequently contradictory than accordant. The master states, without examination, what he believes to be true. The workman, though equally reluctant to consider

gous to fatalism, in supposing the result inevitable, whether favourable or deadly. "If he recovers his health,"—this termination might have been produced sooner and with less suffering, had he submitted to a course of regimen and treatment. "If he die," the probability is that a curable disease was rendered mortal by neglect. The fault of such conduct is as great as its folly. No man has a right to commit suicide, whether direct or indirect. Without adverting to higher principles, society has a claim on each of its members, and the loss of a good mechanic or an useful tradesman, is, to a certain extent, a public loss. Stronger far is the claim of wife and family. The husband, the father, who needlessly sacrifices his life, is unjust, cruel, unnatural.

the employment injurious, states what he feels. Hence many, perhaps most, of the masters will be surprised at the statements of this paper, and think them erroneous or exaggerated. It is only after personal examination, a full and fair examination of the workpeople, that the general correctness of these statements will be admitted. The evil we have stated results from *want of attention*. The masters, I believe, have been indifferent to the health of their workmen, only because their notice has not been strongly drawn to the subject. There is, I feel convinced, no want of humanity or kindness; for we promptly see the exertion of this principle on the call of suffering. Is the wife or child of a workman sick? Wine is sent. Is the man himself incapacitated for work, and consequently unable to support his family? His wages are often generously allowed. Are his circumstances unable to afford proper assistance? A medical man is sent at the master's expense. Let but the same principle, the same kindly impulse, be directed to the preservation of health, which is directed to support under sickness, and we shall have little to deplore; let benevolence be directed to the *prevention*, rather than to the relief of the evils, which our civic state so widely and deeply produces.

The investigations on which this paper is founded, lead us to offer two or three hints for the choice of employments and situations calculated for the respective constitutions of young people.

1. For the delicate and dyspeptic, where there is no disposition to consumption, a selection from the occupations of husbandry, gardening, or travelling, is advisable. When a country situation cannot be procured, seed-crushing, the employments in the woollen manufacture, and that of grooms, are preferable to most others in a town.

I scarcely need add, that weak and scrupulous lads should not

be put to laborious occupations,—as those of smiths, pavers, &c.

2. Where, on the contrary, there is a predisposition, either hereditary or acquired, to consumption, town-life is generally preferable. A selection should be made from the employments of tanners, leather-dressers, glue-makers, butchers, tallow-chandlers, and brush-makers. For the upper classes, a change of climate ought to be adopted. Youth should be sent to the south of Europe; or if so great a change of residence be impracticable, they should at least be removed to the fens of Lincolnshire or Essex. Be it remembered that consumption may be prevented, or, in more correct language, tubercles may be kept latent for life, where *exciting* causes are precluded. It may further be urged, that whatever invigorates the constitution in general, whether by amending the state of the digestive organs, the system of circulation, or that of the secretions, tends, in no slight degree, to ward off pulmonary consumption. Observation even leads us to suppose, that instead of 50,000 British, who are stated to die annually from this disease, not 50 would be its victims, could employments be found and habits insured, which would keep the digestive organs in full vigour.

3. A *change* of occupation is often advisable. Persons subject to catarrh, bronchial inflammation, or asthma, should leave a dusty employment, and take one of those recommended for consumptive patients. Even painting, plumbing, and other arts, very objectionable on some grounds, would be more suitable for such persons, than an atmosphere *mechanically* impure.

In the Tract, now brought to a conclusion, I have endeavoured to aid Medical science, by investigating, on an extended scale, the remote causes of disease. I have been equally anxious to serve, in a more direct manner, the cause of

humanity, by drawing attention to evils in our civil state, which might be diminished or removed. Throughout the paper I have endeavoured to avoid exaggeration. Though many employments are shown to be hurtful, which common opinion has considered harmless, several occupations and circumstances are, on the other hand, reported as innoxious, or even beneficial, which foreign authors, and the English public, believe to be injurious. This paper has proved much longer than I expected; and its details, I fear, have been often tedious and desultory. There has been a frequent repetition of facts and opinions,—sometimes from design, often from oversight. For the *lime labor*, I have now neither time nor inclination. Careless of criticism, and indifferent to literary reputation, I have sought to be useful. The uncertainty of life, and the sense of responsibility, urge us to spend our short-lived day, less in matters of taste and refinement, than in pursuits which we believe calculated to relieve human suffering, and promote human happiness.

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