

The effects of arts, trades, and professions, and of civic states and habits of living, on health and longevity : with suggestions for the removal of many of the agents which produce disease, and shorten the duration of life / by C. Turner Thackrah.

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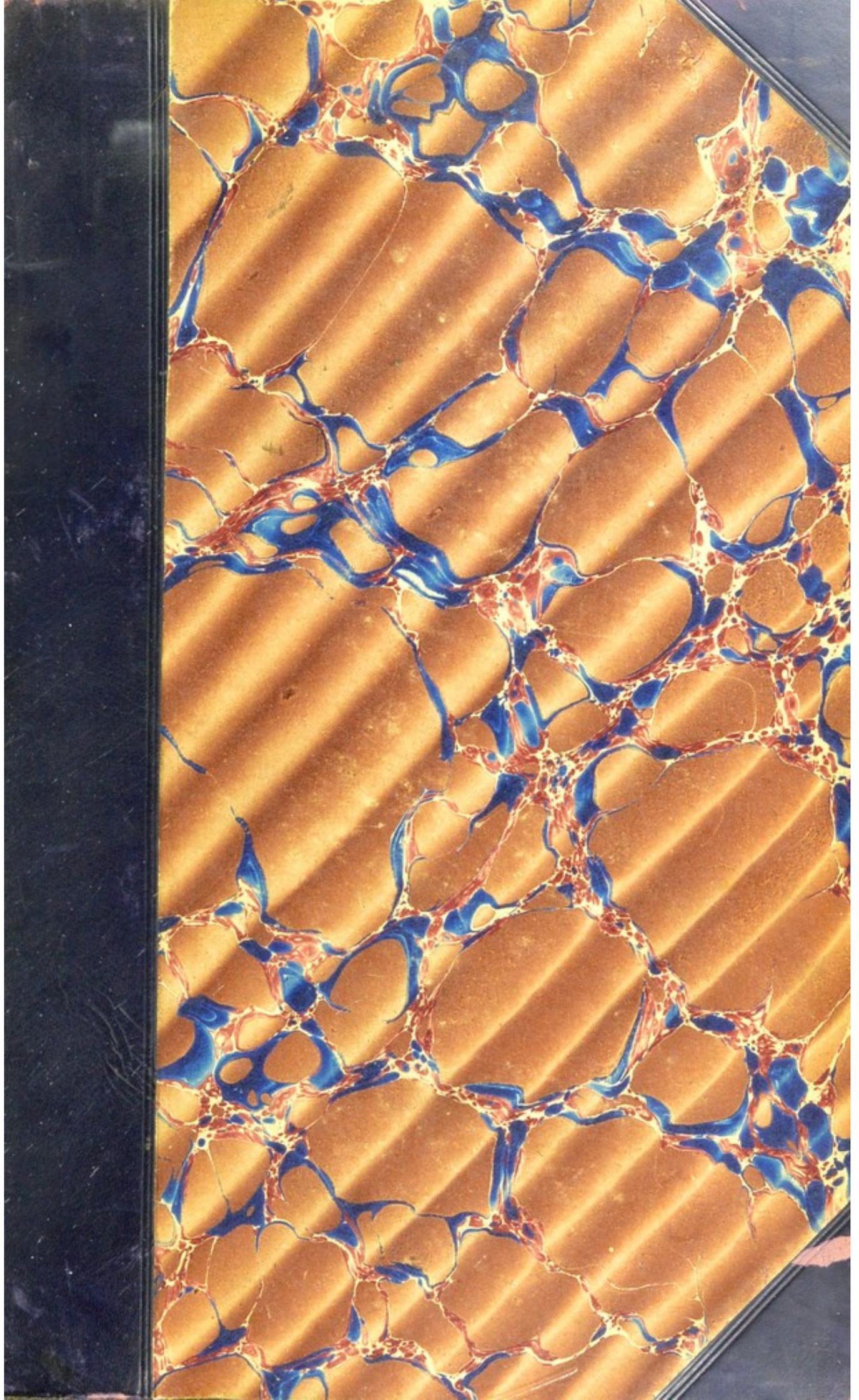


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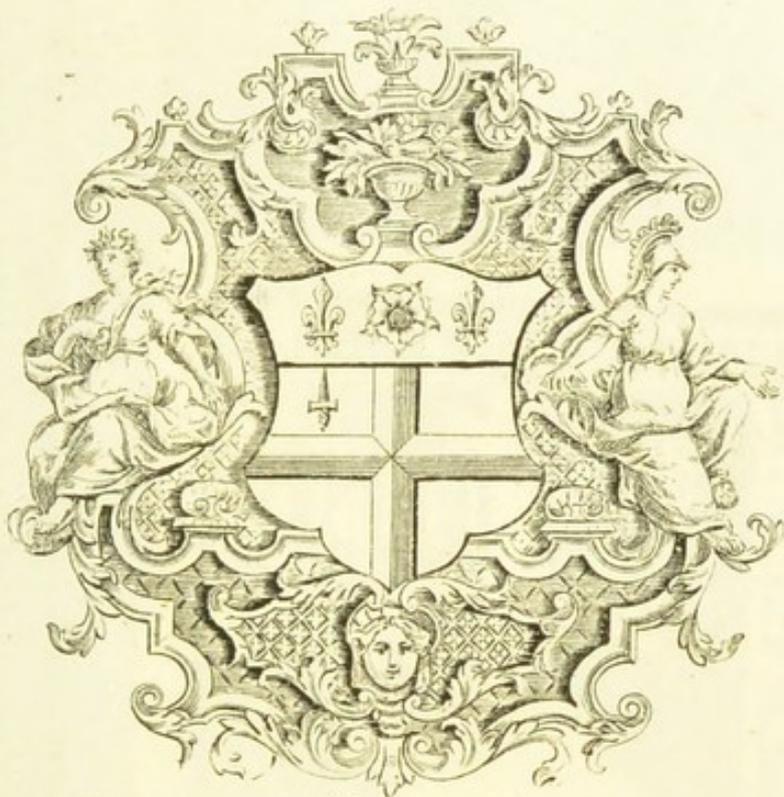
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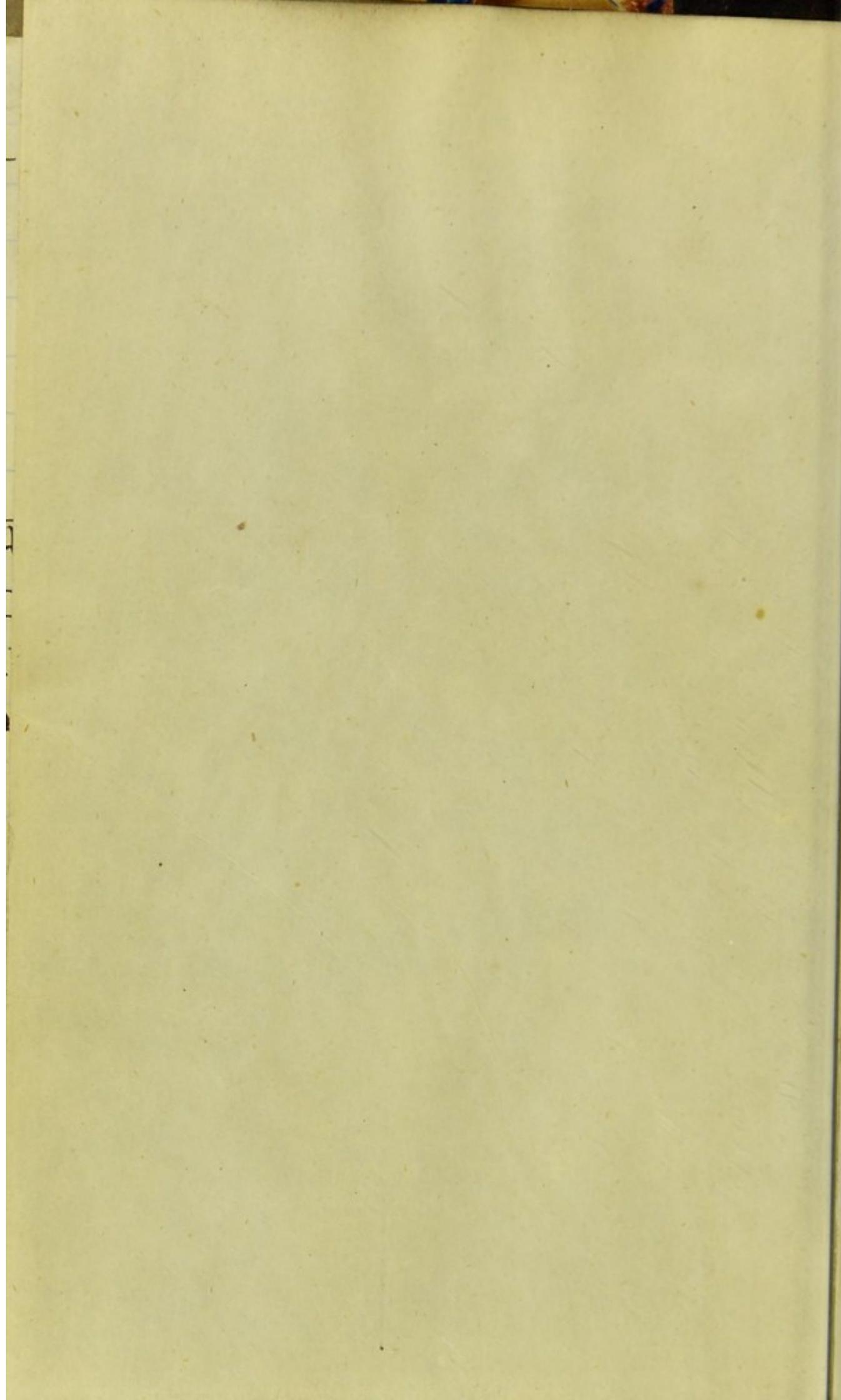


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THE EFFECTS
OF
ARTS, TRADES, AND PROFESSIONS,
AND OF CIVIC STATES
AND
HABITS OF LIVING,
ON HEALTH AND LONGEVITY:
WITH
SUGGESTIONS
FOR THE
REMOVAL OF MANY OF THE AGENTS WHICH PRODUCE DISEASE,
AND SHORTEN THE DURATION OF LIFE.

By C. TURNER THACKRAH, Esq.

* SECOND EDITION, GREATLY ENLARGED.

LONDON:
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By

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PREFACE

TO THE SECOND EDITION.

FROM the rapid sale of the first impression, and the interest which the subject has excited, I have been induced greatly to enlarge my observations and inquiries. The present edition contains, besides much additional matter to the sections, about 120 employments, which were not examined before. Many others were found so closely allied to the subjects of former statement, as to require no separate notice.

Still much, very much remains to be done: and I would earnestly solicit the profession to aid, extend, and correct, these important investigations. If any object, that the *cure*, not the causes or prevention of disease, is the business of the medical practitioner, I would reply that the scientific treatment of a malady requires a knowledge of its nature, and the nature is but imperfectly understood without a knowledge of the cause. Here the modern systems of physic are singularly deficient. From Burserius to Good, we find volumes on the symptoms, character, and treatment of diseases, but rarely a line on the causes as produced by employments and habits, and this line as frequently erroneous as correct. Strange this omission or ignorance in centuries of advancing knowledge!

A study of medicine, moreover, which disregards the prevention of diseases, limits its utility and its honours. It would strip the profession of its noblest attribute, that of benevolence; and exhibit our practice as influenced more by personal and pecuniary motives, than by an anxiety to relieve human suffering, and promote human happiness.

C. T. T.

Leeds, June 25, 1832.

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
RESEARCH REPORT NO. 1000
BY
J. H. GOLDSTEIN AND
R. F. W. WILSON

The present work is a continuation of the study of the
properties of the α -phase of polyethylene, which was
reported in a previous paper (1). The present work
is concerned with the study of the β -phase of
polyethylene, which is a phase of the polymer
which is stable at low temperatures and is
characterized by a high density and a high
modulus. The β -phase of polyethylene is
formed by the stretching of the polymer
at low temperatures and is stable at low
temperatures. The present work is a study
of the properties of the β -phase of
polyethylene, which is a phase of the
polymer which is stable at low temperatures
and is characterized by a high density and
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1. Introduction
2. Experimental
3. Results
4. Discussion
5. Conclusions
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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, re-formed, 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 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 massy 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 the millions who spend their lives in manufactories or live by trade, civic arts, and professions. I ask if these millions enjoy that vigour of body which is ever a direct good, and without which all other advantages are comparatively worthless? I ask if they attain the age of agricultural labourers?

To the first inquiry, the mere appearance of a civic population affords a reply. Take indifferently twenty well-fed husbandmen, and compare them with twenty townsmen 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 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 of Yorkshire:—

ALLOWING 20,000 PERSONS IN EACH RIDING, THERE WERE
LIVING IN 1821,

	Under 5 Years of Age.	5 to 10	10 to 15	15 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.
East Riding . .	2870	2573	2260	1977	3079	2306	2007.4	1393.2	914.0	474.4	135.7	8.6	.42
North Riding . .	2775	2643	2231	1999	2914	2208	1843.7	1420.2	1103.7	629.6	208.6	20.48	.83
West Riding . .	3281	2768	2370	2083	3028	2267	1702.2	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 take an instance at 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 67½. 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 Pickering 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 manufactories, 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. Nor is it in Leeds only that inquiry produces so painful a result. Leaving out of the question London and the Seaports, we might prove that Sheffield, Manchester, Birmingham, in fact, all our great manufacturing towns, exhibit an equal or a greater excess of mortality,—and an excess increasing with the magnitude of the population. If we should suppose that 50,000 persons die annually in Great Britain from the effects of manufactures, civic states, and the intemperance connected with these states and occupations, our estimate I am convinced would be considerably below the truth. Can we view with apathy such a superfluous mortality,

such a waste of human life? Assuredly an examination of our civic states and employments 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 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, and my own observations in practice, I have drawn up statements, which, though avowedly imperfect, must, I conceive, approach to the truth. It will be remembered that the subject is not, to use Brown's phrase, one of those "flat and flexible topics, which are beaten on by every hammer," that few manufactures have 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 on 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 evils 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.*

* Robertson, in his book on Medical Police, 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.”

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 society into five great classes, viz.: 1. Operatives,^{r. 9,} II. Dealers,^{r. 158} III. Master-manufacturers and Merchants,^{r. 162,} IV. Men independent of business and labour,^{r. 169} V. Professional Men.^{r. 173} 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.*

HUSBANDMEN stand at the head of this division. Spending the day in the open air of the country, and in labour varied and good, they are well known to be generally healthy. Though exposed in many parts of their employment to the vicissitudes of the weather, they seldom suffer serious injury. The dyspeptic and nervous disorders, and the long train of chronic maladies so frequent in towns, are almost unknown in the country. But on the other hand, Epidemic Fevers, Cholera, Diarrhœa and Dysentery are certainly more severe, and I think more frequent among agricultural peasants. The purity of the air I conceive to produce both these states,—to subject the husbandman to dangerous epidemics, as well as to exempt him from chronic diseases. Epidemics, it will be remembered, depend on a *natural* change in the constitution of the atmosphere,—some alteration, possibly, in its chemical elements, some alteration probably in its electrical state, some addition most probably of terrestrial exhalations. This baneful change or addition, whatever may be its precise character, is of course a *natural* change or addition, and will be most felt where the atmosphere is most natural. The Epidemic miasm, travelling on the wind, sweeps over the country without obstruction, but is checked by towns and crowded population. For here the atmosphere is so largely impregnated with animal effluvia, smoke, the dust and gases of manufactures and arts, that it can be but partially affected by the addition from without; and the townsman consequently inhales only a diluted miasm. So far he has the advantage of the countryman; but shortly we shall have to turn the scale by reference to the numerous and distressing civic disorders from which the husbandman is exempt. The sporadic diseases chiefly found in agricultural districts are inflammation of the lungs, pleu-

ris, and rheumatism, or rather those painful affections of muscles to which the term rheumatism is popularly applied.*

With the exception of the labourer's debauch at a fair or feast, or the master's taking too much after market, husbandmen are generally temperate. I scarcely need add that longevity is more marked in this than in any other class of society. Before concluding the subject, I must notice the inhabitants of Fens. Here ague is well known to prevail; but of late years, draining has greatly diminished the frequency of this malady. In one district of Lincolnshire, where navigable canals have vastly reduced the swamps and ditches, we were informed that the cases of ague are not more than one-tenth of their number twenty years ago. Chronic diseases of the spleen and liver are occasionally met with as effects of ague, or of the causes which produce it.† In the marshy districts, Pulmonary Consumption is extremely rare. A general practitioner at Swineshead has seen only two cases in sixteen years. Instances of longevity are frequent. In one village in the neighbourhood of the Fens, and containing not more than 120 inhabitants, there are now eight persons nearly 90 years of age.

BUTCHERS 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 greater distances to travel. They walk 20, 30, or 40 miles a day. Butchers, and the Slaugh-

* *M. Patissier*, in his *Traité des Maladies des Artisans*, states Husbandmen to be "tres-sujets aux pleurisies, aux pèripneumonies, à l'asthme, aux coliques, aux erysipèles, aux ophthalmies, aux esquinancies, et aux rhumatismes, qui reconnaissent pour cause occasionelle l' air et la mauvaise nourriture."

† In one case the spleen after death was found to weigh 3lbs.

ter-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.

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 a year, only one was a butcher, and his was a case not of typhus, but of simple fever.*

* 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."

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 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.

* 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.”

M. Patissier, in his *Traité des Maladies des Artisans*, though his statements on this employ are generally similar to those of the text, speaks of butchers as menaced with “Fievres putrides et malignes, à cause des vapeurs fetides qui sont repandues dans leurs tueries, et qu’ils respirent sans cesse.” Had he examined their state more minutely, he would have formed a different opinion. He says that a large proportion of the butchers in London humanely kill their cattle with azote, and thus also preserve longer the freshness of the meat, and improve its taste! This is a curious and novel statement. Since the time of Wepfer, animals in experiments have been destroyed by blowing air into their veins; but I never heard of any other process of slaughter than the common one, and that of pithing, occasionally

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. Among Cow-dealers, however, who are as much addicted to dram-drinking as any of the class, longevity is by no means rare. This I am inclined to attribute to their early rising and the length of their journies on horseback. A Cow-dealer is often mounted at five o'clock in the morning, and rides 60 or 70 miles before night.

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

and partially employed. The statement, however, of Patissier may suggest an important improvement. The draining of the blood from the muscle in the common mode of slaughter is certainly a waste of aliment, and the practice of knocking down the ox by repeated strokes of the hammer, shocks the feelings of every man who sees it but once or twice.

* "Les poissonniers sont exposés au scorbut, à l'erysipele, aux clartres et aux inflammations de l'estomac et des intestins."—*Patissier*. He attributes these diseases to "une odeur tres-puante."

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

DRAY OR WHERRYMEN, persons who attend on the low carriages which carry heavy goods in towns, have, in addition to the long-continued walking of cart-drivers, great exertion in lifting weights. Having higher wages, they are more addicted to intemperance. They complain occasionally of an uneasiness in the feet and loins, which appears to result from their labour,—of headache, and disorder in the urinary organs, which are evidently the effect of frequent potation, and of the variety and often bad quality of the ale they drink. Their constant exercise, however, in the open air, and early rising, seem to check the advance of disease; for wherry-men are generally robust, and attain considerable age.

~~LABOURERS IN HUSBANDRY~~ **SAND LEADERS, AND MEN EMPLOYED ON THE ROADS**, would be healthy, were their means of subsistence adequate to their wants. But 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 chaises 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 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. Many are affected with hoarseness, the effect of laryngeal inflammation. 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 susceptibility to such maladies; and it is intemperance which produces much greater, the fatal affections which we have just mentioned. I scarcely

* *Patissier*, in his *Traité des Maladies des Artisans*, states in reference to these men, "Les maladies qu'ils epreuvent sont les fievres malignes et inflammatoires, les fievres quartes, la cachexie et l'hydropisie." To no such diseases are brickmakers in this country subject; nor do they verify his remark "Leur metier est penible."

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 the 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 the stomach.” They also take ale too frequently. And from these united causes, they become plethoric, have the venous system 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. Gentlemen's servants are subject also to indigestion, in a form however, different I conceive from that of their masters, different also from that of artizans, and more complicated with biliary derangement and cephalic disorder.

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.

SHIP-CARPENTERS, including Boat and Sloop-Builders, have full, and varied muscular exertion, gene-

rally in exposed situations, and often inhaling the vapour of tar. Grog, and ale, when they can be procured, are generally taken too liberally. With the exception of pains which they term rheumatic, but which are more probably the result of stress on particular muscles, carpenters have no marked disease. The hearing, however, is often impaired by the noise of their employ. Accidents, also, from the adze are frequent. Carpenters at sea-ports, and boat-builders at inland towns, are rather long lived; but those who accompany our fleets are subject to such various agents of disease and injury, as rarely to attain great age.

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 habits 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 pot-house 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. Though robust and healthy, they complain of pain in the loins.

When working in the horse-litter and tan, they have often an increase of appetite from the odour.*

PAVIERS 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 they attribute to wet and cold, and which increases with their age. Though addicted to dram-drinking, they often live to an advanced period.

MARBLE-WORKERS, or DRESSERS, have great but varied exertion ; and neither in the sawing nor polishing is there apparent cause of disease. In the chipping, however, minute portions frequently enter the mouth and airtube, and produce considerable annoyance ; but as this process forms but a small part of the employment, and as no individuals pursue it constantly, we find no serious results. The evil of the employ is the incidental one of intemperance. The greatness of the labour, with the frequent exposure to the heat of the sun, forms a cause or a pretext for excessive potation. The men profess to believe quantities of ale necessary to the performance of their work ; though one of the most laborious as well as most healthy of their body in Leeds, was known to take nothing stronger than milk.

QUARRY-MEN, or STONE-GETTERS, have the strongest muscular labour. They are subject to pain in the back, but to no other disorder. When they escape the severe accidents so common in their employ they often attain considerable age.

SOLDIERS are generally a healthy body of men. Hav-

* *Patissier* makes a more unfavourable report. " Forces d'etre continuellement dans des jardins humides, il sont sujets aux coliques, aux rhumatismes, et à la sciatique, ils deviennent souvent cachectiques et meme hydropiques, d'après la remarque de P. Zacchias." He mentions also aneurism of the foot used for the spade.

ing good and varied exertion, provided with wholesome food, and compelled to regularity, cleanliness, and early rising, they are subject to few other diseases than those of the season, the maladies they derive from their parents, or those which result from excesses committed before their enlistment. Discipline has now made drunkenness comparatively rare.* Daily inspection by military and medical officers, has a further effect in the early detection of disease. In civil life a man may be ailing for months without his intermission of labour or use of remedies; but in the army, the slightest breach of rule, the slightest appearance of ill health, brings the man under examination and sends him to the hospital.

From the general health and comfort of the soldier, there are, however, many deductions. One of the least is the Itch, sometimes caught by men marching through a country in which they have billets on the inhabitants: and this troublesome disease, when it appears in a regiment, often requires months for its removal. A more serious affection is the Egyptian Ophthalmia, which was once the scourge of our army, and which still exists in a milder degree, particularly in some Irish stations. Here we find with surprise that the surrounding townspeople and peasantry are exempt from the disorder. In

* Formerly a certain sum was paid to the soldier, from which he provided himself with food; but he so often spent in liquor what he ought to have spent in meat, that it became necessary for an officer to inspect his meals. A story current among soldiers, illustrates the preceding statement. An officer going round the dinner-table of the men, saw one without meat before him. "Donald, where is your meat?" "O, here it is, Sir," showing a vessel of slop, containing a mass of something like tripe. Day after day the same appearance was presented, till the officer having some suspicion, demanded the exposure of the meat." "O it is tripe, Sir," said Donald. "What, do you eat tripe every day? I must see it." On striking a fork into the mass, the officer continued,—"Well, Donald, I never before saw tripe with buttons on it." In fact the meat proved to be a slice of leather small-clothes.

most cases, however, the soldier has a great advantage in the isolation of barracks preventing the access of contagious diseases. The prompt and strict seclusion also of the infected, when such diseases do invade, greatly diminishes his risk. In the Epidemic Fever a few years ago prevalent in Ireland, the army had not more than half the proportion of deaths which occurred among the peasantry.

In actual service, when the duties are severe, the sentinel is frequently obliged to remain for hours in a wet dress, and is consequently subject to severe inflammatory affections. When, moreover, Fever and Dysentery appear in a camp, they generally spread widely, and become aggravated in type. The irregularity in the supply, and the frequent fault in the quality of the rations in the field, form a serious contrast to the good diet of the barracks at home; and with the excesses occasionally committed in the march, and which no discipline can wholly prevent, produce almost always a predisposition to disease, and often disease itself. The wounds and accidents of military life I need not mention, except to remark, that they occasion on the whole a less mortality than disease. In reference to recruits, it is worthy of notice that those from the poor and ill-fed Irish or Scotch districts, suffer from the sudden change to good diet. Few escape an attack of Fever. The lad when taken ill is aware of the cause, and often says to his medical officer, "O Sir, it is the mate that's killing me." It is observed, that if an Irish recruit, soon after his enlistment, be sent, for any trifling complaint, to the hospital, and there brought gradually through the scale of diet to the full barrack allowance, he escapes the Fever. In the cavalry regiments Hernia is frequent. This has been ascribed to the style of riding, and particularly to the length of the stirrup-strap. We may find, however, another cause in the

weight of the sword, which, instead of being supported from the shoulder, is solely suspended by the belt, and this makes a partial pressure on the abdomen. Diseases of the heart and large blood-vessels are frequent among the cavalry; and Varicocele and Sarcocoele are also said to result from their riding.* The capacity of the chest in soldiers appears to be considerably greater than that in artizans, and, indeed, in most other classes of society. Nineteen individuals from the 14th Light Dragoons, examined by an apparatus,† which may be termed a Pulmometer, gave an average of 217 cubic inches of air, which a man could throw out at one full expiration. Nine were officers, and the average of these was 240 cubic

* In addition to the diseases mentioned in the text, as particularly incident to soldiers, *M. Patissier* mentions Rheumatism, Inflammation of the Stomach and Bowels, Dropsy, Scurvy, and Nostalgia, or the love of country. This affection, which rarely appears in the British service, except in Highland regiments, is well known to be frequent in continental armies, and especially among the Swiss. It is often fatal; “*Qui patriam quærit, mortem invenit.*” *M. Percy* notices the injury to hearing, and sometimes the destruction of the membrana Tympani, which the noise of discharges of cannon produces. He states also that artillery-men, from the same cause, are sometimes affected with trembling, and with palpitation lasting for several days, and wholly independent of fear:—“*Saisis par le bruit sans cependant en être effrayés.*”

† This is 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 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.

inches ; four musicians, who used wind instruments, and the average was 220 ; six privates, 247. A tall young cornet threw out 295, and this is the largest expiration we have known.

SAILORS I beg to introduce in the words of my intelligent friend, Mr. Price :—“ Sailors serving on the coast or home station are generally very healthy and robust, hardy and enterprising. Living well, and enjoying good air and exercise, their diseases are few, and commonly of an inflammatory kind, as Synocha, Rheumatismus, Pneumonia, &c. From my own observation, I should say that the most prevalent complaints, as the cause of death, are the sequelæ of the above diseases ; and those from lesions of the lungs and pleuræ, the most frequent. Next to these I may mention disorders of the bowels, as Colic, Diarrhœa, and Dysentery. General observation confirms the idea, that life, amongst this class of people, is materially curtailed by a variety of circumstances connected with situation ; the most injurious are intemperance, night-watching, and restraint.”

I am inclined to believe that the first of these is greater among sailors than among soldiers. Sailors on board have a regular and large allowance of spirit ; and when on shore, whether at home or abroad, they have ample means of procuring almost every kind of liquor. Hence their excesses are greater and more frequent than those of soldiers ; and there are consequently fewer instances of healthy age.

I scarcely need advert to the diseases of the genital organs more frequent in soldiers and sailors than in most classes of society.

At the close of this section I may remark, that old men in all occupations, and especially in those which are laborious, complain of pains in the back and limbs.

Though these affections are always called rheumatic, I doubt the truth of the opinion. Are they dependent on injury of the muscular fibres, the result of excessive labour; or are they dependent on the senile change in the structure of blood-vessels?

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 large town 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

* Hippocrates in his book, *Περὶ αἰρῶν, ὑδάτων, τοπῶν*, 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. X

† From the great consumption of coals and abundance of factories, the air of Leeds and Sheffield would appear to be fouler than that of other places of equal size. I should suppose, indeed, their centres to have an atmosphere as vitiated as that of the middle 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 large provincial towns 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, all the inhabitants. The complexion is pallid: and the tongue shows that digestion is disordered and imperfect. I should think that not 10 per cent. of the inhabitants of large towns 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 proves that there are few individuals who have not either disease of some organ, or an evident disposition to disease.

The effects of impure air are often remarkably apparent in infants. A child subject to Spasm of the Glottis will have alarming convulsions, when it breathes the air of a confined apartment in a large town. The convulsions cease when it is removed into the country, recur when brought home, and are again removed by a purer

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."

The effects of coal-smoke in an extraordinary quantity, and applied for a considerable period, deserve attention. In a case related by Dr. Gairdner, in the *Edinb. Med. Chir. Trans.* the principal effects of sleeping in a room of coal-smoke were giddiness, drowsiness, mental confusion, severe head-ache, and vomiting. It is remarkable that there was no sense of suffocation, or disposition to cough. Another case related by Dr. King, in the *Edinb. Journal*, of four sailors exposed for fourteen hours in a cabin to air strongly impregnated with coal-smoke, exhibits the symptoms in a more advanced stage and greater degree. These were stupor, and disinclination to rise, and, when three of the sailors were roused, suffusion of the face, rigidity of the limbs, incurvation of the fingers and toes, feebleness of the pulse, and respiration impeded, performed with sobs and a rattling sound. The fourth individual did not recover.

To this note I append a remark of Dr. Murray's. "Living or working in cellars, or confined and damp rooms, produce 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."

atmosphere. It is well known that the proportion of children reared in towns, is much less than in the country. No attention to diet and nursing can compensate for the want of pure air.

Adults suffer less in their lungs than in the digestive and nervous system from the atmosphere of towns. 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 deficiency 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 observ-

ing 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 sensibility of the right fore-finger is sometimes greatly reduced, and sometimes the right brachial nerves have their functions impaired.† The reduction in the circumference of

* 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 artisans.

† In the city of Hamburg are two small hospitals, supported by the freemasons. That appropriated to the male sex was intended for labourers; but in 1805 began to be resorted to by the tailors, &c., in 1811 by cabinet-makers; but the latter did not use it after September, 1824. The total numbers of tailors treated was 785; of cabinet-makers, 511; and of bakers, only 71; and the deaths were, 84 tailors, or 1 in 9; and 21 cabinet-makers, or 1 in 24; bakers, 4, or 1 in 18. Diseases which are apt to prove fatal to weak persons were much more fatal to tailors than cabinet-makers; and of those affected with nervous fever, one-third of the tailors, and one-seventh of the cabinet-makers died. Of twelve cases of abdominal inflammation, seven tailors died, while five cabinet-makers recovered. One-half of the deaths among the cabinet-makers was from phthisis; one-third of the tailors. The following table exhibits the proportions affected with the principal diseases, compared with the total number of patients exercising each trade.

DISEASES.	TAILORS.	CABINET-MAKERS.	BAKERS.
Catarrhal Fever,.....	1 in 6.....	9.....	6
Rheumatic Fever, ..	1 in 15.....	14.....	6
Nervous Fever,	1 in 12.....	24.....	18
Gastric Fever,.....	1 in 12.....	12.....	18
Intermittent Fever, 1 in 10.....		17.....	18
Inflammatory Fever, 1 in 98.....		64.....	—
External Injuries, ...	1 in 98.....	22.....	35
Ulcers,.....	1 in 98.....	12.....	14
Ascarides,	1 in —.....	46.....	—

the chest is not so much as we might expect. The average of our measurements presented 33 to 34 inches, while that of other artisans is about 36. The capacity of the lungs, as evinced by measuring the air thrown out at an expiration is not less than common. The average of six individuals was 221 cubic inches. 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 by 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.* Mr. Dobson, formerly a zealous pupil of mine, now a surgeon in Belgrave-street, Pimlico, London, has favoured me with the following statement:—"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 sixty, have curvature of the spine. They are so subject to anal fistula, that they have a 'Fistula club.' Their most common affections are dyspepsia, diarrhœa, and dull headache, with giddiness, especially during

* *Patissier* remarks that the teeth are so much injured by biting the thread that it is rare to find a tailor past middle age with incisors. To his enumeration of the physical diseases of tailors, he adds some references to their mental and moral states. "Complexion lâche, &c. Les tailleurs, dit M. Cadet Gassicourt, ont des goûts anti-physiques tris-remarquables, du penchant au vol, au jeu, à la dépense. Ceux qui viennent de la Flandre et des Pays-Bas, sont querelleurs et peu fidèles; la plupart agiles, aiment la paume et la danse." Tailors and Shoemakers, in this country are more frequently poor and in debt than most other artisans.

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 108°, and in the open air 84°. Tailors are the most intemperate set of men in London. A large proportion die annually of phthisis.” The evils attendant on the employment are in many cases greatly aggravated by bad habits. Like other men physically or morally 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 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 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 ; so much are men formed to their habits. But if 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 a 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.

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. Their diet consists too much of slops, and too little of solid and nutritive food. From these causes collectively we find that girls from the country, fresh-looking and robust, soon become pale and thin. Pains in the chest, palpitation, affections of the spinal and ganglionic nerves, and defect of action in the abdominal viscera, are very general. 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. The remedies 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.†

* Blind or short-sighted at 40.—*Patissier*.

† Two very respectable Dress makers, who charge more than the generality, state that they can earn but 12s. each per week, though they sew, on the average, fifteen hours per day. The sempstress who goes out to her work rarely receives more than a shilling a day in addition to her board. Can ladies, humane in disposition, and prompt in their support of charitable institutions, reflect on the miserable hire they afford to the persons they employ,—persons of their own sex,—persons often reduced by the faults or misfortunes of others from a comfortable situation in life, and sometimes even from apparent independence, to work for daily bread?

WORKING UPHOLSTERERS have on the whole a better employment than milliners. The work is coarse, and hence the eyes are uninjured, and the day of labour is seldom of excessive length. With a sickly appearance, these women generally continue the employ to a considerable age.

SHOEMAKERS, it is well known, are placed in a very bad posture,—a posture second only to that of 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. From the reduction of perspiration and other evacuations, in this and similar employments, the blood I conceive is impure, and consequently the complexion darkened.* The secretion of bile is generally unhealthy, and bowel-complaints are frequent.† The capacity of the lungs in the individuals examined we found to average 182 cubic inches, 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

* Nam vitium capit sanguis, ni moveatur corpus; unde illius excrementa in cute restitant et universus corporis habitus defœdatur."—*Ramazzini de Morbis Artificum*.

† *Corvisart* and *Merat* say that Shoemakers are subject, not only to chronic inflammation of the stomach, but even to cancer of this organ. *Stoll* in his *Med. Pract.* mentions hæmorrhage from the lungs.

‡ 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 gastrodynia, &c.

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. Many, in fact, work but three days a week. No wonder we find poverty and filth marked on their families and houses.* 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.†

SAIL-MAKERS work with the needle, but in a less curved position than tailors. In summer they are chiefly in the open air; but in winter of course they are under cover, and generally in confined apartments. There is a considerable odour from the tar on the sails. Intemperance is by no means so common as among tailors and shoemakers, and life is much longer. Sail makers frequently attain the age of 70.

TOBACCO-PIPE-MAKERS, sedentary and confined, have the pallid appearance of townsmen; but are not subject to any peculiar agents of disease.

CORK CUTTERS have little other inconvenience than the generally sedentary character of the employ. The dust which attends the burning of the cork produces a sense of suffocation, but this process is only occasional.

SLAY AND GEER-MAKERS have no inconvenience

* Quite as bad, it appears on the Continent.—See *Patissier*.

† *Merat* recommends, as a preventative of the evils which afflict shoemakers, the introduction of the English machine,—“pour fabriquer les chaussures.” What does he mean?

except from their sitting posture. They inhale the vapour of tar and pitch, employed in fixing the wires. They appear to be healthy.

CARD - MAKERS have two principal departments. The *doubling* the wire is performed by men, and in a posture the same as that of shoemakers. The disorders produced are also similar;—indigestion, head-ache, and constipation. Obesity is not an uncommon result. No men live to follow this employ from youth to great age. *Card-setting* is performed by children from eight to twelve years old. It requires them to sit, to lean much forward, and to use their fingers and eyes with rapidity and accuracy. The rooms are often far too much crowded. Beginners suffer from head ache and pain in the back; but the children in general make no complaint. They do not, in fact, remain long enough at the employ to develop its effects on health, as they seldom continue card setters after the age of eleven or twelve. There can be no doubt, however, that the maintenance of so bad a position, in a crowded apartment, and at such an age, must injure the vital powers, and give a strong predisposition to disease. The few who remain years at the employ, find their sight considerably impaired.

A previous process of *pricking* the leather for the admission of the wires, and the final process of *finishing*, by rubbing an iron over the cards, are performed by men. The former is strong muscular exertion; the latter produces some dust, and the workmen are occasionally affected with dizziness and sickness.

The preceding employments of this section, we may observe, are such as, employing chiefly the upper extremities, fix the lower part of the body, or allow but little variation of posture. Waving remarks on particular

circumstances which affect these employments respectively, we may state generally that the prevalent diseases of this class are indigestion, disorders of the stomach and bowels, piles, fistula in ano, and affections of the urinary organs.

We turn now to more active occupations, though still in an atmosphere generally confined and impure.

SCRIBBLERS AND CARDERS of Wool, or rather the persons who attend the machines, have moderate and varied exertion.

SLUBBERS of Cloth,—men who form the carded wool into tough loose threads,—and SPINNERS,—men who make these threads finer and stronger,—have 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 in applying fresh cardings, and called “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.

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, when the shuttle is cast by 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. The large weaving rooms also are so crowded with looms and operatives, as to keep the air close and tainted. Fever, in towns at least, is frequent among weavers, but other acute diseases are rare. The men, however, seldom enjoy health. The appetite is often impaired; digestion is almost always imperfect; and the men, Sacking-weavers for instance, who throw the shuttle by hand, and consequently press the region of the stomach on the beam, are occasionally affected with such pain in this part, as to require a suspension of work, generally for a few minutes only, sometimes for days. Asthma and other affections of the chest are common.* Weavers complain of the smell from the oil-lamps. 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 by hand have low wages, and are often out of employ. Many an industrious man, working 13 hours a day, earns no more than 10s. or 12s. a week. Too many persons indeed betake themselves to an art which is easy to learn, and consequently the number of the weavers reduces the price of the labour. Notwithstanding

* *Patissier*, in addition to the disordered states mentioned in the text, states that weavers are subject to chronic engorgement of the liver and spleen, to dropsy, and to piles. *M. Briende* says that they are often affected with dry asthma, with palpitations, and with various nervous disorders. *Ramazzini* states that weavers have the catamenia easy and abundant,—a point worth notice for its therapeutic importance.

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

the poverty and general reduction of health among the weavers, longevity is by no means rare. Indeed I think there are more old men in this employ than in most others. Have not low wages, with their distressing effects, one countervailing agency, that of preventing the excess and intemperance, which, more than any other circumstance in our civil state, shorten the duration of life?

The preceding observations, made in reference to the weavers by hand, of cloth, stuffs, linen, and hair, apply also to weavers in general. But there are circumstances in the working of certain articles, which deserve notice.

The POWER-LOOM WEAVING OF STUFFS employs a large number of the inhabitants of some districts. The attendance on the machinery, though, like most other occupations, it inclines the body forward, requires considerable variety and extent of motion. The labour is light. The majority of the operatives are young persons. In one large establishment, in which were 70 male adults, we found 329 children, and 198 young women. Of the children 3 only were stated to be of the age of 8 years, and 23 between the ages of 9 and 10: and of the 198 females, the majority were about the age of 18. The labour commences at 6 in the morning, and ends at 7 in the evening; and allows intervals only of a quarter of an hour for breakfast, three-quarters for dinner, and a quarter for "drinking" (afternoon meal.) The hours are rigidly enforced in reference to all ages and classes of the operatives. In an employ, indeed, which requires attendance on machinery, no more time can be allowed for rest, recreation, or meals, to the child 8 or 9 years old than to the adult—no more to the operative, who comes from a distance to his work, than to the near resident. Hence children are obliged to brave the storms of our winter at from five to six in the morning, and return

at 7 to 8 in the evening. It is apparent also, that, without great attention on the part of the overlookers, children will often have the wet dress of the morning dried only by the heat of the body and the atmosphere of the mill.

Need I draw attention to the scanty allowance of time for meals? Here it is scarcely thought worth notice, so accustomed are manufacturers to press labour and shorten repose. But we shall more than once have occasion to advert to this subject.

In the kind of labour there is little objectionable. The principal evil we find in the mill, is the closeness of the atmosphere. The apartments, though large even in proportion to the number of operatives, are generally crowded with looms, and by no means sufficiently ventilated. Their centres seem scarcely penetrated by the currents of air from the distant windows. The weaving produces no dust, but there is an effluvium, which though not disagreeable, certainly affects the purity of the atmosphere.

Several of the overlookers and young women suffer from head-ache and disorders of the stomach. The children also not infrequently complain of head-ache; more rarely of sickness and pain in the face. They do not, however, present any symptom of scrofula. We examined the necks of many, but in none connected with the weaving department did we detect tumour. Of 600 operatives in a mill in Airedale, the mortality was six in one year. This certainly is a small proportion, but the mill is more favourably situated than most; and I believe more attention is paid to the state of the work-people. It will be remembered also that no reference is made in this statement to those who leave the factory from ill health, or other circumstance. The ultimate effects, moreover, of this employment on health and longevity are not apparent, as the young women leave the mill when they marry, and the males at the age of 14—16

generally turn to the cloth manufacture. That many of the disorders of after-life, however, depend on the confinement in a close atmosphere, and the want of time for recreation and repose,—in a word, on the unnatural manner in which children spend the years of growth and physical development,—is a question which we cannot satisfactorily solve. But analogy and general observation strongly support an affirmative opinion.

COTTON-WEAVERS in large mills we remark to look better and be more healthy than the other operatives. At Manchester we saw 300 weavers, chiefly young women, at work in one room. This was, however, nearly three-fourths of an acre in area, well ventilated and lightsome. Scarcely any dust is produced by the weaving of cotton.

SILK-WEAVERS, though the employment presents nothing materially different from weaving in general, deserve separate notice on account of the greater depression in wages, and the result on the physical state. In Spitalfields and Bethnal-green, where 1600 looms are at work, the weavers work at their own houses. There are generally two looms in a room, and each engages three persons. Females as well as males of all ages are found at the employ. They commence when children, and continue at the loom often to the age of 60 and 80. When they have work, they weave about 16 hours a day, at the present (Sept. 1831) they can but earn from 9s. to 11s. per week. They live chiefly on bread and potatoes, and eat meat not oftener than twice a week. These unfortunate people are small in figure, and appear half starved. Their wages are too low to allow a fire even in the depth of winter. In fact none but one who has visited their dwellings, can estimate the wretched state in which these poor creatures exist. Yet we find, with surprise, that though of diminutive size, the young women

are remarkably pretty. Silk-weavers are affected with pain in the region of the stomach, from leaning against the beam, and with disorder of the digestive organs, from the bad quality or defective quantities of their food. From these causes also, conjoined with confinement, we find the circulating system generally enfeebled. Hence the use of the treadle occasionally excites swellings of the lower extremities. Pulmonary consumption is frequent; and among the females, distortion of the pelvis.*

WEAVERS OF WORSTED HANDKERCHIEFS, FANCY GOODS, and the WEAVERS OF WORSTED STOCKINGS,

* The silk workers of Lyons, as represented by *Patissier*, from the information of a friend, are in a situation more deplorable. The account, though interesting, is too long to be quoted, and I therefore attempt to condense it.

These artizans, in Lyons alone not less than 80,000 in number, are in a state of general poverty and great physical and moral degradation. The sedentary position, the long periods, the irregular action of muscles in some processes, and the early age at which children are sent to work, seem to be the only evils *directly* resulting from the employ. The miserable dwellings in narrow streets, the crowded state of the apartments, and the want of ventilation, are more injurious. Their habits and manners are the most injurious. *Rousseau* characterised Lyons as a city in which, more than any other in Europe, reigned corruption the most frightful,—“la plus affreuse.”

Patissier, though he terms *Rousseau*'s statements “paroles calomnieuses,” makes remarks equally opprobrious,—“Leurs communications entre eux sont si intimes que le libertinage existe chez eux bien long temps avant que leurs organes aient acquis la force et le développement nécessaires pour le supporter. L'habitude de la masturbation est tellement prématurée chez ces artizans, qu' on ne peut guère fixer l' âge auquel ils commencent à la prendre.”

As to the physical character of these people, he gives, face pale, limbs shrivelled or œdematous; legs deformed by rickets; flesh soft and atonic; stature low; gait characteristically awkward; countenance indicative of foolish simplicity; accent and conversation slow and flat; mental character marked by gentleness and attachment to prejudices, and the ideas fewer than those of a savage. Their

diseases are chiefly those of the lymphatic system, scrophula and its effects on the glands, eyes, and bones; curvature of the spine; muscular pains; inflammation of the stomach and intestines, and varicose ulcers of the legs.

are subjected to some dust, which affects respiration, and renders them less healthy than those who weave cotton for similar uses. The red colours, as in cravats, considerably annoy the eyes; but weavers do not work on the same coloured threads long enough to produce permanent injury. The weaving at Leicester presents nothing remarkably different from that of other districts and other materials.

The **WEAVERS OF WIRE** have much greater labour than those of any other article. Two men are required to pull the beam; and the muscles of the arms and back are strongly exerted. Either from selection of men, or the effect of the labour, and the wages earned, these operatives are more robust and healthy than weavers in general.

RAISERS OF CLOTH, men who brush that part of the cloth with teasels, which has not been dressed by the gig, have good muscular exertion, in alternately extending the arm upward, and drawing it downwards with considerable force. No injury to health appears to result from the employ.

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 above the age of 50; 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. The period of labour is often excessive. When trade is brisk, the men generally work from five in the morning to nine at night, with intervals only of three half-hours for meals. Nay, sometimes they add night-work to the day's, commencing, for instance,

at five in the morning of Friday, and never leaving the shop, except for meals, till five in the afternoon of Saturday! They earn high wages, and frequently take liquor; but now their excesses are much less than before the introduction of cloth-dressing machinery. Then they were the most debauched of townsmen, refusing often to work more than three days a week, and devoting the rest to every variety of intemperance. By confinement

then, by excess of labour, and sometimes by excess in liquor, is health injured, rather than by the nature of the employ.

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. Chronic bronchitis and asthma are rather frequent among the more aged cloth-dressers.

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

* *Mr. Henry*, in the proceedings of the Manchester Board of Health, recommends for crowded apartments the supply of oxygen, from manganese. Inasmuch, however, as the supporting and exhilarating power of the atmosphere depends on something more than the mere quantity of oxygen, this measure, I fear, would not produce any very valuable and permanent effect.

the practice of sitting and standing alternately. The eyes often fail when women continue the employ for years.

FRIZERS, who work the "nap" on the cloth, though they have not a fixed or injurious posture, are kept in a close room often 16 or 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 draw up minute holes with needles, 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 by 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 of the men we examined. The eyes frequently become inflamed, particularly in drawing scarlet. Cloth-drawers scarcely ever live in health to a great age. They 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: but 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.

BLANKET-MAKERS, a numerous class in the district of Heckmondwike and Dewsbury, are engaged in similar processes to those of the woollen cloth manufacture. The only circumstance requiring a separate notice is the labour of *raising*, which is considerably greater than in the making of common cloth. The men, however, are well fed, and have the appearance of robust health.

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

SADDLERS are obliged to lean forwards, and are confined to this position. Hence they are subject to headache and indigestion. WHIP-MAKERS have nothing objectionable in their employ.

LETTER-PRESS-PRINTERS are kept in a confined atmosphere, and, with the exception of the pressmen, are generally stationary. 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

* 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 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

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;† arising, however, rather I conceive, from the reduction of the general health by confinement, than from direct injury to the respiratory organs. We can scarcely find or hear of any compositor above the age of 50. In many towns printers are intemperate.

ENGRAVERS fix the trunk and limbs more than almost any other operatives. The head is brought forward, and the eye intensely and long occupied with objects generally so small as to require a strong artificial lens. In one part of the process, the engraver is subjected to the annoyance of nitrous fumes, but this is only occasional. The posture and confinement affect the head, but more frequently, and more considerably, the organs of digestion. Sometimes the appetite is reduced, almost always the action of the bowels is greatly impaired. Organic diseases, however, of the abdominal viscera are by no means so frequent as in many other sedentary occupations, tailors and shoemakers for instance. This I attribute to the less general intemperance of engravers. The employment affects vision. Young men, for a short time after removing the lens, are unable to judge accurately of the relative size of objects, even at a foot's distance. And the eyes of old engravers are considerably impaired, both as optical and vital instruments.‡

COPPER-PLATE-PRINTERS

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

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

‡ Mr. B., now about the age of 60, was closely employed in engraving for 30 years. His right eye, that which he applied with a convex lens to

have the good muscular exercise of their brethren of the letter-press. In blue printing, a composition of white lead, Prussian blue, and turpentine is employed instead of common ink; and the hands of the workmen are often daubed with the paint from morning to night. Yet no injury appears to result; no case of cholic or palsy from the poison of lead, have we found among these workmen. Whence their exemption? An intelligent master thinks the mixing of the mineral with boiled rather than cold linsseed-oil may prevent its poisonous effects. But this is scarcely probable. Does the prussiate of potass exert any antidotal effect on the oxyde of lead? We gave a compound similar to that of the printer's blue to a dog, with the same fatal result as if a like quantity of oxyde of lead had been given in any other form. On the whole, I am inclined to attribute the exemption from palsy to the comparative infrequency of the process; the printing with blue ink being much more rare than the printing with black. Engravers and Copper-plate printers, thought not remarkable either for temperance or excess, present few examples of old age.

STUFF AND WOOLLEN PRINTERS have light labour with variations of posture, and in rooms large in proportion to the number of persons. A stove or two, required for the process, in each apartment, produces in summer more heat than is pleasant. Boys and men are employed, the first in daubing the blocks, the second in laying them on the cloth. In the latter part of the process some accuracy is required; but close application affects the eyes

his art, is considerably more prominent than his left; and he is consequently obliged to close it when he looks at distant objects. Though not of late years engaged in engraving, he cannot accurately estimate the distance and relative position of near objects. In playing at backgammon for instance, he frequently takes up a wrong marker. In weak light, the left eye is better than the right. Cases of this kind illustrate some points of function and disease.

only when engaged with scarlet or other vivid colour. The composition for printing contains nothing injurious; even for the green colours no arsenic is used; and the slight fume from the mineral acids is rather agreeable than deleterious. The operatives appear healthy.

The *carving* of the blocks subjects the men to the evils of a fixed and sedentary position; but not perhaps in so great a degree as in many other occupations. In

the *calendering* or *glossing*, are occasionally great labour, and considerable heat from the iron over which the cloth is made to revolve. *Printing of Cottons*, we are informed, resembles the process we have examined and described.

BOOKBINDERS AND POCKET-BOOK MAKERS have 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 the closeness of the 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 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.

JAPANNERS have varied and moderate muscular exertion, in rooms not crowded, and generally well ventilated. The majority are females; but men are employed in the *dressing* and *painting*. The dust scraped from the paper articles is too heavy to injure the atmosphere, and that which arises from *rasping* does not appear to affect the workmen. In the *turning*, however, a fine dust is produced so copiously as to impair the digestive organs, and excite serious bronchial disease. This process, the *stoving*,

which will be noticed in a future section, and the *painting*, from its posture and confinement, appear to be the only injurious parts of the employment. Japanning, at least as carried on at Birmingham, is remarkable for the comparatively late period at which the day's labour commences. The operatives begin at eight and end at seven, and have the usual intervals of an hour and a half for meals.

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

DIE-SINKERS, men who cut out designs in iron, have an occupation which resembles carving in every thing but the material. The particles of iron which are detached by the chisel and hammer often wound the eyes, but appear rarely to enter the air tube. Bronchial and pulmonary diseases are by no means prevalent. But though few complain of ill health, the pallor of the countenance indicates a reduction of vigour in the digestive and circulatory systems.

WORKERS IN GOLD AND SILVER have different degrees of muscular exertion according to their departments. In the process of *casting* and *moulding*, the men have moderate exertion, and generally stand. The slight dust which arises from the charcoal or brick-powder, does not produce apparent effect. In the *chasing*, *hammering*, *mounting*, and *pumicing* the workmen sit, and are, in consequence, considerably more affected with disorder of the digestive organs. In the hammering, where they are obliged to lean much forward, the men are decidedly paler than in the mounting, where they sit upright. In the *polishing* they have an alternation of sitting and active

exertion, for while one man turns the wheel to which the brush is affixed, the other holds the article to be polished. The men appear more robust in this, than in most of the preceding departments. *Stamping*, effected by raising a great weight and then allowing it to fall, is a laborious process. Each man is supposed to lift 80lbs. 500 times a day. In most of the rooms charcoal is burnt, but its gas does not produce a sensible effect, except when the apartments are low and the roofs of the common, instead of the pottery form. The "blue vapour" in this case affects respiration at the time, and establishes a morning expectoration of mucus. In no department are the men crowded. Workers in gold and silver earn good wages, live well, and are not generally intemperate. In the department of stamping, which occasions profuse sweating, we find the men to take each during the day about three quarts of porter, twice the quantity consumed by individuals in other departments. It does not, however, seem to be injurious. The stampers were the most healthy men in the great London house we examined. In no department did we find aged operatives; but this seems to arise rather from the preference given to young men, as more expert in the improvements of the art, than from any thing baneful in the employ. A master of 12 or 16 working-silversmiths has since informed us that he has two or three between fifty and sixty years of age, and that, on examining a club of 100 men, he found as great a proportion of aged, as town-life commonly exhibits. He makes some general remarks, which I beg to insert in his own words,—“ Their habits are various, say two of every dozen are rather abstemious, taking about a pint of malt liquor per day, and spirituous liquors not once a month, and live regularly; eight of the same number are men who live well the first four or five days in the week, that is, eating meat two or three times a day, and drinking

perhaps from two to four pints of beer. They then appear dull and heavy, but in the last two days they 'study Abernethy,' as we say; take perhaps no meat, and water instead of beer, which makes them as cheerful as possible, aided a little by the idea of being near the eating and drinking days. The remaining two, or one at any rate, is a regular drunkard, taking from four to eight pints of beer per day, and perhaps three or four glasses of spirits in the same time. Some of this class die at 30, but others are in the workhouse, and live to 50 or 60."

GOLD-BEATERS have an employment distinct from the preceding. They are engaged above half the day in beating the metal with heavy hammers, and the rest in spreading the gold leaf on paper. The process affords, therefore, an excellent alternation of labour and comparative rest. The men exposed to no injurious agent, and enjoying good wages, are healthy and robust.

WORKERS OF TORTOISE-SHELL have an occupation sedentary, but not otherwise injurious. The dust which arises in drilling is too slight to affect them.

MODELLERS in Plaster of Paris have variety of muscular exertion, and nothing injurious in any part of the process. The Englishmen at the burning and grinding factories, are generally long-lived, and several attain the age of 80; while the Italians, the greater part of the modellers, die young, and usually from pulmonary consumption. These men live chiefly on vegetables.

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 watch-making are obliged to leave the employ, and the individuals who remain rarely live to old age.

CUTLERS have some processes which produce little effect on health, and others, as the *grinding* and *filing*, which produce the worst. These will be noticed in another part of this book. In *drilling*, the pressure of the instrument, when long-continued, injures the figure of the chest. In *glazing* or *polishing*, the posture is sitting and leaning. Dust arises from the compound of emery, which is occasionally applied, but not in sufficient quantity to affect respiration. Turning the wheel affords, of course, moderate and varied exercise. Cutlers are generally intemperate and short-lived.

SHEAR-GRINDERS have strong muscular exercise in a stooping posture, as they press the shears on the revolving stone. Iron particles of course are largely detached; but as the grindstone is kept wet, they do not rise to enter the air tube. The noise of the machinery impairs the hearing. We have not found any other ill effect from the employment. Shear-grinders, often I believe intemperate, do not usually attain full 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, 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 or 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 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. NAIL-MAKERS have an occupation resembling that of smiths, but more confined. They sweat and drink much during their labour. They are addicted to intemperance. In coating tenter-hooks with tin, the fume affects respiration.

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. PLANE-MAKERS, or makers of tools for joiners, carpenters, and cabinet-makers, have a similar employment. The men are generally temperate, healthy, and long-lived. The observation applies also to SHUTTLE and BOBBIN-MAKERS, who work on beech and deal, and connect the arts of the turner and joiner.

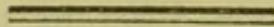
PATTEN-MAKERS are subject to no other inconvenience from their employ, than the bending posture required in cutting the sole; and CLOG-MAKERS, men who make

* *Ramazzini* states, that smiths suffer frequently from lippitude and ophthalmia. In the classic authors we find allusions to the same effect. "Ardentis massæ 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 left for the curious to consult in *Ramazzini*. *Patissier* states hernia, diseases of the heart, inflammation of the lungs and pleura, tumours and varices to be frequent among smiths.

the thick wooden soles for shoes worn by the lower classes in Lancashire, and some other districts, have an employment similar to that of carpenters.

HOUSE-SERVANTS, from their confined situation and town-life, 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 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. Servants in general, are subject to fever.

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



3. 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, or its effects doubtful*, 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 to 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.

STARCH-MAKERS inhale a fetid acetous vapour, which rises from the fermenting wheat, or rather from the water in which the wheat has been steeped. They are occasionally exposed, also, to great heat,—the thermometer rising from 110 to 150, or sometimes even to 200 degrees. In that degree of heat, however, the men do not remain more than a few minutes at once ; but they often work the whole day in a temperature above 100°. More frequently, however, they are employed in rooms, wet, and open to currents of cold air. The manufacture is carried on by night, as well

as day ; but the men do not generally work more than twelve hours in the twenty-four. The muscular labour is varied and good. Starch-makers are subject to catarrh, pulmonic inflammation, and rheumatism. In the neighbourhood of London they are pale and emaciated, complain of great debility, and are often affected with pains in the head and chest ; but in the country these effects are by no means prominent. The frequent immersion of the hands in the acetous fluid and fermenting grain, occasionally produces an eruption on the skin of persons commencing the employ.* Starch-makers have low wages, and are generally temperate. In Lincolnshire and Yorkshire, longevity is not apparently affected by the manufacture. We can find men of 60 and upwards. But in London and its neighbourhood, health is greatly reduced, and life remarkably abbreviated. Here few can bear the employ after the age of 40 ; and indeed from our inquiries at Lambeth, we believe that few, after leaving the employ about that age, survive more than two or three years. The subject merits a further examination. Starch-makers are rare in this neighbourhood—Is the number examined too small for a general deduction ? Or do country starch-makers differ from their brethren of London and France in civic state and habits ? We cannot suppose the process to be materially different, as it is founded on a natural change, the decomposition of grain, and the consequent production of farina. The gases evolved can scarcely vary ; and the atmosphere and temperature can be affected only by the proportion of the

* *Ramazzini* makes his usual loose remarks about stench and suffocation. *M. Cadet-Gassicourt* says that starch-makers are squalid, crapulous, (*crapuleux*, sick from intemperance?) and subject to adynamic and ataxic fevers. *M. Merat* states that if the odours from the process be in great quantity, they produce cough, difficulty of breathing, paleness, and emaciation.

wheat to the size of the apartment and the air admitted. As a preventive of the ill effects of the employ, the evolution of ammoniacal vapour for the neutralization of the acetous, is suggested by a French author.*

WIRE-DRAWERS are in an atmosphere disagreeably impregnated with the odours of tallow and oil, and with the exhalation from the sour ale-grounds, in which the cylinders revolve. The general health, however, does not appear to suffer. Some men have contraction of the fingers. This they ascribe to the sulphuric acid employed ; but a more probable cause is the flexed position, in which the fingers are kept in handling the wire.

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 marked injury to those who inhale it daily. The masters, at least, believe health improved rather than reduced by the employ. But the similarity in the agency of spirit exhaled and spirit drunk, on persons not accustomed to such agency, leads me to suspect ultimate, though not speedy or very apparent injury from regularly inspiring spirituous vapour. The comparative rarity, moreover, of aged men in distilleries, and of men who have been engaged in them for 20 or 30 years, leads to the opinion that life is abbreviated, either by the inhalation or potation of spirit. Men, we find, who have been some years in the business, are accustomed to take a morning dram warm from the still. Surely this practice ought to be prevented.

VARNISH-MAKERS inspire a strong vapour of alcohol, turpentine, gums, and tar. This at first produces sickness, and impairs the appetite ; but men accustomed to the employ suffer no apparent injury.

* *Tourtelle*, in his *Elemens d'Hygienne*.

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

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. STENCILLERS do not appear to suffer from the currents of cold air to which they are exposed by their employ.

WOOLSORTERS are occasionally annoyed with dust from the lime, which in some kinds of wool is used 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, considerable portion of dust. This, however, is said to be rather grateful than noxious.

The MAKERS OF BONE BUTTONS are subjected to some dust, but this not sufficient to produce sensible disorder. The MAKERS OF PEARL BUTTONS appear to suffer more. The pearl-dust produces often bronchial irritation, and this excites pulmonary consumption in individuals predisposed to the disease. Both classes of button makers are, in Birmingham at least, generally intemperate, devoting two days a week to the impairment of their health.

BLEACHERS are exposed to chlorine both in inhalation, and by often standing for the whole day in water strongly impregnated with this gas. They work in open sheds,

* We hear an adage in the mouth of the workmen, that "Bricklayers and Plasterers' Labours, like asses, never die."

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

and are occasionally employed in the field, spreading out the yarn. They are healthy and strong. None are affected with rheumatism. They live to a good age.

BRONZERS habitually wet their hands with the solution of the mineral acids, in which they immerse their metal. No effect, however, more than dyeing the skin or irritating a sore, is apparent. The men, though they look pale, report themselves healthy. The spiculæ from *filing* are not generally small enough to reach the air tube, nor does the heat of the furnace in *soldering* produce any other than the indirect effect of leading to immoderate potation. Bronzers in general are said to be intemperate.

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.*

* *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 which seemed to prevail most was purpura hæmorrhagica, 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,

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

especially 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 et de Médecine Légale*. 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 Thorerus*, 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. *Pavius* 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, Diemberbroeck*, 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. 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

other substances, 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 proportionably 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.

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. Rheumatism is rather frequent

streets in the evening, with cigars in their mouths, is either affectation or something worse.

To the preceding passage, as it appeared in a former edition, a scientific friend, for whose opinion I entertain a high respect, has objected that it is not sufficiently condemnatory. He said he had himself fairly tried smoking for half a year, and found no advantage to result, but on the contrary, a disordered state of the digestive organs.

* *Ramazzeni*, 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.

among crushers; but with this exception, the men 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. The work is occasionally carried on by night, and men are consequently engaged in relays. Nocturnal labour increases the appetite. As illustrating this curious fact, I mention the circumstance of men, when desired by a master to work by night, requiring an increase of wage; not because they thought such labour injurious or disagreeable, but on account of its effects on the appetite and the greater consumption of food.

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 bituminous vapour so freely evolved. 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 moderate diet, would be almost universally robust. HOSTLERS generally 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 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.

COMB-MAKERS, exposed to a disagreeable odour from the bullocks' hoofs, are healthy and long-lived.

BUCKRAM MANUFACTURERS are exposed to the odour of the glue. This is 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 Leeds Buckram-house, 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.*

* *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 this country, however, we do not see or hear of such effects from the employ.

Patissier, in reference to glue-making says, "il se dégage des vapeurs plus ou moins nuisibles aux ouvriers et aux habitans voisins;" and on the employment of tallow chandlers, "Les particules grasses et fetides qu'ils absorbent donnent naissance aux étouffemens, aux douleurs de tête, aux fièvres bilieuses, adynamiques, et principalement au dégoût et aux nausées. Rien en effet n'est si propre à donner des envies de vomir et des soulèvemens d'estomac que la vue des substances grasses et huileuses." Several parts of his work exhibit the common prejudices on the subject of animal exhalation, stench, grease, and humidity. The want of close personal and fair examination we have often occasion to regret, as well in the interesting work of *Ramazzini*, as in that of his French commentator

During the plague in London it was remarked that this class of men suffered much less than others.

SOAP-BOILERS, exposed to exhalations from the oil and alkali, are healthy and even ruddy. During the plague in London, this employ was said to be remarkably exempt. Soap-boilers are generally temperate and live to full age.

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 every dry. Yet they are remarkably robust; the countenance florid; and disease almost unknown.* Tanners are said to be exempt from consumption. 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

* Very different is the account, which *Ramazzini* gives of the tanners in his day. He describes their countenance as cadaverous, subtumid, 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 tan-pits, 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.

† *Dr. Dods*, in his paper published in the *Medical Gazette*, states that he has "not been able to discover one unequivocal instance of death to have taken place in an operative tanner from phthisis, in its tubercular form, in any part of this kingdom." He also states, that "the females of a tanner's family, that lived close to a tan-yard, died of consumption; while the males, who were constantly engaged amongst the tan-pits, survived the disease, although they were evidently affected with the complaint, from being exposed, no doubt, to the more powerful effects of the protecting cause

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.

Ramazzeni 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 NIGHTMEN of London are generally healthy, notwithstanding their disgusting occupation. Of 18, examined by my assistant, only two had even slight disorder. Appetite, they declare, is increased by the effluvia. Their only complaint is defect of food from lowness of wage.

The observations under this head apply also to Slaughter-men, mentioned along with the Butchers, at page 11. The innoxious, and even beneficial, cha-

peculiar to the operation of tanning." Elsewhere he remarks, "what this particular cause of exemption is, for there are several departments of a tanner's business in which he is engaged, we have probably yet to discover; but I consider it myself to be the inhalation of that peculiar aroma, or volatile matter, which is constantly arising from the tan-pits, during the process of tanning with bark, that especially preserves the tanner's health and exempts him from consumption."

A medical friend has informed me of his having attended three tanners in pulmonary consumption. But I am not acquainted with the details of these cases, and with the specific character of the diseases, as indicated by the stethoscope or dissection.

racter of animal exhalations is strongly exhibited in that employ.*

(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,

* In closing the section I may remark, that, since the publication of the first edition of this work, its statements have been supported by those of other inquirers. I quote a passage from the Lond. Med. and Phys. Journ. vol. VI. New Series :—“ A committee has been engaged, in France, examining the circumstances relative to the knacker’s operations. His business consists in killing old worn-out horses, and turning every part of their body to account. The most singular results which the committee have obtained, relate to the innoxious nature of the exhalations arising from the putrifying matter. Every body examined agreed that they were offensive and disgusting, but none that they were unwholesome : on the contrary, they appeared to conduce to health. All the men, women, and children, concerned in the works of this kind had unvarying health, and were remarkably well in appearance, and strong in body. The workmen commonly attained an old age, and were generally free from the usual infirmities which accompany it. Sixty, seventy, and even eighty, were common ages. Persons who live close to the places, or go there daily, share these advantages with the workmen. Whatever disease the horse may have died of, or been killed for, the workmen have no fear, adopt no precautions, and run no risk. Sometimes, when strangers are present, they pretend to be careful ; but, in private, really laugh at such notions. They handle diseased, as well as healthy parts, always with impunity. They frequently cut themselves, but the wounds heal with the greatest facility ; and their best remedy is to put a slice of the flesh about the wound. During the time that an epidemic fever was in full force at two neighbouring places, not one of the workmen in the establishment at Montfaucon was affected by it. It did not appear that it was only the men who were habituated to the works that were thus favoured ; for when, from press of business, new workmen were taken on, they did not suffer in health from the exhalations. In confirmation of the above observations, similar cases are quoted. Above two hundred exhumations are made yearly in Paris, about three or four months after death : not a single case of injury to the workmen has been known.

M. Labarraque has observed, that the catgut makers, who live in a continually putrid atmosphere, arising from macerating intestines, enjoy remarkable health. Similar circumstances were remarked at the exhumations of the Cimetière des Innocens.”

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 36 and 2-5ths inches; and the quantity of air thrown out by a full expiration was somewhat less than 202 cubic inches. Though we found several who had borne the employ from boyhood to the age of 50 or sixty, 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 are from 12 to 12 in some mills. Night work does not sensibly affect the health. The men find it to increase appetite.

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

* *Heinsius*, in his oration "De Laudibus Pediculi," speaks of millers as most honoured by such visitants. And *Ramazzeni* says, "Observatione dignum est, quod molitores * * * pediculari morbo ut plurimum laborant, adeo ut vulgus pediculos per jocum, pulices albos molitorum appellet."

diminished, by a current of air under the floor. The ill effects on hearing, of this and other noisy occupations, might be lessened 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 degrees, and the malt on the floor 140 degrees. 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, and leads often to immoderate potation. Men when they enter the employ, complain of

* "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.

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 57.

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

PAPER-MAKERS, particularly the aged, are unable to bear the dust, which arises from cutting the rags. Young persons, however, are not sensible of much inconvenience; but few remain for years at the employ. Might not rags be cut by machinery, and this machinery included 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.

FLOCK-DRESSERS, chiefly women, are exposed to considerable dust. They would be to more, were not the first part of the process performed by a covered machine. The subsequent sieving and examining of flocks produces great dust, and decidedly injures both respiration and digestion. In proportion to the degree and continuance of this deleterious agent, is the head affected, the appetite reduced, respiration impeded, cough, and finally bronchial or tubercular consumption induced. In summer, when the windows are open, the women suffer much less than in winter, when they are closed. Surely, for such dusty processes, either machinery should be more employed, or at least free currents of *warm* air be admitted to the operatives.

FEATHER-DRESSERS ward off much of the exhalation of their employ by covering the mouth and nose with a handkerchief. The "flue," or floating particles of feather, produce however, occasional coughs. It appears to be not an infrequent excitant of consumption, and

sometimes occasions asthma in men past middle age. Feather-dressers in general, though they make little or no complaint, have an unhealthy appearance. They are often intemperate,—drunk from Saturday to Monday.—Women, who pick out the quilly feathers, appear to have no further annoyance than an occasional fit of coughing from the “flue.”

SHODDY-GRINDERS (a provincial term) are persons employed in certain districts of the West Riding of Yorkshire, as that of Batley and Dewsbury, in picking and tearing woollen rags, and afterwards manufacturing them, with the addition of new wool or worsted, into yarn. This is taken from the mill, and woven at the houses of the workmen into a coarse cloth or drugget. The only part of the manufacture which differs materially from the ordinary woollen, is the sorting and breaking up of the rags. Much dust is produced, particularly by the tearing machines, or “devils.” For the removal of this, there is however a very valuable, though but partially effective provision. A large box at one end communicates with the machine, and at the other with the open air, by means of a wooden chimney, which traverses the roof. The dust is driven by a strong current from the machine into the box, where the heavier and valuable parts subside, and the lighter pass through the chimney out of the building. Sometimes, however, a direction of the wind prevents the success of this contrivance, and the room is so clouded that persons cannot see each other at the distance of a few yards. Could not the dust be promptly diminished by a revolving end affixed to the wooden tube, where it opens outside the building,—an apparatus similar to that frequently adopted for common chimneys?

Girls and women are generally employed in sorting the rags; boys and men attend the machine. The boys

at first are affected by the dust, but after a time they endure it without complaint. Men suffer more, and those who commence the employ after the adult age, are often obliged to abandon it. Indeed very few persons remain for several years at the machine. My intelligent friend and quondam pupil, Mr. Brearey, of Dewsbury, has favoured me with a list of 17 shoddy makers, whom he examined or professionally attended; and of these one only had been at the manufacture since its establishment in the district, 13 or 14 years ago—none of the others more than 6 years—and the majority not more than 2. Mr. Brearey remarks that persons commencing or returning to the employ, are so generally attacked with head-ache, sickness, dryness of the fauces, and difficulty of breathing, that the complaint is known in the district by the name of the “shoddy fever.” This disorder subsides in six or eight hours; but cough and expectoration of dirty mucus, chiefly in the morning, generally remain, and indeed are almost universal, in a greater or less degree, among those who long and steadily attend to the making of chins. Difficulty of breathing, however, and tightness of the chest, do not appear to precede these symptoms for so long a period, as in some other dusty occupations. Men, on returning to work after some days’ absence, are always distressed for a time by the dust. Mr. B. mentions that the oldest man, aged 39, in his list, when respiration is more than commonly oppressed, finds prompt relief from citrate of ammonia in the act of effervescence, and from taking fatty aliments.

The WEAVERS OF COVERLETS are exposed to considerable dust from the chalk with which the web is imbued. Though they do not complain of direct injury, or even of much annoyance, they are not only pale and thin, like weavers in general, but are subject to cough and difficulty of breathing. They do not commonly live beyond the age of 50. The labour is considerably greater

than ordinary weaving, on account of the larger size of the shuttles. The pressure on the pit of the stomach, frequently produces painful affections of this organ.

The WEAVERS OF HARDING, coarse linen used for wrappers, are subjected to great dust. Respiration is so much, and so speedily affected, as to oblige many to turn to other departments. Indeed there are few, I believe, who work constantly and solely at this branch of the linen manufacture.

PREPARERS OR DRESSERS OF HAIR—men, women, or boys—are in an atmosphere of dust and stench, especially when employed on the foreign article. The winnower suffers most. The complexion is soon rendered pale, the appetite reduced, the head affected with pain, respiration impeded, cough and expectoration established, the body emaciated. I scarcely need add, that life is sacrificed to a continuance of the employ. In most baneful arts and occupations, the wages are high; but here we find with surprise, that the winnower does not earn more than 4s. 6d. or 5s. a week. For what a pittance is health broken and life destroyed! But why should the winnowing be effected by hand at all? Why not employ machinery to turn the fan? or why not collect the dust in a box, and carry it off through a wooden chimney by the current from the fan? Few persons, indeed, are employed in the dressing of hair, and fewer are acquainted with their situation and suffering. This may palliate, but cannot excuse the neglect.

HATTERS, employed in the *Bowing* department, that in which rabbits' fur and Spanish wool are mixed by striking a string or bow, inhale much fine dust. The apartment, moreover, from the care which is taken to prevent currents of air disturbing the material, is particularly close. The men are rather pale, complain often of tightness in the chest, particularly in damp weather, and are subject to asthma. Many are nevertheless able

to pursue the employ for 20 years, though the time spent in their close and dusty rooms, is generally 14 hours a day. Their exemption from urgent disease may be ascribed to the early period at which they commence the employ. Scarcely any old men, however, are to be found among hatters; and I believe that the process, aided, as it often is, by intemperance, decidedly shortens the duration of life.

The DRESSERS OF SPANISH OR COLOURED LEATHER, who *ground* the article, are subjected to much dust from the whitening employed. Generally pale and thin, these men have a very different appearance from their fresh-looking and robust brethren in the departments of wet and stench. They are subject to morning cough and expectoration. Nevertheless they give instances of men's pursuing the employ to a good old age. I suspect, however, that many die consumptive;* though, from the migratory habits of the men, I have not been able to trace them to their ends.

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

* *Dr. Hastings*, in his treatise on bronchitis, gives considerable details relative to the disease in the yellow leather-dressers and china-makers of Worcester. Difficulty of breathing is the first symptom; generally followed, at the interval of a few months, by hæmorrhage from the lungs; the difficulty of breathing then is increased, and severe cough established. Febrile excitement, with loaded state of tongue, lividity of the countenance, muco-purulent expectoration and emaciation, succeed; and unless the employ be suspended or changed, common bronchial consumption closes the scene.

by machinery, the quantity of dust is considerably less. Still, however, it is such that a visiter 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 some attention is 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. Of late also a process has been introduced, in which the prepared rovings are passed through hot water in the act of spinning, and as there are in consequence several large troughs in each room, the atmosphere is heated and moist, and the operatives acquire an increased sensibility to the cold of the open air. Dressers of flax and persons in the dusty rooms of the mills, 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.*

* 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 noxius ex hac materia evolat, ut per os fauces, Pulmones subiens, operarios ad continuam tussim compellat, ac ad asthmaticam passionem sensim deducat. * * * * Colore faciei pallido, tussiculos, asthmaticos ac lippos." *Merat* gives a similar statement. Les broyeur de chanvre respirent cette poussière (detritus de chanvre, &c.) qui leur donne des picotemens de poitrine, de la toux de l'enrouement, et à la longue les rend asthmatiques et meme phthisiques.

The first effects, however, do not appear to be direct. The operatives suffer not so much on entering the mill as on leaving it at night. They become particularly susceptible of atmospheric vicissitudes. Besides its application to the air tube, dust, we have little doubt, is also swallowed with the saliva, and deranges, in a greater or less degree, the functions of the stomach. The effects on the constitution have, of course, a reference to the quantity of dust. They are less in summer, when the windows are quite open, than in winter, when they are partially closed.

The early stage of the malady which attacks flax-men varies from that of ordinary bronchitis. The cough and difficulty of breathing are not cotemporary: one precedes the other, sometimes by months, more frequently by years. The cough is harsh; its invasion is generally confined to the morning and evening, and more to the latter than the former. In the early stage there is no mucous, pituitous or puriform expectoration, and little even for years of cough. The disorder of respiration is complicated with gastric and bilious maladies, marked by loss of appetite, sickness, and vomiting of bitter matter. Symptoms of pleuritic or pneumonic inflammation often attend or succeed; but affections of the larynx (proper) we have not remarked. As the cases advance, we find the ordinary character of chronic bronchitis, emphysema of the lungs, or pulmonary consumption.* In

* 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 at that time. In each I found the lungs or airtube considerably diseased. On a recent occasion I examined eight others, several of whom have been but a *short* time in the employ, and are beginning only to feel its effects. I first refer to those who have been *long* at the employ.

1. G. P., a heckler, aged 39, has been in the employ, with some intermissions, for 25 years. His general health is not remarkably impaired.—

this, as well as in other baneful employments, the men who suffer most frequently and most severely are the in-

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 pulmometer, he exhales 158 cubic inches.

2. J. C., 48 years of age, has been employed as a band-looser 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 187 cubic inches.

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 the right side, respiration deficient at the lower parts ; puerile above. Sound of the heart preternaturally extensive. He exhales 129 cubic inches.

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 the chest, respiratory murmur is scarcely audible. On the left side, it is distinct below the clavicle ; deficient in the lateral portion. He exhales 245 cubic inches.

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 pains in the right

temperate; but drunkenness is now comparatively rare among flax-men. The reduction of wages has produced a reduction of excess.

side of the chest, and the right iliac region, of cough, and of head-ache. Expecto-
 rated 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 101 cubic inches.

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 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 129 cubic inches.

7. W. H., aged 58, a heckler, commenced the employ at the age of 12, left it for ten years, recommenced it again, and finally abandoned it two years ago from broken health; so that he has been thirty-four years actually in the employ. Ten years ago his breathing became distressed, and to this, after a time, succeeded the symptoms which now afflict him. His countenance is remarkably meagre, expresses pain and anxiety, and his whole frame is emaciated; complexion sallow, tongue whitish, pulse quick, and feeble. Without the stethoscope, his breathing is heard to be noisy; with it, respiration sounds bronchial over a considerable portion of the chest, and sonorous occasionally. The figure of this cavity is remarkably altered, reduced apparently to half the size common to a man of his height, its sides as if cut off, and the sternum consequently appearing in advance. Dorsal spine projects posteriorly, and the scapulæ are thrown to the sides. The muscles auxiliary to respiration, are in constant exertion. Pulmometer gives his expiration at 86 cubic inches.

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

The majority of operatives in the great flax-mills are young women, girls, and boys. In 23 of these, taken indiscriminately as they come from the mills, we found

I may also remark, in reference to the capacity of the lungs, that no fully-formed man, in good health, throws out less than 200 cubic inches at a forced expiration. Large men expire 230—280. One only of the flaxmen in the preceding statement surpassed the minimum standard, no other reached it, and the last person examined could throw out but 80.

It will be remembered, that the individuals examined on this occasion were, with one exception, persons at their work, not patients applying for relief. They were selected only as instances of those who had been long at the employ.

We now come to the second batch, not selected, like the preceding, as examples of long endurance, but, as far as I know, a fair specimen of hecklers, as found in the mills.

1. W. S., a heckler, aged 33, entered the flax manufacture as a band looser, at the age of 13, became a heckler by hand at 16 or 17, and has continued in this department till within two or three years of the present time. Of late he has been employed in the heckling by machinery, which he conceives to produce more dust than the process by hand. He has never been intemperate. For the last seven years has suffered a difficulty of breathing. It commenced like a common catarrh, and affected him chiefly in the evening and night. For a year or two subsequently, he had no expectoration, but after this time, he began to spit a little mucus, and respiration became impeded. Last winter he became affected with frequent vomiting, with reduction of appetite, weakness of the limbs, and occasional cramps in the legs. His tongue, though without fur, is not fresh: pulse feeble, and rather quick. Of late he has become thinner, and stoops in his gait. The chest is flat anteriorly, and the lower anterior part drawn back, so as to give to the profile the appearance of hump-back. It sounds well on percussion. Respiration deficient in the lower parts of the lungs. Sonorous rale heard over different parts of the chest.

2. T. C., aged 31, has been twenty-four years in the flax manufacture, and chiefly as a heckler. He has never yet been incapacitated by his employ. After he had been twelve years, cough was established, and to this, at the interval of six years, succeeded a difficulty of breathing. It was accompanied by a dizziness and sense of intoxication, which awoke him every night. These symptoms at length subsided, on his vomiting bilious matter. At present his respiration is free; but he has morning cough, and of late some mucous expectoration. The appetite is good, except when he is affected with bilious disorder.

3. J. C., a young man, has been a heckler nine or ten years. After he had been in the employ about seven, he became affected occasionally with cough, and this has since become a regular morning and evening visiter. During the day his respiration is undisturbed. The evening cough is pre-

the air exhaled at an effort, to average 173 cubic inches in males, whose ages averaged 18 years; and 98 cubic inches in females, whose ages averaged 19 years. In 13

ceded and accompanied by difficulty of breathing. Both are relieved by the expectoration of mucus, which is generally bluish, but sometimes almost black. Stethoscope indicates no disorder of the lungs. Appetite good, and no complaint of the general health.

4. J. B., aged 30, has been a heckler 17 or 18 years. His respiration became affected several years ago. Difficulty of breathing preceded by two years the occurrence of cough. The latter is now trifling, but the difficulty of breathing is habitual. Its aggravation is attended by pain across the anterior and inferior part of the chest. On percussion the sound is generally dull and flat, and particularly about the right mamma. Respiratory murmur variable in the several parts of the lungs, generally distinct only on full inspiration, present and absent at repeated examinations of the same point. It is least perceptible about the right mamma, and at this part the action of the heart is preternaturally audible. Extra exertion produces dizziness. He is not so thin as his fellows.

5. S. P. aged 35, began heckling twenty-one years ago, but has in this time been four years absent at different times. About five years ago, he became annoyed every evening on passing from the mill to the open air with cough, and this after a time continued for the night. On his changing his employ, this disorder left him, and he regained full health; but on his return to the flax-mill it became established, and his general health reduced. He is now subject to cough throughout the day. There is, night and morning, a slight expectoration. He has pain in the right hypochondrium. The chest has a raised and rounded appearance. The respiration is irregular and the murmur intermittent.

6. G. S. aged 24, has been a heckler nine or ten years. Last winter he became subject to a difficulty of breathing, occurring chiefly, however, in frosty weather, and when he leaves the mill to go home in the evening. He has little cough. A slight wheezing is observed; and on applying the stethoscope, the respiratory murmur is deficient, except on a forced inspiration. His pulse is stronger, countenance fresher, and general appearance better, than those of his fellows.

7. T. J. aged 40, has been a heckler twenty-seven years. Ten years ago, he was suddenly affected with tightness of the chest; and this for some time occurred every fortnight, beginning on the afternoon of Sunday, and continuing till Wednesday. A copious expectoration carried off the paroxysm. Sometimes also he was relieved by an emetic. In his family there is a disposition to pulmonic disorders. His father was asthmatic, but lived to great age. At the time of his first attack T. J. lived in the country, and on his removal to Leeds the spasmodic asthma became less marked and urgent. But respiration has become permanently difficult, and he has an habitual cough, which is, however, worst in the morning. He occasionally expectorates a little blood. Respiration is heaving and regu-

hecklers between the ages of 25 and 45, the average was 191. The expirations of others may be seen in the note. The younger operatives, who are generally of the age of from 7 to 12, were not examined.

larly supported by the auxiliary muscles. The chest, on percussion, is rather deficient in sound. Respiration is universally puerile, and accompanied in some parts with a slight subcrepitating rale. Sound of the heart preternaturally extensive. His pulse is above 100. He complains of palpitation on exertion, and he can now work but half a day at once. We observe a whiteness of the tongue, and a hectic redness on the cheek. In this case it is probable that the primary disease, the spasmodic asthma, was not produced by the employ. Relieved by residence in a smoky town, it seems, however, to have been modified by this employ,—an intermittent converted into an habitual disease, a nervous changed into an organic, and, in a word, a disorder established, which, if he continue in a dusty department, will shortly destroy him.

In the several individuals examined, the tongue, with the exceptions stated, was fresh and red. The physical character of these seven men and their fellows referred to before, was in other respects bad:—body spare and in most emaciated; head declined and scapulæ projecting; chest heaving; countenance pale, contracted, without the expression of energy, often with that of pain; pulse feeble. Drawn up in a line, they would have been promptly marked by the medical man, as subjects of disease, advancing to a fatal issue; by the political economist, as no longer calculated for the production of wealth; by the military inspector, as unfit for service,—men to be sent to the hospital, or dismissed for ever. Yet these, with two or three exceptions, are men working for their daily bread, and obliged to work till they die consumptive, or till the declining powers of respiration can support little more than organic life, and then—want, charity, or the workhouse. Can the philanthropist contemplate the state of these men with indifference? But I stop, lest I forget the medical character of my book.

I had lately the opportunity of examining the body of an emaciated flaxman who died from peritonitis about the age of 30. The lungs and air-tube were carefully inspected with reference to the present inquiry. We found extensive pleuritic adhesions, particularly of the right side of the chest; lungs generally crepitous, superior lobes on each side firmer and heavier than natural, and on section presenting crude, single and aggregated tubercles. *Bronchi and their ramifications contained a large quantity of bloody fluid about the consistence of cream. The membrane was of a brownish yellow colour, and somewhat thickened.* From this chronic inflammation of the bronchial membrane and the existence of tubercles, we may infer, that had not the patient been incidentally destroyed by Peritonitis, he would, continuing the employment, have sunk from pulmonary consumption. In the great work of *Morgagni*, we cannot easily find cases bearing on the subject of this work. Two dissections of *flaxmen* I have found, but *Patissier* states that there

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 thirty years, and not one instance could we find of any individual who had been forty years either in this or any of the dusty rooms.

There are indeed, comparatively few old persons in *any* of the departments of the flax mills. On inquiry last year at one of the largest establishments in this neighbourhood, we found that of 1079 operatives, the majority indeed children, but a considerable portion adults, there were only nine persons 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 the ages of 18 and 30. I am by no means convinced, however, that young persons escape without ultimate injury to the lungs. Children

are five, in all of which that anatomist found the lungs inflamed and more or less altered in tissue. In one of the two to which I have referred, *Valsalva* found the lungs not solidified, but distended with air. Was not this, emphysema, the result of dry bronchitis? In neither of the cases, does it appear that any examination was made of the bronchial lining. Indeed, the membranes at that period were little noticed by pathologists.

from seven to fifteen 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 not been able 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 generally excessive. When the former edition of this work was published, the people were working from half-past six in the morning till eight at night, and were allowed an interval of but 40 minutes in all that time. The engine was stopped only at noon; and the operatives consequently were obliged to take breakfast and “drinking” while they pursued their labour,—one tending the other’s machinery

* 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.

while the latter took his hurried meal. Children sometimes have not had the opportunity of eating till nine or ten a. m., though they had been at the mill from half-past five, and must have risen from their beds half or three-quarters of an hour before. Occasionally, however, there has been some diminution of the period of labour. During the last summer, we learnt, that at one large establishment the hours were reduced from 72 to 69 per week; and that the engine was stopped three times in the course of the day, viz., a quarter of an hour for breakfast, forty minutes for dinner, and ten minutes for drinking. But even this slight improvement has not continued; for at the present time the work commences at six and ends at half-past seven; the intervals for meals are 15 minutes, 40, and 15, and the children and overlookers are allowed to leave the mill only for dinner. Whatever improvement may be effected without a legislative enactment, restricting the period of labour, this improvement will be but temporary.* Masters however enlightened and humane, are seldom aware, never fully aware, of the

* I cannot pass this subject without expressing my deep regret at the failure of Sir J. Hobhouse's Bill, or, as I ought perhaps to say, its very partial application. Interested only in what relates to health and humanity, I have examined cotton-mills in Manchester and in Yorkshire, have repeatedly inspected various flax mills, and feel no hesitation in expressing my strong conviction, that the flax mills are more destructive than the cotton, and that they more urgently require the interference of government. But, however we deplore the opposition in Parliament, and its result, we should not hastily bring a charge of cruelty and injustice either on the members or the mill-owners. Those of the latter to whom I have applied, have, with very few exceptions, cheerfully exposed their establishments to inspection, and expressed their willingness to remove, as far as possible, the causes of suffering and disease. But they are not aware, or they are only beginning to be aware, of the state of their people. We seldom notice what we see daily,—rarely examine with accuracy what does not force itself on our attention:—familiar with evils, we scarcely perceive their existence.

injury to health and life which mills occasion. Acquainted far less with physiology, than with political economy, their better feelings will be overcome by the opportunity of increasing profit, and they will reason themselves into the belief that the employment is by no means so unhealthy as some persons pretend, and that the children will be nothing the worse for two or three half-hours a-day more labour, and a little less time for meals. That this is no improbable prognostic, is proved by the past. 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 abridgement 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 the established period: and the unfortunate artizans working before in excess, have since had to carry labour to a still greater and more destructive extent. The sound of the steam-engine anticipates often, the cock-crowing of the morning. While the engine works, the people must work. Men, women, and children, are thus yokefellows with iron and steam; the animal machine—fragile at best, subject to a thousand sources of suffering, and doomed by nature, in its best state to a short-lived existence, changing every moment, and hastening to decay—is matched with an iron machine insensible to suffering and fatigue: all this moreover, in an atmosphere of flax-dust, for 12 or 13 hours a day, and for six days in a week.

The wages of flax spinners for all their labour, are by no means great. Hecklers, indeed, earn from 15s. to 20s. a week; but women cannot earn more than 8s. and often, indeed, not more than 6s. per week. The poor woman, for instance, S. J., one of the persons referred to at page 74, an orphan without relatives, is obliged, out of the sum of 6s. a week, to provide herself with food, clothes, washing, and lodging; and in her case there is nothing peculiar. In these mills, moreover, there is rarely, if ever, extra-wage for extra-work.

The 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, much 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.

Since this paragraph appeared in the first edition, I have had the opportunity of seeing plans very similar, in use at the manufactories of cotton and shoddy, and with the most decided effect. Why are the rich and intelligent masters of flax-mills tardy in adopting the principle, and applying it to the relief of their suffering workmen?

DRESSERS OF HEMP have an employment similar to that of Dressers of Flax; but the dust is less, and its effects are consequently less marked.

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 frequently worked. They occasion indigestion, and sometimes diarrhœa.*

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.

WARE-GRINDERS attend machinery, which grinds or pulverizes various kinds of wood used in dyeing, and a few employed as drugs. The dust, greater or less in quantity, and more or less irritating according to the specific character of the material, produces sneezing, tightness of the chest, cough, and an impaired state of the digestive organs. Grinding peach and camwood

* *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.

occasions also head-ache, and sometimes sickness and vomiting. Saunders, young fustic, and orgal, or lees of red wine, produce more effect on respiration than most other kinds of wood. The ware-grinder, however, from his moving about the mill, is less subjected to the dust than the cabinet-maker or turner working on the same material, and confined to the spot where the dust is thickest. Ware-grinding is occasionally carried on by night. There appears nothing injurious in the process, except the dust, and this I conceive might be considerably diminished. Ware-grinders have not the appearance of health, nor do they generally attain full age.

Of the DRESSERS OF JAPANNED GOODS, the few who are employed in *turning*, inhale much fine dust. Pallor, sickness, impaired appetite, difficulty in breathing, cough, and expectoration, are the results. Few men, if any, bear the employ constantly for many years.

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

† *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

are short-lived, dyeing generally before they attain the age of 40.‡ In the country several instances of advanced age are to be found; but the individuals labour under some pulmonic affection, generally, I believe, chronic bronchitis or its effects. An intelligent general practitioner in a neighbouring village, informs me that he has attended seven masons, who died about the age of 56, from disease of the lungs.

COLLIERS are subject to the inhalation of dust from the coal, and to gases more or less pernicious, especially carburetted hydrogen "fire-damp," and carbonic acid "choke-damp." Explosions from the former are well known to have been awfully destructive before the introduction of the safety-lamp, and still to arise occasionally from the workmen's neglect of its use. Car-

this statement correct? If so, were the heaps of sand inhaled, or were they not rather the calcareous deposits formed by the disease? A medical gentleman informed me that he found sand in the lungs of a carrier. *Ramazzini* and *Alibert* relates occurrences similar to those of *Diemerbroek*. *Morgague* also has some reports which bear on this subject.

‡ *Ramazzini* remarks on the effects of the dust, "tabidi (Lapidæ) fiant." And *Merat* says, "L'espece de phthisie qui resulte des fragmens de pierre avalés—attaque ces ouvriers avant quarante ans."

Dr. Alison, in a paper in the *Edin. Med. Chir. Trans.* says, "I have reason so believe that there is hardly an instance of a mason, regularly employed in hewing stones in Edinburgh, living free from phthical symptoms to the age of 50."

Patissier quotes from *Blanc's* *Precis d'Operations de Chirurgie*, an account of the stone-dressers of Saint-Roch. The greater part of the workmen are attacked with the disease of Saint-Roch before they are forty years of age; some, however, though very few, escape phthisis, and live as long as other men. Abridging the details, it may be stated that the disease commences with a dry cough, which continues some months,—that expectoration of muco-purulent, sometimes sanguineous matter succeeds: then, hoarseness and heat of the trachea, febrile excitement; general oppression, with hardness of right hypochondriac region; diarrhoea with cessation of sputa; loss of hair and nails; absence of sleep, or profuse sweating accompanying sleep; emaciation; death. The disease of Saint-Roch lasts six months, a year, or sometimes several years.

bonic acid is sometimes disengaged so largely in the accidental burning of the coal, as to produce by inspiration, fatal or dangerous effects.* The opening also of parts of mines which have been long closed, liberates gases of the most destructive character, as carbonic acid, and sometimes, I believe, sulphuretted hydrogen; but accidents from this cause are now less frequent in England. The kind and quantity of the gases ordinarily vary with the character of the coal beds, and the full or imperfect ventilation of the mine; but colliers at work can rarely, even in the most favourable circumstances, breathe a proper atmosphere. Among the evils of their situation, I must mention also the occasional out-break of water, which occurs so suddenly as to give little chance of escape.

Colliers have good muscular exertion. The position varies with the situation of the coal, and the thickness of the seam or bed. This, in Yorkshire, as I am informed by Mr. Leather, is from $1\frac{1}{2}$ to 9 feet, while in the more northern counties, it is not more than from $2\frac{1}{2}$ to 7 feet. The differences of thickness admit the erect posture, or oblige the men to sit, recline, or sometimes to bend the body to the greatest degree. Hence the colliers in some mines are of good figure, and erect; while in others they have the spine permanently curved, and the legs frequently bowed. They often work almost naked, either for the convenience of motion, or from the effect of the close and heated atmosphere. The hours of labour are generally about 8 or ten daily. The men are in the mine commonly at four or five in the morning, and remain there till they have

* See in the Edin. Med. Journal, vol. 32, a short but interesting paper by *Mr. Watson*, of Wanlock Head, on a case of this kind. Head-ache, 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.

completed this term, and often without taking a regular meal. Colliers are subject to disorders of the head, muscular pains, particularly in the back, to rheumatism, to asthmatic and other disorders of the lungs and air-tube. The pulmonic diseases, however, chiefly prevail among the miners of coal, which is loaded with pyrites, and which produces consequently considerable dust.* The complexion of the colliers, even after the removal of the dirt, is generally sallow and unhealthy. Their eyes, from the swelling of the lids, appear small, are affected with chronic inflammation, and intolerant of full light. They are well known to be subject to severe accidents from the fall of parts of the mine.

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 mine. Colliers are not habitually intemperate. Fields of men will sometimes work for a year at once without the absence of a day, except for ill health; but occasionally they break off from work, and spend their time at the ale-house. Colliers 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 at the employ. In the mines charged with pyrites, few can remain so long. The prevention of

* A remarkable case has been detailed by *Dr. Gregory*, in the *Edin. Med. and Surg. Journ.* of a man, who, having worked several years in the mines of Dalkeith, died from pulmonary disease, and whose lungs were infiltrated with black matter. The analysis of *Dr. Christison* showed this black substance to be very different from the product of melanosis, and to resemble, if not to be identical with coal.

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 knew, accidents would be comparatively rare.

From their affinity to the preceding class, **IRON-MINERS** are next noticed. As the ore generally lies over the seam of coal, both minerals are often worked together: and the habits and general character of the iron-miners, are similar to those of the colliers. The greater height of the mine, however, gives the former an advantage in labour. Hence iron-getters are more upright and less subject to distortion than colliers. They are, however, generally thin, sallow, often affected with head-ache, and have the sight frequently impaired. Men unable, as they advance in years, to bear the labour of the mine, become "banksmen," and are employed outside the pits, in removing and conveying the ore. Hence, though there are few old men in the pits, many are found among the banksmen 50, 60, and 70 years of age, and occasionally an individual of 80. Iron-miners, like the colliers, are subject to severe accidents from falls of the roof, and to the more fatal effects of explosion and suffocation.

MINERS OF LEAD suffer considerably from their employ. In the mines of the North of England, the men are injured by working ore in sandstone, but are sensible of no inconvenience when the ore is in limestone. A scientific friend, to whom I am indebted for my information on this subject, observes, "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 thirty 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 Cartmell 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? Assuredly the wretchedness and mortality of miners may be greatly diminished, by reducing the dust of the employ, by temperance, proper hours, and occasional changes of occupation. Some of the Derbyshire miners,

as soon as they are disordered, employ themselves in lime burning, and are said to experience great relief from the consequent inhalation of carbonic acid. Would the inspiration of dilute chlorine for an hour in an evening, so invigorate the constitution as to enable it to resist the invasion of disease?*

* *Ramazzini* and *Patissier* enter at large, and with great interest, on the state of the miners of different minerals. I shall endeavour in this note to condense the information which these and some other authors communicate.

The learned Italian, after referring to several authors who had noted the state of miners, adverts to the wet or dry state of mines. From the former the men suffer in the lower extremities (“*crura vitiantur*”—deformity, necrosis, or ulcer?—the latter, I suppose) and are occasionally asphyxiated by the exhalation from the stagnant waters. The workers in quicksilver mines, according to *Fallopianus*, can scarcely endure the employ for three years, and, according to *Etmuller*, become in four months subject to tremors, palsy, and vertigo. *Ramazzini* quotes from the English Philosophical Transactions a statement, that in some mines no man can work more than six hours at once, and the case of an individual, who, after having been employed there for half a year, became so charged with mercury, that he made a piece of brass white, by touching it with his mouth or his finger. *Tozzius* remarked that the miners of quicksilver lost their teeth, and were subject to asthma. This disease was called *asthma montana*, and was placed by *Van Helmont* between the common forms of dry and moist. Some thought they found mercury in the bodies of the miners destroyed by the employ. In the copper mines the men often respire with difficulty. In the mines of Misnia, in Upper Saxony, which produce black dust, the oxyde of zinc, *Agricola* states that the arms and legs are ulcerated. In the silver mines the workmen are often stung by insects resembling spiders, and affrighted by the notion of spectres. *Hoffman*, in his *Metallurgia Morbifera*, states that the men employed in digging and manufacturing the cobalt at Kuttenberg, in Bohemia, are affected with vomitings, syncope, anxiety, cardialgia, difficulty of breathing, sense of suffocations, tremors, &c. and that they appear like living skeletons.

Patissier, in discussing the diseases to which miners are subject, divides the deleterious agents of mines into 1. Injurious gases. 2. Emanations from the metals worked. 3. Inundations. 4. Accidents. Under the first head, besides the impurity produced by common causes, he mentions carbonic acid, hydrogen, carbonic oxyde. To these he adds the carburetted hydrogen of coal-mines, the arseniuretted hydrogen (*le gaz hydrogène arsenique*) of tin, silver, &c. The foul air of old workings, and that from stagnant water, are particularly dangerous. Season, and especially warm and moist weather, sometimes occasion the sudden develop-

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,

ment of deleterious gases. Explosions from hydrogen and its compounds, and asphyxia from the azotic air of old mines and caverns opened anew, are the chief results. A creeping sensation over the whole body is the slightest effect of the azote. A more permanent one is a convulsive cough, which commonly ends in consumption. The symptoms which mark the affections produced by the inhalation of deleterious gases, are—malaise; anxiety; sense of constriction of the chest; impeded respiration; frequently nausea and vomiting; oppression of the head and senses; loss of consciousness; irregular action of the muscles, amounting sometimes to convulsion; pulse imperceptible; face swollen and hard; eyes open and projecting; jaws closed; belly distended; ecchymoses; finally asphyxia, and death.

The means which he and *Ramazzini* recommend for the prevention of such fatal accidents are those well known in this country, and often urged on masters of coal-mines and their workmen.

2. Emanations from the metals produce, according to *Alibert*, pruriginous eruptions on the skin. Workmen in mines of mercury are at first very subject to salivation and trembling. *Bernard de Jusseiu*, in a memoir read to the Academy of Sciences in 1719, stated that in the mercurial mines of Almaden, the free workmen, who were not restricted to the place, and were cleanly in their habits, had no other disease than a slight trembling; while the slaves, confined and dirty, were affected with swelling of the parotids, with aphthæ, salivation, pustules, scurvy, and considerable trembling. *Stoll* remarked that the workers in lead mines had a peculiar figure, that their physiognomy was sad, melancholic, somewhat sinister and menacing; and that they were subject to palsy and colic. *Patissier* states that the miners of copper are subject to colic, diarrhœas, and dysentery. The mines which contain arsenic are very baneful to the operatives, though the diseases which they induce are of slow march. These are slight fever, leanness, colic, and weakness of the limbs. Mineral vapours affect the eyes. Passing over *Patissier's* heads of inundations and accidents, we find a disease referred to under the title of "Anemie." It attacked for 11 years, epidemically, all the workmen in one gallery of a coal mine at Auzain, near Valenciennes. This gallery did not differ in situation or ventilation from others in its neighbourhood. The air analysed contained sulphuretted hydrogen, and carbonic acid. The "Anemie" presented the following characters—violent colic, pains in the bowels and stomach, difficulty of breathing, palpitation, prostration of strength, flatulence, and black and green colour of the fæces. This stage continued ten or twelve hours, and was succeeded by abdominal pains, pulse weak, concentrated and quickened, skin discoloured and tinted with yellow, loco-motion difficult, and fatigue extreme, palpitations frequent, face swollen, sweats constant. The second stage was of many months' duration, and was chiefly marked by

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. Dr. K.'s paper very properly alludes to the combination of injurious

depression and emaciation. At last the first symptoms recurred; there were dire pains in the head, frequent faintings, intolerance of light and sound, flatulence, purulent stools, sudden death. Less acute and urgent were the symptoms in persons who had not the first stage in a marked degree: and great bilious disorder with its attendant affections of the stomach, heart, and head, formed the chief character, and gave the name of "*maladie jaune*." On post mortem inspection, the arteries and veins were found to contain only a liquid serum. [This surely is a very deficient report.]

Asthma is next mentioned by *Patissier*, as resulting from labour in coal-mines. It commences with a cough, at first dry, but afterwards accompanied by the expectoration of a thick matter. The breathing becomes difficult, with panting on exertion, and increased by the advance of age. At the beginning, the disease attacks in paroxysms twice or thrice a year, which last from seven to eleven hours, and subside by sweating.

Rheumatism is the last subject of particular notice. The humidity of the mine affects the half-dressed workmen, and according to our author produces this disease. He concludes with some general remarks. Workers in mines of quicksilver are subject to trembling,—in those of lead to colic, &c. The injurious effects may be diminished by covering the antrum and protecting the air-passages. Consumption does not occur, according to English physicans, among the workers of sulphurous coal-mines; indeed phthisical patients have been cured by remaining in coal-pits. Instances of great age are found among colliers.

Percival, in his little work on poison of lead, states the men to be healthy in many of the Derbyshire mines. The two agents of disease he represents, as in some cases, the detachment and inhalation of small particles from the limestone bed, and in others, the dashing of dirty water in the faces of the workmen by the stroke of the pickaxe. This kind of work we should have expected to have been harmless.

In *Clarke's Travels in Sweden and Norway*, we find an account of his visit to the copper-mines at Roraas:—"The first thing we were shown, upon our arrival at the mines, was the dormitory of the workmen, who sleep upon boards, before an enormous fire, with rein-deer skins for their pillows. We were struck with the unhealthy appearance of the workmen; almost all the miners being asthmatic. The reason assigned for this by the directors was threefold: first, that they came much too young to work; secondly, that they work by the gross, and often injure their health by the violence of their exertions; and thirdly, that it is a constant practice with all of them to drink large draughts of cold water, when they are very hot. But perhaps the real cause of the prevalence of this disorder may be found in the sulphurous exhalations from the works, which are

agents and circumstances. It is not merely the pernicious employment, but the want of sieve and ventilation in the apartments where the men now work,—the want, moreover, of that exercise in the open air which they formerly took in going to work and returning from it ; and finally, the intemperance which results from their congregation, and still more from their desperation of life. It appears, that in 1822, “ out of 2,500 grinders, there were not 35 who had arrived at the age of 50, and perhaps not double that number who had reached the age of 45 : and out of more than 80 fork-grinders, exclusive of boys, it was reported that there was not a single individual 36 years old.”*

The symptoms of the grinders' disease are difficulty of breathing, such as to require generally the action of the muscles auxiliary to respiration ; tightness of the chest ; hoarseness of voice, and tenderness of the larynx ; sonorous cough ; spitting of blood ; expectoration of mucus, containing often dust, and, in the latter stage, of fetid and purulent matter ; muddiness of complexion ; anxiety of countenance ; pulse quickened, not at first, but in the after stage ; colliquative sweats and diarrhœa ; emaciation ;—in a word, the signs

so powerful in the neighbourhood of Roraas as to affect the inhabitants.”

“ An immense proportion of the miners in Cornwall are destroyed by chronic bronchitis ; one of the principal, though by no means the sole cause of which, I consider to be the inhalation of dust.”—*Forbes note on Laennec.*

* In 1796, *Dr. Johnstone*, of Worcester, published a short paper in the *Mem. of the Med. Society of London*, on the consumption of needle-pointers. He states that “ persons employed in pointing the needles, by dry grinding them, are consequently very soon affected with pulmonary complaints, such as cough, purulent or bloody expectoration ; and being so affected, they gradually waste in strength and flesh, and hardly ever attain the age of forty years. As the business is known to be constantly attended with such fatal effects, the manufacturers find it not very easy to engage persons to work at it ; and they who are engaged, are so well paid as to get money enough to mispend in drink, being, for the most part, in this respect, persons of very irregular manners.”

of slow but certainly fatal consumption. The remedies judiciously recommended by Dr. Knight, are, 1st. Dusting the machinery, before the work commences; 2nd. Great reduction in the time of labour; 3rd. Use of wet stones as much as possible; 4th. Large flues to be laid on the floor for ventilation, and currents of air to be forced through them by the machines; 5th. Fork-grinding to be confined to criminals.

FILE-CUTTERS are allied to the grinders; but are subjected to less injury. In *grinding* the files, as the stone is wet, no particles rise into the airtube. But the *chipping* and *raising* of the stone, occasionally required, evolve sand and dust, which are baneful both to the respiratory and digestive systems, and would, if the employ was constant, produce the most serious results. *Cutting* occasions little dust.

The posture, in most of the departments, is sitting and leaning forward. The men are pale and sickly. They are subject to indigestion and bronchial diseases, and seldom live beyond the ages of 45 and 50. This defect, however, of health and longevity, is, I suspect, more to be ascribed to their habits of intemperance, than to the nature of their employ.

MACHINE-MAKERS are divided into several departments. The founding produces only the slight and temporary annoyance of dust from the charcoal sprinkled on the mould. The men are generally healthy. Dressing the iron, technically called *fettling*, seems to be equally innocuous.

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 præternaturally dry. Besides the dust there are some very bright scales, called *kisk*, very visible though scarcely tangible, which rise from the castings, as these are taken out of the moulders' boxes, and considerably irritate the air-tube. But these scales produce much less frequent annoyance than the particles detached by the file, notwithstanding the dust of the employ. Respiration is not promptly impeded. Of ten men whom I examined with reference to this point, but one had difficulty of breathing as a *primary* symptom. The filer on rising in the morning is distressed with a painful oppression behind the sternum, and a sense of tightness or soreness. In a short time, cough, and expectoration of blackish or dark blue matter, relieve him, and he is able to move without discomfort. But the cough affects him at intervals during the day. He rarely suffers in the digestive organs. The tongue is clean, the complexion on the removal of the dust of his employ is tolerably fresh, his pulse is not feeble or quick. The large muscles of the arms, from their action in his labour, are full and hard; but his general appearance, though much better than that of the flax-men, is rather thinner than that of most [other artizans equally well fed.* Such is the

* I insert as examples, short notes of two or three cases of men at their work, and conjoining, as most machine makers do, the filing of iron and brass.

J. B. 25 years of age, has been 11 years employed as a filer of cast iron,

general character of the early disorder of filers. But some have pain in the loins and chest, a few complain of hoarseness, and occasional loss of voice, and one who has been very long at the employ, was first affected with nocturnal difficulty of breathing as his principal disorder. The subsequent symptoms are determined chiefly by intemperance, and the constitutional disposition to consumption. The machine-makers earn high wages, and many consequently are addicted to liquor. In all, the breathing becomes in a few years, more affected by exertion; but in the intemperate it is most affected; the morning cough is attended with retchings, disorder of the liver and of the other organs of digestion becomes established, and at length pulmonary consumption closes the list of

wrought iron, and brass. About three years ago, he became affected with pain and soreness at the sternum, and with cough and expectoration of dark matter. On percussion, the chest returns rather a dull sound, but by the stethoscope no great defect in respiration is perceived. The man's general health and appearance are as good as those of townsmen in general.

2. J. M. aged 39, has been 25 years in the employ—an unusual period. For many years past, he has been affected with urgent morning cough, retching, and difficulty of breathing. His pulse is weaker, tongue not so fresh, and countenance paler than his fellows. On percussion, the chest returns a dull sound; and on the application of the stethoscope, the respiratory murmur is generally weak, and a sonorous rale heard in parts of the lungs. The records of other cases resemble these so much, that instead of stating them, I insert one of a less frequent kind.

3. Mr. N. aged 49, has been from youth till the last few years closely engaged in making machines, and chiefly in filing. Temperate in his habits, he had suffered only from occasional attacks of gastric disorder, till six months ago; when after speaking for two or three hours, he was suddenly seized at bed-time with a sense of tightness of the chest, and great difficulty of breathing. These symptoms have occurred in a greater or less degree every night since, and oblige him to rise from bed. During the day, respiration is free. He has no cough. On examination with the stethoscope, the murmur is heard only on a forced inspiration, and is more deficient on the right than the left lung. The action of the heart is preternaturally audible. His general health is not much affected.

In referring to my notes of those who have died consumptive, I do not find any peculiarity of symptom or circumstance. No post-mortem examination of a machine-maker, have I yet been able to obtain.

symptoms. Where there is a predisposition to this disease, the employ, independent of intemperance, is sufficient to produce it. Bronchial hæmorrhage, inflammation of the liver, and painful affections of the stomach, I have found among machine-makers, but these complaints are not frequent. A decided case of asthma from the employ, has not fallen under my observation, unless the third in the note be deemed one. On examining the chests of 17 machine-makers at work, we found the average circumference $38\frac{5}{4}$ inches, and the average quantity of air expired at an effort, 207 cubic inches. Another batch of five men gave 234 c. i. The capacity of the lungs does not, therefore, appear to be soon affected. Scarcely a filer, however, can be found in health. Few bear the employ, even modified as it is by frequent changes of material, for 25 years. Only one instance have I been able to find, of a working filer's exceeding the age of 50. In an establishment of 100 men, five died last year from consumption, a proportion about 12 times greater than the phthisical mortality of the English in general. The frequency of pulmonary consumption among iron filers, and others in dusty occupations, admits of easy explanation. 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 and 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 a disposition to the formation

of tubercles ; 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 spiculæ—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, and a vast majority die consumptive.

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 airtube, were many years ago introduced in Sheffield, and ought ere this to have been more extensively tried. 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 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 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,

* *Ramazzini* speaks of metal-workers, &c. in very different terms: "Persæpe miseros artifices audias medicos ipsos orantes, ut vel *occidunt* 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.

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

The MAKERS OF FIRE-ARMS have an employment compounded chiefly of the works of the smith and the iron machine-maker. In grinding the barrels of muskets and fowling-pieces, there is considerable dust, and effects are produced similar to those referred to at page 96. In this, as well as in other injurious employments, we find the intemperate chiefly suffer.

The BRASS-FOUNDERS suffer from the inhalation of the volatalized 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. The brass-melters of Birmingham state their liability also to an intermittent fever, which they term the brass-ague, and which attacks them from once a month to once a year, and leaves them in a state of great debility. As a preventive they are in the habit of taking emetics. They are often intemperate. In Leeds 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 continued at the employ from boyhood.* The *Turners*, *Filers*, and *Dressers*

* *Aretæus*, in his chapter Περὶ Ασθματός, characterised, as most of his writings are, by a vivid picture of the disease, refers to the workers in

of Brass, if confined to this metal, 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. This I suppose to result from the oil of the hair's combining with the copper in the brass particles.

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-SMITHS are considerably affected by the fine scales which rise from the imperfectly volatalized 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 sulphurous 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. Tinnners also are subject only to temporary inconvenience from the fumes of the soldering.

PLUMBERS are exposed to the volatalized oxide of lead, which rises during the process of *casting*. The fumes frequently induce at the time nausea and tightness at the chest; and men, who are much in this department, are soon affected with colic and palsy. These diseases, however are much less frequent and severe, than among smelters.

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. Asthma, however, is rare, and plumbers, though sickly in appear-

brass, iron, &c., and to the tenders of the bath-fires. He considers them, it appears, affected with a moderate but durable asthma, the prelude of death—*αμβολη θανάτου.*

ance, and occasionally affected with griping in the bowels, are not frequently off work from illness, except where the process of *casting* is common. We are 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. A small proportion reach the age of 50.

The MANUFACTURERS OF WHITE LEAD are subjected to its poison, both by the lungs and the skin. The dust and exhalation are most from the *white-beds* and the *packing*; little from *smelting*. There is only stench from the *grinding*, and neither dust nor smell from the *blue-beds*. Such at least was the statement of the managers of an establishment at Hull; for we were not permitted personally to inspect the process, though we examined the men. In several departments the heat is such as to produce sweating. Drinking, however, is less than in many other hot employments, and white-lead preparers are not as a body intemperate. In all departments the men and women are sallow and thin, and complain frequently of head-ache and loss of appetite. The effects of the lead are most marked in the white-beds and packing departments. Here, men soon complain of head-ache, drowsiness, sickness, vomiting, griping, obstinate constipation, and to these succeed colic or inflammation of the bowels, disorders of the urinary organs, and, finally, the most marked of the diseases from lead, palsy. We observed the muscles of the fore-arm more frequently and sooner to suffer than other parts. The eyes are also affected with chronic inflammation, or reduced nervous power. Persons commence the manufacture about the age of 20; many soon leave, from broken health; those who endure the employ, do not remain on

the average longer than the age of 45, and during one-third of these 25 years, the men are laid up in bed, or decrepid from colic or palsy.* The oldest man known in a large establishment at Hull, we found to have attained the age of 54. But he is now unable to work. It is 16 years since he entered the employ, and during this period he has been laid up 28 times from serious disease! Each attack has been worse than its predecessor. He has been on one occasion 19 weeks in bed, with scarcely the power of stirring a limb, and was a month without any evacuation from the bowels. This miserable man is now partially paralytic; he has scarcely any motion in either

* *Merat de la Colique Metallique* contains the fullest account of this disease; and in *Dr. Christison's* able work on Poisons, is a valuable summary. The comparative frequency of this disease in various occupations, *Merat* had an ample opportunity of ascertaining at the hospital of La Charité, in Paris. I quote his statement, as introduced in the work of Dr. C.—

“The total number of cases in 1776 and 1811 was 279. Of these 241 were artizans whose trade exposed them to the poison of lead,—namely, 148 painters, 28 plumbers, 16 potters, 15 porcelain makers, 12 lapidaries, 9 colour grinders, 3 glass blowers, 2 glaziers, 2 toymen, 2 shoemakers, a printer, a lead-miner, a leaf-beater, a shot manufacturer. Of the remainder, 17 belonged to trades in which they were exposed to copper,—namely, 7 button makers, 5 brass-founders, 4 braziers, and a copper-turner. The remaining 21 were tradesmen who worked little, if at all, with either metal,—namely, 4 varnishers, 2 gilders, 2 locksmiths, a hatter, a saltpetre-maker, a wine-grocer, a vine-dresser, a labourer, a distiller, a hatter, a stone-cutter, a calciner, a soldier, a house-servant, a waiter, and an attorney's clerk. Age or youth seems not to afford any protection against the poison. Of the 279 cases, 24 were under 20; and among these were several painter boys not above fifteen years old; 113 were between nineteen and thirty; 66 between twenty-nine and forty; 38 between thirty-nine and fifty; 28 between forty-nine and sixty. These proportions will correspond pretty nearly with the relative number of workmen of similar ages. Among the 279 cases, 15 died, or 5.4 per cent.” The only disease found on post mortem examination of those who have died from the poison of lead has been a contraction of the large intestines; and in a great majority no morbid appearance whatever. I suspect the spinal marrow has not been carefully examined. In an inquiry on the effect of the poison of lead, I found ramollissement of the spinal cord, in dogs destroyed by a course of the carbonate.

wrist, and his lower extremities are so weakened that he can scarcely trail himself along even with the aid of a crutch. His haggard countenance and emaciated frame give the appearance of the age of 80 rather than of 54.

No person can be a month in the worst department without a serious attack of disease. Drunkards suffer most. One of them was said to have been suddenly seized with violent insanity while packing lead, and to have died soon after. Persons do not work in the lead manufactory more than five days a week on the average; and as no man could be induced to remain in the destructive departments, there is a regular change of duties. Thus, though none are destroyed, all are exposed in turn to the most baneful process.*

What means can be used to improve the state of these wretched operatives? Last year I examined with care the agency of white lead, which was said to have been rendered innocuous by a peculiar process. I regret to add, that I cannot support the statement of the projector. Will any chemical process avail to prevent the poisonous effects of this mineral? Can any substitute be found for its use in our arts and manufactures?

For paint, Mr. Parkes, the chemist, recommends carbo-

* From the work of *Dr. Percival* on lead, I extract a few passages:—
 “It is the common practice of the smelters of lead, and others also who live in the neighbourhood of smelting mills, to broil mutton, beef, and pork steaks on the hot pigs of lead, by which the flesh acquires a peculiar agreeable flavour.” Is not this practice a great source of disease?
 “The workmen in the sugar-house at Manchester are supplied with beer, prepared from malt and the refuse of the sugar, which are often fermented together in a large leaden cistern. The liquor ferments so briskly, that without the utmost care, it becomes foxed, or inclined to acidity, and the men who drink of it were formerly subject to the most severe and excruciating colics. Of late, proper measures have been taken to check the progress of the fermentation; and the sugar boilers, in consequence of this precaution, have been since exempt from those violent attacks to which they were before incident.” Hounds fed in leaden troughs, have been repeatedly known to fall down in the chase.

nate or oxide of zinc, which, if not wholly harmless, is a less noxious substance, and states that though not quite so white, it keeps its hue longer than the common carbonate of lead.

One means, at least, of prevention is quite practicable—cleanliness. The success of this simple measure at one manufactory,* warrants our belief that more than half the diseases of lead-preparers, would be prevented by washing and brushing the hands and skin whenever they leave work, cleaning the mouth, changing the dress, and the regular use of the bath. A linen dress is also recommended as excluding from the skin much of the dust which would enter through woollen. The rooms in which the processes are carried on, ought of course to be spacious and well ventilated, and there should always be a strong draught through the furnace. A subsidiary chimney, anterior to the ordinary one, is mentioned by Dr. Christison as particularly efficient in carrying off the exhalations from the rakings. Men should never be allowed to take their meals in the workshops. Fatty aliments are recommended as a preservative from the poison of lead.

HOUSE PAINTERS are subject to injurious exhalations, and to absorption of poison by the skin. The effects of the employ are most immediately felt during the process

* 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.*

of *flattening* or finishing the dead colours with turpentine. The exhalation produces first dizziness, and afterwards in many individuals, vomiting—the symptoms indeed, rather of spirituous intoxication than of a mineral poison. It is probable, however, that some emanation from the lead is combined with the vapour. The effects are thought to be greater in proportion to the surface, when spirit of wine is used in the varnish of cabinet-work. *Grinding* the paint is perhaps the most baneful department. Here the skin is rubbed with the salts of metals, commonly white lead, occasionally mineral green (the arsenite of copper.) The latter, though its dust is scarcely visible, occasions discharge from the eyes and nose, and a soreness of the chest, which sometimes remains for days and weeks, and were not this part of the employment comparatively rare, permanent injury would result. The men consider themselves subjected to no danger from the use of mineral green after its pulverization, whether combined with water as in colouring, or with oil as in paint. The scraping of old green walls produces effects similar to those of grinding the colour.

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 air-tube. Bilious and gastric disorders are frequent; but the most serious and permanent evils of working in paint are colic and palsy. The first is the peculiar form of disease called “*colica pictorum*,” and the second is marked by a local rather than by a general affection,—one arm, or even one finger, loses its power of motion, and the member, according to *Clutterbuck's* remark, is generally that which has been accustomed to hold the brush.

Is the mineral absorbed,

or are the effects produced by an impression on the cutaneous nerves, and through them on the 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, might not some less exceptionable article be substituted?

As the poison appears to act principally on the skin, cleanliness is highly important. The washing of the hands, brushing of the nails, and change of dress, should be practised much more frequently than in the common habits of the men.* Ventilation also should be more regarded.

PAPER-STAINERS suffer chiefly from the rubbing and grinding of the paint. When arsenic or white lead is employed, they lose appetite, and are affected with severe headach. This, however, subsides on their going out into the fresh air. Sickness often results from Prussian blue and arsenic, especially when turpentine is employed. Hence paper-stainers, as well as painters, attribute baneful effects to this substance.

Boys suffer more than adults from the grinding department. But as neither are often engaged for long periods, in working the colours, green or orange, which contain arsenic or oxide of lead, we do not find the more severe effects of these minerals, constipation, colic, and palsy, frequent among paper-stainers. Some, however, complain of abdominal pains. A less immediate but more permanent evil than the headache and sickness of grinding, is the

* *Dr. Christison* says, "I have been informed by an intelligent workman, once a patient of mine, who had been a journeyman painter both in London and Edinburgh, that the number of his acquaintances who had been affected with colic in the metropolis, was incomparably greater than here (Edinburgh.) This man ascribed the difference to the working hours being more in the former place, so that the men had not leisure enough to make it worth their while to clean themselves carefully in the intervals."

impaired vision of the printing department. The blocks which impress the paper, require very accurate adjustment. From this, from the dazzling of the flocking department, and from the application of the eyes to other minute objects, these organs suffer considerably. Dimness of sight incapacitates most men, before they reach the age of 50.

The men are not addicted to liquor. Indeed, the nicety of hand and eye required in the employ precludes intemperance. A fine

dust arises from making flock-boarders, and considerably affects respiration. The process, however, is not carried on long by the same persons, and hence no permanent injury of the lungs and airtube is apparent. The vapour from spirit of wine and turpentine used as a varnish, produces a slight intoxicating effect.

Though some parts of the labour appear slight, those which require large blocks, are rather severe; and cramp in the hands sometimes results from the lifting of such heavy bodies. The men have varied muscular exertion in the different processes of rubbing the colours, applying them or "printing," and fixing the papers on the walls. In no part of the business are they crowded.

There are few instances of aged paper-stainers. We heard of a solitary case of a man now living at the age of 55, but he has not been able to follow the employ for the last five years.

The MAKERS OF MILITARY ORNAMENTS at Birmingham have various occupations, several of which are injurious. In *bobbing*, some of the articles produce much dust, and proportionally excite sneezing, cough, and difficulty of breathing. In *turning*, the small wheel, covered with emery, throws off sparks of fire, which entering the throat, cause a warm sensation in the chest and stomach. In *filing*, the particles detached are larger, and consequently do no injury. *Lachering* is considered

by the women who perform it, unhealthy; but the only results apparent are paleness and loss of appetite. No person is confined to any one of these processes, and hence the effects of each are not marked. The operatives do not commence work till eight in the morning. Generally temperate, they live to age.

METAL SPOON MAKERS are subjected to some fumes from the melting of their materials; but temperate workmen enjoy health, and attain full age. We did not hear that the antimony, tin, and lead which they use, induce any form or modification of palsy.

METAL AND IRON BUTTON MAKERS are exposed in the *casting* department, to great heat and some dust. The fumes from the zinc produce occasionally that form of ague to which brass-founders are subject. The men, however, though pale, are generally healthy. In this, as well as in the preceding employ, scalds from the melted metal sometimes occur. In *turning*, particles of the buttons are detached, which frequently pass into the stomach or air-tube. For the gastric annoyance, the men occasionally take emetics. The irritation of the air-tube produces often more serious effects, bronchitis, inflammation of the lungs, and ultimately consumption. In *grinding*, smaller particles are detached, the atmosphere is consequently more clouded, and serious disease more frequently produced. The men who escape pulmonary disease, appear unhealthy, and are seldom able to remain at the employ after the age of 45 or 50. Their posture is leaning and confined; and the opportunities which offer for exercise and fresh air, are often devoted to the destruction of health: Mondays and Tuesdays are spent at the alehouse. In *finishing* the buttons, the stone and sand powder does not foul the atmosphere, and hence urgent disease is not produced; but the rooms are small, and the operatives confined to a leaning posture. Men, boys,

and females are employed. Though some in this department live to a considerable age; the general health in most of the elder operatives appears to be reduced. In the *polishing*, the dust is especially injurious, bronchitis is soon produced, and consumption frequently follows. In the *varnishing* department the operatives look pale, but seem to suffer only from confinement and the leaning posture.

GILT BUTTON MAKERS, in the *casting* department, are subjected not only to great heat, but to rather severe effects from the fumes of zinc. These are giddiness, headache, sickness, reduction of the appetite, and bilious disorders. The men have the appearance of ill health; 45 is about the average duration of life. In this, however, as well as other baneful occupations, it is difficult to determine the proportion of evil which the employ and intemperance respectively produce; for labour that distresses is generally well paid; high wages admit considerable intervals of rest and leisure; and leisure, by most uneducated workmen, is spent happily only at the ale-house. In *gilding*, the temperature of the rooms is 110° to 120°. But the principal evil is the mercurial vapour. Reduction of appetite and of sleep, trembling of the limbs, soreness of the gums, and disorder of the bowels are the common effects. At Birmingham, the women employed in this department begin their work at 10 a. m., and leave it at 5 p. m. They seldom live to full age.

MAKERS OF LOOKING-GLASSES, or rather MEN WHO SILVER MIRRORS, are exposed, both by inhalation and touch, to the action of mercury oxygenized by the atmosphere. The operatives are chiefly Italians. Few can bear the employ daily for a long period. Some work on alternate days; and many, more constantly engaged, are obliged from illness to be absent for weeks or months. An English master tells me that he has been in

the habit of silvering mirrors, for two or three hours a day during the last fourteen years, and considers it remarkable that he has suffered, even from this short diurnal employ, no other injury to health than constant though not great trembling of the hands. The general effects of the art are difficult enunciation, pain and constriction at the base of the chest, emaciation, debility, tremors, and lastly salivation. The gums are often wasted and the teeth left loose in the sockets. As the fingers and hands are generally the parts first disordered, it appears that the primary impression is on the nervous system at large, and is made through the medium of the skin rather than that of the lungs.* Intemperate men suffer most.

* In the *London Medical and Physical Journal*, for November, 1831, is an interesting article on this employment, by *Mr. Mitchell*, of Lamb's Conduit-street, London. I extract two of the cases he relates :—

“ Peter Cataneo, an Italian, had worked for five years at silvering mirrors ; during that time he had repeatedly been obliged to desist from his employment, until the effects of the mercury subsided. November, 1829. The tremors are general ; gums sore : spirits depressed ; bitter taste in the mouth, which is also very clammy ; tongue white ; temperature of the skin sensibly above the natural standard ; pulse quick and small, but is with difficulty felt, in consequence of the constant tremor : he likewise complains of cough and tightness. He took the sulphur, as recommended by those who have practised at the mines, with some degree of benefit ; a grain of opium at bedtime ; and his subsistence consisted of milk, gruel, fish, and porter. He used for the sore mouth an acid gargle. The ptyalism abated ; the tremors subsided, and in the course of a fortnight, in a great degree, vanished ; leaving, however, behind a great feeling of weakness, which was successfully combated by nutritious diet and bark. The injunction never to resume the employment of silvering had no effect ; but he has since, I understand, been obliged to relinquish it.

P. Nash, æt. twenty, of nervous temperament, commenced silvering six months ago, the trembling came on three days after he began to work, and his mouth was sore in six days ; and he has continued to suffer, more or less, up to the present time. 14th March, 1831 : The speech greatly impeded ; the limbs totter when he attempts to stand or walk, which he accomplishes very slowly and with great difficulty, an infirm step, and awkward gait ; he is unable to convey any substance to the mouth, in consequence of the severity of the tremors ; slight subsultus

WATER-GILDERS, men who coat silver or other metal with an amalgam of gold and quicksilver, are exposed to the same poison as the silverers of mirrors.* They diminish its effects, however, when employed on small work, by interposing glass between the mouth and the materials; and when engaged on larger articles, by affixing to the mouth and nose a kind of proboscis, which hanging down, opens at a distance from the source of the mercurial fumes. Notwithstanding these contrivances, and every attention paid to ventilation, the art cannot be closely pursued without the induction of serious disorder.

tendinum, confined the upper extremities; the tongue quivers, gums slightly tender; pulse strong, rather quick; appetite diminished; sleep disturbed; body wasted; he complains as if a feeling oppressed like a load across the lower part of the chest; or as if a substance lay at the bottom of the lungs, as he expresses himself, which he conceived to have been drawn in by inspiration; the breathing was quick, accompanied with strictured feeling and cough. He was nearly thrown from a bath by the violence of the trembling; a large quantity of the water was driven by his excessive agitation over the sides of the bath; and if two men had not held him steadily in the water, he must have been thrown out before he was capable of remaining quiet."

Mr. Mitchell remarks that in twelve looking-glass manufactories he visited, "it clearly appeared that the metal became oxidized, by combining with part of the oxygen of the atmosphere, and the more quickly so from the friction which is necessary in the application of the quicksilver to the plate of glass."

The French see much of this disease, and call it *Tremblement des doreurs*, or *Tremblement mercuriel*. *Merat* has paid particular attention to the subject, and *Patissier* enters on it at large; but after the details already given, I need only remark that they dwell especially on the nervous diseases induced, the convulsive motions of the muscles so universal and urgent, and the occasional occurrence of somnolency and delirium. Sometimes the men, from their inability to direct their hands with precision, are obliged to feed like quadrupeds.

Ilsemann as quoted by *Sir George Baker*, states, "Adficiuntur hydrargyri effluvia qui hauserunt, lipothymia, sudore frigido, convulsionibus, αναισθησια, apoplexia, epilepsia, et praesertim artuum tremore, paralyssi, ptyatismo, et dentium vacillatione."

* The superintendent of a manufactory told us, that from the sweeping of the chimnies on one occasion, he collected twenty pounds of good quicksilver.

Depression of spirits or "nervousness," is succeeded by trembling, sickness, depraved taste, fetid breath, and finally salivation.* Palsy also is frequent; but this, as well as the other maladies, is in most cases removed by rest and fresh air. Repeated attacks, however, destroy vigour of constitution and shorten life. Men past middle age suffer so much more than others, that scarcely any are found at the employ. Water-gilders generally work but four days a week, and for about nine hours each day.

Personal cleanliness and change of dress considerably diminish the bane of this and the preceding employment. Ventilation also, and the management of currents of air through the workshops, should be regarded as much as possible.† When tremors appear, rest, fresh air, and aperients should be promptly employed; and for salivation, I have found opium the most efficacious and speedy remedy.

JEWELLERS AND WORKERS IN GOLD, a distinct class from that of the Silver-workers, mentioned at page 46,‡ are subjected, not only to the evils of confinement, but to the effects of gases evolved in the manufacture. These are, the gas from the coke employed, as in collecting the gold from the sweepings of the floor; the gas from the charcoal used in melting;

* *Van Swieten* observes, "Argenti vivi, per ignem agitati, vapores illos, qui deaurandis metallis victum quærunt, miserrimos reddunt; dum tota vita tremuli omnibus membris manent; quandoque et epilepticos inde factos fuisse novi.

† In the *Dict. des Sciences Med.* Tome XXVII. are a plate and description of a contrivance by *M. Dacier* for the removal of noxious fumes, and which obtained the prize of 3000 francs, bequeathed by *M. Ravrio*. This person, who made a fortune as a *marchand de bronze d'or*, was so impressed with the sense of injury done by the Gilders' employ, that he left the prize for the discovery of some means of prevention.

‡ By mistake, the workers in gold were there joined with the workers in silver.

and the vapour, which arises in the process of *dry* colouring, from the fusion of saltpetre, alum, and common salt. The last produces such distress in the head and nervous system as to make it particularly disliked by the men. *Wet* colouring, in which mineral acids are used, I believe, is comparatively innocuous.*

The jewellers' work-rooms are generally crowded, and the atmosphere consequently fouled by respiration, animal effluvia, and the smoke of lamps, as well as by the specific exhalations of the manufacture. Its temperature is generally raised, and in summer the heat is excessive. The labour is light; but the confinement to a leaning posture, with the head much depressed, and the elbows generally fixed to the sides of the trunk, for ten, fourteen, or sixteen hours a day, is irksome and injurious. Intemperance is general, and dram drinking especially prevalent.

The disorders of which jewellers principally complain, are pains and soreness of the chest, disorders of the stomach and liver, and plethoric affections of the head.

They enter the employ about 13 or 14 years of age, and are obliged to abandon it generally at 45-50. In an establishment of 37 men, two were under 20 years of age, twelve were between 20 and 30, thirteen between 30 and 40, and nine between 40 and 50; one only had passed the age of 50. An old jeweller is worthless to the

* *Merat* speaks of the *derochage* and the consequent inhalation of gas from the acids as injurious. "Beaucoup trouvent la le germ de diverses maladies de poitrine, de la Phthisie meme, ou au moins d'un etat languissant presque continuel." "—— le teint pale & plombe." I doubt the production of consumption or other organic disease of the lungs by the inhalation of the gases. Most of these act chiefly on the nervous system, and affect the lungs, only by depressing this system and thus reducing the general health. I can readily suppose a state of great langour and defective carbonization of the blood, induced by the constant respiration of an atmosphere largely impregnated with gas from a mineral acid; but in this country workmen are not *constantly* exposed to such annoyance.

art, and seldom indeed to be found. A master observes, that “the men drop off from work unperceived and disregarded. I am quite at a loss to know what becomes of them. When they leave off working, they go, and are seen no more. Some, perhaps, became applicants for charities; but so few have I known of the ages of 60 or 70, that leaving work, they seem to leave the world as well, a solitary one appearing at intervals to claim some trifling pension, or seek admission to an alms’ house.”

This is a melancholy, but, I fear, a correct representation of the end of artizans in other manufactures, as well as this, where health is either forgotten, or deliberately sacrificed to lucre, and where this lucre is devoted to intemperance—where the high wages moreover of a baneful employ, afford opportunities of absence from work for hours, or days—and where this absence or interval, instead of being devoted to the refreshment and renovation of the animal frame, harassed and injured by labour, is wickedly perverted to the induction of effects, more baneful than those of any art or occupation.

CHEMISTS and DRUGGISTS are exposed to various odours, and the evolution of gases, many of which are injurious.* Hence the persons employed in laboratories

* An apprentice to a chemist, 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. In another young man, sulphuretted hydrogen produced an alarming fit of epilepsy. *Gehlen*, Professor in the academy of

Munich, examining the reciprocal actions of arsenic and potass, incautiously tried to judge by smell, was poisoned by the gas, and died miserably. *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,

are frequently sickly in appearance, and subject to serious affections of the lungs. They are often consumptive. Few old men are found in the employ. Care on the part of the men, and ventilation practised as much as possible, would considerably diminish the effect of the baneful agents.

The MAKERS OF SULPHURIC AND NITRIC ACIDS, AND OF SULPHATE OF MAGNESIA, have an art separate from that of the general chemist. The fumes of the mineral acids, when largely evolved, produce cough, and a sense of tightness of the chest. Hence asthmatics cannot bear the employ. In others, however, habit diminishes the susceptibility of irritation, the general health is not impaired, and aged workmen are found in the manufactories. The enamel of the teeth is injured by the acid fumes.

GAS-MEN, persons 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.

WELL-SINKERS, in addition to the great labour of their employ, 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 greater degree, animation is suspended, and sometimes destroyed. By a less degree, when continued for some time, health is affected. The men complain of headach, sickness,

(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.

and loss of appetite, and are unable to work for days or weeks. The danger of the employ, care would, in a great measure, obviate. Every workman knows that a light will not burn in an atmosphere too foul for respiration; 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 Cyclopædia, Art. *Well*.

SEWER-MEN, persons employed in cleaning sewers, are often affected by the fetid gases, and sometimes so severely as to suffer suspended animation. When death ensues, the cause appears, from the remark of *Laennec*, to be a dilated and incontractible state of the air-cells: for on opening the bodies of suffocated sewer-men, he found the lungs to be crepitous, but greatly enlarged, and to remain expanded. With the exception of asphyxia, however, these men are not, as far as we could ascertain, subject to any serious disease,† nor are they short-lived.

STOVERS OF STRAW BONNETS are affected by the sulphur burnt. The fumes, in some houses, spread

† 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 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.

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 straw-bonnet makers.

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.

The BLEACHERS OF WORSTED ARTICLES at Leicester, suffer more, for they remain a minute or two at once in rooms filled with sulphurous gas, and on emersion, the breathing is with difficulty restored. The men are habitually subject to cough, and their sallow complexion indicates impaired health.

On reviewing the employment of this section, a few *general* remarks may be made:—(1.) Dust is the great bane of manufacturers, and whether it be farina, animal or vegetable fibre, or evolved from minerals, stone, lime, coal or metal, it injures the respiratory organs, in proportion to the *mechanical* irritation it induces on the bronchial membrane. (2.) The gases of manufactures affect the respiration of the men, only when applied in an extraordinary degree, and seldom do permanent injury, unless this strong application be long continued. To this remark, the volitalization of lead, mercury, and some

other minerals, form the principal exception. (3.) The digestive organs suffer considerably from an artificial atmosphere, and except in the dusty occupations, seem to be sooner affected than the respiratory. (4.) Animal decomposition, however disgusting to the senses, does not injure those who are continually exposed to it, but on the contrary, appears very considerably to invigorate the constitution.

4. Having now adverted to the principal occupations which affect health, by the 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.* The intemperate men are generally those who suffer most severely. Potters are remarkably subject to constipation of the bowels. Of seven individuals taken indifferently, we found five affected with this complaint. One of these had been without an evacuation for six days, another for eight, and a third for eleven. Could not the process of glazing 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? With this view, boracic acid would be available to a considerable extent, were not the duty so high as to prevent its general em-

* *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 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."

ployment. In the transactions of the Society of Arts, common red marl, ground and mixed with water, is recommended by *Mr. Meigh* as a substitute. 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 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."

I am told, by an intelligent manufacturer of earthenware in Leeds, that the comparative cheapness of the lead in 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.

Besides the effect which belongs to the present section,—the grinding of flint for the manufacture, evolves dust and produces pulmonary disease.

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.

HATTERS have their hands frequently immersed in a

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

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.

BRONZERS appear to suffer no annoyance from the frequent immersion of their hands in mineral acids.

SILVERERS OF MIRRORS have been noticed before; but it appears that in them, as well as in several other operatives, mentioned in the same section, quite as much poison is absorbed by the skin, as by the mouth and air-passages. The importance of cleanliness is illustrated by a fact related by *Mr. Mitchell*, in the *Med. and Phys. Journ.* of an Italian, who habitually paid attention to cleanliness, and who, in consequence, was able to pursue the employ with short occasional intermissions, for 25 years.

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 dust, 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, 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 want of cleanliness greatly aggravates the evils of the employ. Sweeps, I am informed, wash themselves but once a week, except on the occurrence of a holiday. The misery of sweeps is still more increased by intemperance. Those who travel through the country are especially drunken; and lads acquire a craving for liquor, from the habit of their receiving beer at every house they serve.

Many chimney-sweeps die in youth ; few live to the age of 50. I learn that there is but one in Leeds who has attained this age, and the man was fifteen years at sea. Surely this shocking and unnatural occupation ought to be abolished !

FARRIERS do not, I believe, suffer from handling the legs of horses affected with the grease, but they are liable to absorb the poison of glanders ; and several cases are recorded of human death from this horrible disease. A man with a scratch or wound of the finger dresses a glandered horse ; some time after, the finger becomes painful ; irritation in the absorbents succeeds ; the constitution becomes affected ; a disgusting suppuration takes place in the nostrils and throat ; the air-tube and probably the lungs also are affected, and death soon removes the sufferer.

The importance of plastering any wound of the hands is quite obvious. When this precaution has been neglected, perhaps washing immediately after touching the diseased animal and then applying a drop of nitric acid to the sore on the hand, would diminish the risk of absorption.

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. In ordinary circumstances and seasons, the greatest proportion of sickness and mortality, I have often observed to occur in dirty families; and on the invasion of severe epidemics, this remark is better established. In the year 1825, Gawthorpe, a village remarkable for its filth, was equally remarkable for the prevalence and fatality of Cholera and Dysentery. The contrast between this and the neighbouring villages is strikingly exhibited in my Tract on Cholera.

Bathing is generally neglected. 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*. 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 practicable 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, and exposed to currents of cold air. In

* Since the publication of the first edition of this work, a gentleman has tried inunction, and has favoured me with the following statement:—“ I have now tried the oiling for about three weeks. I use about a teaspoonful and a half of Almond oil in the morning, after sponging myself with

washing the wool, the arms are immersed up to the elbows in warm soap and water; the men then carry the article into a room about the temperature of 80°, to dry; and immediately afterwards, often in a state of perspiration, and always without full clothing, turn out into the open air, to fetch more wool. Yet from these great and frequent transitions, they are not sensible of any ill effect: they are not more subject than others to rheumatism, catarrh, or pulmonary inflammation: and the only complaint they mention is pain in the loins from stooping.

DYERS are exposed to the same agents, with the addition of ammoniacal gas, prussic acid vapour, and other exhalations, from the materials for the different colours. Temporary distress of respiration, and slight tenderness of the eyes, appear to be only the result of the gases; and in reference to the wet and changes of temperature, though a few are affected with feverish maladies, and others complain occasionally of pains in the chest and limbs, dyers are, as a body, healthy and long-lived. Of 51 men in one house, 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

cold water. I cannot say that I experience any sensible effect. The act of doing it is pleasant." He has since informed me that he has continued, and conceives himself benefited by the practice. "Extus oleo, intus

mulseo," said the healthy veteran, in his patois Latin, to Augustus.—
"Nero, qui exemplo Caü Caligulæ, calidis & frigidis lavabat unguentis."

Eutropius.

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.

FULLERS, or MILLERS OF CLOTH, are exposed to wet and cold, and, in boiling the cloth, to hot steam alternated with currents from the open air. Like other operatives, who have the legs subjected to wet, they are said to be liable to necrosis of the tibia. They are generally, however, very robust in appearance, and instances of constitutional disease 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 can 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. An extensive bruise or fracture generally terminates in mortification. We often observe also in these men, a reduction of physical sensibility, joined with a moral obtuseness. The bulky brewer, however seriously injured, seems to suffer little; he can scarcely be convinced he is in danger; he seems indifferent to his family, about to be destitute; and, confident of recovery, dies from gangrene. The state of brewers is the result not of their employ, but of their habits: for the dray-men, who deliver the malt liquor, and who have good exercise in the open air, are equally plethoric and predisposed to disease. Both drink great quantities of porter and ale. In most establishments they are allowed to take as much as they please; and where restriction is attempted, the men, I am informed, will introduce a pipe into the vat, and drink the *fermenting* liquor.

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 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 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 66. 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, and sometimes even to 80. 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 brick-makers. We have adverted to their state under another head (page 14), 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 to avoid cold,” protecting themselves with every variety of clothing, and shrinking 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,

* *Patassier*, in his observations on dyers, fullers, &c. seems rather to state the diseases which the nature of the employ led him to expect, than the results of actual, careful, personal inquiry. Our observations, at least, made on a large scale, at different places, and with every attention to fairness, differ considerably from his.

† If a man suffer to-day from headach 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.

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 brick-maker, 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. Thus, according to the remark of *Laennec*, porters, who are obliged to stand inactive at the corners of the streets,

and exposed to the weather, are frequently attacked with inflammation of the lungs. The re-action, which ensues in this and similar cases of long-continued depression, 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, porters for instance, 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 vicissitudes, 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

* The gorged state of the system of the vena portæ, 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.

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 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, and referred to at page 126. 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 disorders

* 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.

of the stomach, to cough and rheumatism.* The two former of these affections arise, I conceive, from the dust which is largely inhaled. In the plague of Venice, we find from *Mercurialis*, that bakers, and other persons in similar employments, suffered most. In the *Dict. des Sciences Medicales*, 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 CONFECTIONERS‡ are subjected to considerable heat. Our common cooks are more unhealthy than housemaids. They often take too much liquor. Their complexions are sallow; their digestive organs frequently disordered: they are subject to head-ach, and their tempers are irritable.§ Cooks, in particular, have painful affections of the stomach, difficult of cure, but relieved most by astringents. They are also, I think, more than commonly subject to diseases of the ear.

SUGAR-REFINERS are exposed to more heat than almost any class of operatives. The temperature in

* In a report of a Hamburgh Institution, it appears that rheumatic fever seized one-sixth of the bakers, and but one-fourteenth of the cabinet-makers, and one-fifteenth of the tailors. Raucidines, grave-dines, ac pectoris morbi, ut pleuritides, peripneumoniam.—*Ramazzini*.

Merat says a great number of bakers are in the hospitals.

† “ Mais encore de l'habitude 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 étier 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

which they work is 70°, 90°, and sometimes 120°, and that of the stoves is 150°, 180°, and often 200°. Germans, bearing the work better than Englishmen, are almost exclusively employed. Though dressed only in flannel shirts and linen trowsers, they perspire profusely: on coming out of the stoves, however, they take care to rub the skin dry. A disagreeable acetous exhalation arises during the process, but does not appear to affect health. The steam also is sometimes so great as to prevent the men seeing each other. A barrel

of ale placed in the sugar-house allows free potation; much indeed is taken, from three to four, or even five quarts each per day; but the men do not appear to suffer from this quantity; and drunkenness is rare. They work from three a. m. to three p. m. The labour is great.

Sugar-refiners are healthy and remarkably muscular. They never suffer from the complaints commonly termed colds. They are said to be rather frequently affected with hernia, to be subject to rheumatism, and to be worn out, or die consumptive, generally before they reach the age of 50.*

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 precieux*) who gives 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.

* A sugar-house I have not had the opportunity of personally examining, and the observations in the text are chiefly on the statements of my friend Mr. Dobson, of Belgrave-street, London, who examined one in White-chapel. My late assistant, Mr. Bell, was informed in reference to another establishment, that men on entering a sugar-house become thinner, and those who leave the employ, become stouter in other occupations.

WOOLCOMBERS work in apartments which, from the fire employed to heat the combs, are kept at the temperature of about 80°. The fires are made of charcoal. From the evolution of carbonic acid gas, when the windows are not sufficiently open, the men are occasionally affected with head-ach. In some of the manufactories, an attempt has been made to heat the combs by means of steam, but the workmen complain that by this mode, the rooms are made hotter, and the combs colder, in other words, that the increase of temperature is more diffused. A light dust arises from the wool, or rather perhaps from the soap retained by the wool after washing. It annoys the air-tube and obliges some persons to leave 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. Three or four 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 have repeatedly seen at work men from 60 to 70 years of age.

SPINNERS OF WORSTED, chiefly young persons, are exposed to considerable heat, in rooms traversed by steam-pipes, and often deficient in ventilation. The thermometer, in November, we have found in the spinning rooms at 65° and 70°, and in the warping-rooms, where steam pipes are not introduced, 58°, while in the open air it was 48°. In summer, of course, the temperature, particularly of the spinning-rooms, is considerably higher. The rooms in most mills though spacious, are too low. The windows are about the middle of the walls, and no apertures are made above them for the admission of air. The labour is light, and the posture varied. In

the neighbourhood of Leeds the general intervals for meals are three quarters of an hour for dinner, a quarter for breakfast, and a quarter for "drinking." The two last are taken in the mill, but the engine is stopped during the time. The operatives have generally the appearance of health. Many, however, particularly at the commencement of the employ, suffer from head-ach and sickness, the result, I conceive, of the want of ventilation rather than the temperature of the rooms. Some cannot bear the employ. The mills are generally in the country, or at the outskirts of the town.

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 0, 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 langour, 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 extreme point of dryness in the hygrometer we used, 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.

The heat and 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 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 SINGEING 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 0, the point of extreme dryness. The digestive organs often suffer; but urgent maladies are rare. 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; and 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

* Sept. 18, 1829, the following numbers appeared on the thermometer in a press-shop: at 12 o'clock, 69°; 12½, 70; 1, 72; 1½, 71; 2, 71; 3, 70; 3½, 84; 4, 82; and at half-past 4, 76.

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

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.

CALENDERERS, men who attend the mangles by which cloth is pressed, and rendered smooth, are exposed to great heat; but without any other effects on health than those of stuff-pressing.

As this is the last process in the cloth manufacture, we may enumerate the several departments, although but a few of them properly fall into the present section :—

PREPARATIONS OF WOOL.	PREPARATIONS OF YARN.	FINISHING THE CLOTH.
PAGE.	PAGE.	PAGE.
Sorting..... 55	Spinning..... 33	Scouring.....125
Scouring.....125	Warping..... —	Burling..... 40
Dyeing.....126	Sizing..... —	Milling.....127
Picking..... —	Weaving..... 33	Gigging or Raising..... 39
Wilying..... —		Boiling.....127
Carding..... 33		Drying..... —
Scribbling, (as Slubbing) 33		Cutting..... 94
Piecing and Slubbing.. 33		Singeing.....138
		Glossing.....138
		Pressing.....140
		Brushing.. ..126
		Steaming.....126

Woollen-mills in general, I believe, allow the workmen in all the departments, except weaving, burling, and finishing, each, an atmosphere of about 190-195 cubic feet, and in the weaving, each 160-165 cubic feet.

I have been favoured by an intelligent friend with tables of the mortality at one of the largest woollen manufactories in this town, where an account has been kept for several years; and although the diseases are stated on the reports of relatives, which are of course frequently incorrect, the statement is very valuable as a considerable approach to the truth, and as showing the several occupations of the cloth manufacture in which the deaths occurred. From January, 1818, to December, 1827, inclusive—10 years, about 700 operatives were employed, and of these 92 died, or 1.31 per cent. per annum.

MORTALITY.

Number of Persons in each Department,

DEATHS FROM		5	19	2	64	12	49	143	94	8	113	49	6	6	33	10	1	6	14	1	2	4	2	1	92
"Consumption" or "Decline,"		1	..	..	..	..	2	10	17	3	5	1	..	1	6	1	..	1	1	1	1	1	1	..	52
Asthma, .....		..	1	1	..	..	..	..	3	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	7
Complaints of the Stomach and Liver, .....		..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3
Persons "Worn out," and too old for Work, .....		..	2	..	..	..	1	1	..	..	2	..	..	..	..	..	1	..	1	..	..	..	1	..	9
Fever, .....		..	..	..	..	..	..	2	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4
Childbed, .....		..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	4
Flts, .....		..	..	..	..	..	..	..	2	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	3
Palsy,		1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	3
Water in the Head, .....		..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Sudden Death, .....		..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Stone, .....		..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2
Ulcer in the Throat, .....		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Cholera, .....		..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Dropsy, .....		..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Amount of Deaths in each Department,		2	4	1	..	0	5	17	24	3	10	1	1	2	10	1	1	1	4	1	1	1	1	1	92

Wool Sorters.
Dyers.
Willyers.
Children employed in Scribbling.
Slubbers.
Spinners.
Weavers.
Burlers.
Cloth-millers.
Cloth-dressers.
Bobbin-winders.
Tyers.
Letterers.
Moters.
Knotters.
Size-boilers.
Press-setters.
Overlookers.
Porter.
Firemen.
Joiners.
Plumbers.
Cook.
Total Deaths.

Some artizans are mentioned who have no direct connection with cloth-making, as joiners, plumbers, and a cook. These persons were exclusively employed in the large establishment to which the tables refer, and are, therefore, enumerated among the regular workmen. A classification of the ages at which death occurred, shows that no person died under 10; 6 died between 10 and 20; 20 died between 20 and 30; 22 between 30 and 40; 14 between 40 and 50; 12 between 50 and 60; 11 between 60 and 70; 4 between 70 and 80; and 2 between 80 and 90. The ages of the nine persons who are reported to have died "worn out" or from old age were 59, 62, 66, 74, 78, 79, 82, and 85 years. The dyers were the longest lived.

Remarking the few slubbers stated in this table, I find that most of the slubbing of this firm is performed at another mill, where no accurate account is kept. Of the 12 men employed in the Leeds mill, not one died in ten years; and on particular inquiry of the bookkeeper and overlooker at the *other* establishment, we learn that of 27 to 34 slubbers, regularly engaged there, he only remembers six or seven deaths during twenty years, the period of his being in the situation.

Among the bobbin-winders, also, the mortality *appears* to be very small, as one death only out of 49 women is noted; but my informant remarks that the account on this subject is quite defective, and that a change in manufacture has now generally superseded the bobbin-winding, and turned over most of the women to the department of burling.

By "consumption" or "decline" is meant, in popular language, not only phthisis pulmonalis, but any disease which occasions great emaciation. Hence of the 52 cases recorded, not more probably than one-half were consumption of the lungs. The moters and burlers, chiefly young women, present the greatest mortality from "consump-

tion" or "decline," viz. of the former 18.18 per cent. in ten years, or 1.8 per cent. for each year; and of the latter 18 per cent., or 1.8 per annum. When we consider, however, the age of these operatives, it is probable that, placed in other situations, they would not have presented a much less mortality. From the same diseases, weavers present a mortality of nearly 7 per cent. for ten years, or .7 for one. Less again is that of the cloth-dressers, viz. 4.4 per cent. for 10 years, and of the spinners 4.08. The other classes of operatives are too small to admit of general inference.

During the years of 1828 and 1829, 1,100 persons were employed on the same premises. Of these operatives 34 died, or 1.54 per cent. per annum.

MORTALITY.	Spinners.	Weavers.	Burlers.	Cloth-miller.	Dryhouseman	Cloth-dressers	Total Deaths
DEATH FROM							
Consumption or Decline,	1	1	7	..	..	4	13
Asthma, .....	..	..	1	..	..	..	1
Persons "Worn-out," and too old for Work, .....	..	..	..	..	..	4	4
Fever, .....	..	4	..	1	..	2	7
Fits, .....	..	..	1	..	..	..	1
Inflammations,	1	..	2	..	..	1	4
Accidents, .....	..	1	..	..	..	1	2
Suicide, .....	..	..	..	..	1	..	1
Unknown, .....	..	1	..	..	..	..	1
Total of Deaths in each Department, ..	2	7	11	1	1	12	34

Of the accidents, one was death by drowning, and the other from a fall on the ice; neither, of course, at all connected with employment. It is remarkable that no death from machinery is found in this report. In fact, my informant assures me that no fatal accident has occurred at this mill during the last 30 years—a statement obviously important to humanity. How many deaths and shocking mutilations might be prevented, if all millowners and overlookers were equally careful! On the whole, the cloth manufacture appears to be less

injurious to health than any other, in which so great a number of operatives are collected.

COTTON-WORKERS, persons I mean who are employed in the several processes by which the plant is formed into yarn for weaving, are subjected to considerable heat, and to some injurious agencies. I shall first refer to the process and operatives as I found them in a large mill at Manchester, and one, I believe, of the best conducted. In the first process, the *machining*, or cleaning and opening the cotton, no increase of temperature is required; the labour is light; the operatives are not crowded, nor is there any defect in ventilation. Much dust is necessarily produced in the process, and light flakes of cotton float in the room; but the atmosphere is scarcely fouled, for a machine revolving 1200 times in a minute produces a current of air, which enclosed by a casing of wood, conveys the dust through a sort of chimney quite out of the building. The children in this room made no complaint. The oldest man in it had been 16 years at the employ. He was thin but not sickly.

In the *carding* and *preparing* room the temperature is above 60°, a heat necessary to the working of the cotton and the machinery. The dust is not great; the labour is light, and the operatives are not crowded. The children, however, are puny. Head-ach and gastric disorders are frequent, especially among beginners. Common catarrh, and coughs of short duration, are found among the operatives, but not rheumatism, or any urgent disease.

In the *spinning rooms* the temperature is 60° to 70°. Particles of cotton float like thistle-down, but there is little dust. The machines are small, and the muscular exertion is good.

In the *dressing* department, where the paste is applied to prepare the material for weaving, the heat of the room is greater than in any other process. We found it 98°, but were informed that it is generally

rather higher. The men, however, appear healthy. Some complained of "aching of the bones," but serious disease is rare except as the result of intemperance. They do not experience inflammation of the lungs, pleurisy, or rheumatism. There are few examples, however, of the men at the employ as old as 58. The WEAVING has been already referred to, at page 37. In this mill 1500 persons are employed, and more than half of these are under the age of 15. It is said that none are admitted under that of 9, but several children, from their appearance, we should have supposed a year or two younger. There are few persons who have been more than thirty years in the cotton-mills; and this circumstance is ascribed by the masters and overlookers to the better wages of other employments, and the consequent secession of operatives when they attain full age and strength. Most of the children are barefoot. The work commences at half-past five a. m. and ends at seven p. m. and intervals are allowed of half an hour for breakfast, and one hour for dinner. The mechanics have half an hour also for afternoon meal; but this is not allowed to the children and other operatives. We were informed that at many mills *no time is allowed for breakfast, though the work commences as early as half-past five.** At other mills, moreover, it appears that the dust is much greater, particularly in the carding rooms; and less attention is paid to the health and comfort of the operatives.

I stood in Oxford-row, Manchester, and observed the streams of operatives as they left the mills, at 12 o'clock.

* *Dr. Lyon*, in the North of Eng. Med. and Surg. Journ., states that "The usual hours of labour of the persons engaged in the cotton mills of Manchester, are from five in the morning till seven at night, with half an hour's rest for breakfast, an hour for dinner, and half an hour in the afternoon; a few mills are kept at work day and night, with two sets of hands; the temperature of the rooms in which the work is performed, ranges from about 60° to 80° fahr."

The children were almost universally ill-looking, small, sickly, barefoot, and ill-clad. Many *appeared* to be no older than seven. The men, generally from 16 to 24, and none aged, were almost as pallid and thin as the children. The women were the most respectable in appearance, but I saw no fresh or fine-looking individuals among them. And in reference to all classes, I was struck with the marked contrast between this and the turn-out from a manufactory of Cloth. Here was nothing like the stout fullers, the hale slubbers, the dirty but merry rosy-faced pieceners. Here I saw, or thought I saw, a degenerate race,—human beings stunted, enfeebled, and depraved,—men and women that were not to be aged,—children that were never to be healthy adults. It was a mournful spectacle. On conversing afterwards with a mill-owner, he urged the bad habits of the Manchester poor and the wretchedness of their habitations as a greater cause of debility and ill-health than confinement in factories; and from him as well as from other sources of information, it appears that the labouring classes in that place are more dissipated, worse fed, housed, and clothed, than those of the Yorkshire towns. Still, however, I feel convinced that independently of moral and domestic vices, the long confinement in mills, the want of rest, the shameful reduction of the intervals for meals, and especially the premature working of children, greatly reduce health and vigour, and account for the wretched appearance of the operatives. To establish or correct this opinion, I afterwards examined a cotton-mill at Thorner, a village in an agricultural district, and where there is no other manufactory. Here, though the children had a somewhat better appearance than those at Manchester, they were decidedly more sickly in countenance and figure than the operatives in cloth-mills, and still more decidedly, than the peasantry around them.

Though the temperature in this mill was not so high as in those of Manchester, the air was more oppressive and ventilation less regarded. We had no reason to believe that either at these places or at the Leeds mill examined before, urgent diseases are often produced or the immediate mortality great.* Disorders of the nervous and digestive systems are frequent, but not severe. Bronchitis and some pulmonary maladies are occasionally found among the adult operatives, but neither prominent in feature, *as far as we have observed*, nor generally prevalent. *Dr. Kay*, however, whose residence at Manchester and charge at the Ardwick Dispensary afford him more ample and continued opportunities of observing these operatives, describes a "Spinners' phthisis," † inflammation of the bronchial membrane

* I am favoured with a statement from a highly respectable mill-owner in Wharfedale, from which it appears that in the year 1831, out of 385 operatives only three died—certainly a very small proportion. But the situation and circumstances of this establishment are such as to allow only of comparison and contrast—by no means of general deduction on the effects of the manufacture. Direct mortality, moreover, is far less frequently the result of dusty employments and confinement in mills, than impaired health, lingering ailments, and deaths in other occupations, to which the operatives have turned, when unable or unwilling longer to bear the cotton or flax.

† "In many cases which have presented themselves at the Ardwick and Ancoats Dispensary, the disease induced has appeared to me to differ from ordinary chronic bronchitis. In the commencement of the complaint the patient suffers a distressing pulmonary irritation from the dust and filaments which he inhales. Entrance into the atmosphere of a mill immediately occasions a short dry cough, which harasses him considerably in the day, but ceases immediately after he leaves the mill and inspires an atmosphere free from foreign molecules. These symptoms become gradually more severe; the cough is at length very frequent during the day, and continues even after its employments have ceased, disturbing the sleep, and exhausting the strength of the patient; but it is accompanied with little or no expectoration. In this stage he seeks medical aid. He is harassed with a frequent cough, which is often excited by speaking, by slight exertion, or a change of temperature. The patient sometimes expectorates a little, but the cough is often dry and short, and recurs incessantly. He experiences a

terminating in consumption. He found it to occur chiefly where coarse cotton was manufactured, or comparatively little attention paid to ventilation and protection of the operatives from dust. To me the principal physical effect of the heat and confinement appears to be exhaustion of the nervous system—that reduction of the vital power which both renders the animal machine particularly susceptible of disorder, and prevents its lasting to its natural duration. Thus a child's constitution becomes enfeebled without his parents' observation; he continues at his work, ailing occasionally, but not ill; his situation does not expose him to attacks of inflammation or fever, and his age is not favourable to the development of consumption; grown up to manhood, he turns to some other occupation more healthy probably in itself, but a great change from his previous employ; his habits too are altered; he commits some little irregularity, or is exposed to some agent of disease; he is attacked, his constitution previously weakened, his nervous system reduced by early employment and long confinement in a cotton-mill, offers little resistance; and he falls an easy prey to disease, which the countryman would have successfully resisted.

diffused and obscure sensation of uneasiness beneath the sternum; in sudden exertion a pectoral oppression ensues, arising, as it were, from an inability to dilate the chest freely in the ordinary inspirations. The whole respiratory system evinces a great and easily excited irritability. There is little febrile action. On the application of the stethoscope no rales are in general perceptible, the respiratory murmur is scarcely puerile. The patient is easily affected with acute bronchitis on exposure to its exciting causes, and this disease often succeeds the previous complaint."—*North of England Med. Journal.* *Patissier* in reference to the *Filateurs de coton*, says

“ Ces ouvriers inspirent continuellement un air charge de debris cotonneux trestenus qui excitent les bronches, provoquent la toux, et entretiennent dans les poumons une irritation perpetuelle. Ils sont souvent obligés de changer de profession pour prevenir la phthisie.”

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

Another individual brought up in the factory, remains in his situation, escapes perhaps the invasion of inflammation or fever; lives on, neither well nor ill; is worn out at an early period and sinks an old man at the age of 45 or 50. A third debilitated and unwell, acquires a habit of seeking relief in drams, and dies of visceral disease at 40.

In the neighbourhood of Ashton-under-Lyne the number of spinners employed in the mills previous to the late turn-out appears to have been 1685, and of these the average age was $27\frac{1}{4}$.

YEARS OF AGE.		YEARS OF AGE.	
170	were from 15 to 20.	50	were from 45 to 50.
514	..... 20 to 25.	22	..... 50 to 55.
404	..... 25 to 30.	5	..... 55 to 60.
260	..... 30 to 35.	3	..... 60 and upwards.
136	..... 35 to 40.		
121	... .. 40 to 45.	—	
		1685	

Thus we find by far the greatest number between the ages of 20 and 30, after this period a progressive reduction, and after 45 a decline remarkably rapid. Between 20 and 40 there were 1314, but between 40 and 60 only 198, and of the whole number of 1685 spinners only eight had passed the age of 55! This is a subject of painful interest. Do the spinners, who leave the employ at 30 or 40, remain 20 or 30 years robust operatives in other arts or manufactures, or do they sink "worn out" or diseased, and die of old age in their prime?

SILK THROWSTERS in general are not subjected to high temperature, but the SPINNERS OF SILK work in an atmosphere raised to 70° — 80° . The operatives are chiefly children. They appear more healthy than the children in cotton-mills, though decidedly less than those in the woollen. Many are barefoot; but as we were informed, not from poverty, nor from the heat of the rooms, but from choice and custom. There is no great labour in any of the processes. The *reeling* performed chiefly by young women, affords good muscular exercise of the trunk as

well as the arms ; but the departments of *winding*, cleaning the thread, and *spinning* employ chiefly the arms and hands.

There is little or no dust in a silk-mill. The apartments are generally spacious, but ventilation is often imperfect, from the dislike of the work-people to currents of air. This might be remedied by making apertures near the *tops* of the rooms.

At the mill we examined in Manchester, the day's labour was then (June, 1831,) 11 hours. We saw no marks of actual disease from the employ. Reduction of the general health by confinement appears to be the principal effect.

GLASS-WORKERS are in a high temperature. This 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 or from the habit of drinking cold water when they perspire profusely. 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. But in most the

eyes fail so much at 50—60 that the men are disqualified for the employ. Amaurosis is frequent. It is remarked that Glass-blowers sometimes die suddenly. Is this the result of disease in the large blood vessels?*

The **STOVERS OF JAPPANED GOODS**, generally women, are exposed to a temperature of 100 to 110°. Sitting with their backs to the stoves, they perspire profusely. They are subject to head-ach, giddiness, and loss of appetite. Restricted in their drink while at work, they are said to indulge in the use of spirits at night.

SPINDLE AND FLY-MAKERS have strong exertion, and are exposed to great heat from the forge. When they work on good steel, they are little subjected to dust or spiculæ from the operation of the file. Though rather pale, they are healthy and robust, pursuing the employ often to the age of 60.

IRON-FOUNDERS have been mentioned before, as part of machine-makers. There is, however, another and a larger body of men, as the operatives at the great iron-works of Bowling, Low Moor, &c., who are differently situated, particularly in reference to heat. In the several departments there is great muscular labour. The men

* *Ramazzeni* 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 noxis 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 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 had to correct in myself.

Patissier says that most Glass-workers are feeble, meagre, and always in a feverish state. He remarks that bottle-blowing causes the cheeks to be pendant and wrinkled,—“les joues pendantes et plissées.”

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 foundry men are exposed, we did not 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 neighbour-

* *Mr. Rayner*, an intelligent surgeon at Birstal, remarks that "the coke burners suffer most from what they call *slacking*, i. e. quenching the coke, which consists in throwing water into the oven upon the coke while almost at a white heat. The vaporised water, carrying with it a dense cloud of dust, is sufficient almost to suffocate the attendants. This I think is a greater evil than any sulphur which *these* coals contain."

hood 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; but the men do not complain of acute disease, and rarely even of chronic maladies. 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 who are subjected to high temperature and transitions of temperature,—as smiths, brass-founders, hat makers, and seed-crushers. These have been mentioned in former parts of this paper; and there are others of a similar kind, which present no diversity of effect, worthy of notice.

The high degree of temperature, which the human body can sustain without injury, is surprising. I scarcely

* Dr. Macturk, of Bradford, who, from his vicinity to the ironworks, 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 ironfounders. He adds his opinion that rheumatism, and affections of the head, are frequent.

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. My observations lead to 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. In all, the tongue is milk-white.

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

* 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.

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 the muscular power reduced, organic disease does not speedily result. Men working in high temperature are not often incapacitated for work.

5. Adults bear heat better than the young.

6. Do hot employments especially require a nutritious diet? This appears to be the case in reference to some of the manufactures lately noticed. Cotton-spinners, for instance, are said to require more and much better food than husbandmen.

7. Is life shortened by habitual exposure to great heat? I think not. 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 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, 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.

At the close of the preceding section, I adverted to the effects of *humidity* in the production of catarrh and rheumatism, and showed that these maladies are by no means frequent in wet employments. At the close of this, I would make a remark on the effects of heat, and great changes of temperature, in reference to these disorders. Rheumatism I admit to be common in hot employments, but catarrh, bronchitis, pneumonia, and pleurisy, I am convinced, are rare. The effect of changes of temperature in the production of such maladies, is not well established.* Habits, diet, and perhaps the indulgence in slops in particular, appear to give the *predisposition*, and some atmospheric states, the *excitement* of catarrh. What these states are, we have yet to ascertain. But they are

* 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 Médecine 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'urèthre, des analogues. Le froid, appliqué aux membranes muqueuses, produit par

not, I conceive, either mere degrees or variations of temperature, for we frequently find catarrh prevalent when the weather is comparatively mild and settled. That cold is not the cause of catarrh, appears moreover from the fact of bed-ridden persons being attacked, 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. Look at the fire-feeders, particularly those at a glass-house,—men one moment exposed to a temperature of 130° or 150°, the next in the coldest air of winter, rendered still more piercing by strong artificial currents,—at the bakers on the continent, who come out of the ovens almost naked into an atmosphere often below zero; and reflect on the well known fact of the Russian, who, emerging from the hot bath, immediately rolls himself in the snow. How is it, that these persons do not immediately fall victims to such transitions; or, in

fois un effet semblable; il la produit par la réaction qui suit ordinairement la torpeur qu'il a d'abord occasioné." How does this doctrine, the common one of the schools, accord with the facts in this paper, with 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. It appears, from *Beddoes'* investigations of the effects of an elevated temperature, that "none of the attendants, as far as was known, took cold; and the patients were much less sensible to the chill of the atmosphere upon quitting the heated apartments, than they would have been under ordinary circumstances." "It is generally apprehended, and that belief appears to be well founded, that a healthy West Indian resists the cold of his first winter in Europe, better than the natives themselves."

tea-table phraseology, "catch their death of cold?"

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 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 subject 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.

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 often 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 in the country. They are, therefore, proportionately more healthy. But even these have the blood impure from defect of decarbonization or vivifying elements. They are particularly subject to headach. The rosy country youth becomes, in a few months, pale and sickly, and if he be deprived of exercise in the open air, not only is the head affected, but the constitution often permanently impaired. Of 41 patients—38 young men and 3 young women—from drapers and grocers, 11 suffered from affections of the head and throat, characterized by active vascular congestion, 1 from epilepsy, 4 from pulmonary diseases, 6 from disorders of the stomach and bowels, 2 from affections of the muscles, 3 from fever, 1 from measles, 3 from diseases of the skin, 1 from ganglion, 2 from accidents, and 8 from disorders unconnected with situation or diet.

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. A tradesman, after the 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 con-

stitution can long sustain the daily potation of ardent spirits, in addition to the evil of confinement in a polluted atmosphere.

INNKEEPERS, almost universally addicted to unnecessary drinking, sometimes from love of liquor, more frequently from weakness in yielding to the solicitations of customers, are generally unhealthy. Often bulky and plethoric, they have the appearance which ignorant persons mistake for health, but which is known to the medical eye as the foundation of disease. Sometimes gastric disorder introduces serious affections of the brain, but more frequently abdominal congestion, with diseases of the liver and stomach, are first established, and apoplexy or dropsy closes the scene.

COMMERCIAL TRAVELLERS have greatly the advantage of most of the civic class. 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 abdominal 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 dropsy, 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 sleep-

* I attended a commercial traveller who pursued his employ to the age of 79. His habits, however, were widely different from those of his class.

I am favoured by *Mr. Pierce* with specimens of innkeeper's charges to commercial travellers, in 1774 and 1791, from which it appears that, though the diet was generally better, customers were then treated with spirits and wine, and the quantity drunk in such business-conviviality, was sometimes as great as any modern excess.

February, 1774:—"Breakfast (Bread and Milk), 2d. ; Geneva, for Customer, 1½d. ; Oats, half a peck, for horse, 4d. ; hay, 1d. ; Hostler and Waiter, 2d."

December 9th, 1791.—"Breakfast, 8d. ; Dinner, 8d. ; Tea, 8d. ; Supper (Chickens and Asparagus), 8d." December 10th & 11th, the same routine of meals, at 8d. each, with the addition of liquor for customers, 2s. 0½d. the first day, and on the 2nd and 3rd days 6s. 6d.—sums which, in those days, would supply enormous potations.

ing 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. They seem to be 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.*

* Mercantile custom, in reference to hours, varies, I believe, with place, and kind of siness ; but in towns devoted to trade and manufacture, the application is generally excessive. It may not be improper to adduce an example or two, of the cases which present themselves to a medical man.

Mr. — complains of habitual pain in the head, with occasional attacks of severe throbbing, depression of spirits, broken rest, impaired digestion, and a torpid state of the bowels. He is a slight active man of thirty, and has been in a merchant's establishment since he left school. He rises at five o'clock, or soon after, and immediately enters the warehouse, which adjoins his house. At eight he steps home to breakfast, but returns again in fifteen or twenty minutes, and is at business till

Of the causes of disease, anxiety of mind is one of the most frequent and important. When we walk the streets of large commercial towns, we can scarcely fail to remark the hurried gait and care-worn features of the well-dressed passengers. Some young men, indeed, we may see, 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. If we cannot adopt the doctrine of a foreign philosopher, "That a

half-past one. He then goes to dinner, eats it hastily, rarely sits ten minutes afterwards, but proceeds to the warehouse. Tea and supper are uncertain, and one or other is taken as convenient. The counting-house is closed at nine or ten, and he remains with the clerks to the last. Such is his general routine for five or six days a week.

Mr. ——— complains of a deranged stomach, with a morbidly-recurring appetite, occasional acidity, and lately vomiting; pains in the various parts of the trunk, and defect in the action of the intestines, dependent, it appears, on fault in the secretion of the bile. On inquiring his habits and circumstances, he says,—“ I have long been an invalid. Within the last six years, I have had great losses, and my mind, of course, has been constantly hurt, by finding my property slipping from me. I have worked hard for it in early life. We were at business early and late. My father used to say, 'quick at meat, quick at work,' and I have seldom allowed myself more than a quarter of an hour for any meal. I do not think, however, that the exertion of my early life has injured me so much as the anxiety and grief of later periods.” Relations

like these might easily be multiplied: in such cases we cannot be at a loss for the causes of impaired health, and shortened life.

thinking man is a depraved animal,"—we may without hesitation affirm, that inordinate application of mind, the cares, anxieties, and disappointments of commercial life, greatly impair the physical powers.* 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 headach, 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 diarrhœa; it sometimes affects even the kidneys; it almost always, when long-continued, produces permanent disease of the liver. Scirrhus of the stomach moreover, medullary and fungoid tumours, and other malignant diseases, occur most frequently among the victims of mental depression and care.†

* The *general* longevity of mercantile men is not easily determined with precision; but I am inclined to believe that when they surmount the minor diseases which care and disappointment produce, and escape the more malignant, they attain full age. I am informed that even stock-brokers, notwithstanding their occasionally intense anxiety, are by no means short lived.

† A parent, for half his life deeply afflicted by the conduct and misfortunes of his children—a man of a remarkable anxious and avaricious character,—and a tradesman, reduced to poverty from comfort and independence, had all diseases similar in the leading symptoms, viz. vomiting of yeasty matter in large quantities, defective and depraved secretion from the liver, obstinate constipation; after a time the rejection of all aliment, and progressive emaciation. In one of the cases where we had the opportunity of a post mortem examination, scirrhus was found to have surrounded the pyloric extremity of the stomach, and greatly reduced the diameter of the canal.

I cannot omit a remarkable passage in *Laennec's* great work on diseases of the chest, though the causes of affliction were very different from the anxieties and losses of trade. "I had under my own eyes, during a period of ten years, a striking example of the effect of the depressing passions in

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

producing phthisis; in the case of a religious association of women, of recent foundation, and which never obtained from the ecclesiastical authorities any other than a provincial toleration, on account of the extreme severity of its rules. The diet of these persons was certainly very austere, yet it was by no means beyond what nature could bear. But the ascetic spirit which regulated their minds, was such as to give rise to consequences no less serious than surprising. Not only was the attention of these women habitually fixed on the most terrible truths of religion, but it was the constant practice to try them by every kind of contrariety and opposition, in order to bring them, as soon as possible, to an entire renouncement of their own proper will. The consequences of this discipline were the same in all; after being one or two months in the establishment, the catamenia became suppressed; and in the course of one or two months thereafter, phthisis declared itself. As no vow was taken in this society, I endeavoured to prevail upon the patients to leave the house as soon as the consumptive symptoms began to appear, and almost all those who followed my advice were cured, although several of them exhibited well marked indications of the disease. During the ten years that I was physician of this association, I witnessed its entire renovation two or three different times, owing to the successive loss of all its members with the exception of a small number, consisting chiefly of the superior, the grate-keeper, and the sisters, who had the charge of the garden, kitchen, and infirmary. It will be observed that these individuals were those who had the most constant distractions from their religious tasks, and that they also went out pretty often into the city, on business connected with the establishment. In like manner, in other situations, it has appeared to me that almost all those who became phthisical, without being constitutionally predisposed to the disease, might attribute the origin of their complaint to grief, either very deep or of long continuance.”—*Forbes' Translation.*

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, or rather reminds us, of the insufficiency, the vanity of riches. The subject is trite and hacknied: the 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 populous towns. 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. Many an invalid would regain his appetite and strength by attending to the ancient direction, "quære sudendo." Quoits and cricket are excellent, but these recreations unfortunately are confined to youth. We have also to regret the decline of archery. This practice excites the muscles of the chest and arms, without that continuance of exertion which injures the man of sedentary habits. 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 the exhalations of towns. 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. Utility is my object.

IV. The class of MEN who are INDEPENDENT OF BUSINESS AND LABOUR, will not long detain us; for their health and longevity are founded rather on personal habits than on general circumstances. The chief point to notice is, the physical effect of a want of regular occupation. This may seem directly to promote the well-being and duration of life. A man supplied with food and comforts without labour and care, has constantly full opportunity of attending to health. But man is a social animal. The Creator has ordained that no individual shall live to himself, and live in happiness. A man without an object, is like a tree without a leading shoot. He has not the vigour of his fellows; his strength is either dissipated in irregular pursuits, or decays from listlessness. In professions and trades the nervous system is often exhausted by excessive application; here, as frequently, it declines from the want of exertion; and ennui, tedium vitæ, and hypochondriasis afflict as deeply* as the abdominal disease of the Shoe-maker, the bronchitis of the

* They have often been the cause of suicide. *Darwin* gives some cases. Lord S. one day said to a friend, "I am tired of the insipidity of life, and intend to-morrow to leave it." He kept his word. The next evening the corpse was found leaning over the arm of a great chair, the pistol on the ground, and its contents lodged in the brain. A gentleman of about 50, of polished manners, one day said to *Dr. Darwin*, "A ride out in the morning, a warm parlour, and a pack of cards in the afternoon, are all that life affords." He shot himself a few months afterwards. The misery of idleness is shewn as much in men whom circumstances have transferred from active to useless life. Tradesmen and

Flaxman, or the gastric and cephalic disorders of the anxious Merchant. Need I add, that the vices which result from the want of employment, undermine the constitution, and shorten life ?

Men of independence have, however, more than any other class, health and happiness in their power. Let them remember that neither can be enjoyed without a system of employment, and an useful object. *Aristotle* strongly remarks that happiness is a certain energy ;* and daily observation shews that happiness and health are incompatible with idleness,—incompatible with that frivolity which lives on the wind of fashion, and plays with the toy of the hour. A laudable object, which regularly occupies without exhausting the mind, and which requires full and varied exercise in the open air, greatly conduces to vigour and longevity. Agriculture and the improvement of its productions, afford a field wide, interesting, and useful alike to society and the individual. A living example is well known in the venerable Coke. Statistics, Geology, an examination of the state of population in different districts, and with different occupations, foreign travel with the view of comparison and improvement ; these and such pursuits are equally honourable and useful, salutary alike to the body and the mind.

Bons Vivants—a class, large in many towns, is formed chiefly by men who live independently of business, but includes some mercantile and many professional men. The habits and character of these persons exhibit great

merchants, who have accumulated fortune and retired to enjoy it, often find rest, an intolerable load. From one of the last expressions of *Dr. Gartshore* also, it appears that this celebrated physician had tedium vitæ induced by the change from activity to confinement. When he knew he was expiring, he said, “ I’m glad of it, I’m tired of having my shoes pulled on and off.”

* Η ευδαιμονία ενεργία τις εστι.

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. A celebrated Greek heads his chapter on gastric disease, with the remark, that the stomach presides over our pleasures and our pains.* And assuredly no practitioner of medicine who closely observes his patients—no man, in fact, who closely observes himself—can hesitate in frequently ascribing the source of irritability, anger, and despondency, or on the other hand, of cheerfulness, hope, and benevolence, to the state of the digestive organs. The kinds and quantity of food therefore, 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.

Plethoric health is incompatible with our civic state. *Hippocrates* remarks, even of the Athletæ, (and the word εὐεξίαι will apply also to the robust in general) that their full health cannot be maintained. Still less is it possible for men living in the artificial manner of the upper classes of society, to maintain the strength and the animal powers of the well-fed blacksmith or ploughman.

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, “ Ven-

* Στομαχος ηδονης και ανδης ηγερτων.—*Aretæus*.

ter, 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. *Chaucer*, in his Parson's Tale, arraigns their "divers meats and drinks, bakemeats and dishmeats, brenning (burning) of wild fire." "Ampliter viventes," says *Polydore Virgil*, "in prandiis et in cœnis." "Banquets, rere-suppers and juiceries betwixt meals" are mentioned by *Bishop Fischer* as the common excesses of his countrymen. 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 freely 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.

V. 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

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

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, diseases of the larynx, œdema of the glottis, pulmonary emphysema, and spitting of blood. The latter is especially common, but dependent more frequently on an exhalation from the bronchial membrane, than on rupture of a vessel in the lungs. In the want of that more accurate knowledge which the stethoscope affords, an opinion may be formed of the source from the quantity of the blood,—small in that slight affection, bronchial hæmorrhage,—copious in the serious, and generally fatal disease of the lungs.* Street-cryers often perish from laryngeal 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 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

* *Fallopian* says that bass-singers, and cowed 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.

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.* *Patissier* aptly quotes the adage, “*Aliis inserviando consumantur, aliis medendo moriuntur.*”

Indigestion is general among medical men, and diseases of the lungs and blood vessels are frequent. Surgeons and accoucheurs, moreover, are liable, in the discharge of their professional duties, to the absorption of syphilitic poison, and a consequent train of distressing and sometimes fatal effects.

Does the profession, as a body, attain the full duration of life? I am not acquainted with any satisfactory statements on the subject. Instances, however, of considerable age will be immediately remembered; but while referring to such cases, 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.†

Pupils sent to distant medical schools

* *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!

† *Voltaire* has remarked, that among centenaries, not one was from the faculty of medicine; that the King of France had interred 40 of his physicians, &c.

at the end of their apprenticeship, and thus placed suddenly in a scene of dissipation, without governor or adviser—mixing, too, with a large mass of young men 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—often also obliged to acquire, in a couple of winters, that various knowledge to which triple the time ought to be devoted—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, a fixed position, and often also from long days. At many large manufactories, the book-keepers are kept at the desk, with the intervals of two hours and a half for meals, from half-past six in the morning till nine at night. Attorneys' clerks are sometimes confined too long and too closely; but this excess is but occasional, and on the average, I believe, their work is moderate. Yet they, as well as the book-keepers, are often distressed. Their muscles are distressed by the

maintenance of one posture; and they complain frequently of pains in the sides of 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, but scarcely less than in the average of townsmen; and the capacity of the lungs, as indicated by the pulmometer is not at all reduced. In clerks and bookkeepers, 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. Many of the class have the opportunity: all ought to have.

To the preceding classes I must append a few observations on SCHOOLS, a subject not inferior in importance to any which has been discussed. 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. Children, and very young children too, are kept 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

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

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. It is not sufficiently animal; nor are the meals as numerous and plentiful as required for the growth and nourishment of the body. In numerous instances, the ailments of adults, and a want of vigour for life, are attributable to the niggardliness of the conductors of schools, and the supineness of parents in permitting it. 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 affected with chilblains.

Eruptions on the skin are frequent in schools, and contagious disorders when they appear spread quickly among the crowded inmates. Urgent and fatal diseases are however comparatively rare. It is the reduction of health and the induction of scrofula which the attentive observer most frequently remarks.

Were every school regularly visited by a medical man, not merely to prescribe for sick individuals, but to animadvert on the conduct of the establishment, to examine the clothing, diet, and sleeping-rooms, the alternation of exercise and study—to detect the first symptoms and insidious advance of disease, particularly in the children of delicate parents, to apply remedies promptly, and above all, to remove to more salubrious situations, the children who require it—much, very much of the consumption, which blights the hopes of families, and of the chronic

disease, which irritates or depresses for life, might be prevented.*

To girls' schools, in particular, should attention be paid. The exercise is much too limited. Young ladies walk out, it is true, but scarcely at a rate 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 should by their action keep them in a proper line, become 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.

* "Oh! but the children," replies the Mistress, "make no complaint. This and this look pale, but they have got a little cold. This looks thin, but, you know, she grows fast." "My dear, how awkwardly you hold yourself!" "The shoulder, sir, stands out, but she will grow out of it as she gets stronger." Such remarks and answers commonly satisfy parents, but would little content an intelligent medical examiner.

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?

I must notice, however, a practice which produces a marked change in the form and health of FEMALES in general. 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. The 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 vertebræ 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 vertebræ 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 us that while healthy men exhale by the pulmometer 200 cubic inches and upwards, women rarely exceed 100, and often do not reach that amount! No wonder that the respiration in females should be short and flurried by slight extra-exertion. Part of this remarkable difference in the sexes no doubt arises from native formation; but much more is evidently the effect of lacing the chest. The stomach and digestive organs suffer from the same compression. Appetite is diminished, dyspeptic complaints are induced, often also palpitations and a train of nervous disorders. The mechanical effects, also, on the abdominal viscera are sometimes serious. The pressure of stays on the abdomen is not uniform: no support is afforded, where support, if required at all, might be applied with advantage: and the compression of the upper part of the trunk throws all the force which the strong action of the abdominal muscles produces, on parts naturally the weakest, and moreover devoid of artificial support. From this double misconduct, hernia frequently results.*

We do not, however, ascribe all the ill health of females to the wearing of stays. Much also originates in the want of full and regular muscular exercise, and much in dietetic faults. To these causes united, we especially attribute that hysterical character which so often marks the delicate female for life,† and those hypondriacal mala-

* “When the upper part of the abdominal cavity is subjected to forcible external pressure, as by the application of tight-laced stays, the viscera are driven downwards, and the formation of an inguinal or crural rupture much facilitated. That the consequences of this practice are not imaginary, may be proved by dissection, which shews us an actual change of figure in the lower ribs, and sometimes the obvious marks of external pressure on the surface of the liver.”—*Lawrence on Hernia.*

† *Paucissimæ enim fœminæ omnino ab hoc morbo (hysteria) immunes sunt; et tantum fere illæ quæ duris laboribus vitam tolerant.*—*Van Swieten.*

dies more afflicting than even acute disease.* I have mentioned dietetic faults. To one I would especially refer, as frequent among females—the abuse of warm slops. This practice produces in a marked degree, indigestion, flatulence, and a train of nervous disorders. We conceive, also, that caries of the teeth, so general in modern times, originates in the same cause. Roman skulls, dug up after the lapse of centuries, exhibit perfect teeth; and among our cattle fed on cold aliments, caries I believe is almost unknown.†

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 236 cubic inches 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

* “ Drooping and blighted creatures; frequently half insane from regret and remorse; with whom the past is a scar and the present a sore; sensible only in the gross, from what quarter have issued the darts with which they have been stricken; and so wild with fear, that they hear the wing of the Angel of death in the rustling of the gentlest gale of Heaven.”—*Beddoes*.

† *Pliny* aptly remarks, “ Nullum animal præter homines calidos sequitur potus; ideoque non naturales sunt.” An intelligent friend also points out other remarks of a similar character, “ Pecora, sues, &c. calidis cibis nutriti elumbes fiunt, et vix incedere valeant.” “ A nimio usu Theæ, dentes fiunt nigri, fragiles and cariosi. Thea ventriculum debilitat et partus reddit difficiliores.”—*Linnæi Amœnitates*.

of the stomach decidedly injured. The tongue is almost always foul; and the complexion becomes 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 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 confined 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, literature, and the fine arts.

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

A highly excitable state of the nervous system is not infrequently produced. Irritability of temper, vain fear and anxiety about trifles, mark, in common life and ordinary circumstances, the character of men, who on greater occasions manifest the noblest benevolence, courage and coolness.† The effect of close study 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 character, represents, in strong terms, the excitement generally felt by

* 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, potatoes, and water. His fat of course was disease, and this disease maintained or aggravated, if not produced, by his sedentary habits.

† “*Qui studiis dediti libris impallescunt, adeo mobile et irritabile habent totum genus nervosum, ut à levi etiam animi affectu summæ anxietates, spasmi, dolores, &c. producantur.*”—*Van Swieten.*

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. The number of distinguished men, as Galilei, Linnee, Newton, Leibnitz, Harvey, &c., who have suffered from gout, stone, and affections of the urinary bladder, warrants the remark of Baglivi, that these diseases "murder the wise more than the foolish."*

* 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 sallow and melancholy. We see minds almost without senses, and bodies almost deprived of blood and nerves. We find no buxom 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, sapientiæ pars habebatur, ut et morborum curatio, et rerum naturæ contemplatio sub iisdem auctoribus, nata sit scilicet his hanc maximi requirentibus, qui corporum suorum robora inquieta cogitatione, nocturnaue 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 reading. "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*. *Patissier's*

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, and this individual was Fontenelle.†

chapter on this subject is chiefly an abstract from *Tissot*. There is much interesting matter in the well-known book, *Burton's Anatomy of Melancholy*.

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

† My intelligent friend Mr. M. T. Sadler of Barnsley, has favoured me with some observations on this subject. "When I had a conversation with you, ** respecting your interesting and valuable publication on 'Employments as affecting Health and Longevity,' I stated to you that I thought you had under-valued the chance of life with reference to men engaged in literary and scientific pursuits; and that on further investigation, it would be found that the average of their lives greatly exceeds that of every other class of men. This opinion is I think corroborated by the facts advanced by M. Brunaud, who took at hazard 150 Savans, one half from the Academy of Belles Lettres, the other from the Academy of the Sciences at Paris, and he found that the sum of years lived by them was 10511, or above 70 years to each man. The same gentleman has shewn that literary men in all ages and climes have been long-lived. Thus it is pleasing to contem-

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 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,

plate that those studies which contribute to the prosperity and happiness of mankind, have the promise of the life which now is, and that 'knowledge has length of days in her right hand, and in her left hand riches and honour.' Great exertions of the brain, combined with sedentary habits and late hours, do certainly tend to produce a delicate state of health; but that is by no means incompatible with longevity. For as Sir William Temple, in his interesting essay on health, observes, 'Weaker constitutions may last as long as the strong if better preserved from accidents—so Venice glass, as long as an earthen pitcher if carefully kept.' Great vigour of constitution frequently betrays men to the dangers arising from excesses of various kinds, which so greatly tend to shorten life. The porters, coal-heavers, and dray-men of London, it is well known, are the strongest and finest built men from the country, formed for health and long life. Yet Mr. Lawrence, in his Lectures, (Lecture 6th,) says that they very rarely live above 50 years of age, and generally die from some organic disease arising from excesses in eating, drinking," &c.

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; for 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. As Milton feelingly remarks, “The spirit of man cannot demean itself lively in this body without some repeating intermissions of labour, and serious things.” Constant application renders the ideas confused, and stops invention. The brain may then be said to be strained, rather than exerted, and its work is aptly said to smell of the lamp. Let the student bear in mind that even without reference to health, long continued application of the 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.” Nor is temporary failure all. I have before adverted to the serious effects on the brain and its membranes, which result from excessive application of

mind. Let me again urge the student to remember that exhaustion is the result of great exertion, that the finest intellect and powers which mock difficulty, and ridicule opposition, are often broken by their own intensity of action. Nothing surely is more melancholy than the view of high-wrought talents sinking into torpor, and nightshade encircling the brow, which should have worn the chaplet of laurel.

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 3rd 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

* “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 Plato*. Hippocrates, though delicate in constitution, acquired health by the practice of the gymnastics, and attained the age of 100.

period of its abundance is determined by the habits of the individual. If a man, accustomed to dine or lunch 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 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

* Poor prick-eared Prinne, a man of immense reading, fell into both these errors. “About every three hours,” says Aubrey, “his man 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.

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 impaired, and a train of bodily evils necessarily succeed. The mental faculties are in many persons affected even immediately by the state of the bowels.

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 annoy-

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

ance to individuals. Evelyn makes an observation to the effect, that a good gardener cannot be a bad subject. We may add, that a man addicted to pursuits like this, 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 history, 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 sine perturbatione*,” which Seneca repeatedly mentions—that “*calm and pleasing solitariness fed with cheerful and confident thoughts*,” to which Milton refers as the highest enjoyment of his life.

Having examined seriatim the principal employments, we may now offer a recapitulation or abstract of their effects.

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 125—133 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. Pages 154 & 155.

3. The *exhalations from vegetable matter* we have not found injurious; but we had not the opportunity of

making observations sufficiently numerous and correct, to warrant a decided opinion.*

4. The *natural odours of manufactured vegetables*, with the exception of coffee, appear to be little noxious. Tobacco-workers (snuff-makers are not included) 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

* In many situations, besides the marshes of England, the baneful influence of vegetable *decomposition* is well known. An intelligent traveller informs me that "nobody dares to sleep in the beautiful villas in the Campagna di Roma during the summer, and even the shepherds come into Rome at night. The Malaria is seen to rise to a certain height in the shape of fog; all the ancient Roman cities are built above this line." The disorders which of late years have prevailed among cattle and sheep, he is inclined to attribute to moist vegetable effluvium, remarking that sheep, healthy on dry ground, soon become diseased on removal to adjacent marshlands.

† A friend refers to a statement of an experiment on horses which bears a different character. During the Peninsular war, two French cavalry regiments were ordered to march from Catalonia to the south of Spain; and the commanders agreed that one should march by day and the other by night. The result was that many of the horses worked by night were killed or injured; while the horses worked by day came in fresh and able. No remark was, however, made on the state of the men. Horses, I have observed to suffer from night-work. A short journey in the night, or early in the morning, renders them spiritless for the succeeding day. The effect, however, is probably not apparent in horses *regularly* worked at night.

to the health of glue-makers, buckram-stiffeners, tanners, slaughter-men, tallow-chandlers, curriers, leather-dressers, grooms, &c.* Pages 11, 42, 59-62.

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." Pages 33 & 125.

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.

α. 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 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-makers, milliners, weavers, saddlers, cork-cutters, &c. in all persons engaged in reading and writing.

* The influence of putrid exhalations is shown also by the effects of a dissecting-room. Students are at first annoyed by 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.

I am informed by an intelligent correspondent, that "during the time of the malaria, the artists who are obliged to live in Rome, take lodgings near the Pantheon, a low situation, and surrounded by butchers, poulterers, and fishmongers."

Results, Defect in the blood's general circulation—
 Congestion, especially of the system of the vena
 portæ—Functional disorder of the liver—Indiges-
 tion—Diarrhœa, and other diseases of the mucous
 membrane of the intestines—piles—fistula in ano.

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 lumbar 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 employ-
 ments.

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

ε. *Pressure of the chest on the stomach*, in weavers.

Result, painful affections of this organ.

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

Result, Hernia.

η. *Steam*, in brushers of cloth.

Results, Bowel complaints, indigestion.

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

θ. *High temperature*, in bakers, cloth-pressers, glassmen, and in all operations mentioned at pages 128 et seq.

Result, Impaired appetite.

ι. *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 63 et seq.

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 INJURIOUS TO THE URINARY ORGANS.

α. *Long sitting, and delay of micturition*, in literary and scientific men, and in many artizans.

3. AGENTS OR STATES INJURIOUS TO THE RESPIRATORY ORGANS.

α. *Dust*, in corn-millers, maltsters, snuff-makers, flax-spinners, 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.

ε. Confinement in a bad atmosphere, and in a posture which induces vascular congestion of the lungs and heart, in tailors, shoe-makers, weavers, printers, &c.

Result, Pulmonary consumption.

All agents which reduce the general health, tend to develop disease of the lungs, and especially excite into fatal activity the tubercles, which, in favourable circumstances, may remain crude, latent, and harmless for an indefinite period.

4. AGENTS INJURIOUS TO THE CIRCULATORY SYSTEM.

α. Posture, in hackney-coachmen, postilions, &c.

Result, Aneurism.

β. 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.

5. AGENTS AFFECTING THE NERVOUS SYSTEM IN GENERAL.

α. 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; carbonic acid gas, to wool-combers, &c.

Results, Difficulty of breathing, debility, head-ach, 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, salivation from the action of mercury.

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 head-ach, apoplexy, palsy, &c.

ζ. Declination of the head for long periods, in carvers and gilders, shoe-makers, clerks, &c.

Result, Congestion of the vessels of the head.

6. AGENTS INJURIOUS TO VISION.

α. Close application to minute objects, in watch-makers, workers for linen repositories, milliners, burlers, engravers, literary men, &c.

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

β. Application of the eyes to scarlet colours, as by weavers of certain articles, printers of woollen and stuff cloths, drawers, &c.

γ. 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.

7. AGENT INJURIOUS TO HEARING.

α. Noise of Machinery, as in frizers, cotton-spinners, corn-millers, &c.

8. AGENTS INJURIOUS TO THE BONES.

α. Wet, to the lower extremities of colliers, &c.

Result, Necrosis?

9. AGENTS AFFECTING THE MUSCULAR SYSTEM.

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

Result, Pain in the loins, &c.

10. AGENTS INJURIOUS TO THE SKIN.

α. As flour, in baker; sugar, in grocers; sulphuric acid, in hatters; lime, in bricklayers; &c. Pages 121 et seq.

Result, Cutaneous diseases.

Though I have attempted to classify the agents of disease, I am 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 shows 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 pulmometer, show comparatively little difference between clerks, tailors, shoe-makers, &c., on the one hand, and carpenters, soldiers, and slaughtermen, on the other. Two inches by the line, and ten cubic inches by the pulmometer, are the differences shown by our averages, in favour of the active employments. On reflection, it will appear that the posture which curves the spine, affects the abdomen, rather than 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.

The diseases of the respiratory organs, which we have had most frequently to remark, are the results of direct irritation of the membrane of the air-tube. 1. Certain effluvia and gases appear to produce constriction of the bronchial tubes, or such an impression on the nerves of the lungs as to distress or suspend the respiratory functions. 2. Dust constantly inhaled, exhibits much more marked and general effects: but these, however great, do not appear to me to bear a regular ratio to the period of exposure. A person on entering a dusty employment, is immediately affected in respiration; but in a few days the annoyance subsides, and he goes on for months or years, though with impaired health, still with no other effect on the respiratory organs than morning cough. Nor during this period does mensuration, percussion, or the stethoscope, as far as my experience extends, frequently indicate disease. The impression, indeed, of dust on the bronchial membrane seems long confined to the larger branches; and considerable disorder to be produced only on the occurrence of common

catarrh.* After some years, however, from the continuation of the irritating agent, and the action of morbid states of other organs which it has induced, we find bronchitis established, and a variety of pulmonary diseases of serious or fatal character; but these diseases modified in kind and degree by native constitution, as in the example of scrophula, and by habits, as temperate or the reverse.

Opportunities of dissecting the lungs of any particular class of operatives are not sufficiently numerous to allow of general and satisfactory deductions. No observations of mine, nor any records with which I am acquainted, would establish autopsic varieties of pulmonary consumption, on difference of cause and circumstance; in other words I am not aware that the bodies of consumptive grinders, flaxmen, or leather dressers, present to the scalpel and eye such difference, as would enable the experienced anatomist to know the art and habits of the individual, from the examination of his lungs. Whether we examine the body of the miserable operative, phthisical from the dust of his occupation, or that of the nursling of kindness and affluence, we find similar changes of structure in the lungs,—solidification of some parts by inflammation, aggregation of tubercles, or by extravasation of blood—debris of the pulmonary substance, purulent matter, and consequent excavations—bronchitis and its effects, thickening of the membrane, sometimes dilatation of the tubes—finally, adhesions of the pleura.† Nor is it pro-

* *Broussais* has remarked that bronchial inflammation affects most frequently the tubes in the upper lobes of the lungs. Here too we well know tubercles and tuberculous cavities to be most common. Hence appears a close connection between irritation of the mucous membrane and change of structure in the lung itself.

† Notwithstanding the extensive and valuable labours of *Laennec*, *Bayle*, *Louis*, and *Andral*, the pathology of pulmonary consumption is far from

bable that a more extensive examination than has yet been afforded, would exhibit varieties of disease accordant with employments. Necrotomy presents the *effects*, not the *causes* of disease. And if we would examine the peculiar action of a morbid agent, or the appearance of the structure it deranges, we must avail ourselves rather of the accidental opportunities of seeing the parts, when death has been produced by other circumstances, than look for satisfaction in the final effects of the disease. Destruction of parts, obliteration of cavities, morbid effusions and depositions, result from a series and complication of operations; and the last of the series—the change by which life is finally destroyed, is little calculated, in the present state at least of our knowledge, to show the nature of that, by which health is first impaired.

We have adverted to the more direct effect of morbid agents on the lungs. Many artizans, however, perish from pulmonary disease, who have not been exposed to dust. Consumption is frequent, for instance, among tailors and printers. The cause of this secondary consumption I had occasion before to notice. The health of artizans who have fixed position and a confined atmosphere, is of course considerably reduced, and excess in diet, or some slight febrile disorder, favoured by the impaired health consequent on employment, or, in better words, but feebly resisted by a reduced conservative principle, brings into action that disposition to pulmonary disease, which, though native, might in better circumstances have remained dormant for life.

complete. The careful examiner will find many points of description, in which these authors considerably differ, and some, perhaps, in which his own observations would lead him to differ from each. Reasoning, moreover, on the effects of the disease which his scalpel displays—effects by no means confined to the lungs—he would consider that, however local irritation may excite, a general state is the great basis of the disease; and he would suspect that general state to exist in the contents of the circulatory system.

The function of the liver, and sometimes its structure, I have suspected to be affected by certain employments ; but my observations on this point are too few and crude for any satisfactory inference.

Though health is directly attacked, and finally destroyed by many occupations, it is much more frequently undermined. By close attention, and continued labour, 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. Life is worn out by excess of labour, as in the smith. More frequently it is reduced and shortened by the want of its natural food—an atmosphere pure and free. The importance of fresh air is shewn not only by the state of the sedentary artizan, but by an observation which I believe will be found generally correct, that persons in baneful occupations, as masons, live considerably longer—on the average, perhaps, not less than 10 years—in the country than in the town.

In examining factories, we have frequently asked, “Where are the *old* men?” In fact, our towns and manufactures present but a small proportion of the aged,—no such proportion as we can find in the pursuits of husbandry.* In the employments, moreover, which *do*

* Some mill-owners assert that the ratio of mortality in their establishments is considerably less than the average of the people around them, and thence infer that their manufactories are conducive to longevity ! When an operative loses health, he generally changes his employment ; and the morbid action produced in the first, often terminates fatally in the second. A young female leaves a dusty employment on account of the distress which she feels in respiration—the bronchitis which this occupation has produced. She tries another which is comparatively innoxious. Still her cough continues, and she declines in strength and flesh. Unable at length to follow any regular employment, she is received into the house of some relative in the country, where finally she dies consumptive. Her death of course never enters the mill-book of her first employ. Cases of

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

this kind are of frequent occurrence, and sufficiently explain the low ratio of mortality, which appears to take place in baneful employments. No reflecting man, however, asserts that mills in general, directly and rapidly destroy life. It is the injury to health we deplore, the diminution of vital power, and the induction of physical states which ultimately lead directly or indirectly to fatal disease.

The increased duration of life, in present as compared with past periods of our history, does not, it is obvious, bear on the present subject. The augmentation of food, the better information of the lower orders, the improvement in dwellings, and especially the advance of medical science, have effected this happy change.

The point in question is, the longevity of manufacturers, as contrasted with an agricultural population ; and here I need only refer to the table and the observations at pages 3 and 4.

Last year, I accidentally observed a letter in a Manchester newspaper, under the signature of “J. R.,” and written to controvert a statement, that “where the duration of life is on the increase, there an increasing diffusion of health may be predicated.” Admitting the increased duration of life in the present age, he asserts an increase of disease, which, without reducing longevity, greatly diminishes the happiness of the people. “The number of Dispensaries in Manchester, and still more the amount of patients entered in their registers, demonstrates that a very high proportion of our operative population is annually on the sick list. The number of inhabitants probably does not exceed 180,000 ; yet, during the last year, which was by no means sickly, the home and out-patients admitted at the four great general Dispensaries, amounted to 22,626. This was independent of patients admitted at the Eye Institution, the Children’s Dispensary, and the Lock Hospital : of the in-patients of the Infirmary and fever wards ; of the great multitude of sick connected with the Lying-in-Charity ; and the numerous poor attended as out-patients by the medical officers of the Manchester and Salford work-houses ; amounting in all, at least to 10,000 more. If to this sum we were further to add the still greater number of all ranks, visited or advised as private patients, by the whole body (not a small one) of professional men ; those prescribed for by the chemists and druggists, scarcely of inferior pretension ; and by herb-doctors, and quacks ; those who habitually swallow patent medicines ; and lastly, the subjects of that ever-flourishing branch—domestic medicine ; we should be compelled to admit that not fewer perhaps than three-fourths of the inhabitants of Manchester annually are, or fancy that they are, under the necessity of submitting to medical treatment.

There are a few incontrovertible facts, not adverted to perhaps by the secluded political writer, but which those who mingle in the busy world of a vast manufacturing community, will scarcely refuse to admit. One of these is, that

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

sedentary, and other occupations, which wholly seclude the artizan at all seasons (and from a very early age,) from the pure air and from the green face of nature, generally give rise to some degree of derangement of the health, manifested primarily in the stomach and bowels, and also render the mind torpid and irritable; further, that this uncomfortable condition of body and mind, existing in almost every individual of great masses of people crowded together in factories, and in narrow streets and yards where they have their habitations, is apt to increase, and to be aggravated by the very means but too commonly adopted to obtain relief.”

“The extension of the manufacturing system,” says *Armstrong*, in his work on consumption, “has operated morally and physically to the detriment of thousands, however beneficial it may have been to the world at large. The young, the middle-aged, and the old, are commonly crowded in many of the large manufactories, even without due regard to the distinction of sex, and in the most unwholesome places, and employments; and some of them are daily exposed to noxious, or irritating inhalations, which must act as direct excitants of consumption, where any latent predisposition lurks. Indeed the general health of this class is continually broken up by the influence of their situation, and by the dissipated, irregular, or unnatural habits which they contract: and hence among them, perhaps more than among any other description of people, are seen the various developments of scrofula; and phthisis, of course, has its share of victims. But one of the most melancholy results of the manufacturing system is the cold calculating selfishness, which it has engendered even in parents, so that they frequently begin to value children as mere labouring animals of interest, almost as soon as they can run about, and accordingly coop them up to earn money by some noisome work, instead of unfolding their affections, and establishing their strength. This is a fertile source both of crime and disease; for it is unreasonable to expect that such children should generally be either virtuous or healthy. Many of them fall prematurely into consumption and similar diseases; and most of them who survive, have sickly bodies, and depraved minds. It were to be wished, that such cruel sacrifices should cease to be made; and it is extraordinary that they should so frequently happen in a country which abounds with more true philanthropy than any other.”

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, improvidence, and disease; and I believe that in several classes the reduction of such extravagant pay has, after a time, considerably improved health and increased longevity. On the other hand, the low wages generally given to weavers, woolcombers, burlers, milliners, roadmen, &c. preclude a regular supply of proper nourishment, and render the constitution particularly subject to fever and other acute disease. Both extremes produce also disorders of the digestive organs, though these of course vary in character with the cause. Sudden transitions 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 full 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 ; at a large woollen manufactory, where 1,100 persons are employed, it is stated that no fatal accident has occurred within the last twenty years, nor a case to require amputation ; and at a mill where stuff weaving by power has been carried on since 1822, and where 600 persons are employed, there has not been a loss of life or limb. 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 manufacturing districts 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

* June, 1831. A plump but not healthy-looking young man of 20, complains of pains in the shoulders and chest. On examination, the clavicles have the *appearance* of being dislocated upwards. His chest wants development and is ill-formed ; the sides are flattened and the sternum advanced, ("chicken-breasted"). He has been employed in a wool warehouse, and has often had to lift great weights, even at an early age.

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, agricultural as well as manufacturing, 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. No part shews the effect of labour more generally than the hand. In this the maid-servant and her mistress most remarkably differ; for labour at too early a period of life so distorts the fingers, that a fine female hand is scarcely ever seen among the lower classes.

In the details of employments, I have frequently had to animadvert on the *excess of labour*. From this cause a

* The *Abbe 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 fewer arts and manufactures, the figure as well as health of its inhabitants, was better than at present.

great proportion of town-operatives prematurely sink. "Worn out" is as often applied to a workman as a coach-horse, and frequently with equal propriety.

Greediness of gain often urges operatives to excess of labour, contrary to the wishes of their masters. A manufacturer pressed by his engagements requires work at his mill, more than the day's labour can effect, and proposes to employ fresh persons for the night: the regular operatives object, and at their earnest request are employed night as well as day, till the work is completed. Even children, with the consent of their parents—sometimes I fear by their desire—are at close labour from six o'clock on the Friday morning, with intervals only for meals, till eight on Saturday night! Not

only does great and protracted labour directly exhaust the constitution, but it leads men to take liquor in excess. A temperate cloth-dresser, for instance, admits that he takes daily five or six pints of ale; but he labours, with the intervals collectively of one hour and a half, from five in the morning till nine at night. Some men in the same shop drink considerably more. A diminu-

tion of the hours, and in many employments of the degree of labour, is urgently required. "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." And the masters would urge, "we cannot give the same wage for less work." If a man, little acquainted with trade or political economy, may hazard an opinion, I would say that an universal reduction of the hours of labour, by diminishing the production, would enhance the price of the commodity, and thus allow an equal or a greater wage to the labourer. That our exports would suffer from such an advance is

probable, but not perhaps to a serious extent, supported as we are by superior machinery, our colonies, and our ships. But should no advance be made in wages, still health and life require a sacrifice of labour, and if the operative receive less, he must reduce his expenditure. The artizan, in common with his master, has numerous artificial wants : his diet is often higher than the demands of nature ; and 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-fourth of the day to recreation, if we wish to live comfortably, and attain the age of man. 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 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. A minor part of this subject I must notice. 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.

The great bane of civilized life is **INTEMPERANCE** ; and its progress and effects are most apparent among the lower orders. The operative, though he takes during the hours of labour more drink than he requires, instead of spending the evening with his family, 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 resorts to the ale-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. He “ can well spare two-pence.” 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

* *Dr. Lyon*, writing on the state of Manchester, says—“Before quitting this part of the subject, it is necessary to advert to an evil of recent origin in this town, which has rapidly attained an enormous magnitude;—namely, the excessive multiplication of dram shops, now almost universally attached to the public-houses, and frequented to an alarming extent, especially by the female part of the population, and even by children. Some of these baneful places of resort are scarcely ever closed: they stand open to receive the latest wanderer by night, and again to tempt with a treacherous warmth, the earliest of those who repair to their morning’s work. If the practice be suffered to continue, it must inevitably debase both the moral and physical character of the people.”

† From the report of the Leeds Temperance Society, “it appears that during the last eight years, the number of public-houses and dram shops has been greatly on the increase. In 1822 there were in Leeds 152 public houses and 6 dram shops; now (1830) there are more than 200 public houses and upwards of 40 dram shops, most of which are attached to the public houses. How the former are frequented, no common observer in the habit of walking through our streets need be informed; and as to the latter, the number of people, men, women, and children, in the constant habit of attending them, is almost incredible. From observations made by different individuals on the evenings of several market days, it appears that the average number of customers at some of these shops amounts to 8, 10, and 12 in a minute, and that for four or five hours in succession. Taking therefore the lowest average, eight, for four hours, we have the astonishing number of *one thousand nine hundred and twenty* individuals visiting one of these shops every Saturday evening; and the total number of customers at three shops for the same time, is *five thousand seven hundred and sixty*. It must be remembered too, that these shops are open every day, many of them from an early to a late hour.”—Yet Leeds is not so intemperate as many other towns.

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 produce. The head is oppressed; the appetite diminished; the secretions are depraved; the strength is reduced. At length regular morning vomiting succeeds. 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. Consumption, in fact, in many cases, succeeds, and gradually removes the drunkard to a premature grave. In other cases, the lungs remain free, but the cerebral functions become more disturbed. Sometimes stupor and imbecility of mind are manifest; sometimes an occasional perversion of moral disposition, the prelude of insanity. The liver suffers, not often however, as far as my observation extends, from marked or acute inflammation. On post-mortem examinations, I have frequently remarked the acini surrounded with light coloured margins, (cirrhosis of *Laennec?*), the deposit, I conceive, of a chronic action, which gradually compresses, and at length destroys the secretory apparatus; and this appears the most common disease in the substance of the liver. Engorgement of the system of the vena portæ, and consequent oppression of all the abdominal viscera, are more obvious effects of intemperance. Dropsy slowly advances to complete what irritation has begun; or inflammation of the brain, or apoplexy, makes a more suddenly fatal seizure.

On the subject of intemperance, however, I must remark, that there are two states in which its

effects are less apparent: the first, in hot employments, and where there is consequent habitual and great perspiration: and the second, when men rise early, and spend the day in the open air, and in great muscular exertion. In the first, though a greater or less degree of disorder prevails, the men attain considerable age: and in the second, there is little apparent disease, and life is long. That life would be more protracted by temperance in each case, and especially in the last, can scarcely admit of doubt; and consequently that the effects of intemperance are modified and checked, rather than prevented.

Intemperance, greater in towns than in the country, dreadfully aggravates the evils of our civic employments. Whether we examine the various manufactures of the West-Riding of Yorkshire, or the cotton and silk mills of Manchester, or the iron manufactures of Birmingham, or the watermen of our ports, or the common arts and trades of the country at large,—intemperance we shall find in each, in all, the most frequent cause of disease. It creates disease in the healthy occupation; it aggravates, it hurries to a fatal termination, the effects of occupations which are pernicious. Are grinders and hecklers a sickly short-lived race? The individuals most wretched in appearance, and the first to fall, are the drinkers. Do we remark the puny and pallid children of Manchester? We find the worst are the offspring of dram-drinking parents. Here, however, I believe, the effect is not generally direct. Though some wretched children may learn from the example of the parents to sip spirits, and drink ale, most have the constitutions injured by the improvidence, the want of natural affection, which generally accompany the intemperance of parents. Many of these are even so inhuman as to seize the earnings of the children, and spend the greater part

in liquor, and consequently leave half-famished their miserable offspring. Thus not only are the tender frames of children devoted to confinement and labour, though nature and reason have destined them to sport over the green face of nature—not only is the human strength exhausted before maturity, the form stunted, the duration of life shortened—but all this for the support of vice in others, for the direct production of fatal disease, for the dissolution of the best affections of nature—in a word, for parents to sacrifice their own offspring to their sensuality, and this sensuality, moreover, rapidly destructive to themselves. What scene in history, what practice among savages, can be more disgusting and lamentable? And is there indeed such a practice to be found in a civilized country? Yes—in England, the enlightened, the religious, and the free. This is no matter of declamation: the fact is notorious in Manchester. I have seen the miserable children in the mills, and I have ascertained the facts from the most respectable authority.*

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

* As an instance, I may mention a statement made by a respectable mill-owner. He has in his employ three children of a hair dresser, who earn twelve shillings a week. This money is taken by the parents, the greater part spent in liquor; and after Monday morning the poor children, while working for another supply for the parent’s debauchery, themselves want food, and are scantily supported by what other children in the mill give them from their own meals!!

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.

I scarcely need advert to the drunkenness and immoderate potation,—the first of which is very rare, and the second, I trust, becoming less frequent and marked—among the *upper* classes of society. 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.

A few other points important in preventing or diminishing the evils of our civic situations, may here be noticed.

Fresh air, and change of air, I have repeatedly mentioned; and I might with propriety have urged it on every class of operatives, as well as on merchants and most men in professions. Send, for instance, 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 extends the atmospheric impurity of large places, a mile or two has a sensible effect on health. A man, for instance, who has lost his appetite for breakfast while working in the centre of a town, will often immediately regain it, when he enters a similar employ at the outskirts.

The importance of ventilation is well known; 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. Air should be freely admitted by openings at the *highest parts* of the rooms. The apartments, moreover, in many manufactures, should be more lofty: cloth-weavers should be less crowded; burlers, tailors, &c. should be more divided, or work in larger apartments. The smoke from oil-lamps, particularly in an ill-ventilated mill, considerably oppresses respiration. Gas-lights, when the apparatus is perfect and well-managed, and the gas pure, appear decidedly preferable. The heat, however, after some hours, becomes so great, and the loss of oxygen so considerable, that people in mills suffer from nightwork. They have a feeling of languor, and impeded respiration, which are unknown in the day.

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.

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.

Proper *muscular exercise* is essential to health. From our observations at page 207, it appears, that even 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 convents, has been ascribed, not without reason, to the singing and chaunting. The danger of *excess* in this practice has been noticed before, page 174.

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 their practice is almost unknown to the lower classes of society, and has been little more than the sport of fashion for the upper. 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 work-people 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.

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

* 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

and masters, 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

the early stage, consumption might often be prevented even where tubercles exist in a crude state, or some deposit has taken place, and would almost always be prevented, where tubercles or deposit, 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 analogous 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.

Higher principles apart, 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, and unnatural.

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 the employment injurious, states what he feels. Hence many of the masters will be surprised at my statements, and think them erroneous or exaggerated. Few as yet are acquainted with the evils of their own art or employ. If we go to a manufactory, and ask to examine the processes and the operatives, the proprietor or manager civilly assents to our request of inspecting his establishment, but on the mention of “health” and “workpeople,” he smiles and hesitates. “Health, Sir! why our people have excellent health,” and, turning to an overlooker or clerk for the corroboration of his statement, “We have not more than three persons off work from sickness in all our establishment. If you want to find sickness, there is a mill below, another kind of manufacture, where I believe the people suffer a good deal.” The Spanish leather-dresser says, “No doubt towns are very unhealthy, but disease is not produced in our places. You will find the flax-mills very injurious.” When we go to the flax-mills, the reply is, “Our hands are very healthy. It is in the cotton-mills you will find

most disease." When we inquire at the cotton-mills, the charge is banded back on the flax-mills. The master tailor says the shoemakers, he believes, are unhealthy. The master shoemaker urges that, though his drinking men are often ill, the employment is not in fault, and is surprised we do not suspect some other occupation. The shopkeeper, the merchant, and the professional man, promptly refer the diseases of employments to factories and arts. If such replies and observations were regarded, it is obvious that no inquiry would be efficient. They show the urgent need of more attention to the subject both by masters and medical men, than has ever yet been paid.

Again the excess of labour which injures health, is often zealously reprobated by men who forget their own establishments. The editors of the London newspapers, for instance, have very warmly and very properly supported Mr. Sadler in his efforts to diminish the hours of labour in factories; while their own people are employed, I am told, often 15 to 17 hours a day!

The evils and inconsistencies referred to, evidently arise 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.

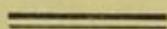
The investigations on which this paper is founded, lead us to offer two or three hints for the choice of employments and situations calculated for the respective constitutions of young people.

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 scrophulous lads should not be put to laborious occupations,—as those of smiths, paviers, &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. Youths 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, and chronic disease of the pulmonary substance may slowly subside, 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 con-

sumption. 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, and ward off pneumonic inflammation.

3. A *change* of occupation is often advisable. A person 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 an individual, than an atmosphere *mechanically* impure.



A full discussion of the treatment of diseases which result from employment and habits, would lead me over the wide field of the practice of physic, and convert a tract into a folio. There are, however, two subjects, to which I would call the attention of the medical reader.

1. *Congestion of the Vena Portæ*.—This state, scarcely noticed by authors, I have before mentioned, (p. 195,) as the foundation of most diseases of the abdominal viscera, and remotely of several of the chest and head.

The Symptoms of portal congestion may be briefly stated as the following:—sense of oppression, and distension of the abdomen without tenderness on pressure;—flatulence; faintliness; turbid state of the urine; oppression of the head and nervous system in general, and consequent listlessness or melancholy; urine dusky, rather than yellow; perspiration reduced; general and fugitive pains in the limbs. The

negative symptoms are more characteristic than the positive. The tongue is never foul, nor is there commonly even a white fur; the taste is natural; the

appetite is unimpaired, often indeed excessive ; the sleep usually good ; the pulse unexcited, but deficient in freedom and force. Portal congestion is, however, a state which we rarely see distinct. It induces no such distress as to bring it frequently under the medical eye, till the superinduction of chronic inflammation of the viscera : and then of course we find the compound symptoms of congestion and inflammation, or rather those of the latter—the more acute disease—than those of the former. Thus, though the bowels, in the early and pure stage of congestion, are generally inclined to constipation, and the fæces dark-coloured, a change takes place on the advance of hepatic disease—diarrhœa frequently occurs, and the evacuations become olive or pale or deep-orange.

Causes. At the page quoted before, I adverted to the effect of a sedentary occupation in producing portal congestion. Another cause is irritation of the mucous membrane of the intestines ; as by improper drinking of stimulants, which, exciting the action of the arteries, engorge the veins. A third is, mechanical obstruction of the trunk of the vena portæ, as by diseased liver compressing the branches with which this viscus is supplied.

Treatment. The first measure is the application of leeches to the anus. When we examine the roots of the vena portæ which arise from the rectum, the size of these veins, and their general enlargement in abdominal disorders, the way in which they often protrude, burst, bleed, and become the foundation of hæmorrhoids, their anastomosis with the blood-vessels of the integuments about the anus ; when we reflect, moreover, that at no other part of the abdominal parietes, is there any connection between the skin and the radicles of the vena portæ, we see why the application of leeches to the anus should be much more efficient, than their application over

the abdomen itself in general congestion, or to the right hypochondrium in diseases of the liver. Thus bleeding from the anus, as the most direct means of disgorging the portal system, is urged as well by anatomical reasoning as by therapeutic experience. 8 or 10 leeches may be applied once a week for three or four times. Purgatives are the next means; and the alternation of saline and cholagogue, appears preferable to the use of either solely. Full friction of the abdomen, night and morning, is an important auxiliary; and a combination of oil of turpentine, of chamomile, and of olive, with the solution of ammonia, presents a good formula. Tincture of veratrum in the doses of 15 to 25 minims thrice a day is a valuable medicine in this disorder as well as the hepatic affections founded on it. Unlike most medicines, it seems to act simultaneously on the secretions of the liver, the kidneys, and the skin. Soda may be advantageously added. The warm bath, on alternate days, with subsequent friction, is a good auxiliary to other measures. During convalescence, super-tartrate of potass is a useful daily aperient.

Diet must be regarded.

After a week or two's continued but gentle purgation, slops must be reduced. To remove the flatulence, which is ever a principal complaint in this and other disorders of the digestive organs, a solid diet will be found most efficient. I have many patients who are each confined, with the best results, to a pint of liquid a-day.

So much for the general treatment of congestion of the portal system. In most cases, however, we have the effects of that state on other organs to treat at the same time,—as disease of the liver, inflammation of the mucous coat of the stomach, and of the intestines, and the various disorders ill-arranged under the generic name of dyspepsia. But where attention is paid to the principle of improving the circulation of the blood through the affected organs,

there is comparatively little difficulty in the adoption of ulterior remedies.

Portal congestion is generally the foundation of the diseases of scientific and literary men, of many professional, of some mercantile men, and of most sedentary artizans. ¶ My second remark has reference only to men in dusty employments, as those mentioned at page 63 et seq. ↗

(Without discussing the nature of bronchitis, or entering at present on the principles and details of treatment, my observation refers to a single remedy. The inhalation of chlorine gas we have tried rather extensively among the workers in flax, suffering from chronic bronchitis. Sixteen of these men I induced to come every evening, after the day's work, to an apartment, the atmosphere of which we impregnated with chlorine, by pouring muriatic acid on manganese. Here they remained at first for a quarter of an hour, and afterwards for about an hour. One individual declared the second evening, that he had not slept so soundly for several years as he did the night after inhaling; and on the fifth evening, all the men declared their breathing freer, and the cough considerably reduced. Those who previously could obtain little unbroken sleep, had better nights; and others had regained appetite. The plan, from accidental circumstances, was omitted for three evenings. A recurrence of cough and dyspnœa was the speedy result. They gladly, therefore, returned to the inhalation of the chlorine, and continued it for several weeks with the most marked advantage. They have since resolved, on the approach of next winter, to take a room for themselves, adjoining their mill or houses, for the purpose of the regular inhalation of chlorine. Two hatters, labouring under similar diseases, joined the flaxmen, and experienced the same benefit.

Further observations, more numerous and more correct, will hereafter, I trust, be adduced for the adaptation of treatment to the causes of disease. The subject, neglected, forgotten, or unknown, is fertile in discoveries and improvements, important alike to humanity, and to science. Any practitioner, by habitual attention to the subject in the course of his routine, and the honest registration of results, may at once serve these great interests, and obtain durable honour for himself.

APPENDIX.

“ THERE is, we will venture to say, no country in the world where the effects of trades on the health, and longevity of the workmen who follow them, are so extensively pernicious as in Great Britain. For there is none where the proportion of the people employed in hurtful trades is so great, none where the workmen are congregated so much in towns, and large manufactures, and none too, we believe, where the working hours occupy so large a part of the day. It is then melancholy to reflect how little has been done in this country by medical men or philanthropists out of the profession, towards ascertaining the nature and extent of these effects, as well as the means of correcting them, and how little encouragement has been held out by our government for such investigations. English medical literature has been till now destitute of a single general treatise on the disease of trades and professions; scarcely can it reckon more than one or two monographs on special departments of the subject; and on one occasion only has the government interested itself in the fate of the sickly and short-lived artizan. No one will feel surprised at the apathy of a government, which has long been notorious for indifference to scientific inquiries.”—*Review of the first edition of this work in the Edinburgh Medical and Surgical Journal, for 1831.*

The “*Annales D’Hygiène Publique et de Médecine légale,*” contain valuable papers, but I have not been able to obtain the numbers in regular succession. In that for March, 1832, are a long communication from M. Parent Duchatelet, and a shorter one from Dr. A Girandet, on the effects of the *Steeping of Hemp.*

On the whole these gentlemen conceive it little noxious to health. From M. Parent Duchatelet, I extract a summary. " Si de petits oiseaux et des poules peuvent boire impunément une macération saturée de chanvre, et se nourrir, pendant un temps assez long, de pain et de grain trempés dans cette macération ; Si sous l'influence de l'usage de cette macération, continuée pendant cinq mois, des cochons—d'Inde, animaux délicats, peuvent vivre et procréer ; Si des animaux de cette espèce, quittant le sein de la mère, peuvent prendre impunément, pour première nourriture, du son détrempé dans cette macération ; Enfin, si ce régime ne contrarie pas et n'arrête pas la croissance de ces mêmes animaux ; ne serons nous pas tenté de croire, que les principes fournis à l'eau par le rouissage du chanvre, ne sont pas tout-à-fait aussi nuisibles qu'on l'a prétendu. Mais si, en expérimentant sur l'homme lui-même, nous apprenons, qu'il peut prendre impunément des doses énormes de cette macération ; nous en concluons :—Que tout ce qu'on a débilité à ce sujet, sur de prétendus accidents et de prétendues épizooties, n'était probablement qu'un jeu de l'imagination et nullement le fruit de l'observation ;—Qu'on peut, sans danger, conduire les bestiaux dans les lieux où l'on fait rouir le chanvre, et que, quelle que soit la masse de chanvre accumulé dans un endroit, quelconque l'eau qui le baigne ne nuira pas à ces bestiaux, si toutefois ils ne répugnent pas à la boire : depuis long temps l'expérience des agriculteurs leur avait appris cette vérité. Qu'on peut, sans inconvénient, recevoir, et introduire dans les bassins destinés à l'approvisionnement des villes, dans les tuyaux répartiteurs, l'eau des ruisseaux dans lesquels on aura fait macérer du chanvre ; que la présence des produits du rouissage, peut tout au plus nuire à la sapidité de l'eau ; et, qu'à cet égard, les sens du goût et de l'odorat, sont les meilleures règles à suivre pour savoir ce qu'il convient de faire."

STARCH-MAKERS, mentioned at p. 52. Starch-making in the country I have personally and repeatedly examined ; but not that in London, and have been obliged to make my inquiries through the medium of a professional friend. Since the early part of this work was printed, I have received information from

another source which leads me to doubt the comparative unhealthiness, and short lives of London starch-makers. My friend, Mr. Dobson, of Belgrave-street, visited the establishment at Lambeth, and found the men as robust as the generality of townsmen. He afterwards examined one at Whitechapel. The operatives were 40 in number. One man was 74 years of age ; and had been in the establishment 43 ; and another 63, and had been there 20. The rest were young men and boys. Mr. D. considered them, as a whole, healthy and robust, and fresher-looking than the men at the Lambeth manufactory. Before entering the employ the strength of each is tested by requiring him to carry a bag of 3 cwt. Mr. D. was informed that the appetite of the men is excessive, especially when they work over the acid largely disengaged. In the country we have not found this to be the case.

CLOTH-DRESSERS, OR CROPPERS, p. 39. Many suffer so much from bronchial and pulmonic disease as to be disabled soon after middle age. On inquiring of a cropper the history of the oldest men he knew in the employ, I received the following statement. Sp. was unable to work at the age of 43, and died at 50. Sm. worked with intervals of illness from "asthma," till within a few months of his death ; but this occurred at 48. W. during the latter part of his life was so asthmatic as to depend on his sick-club for six or seven months in a year ; he died at 47. Sl. worked regularly, with short exceptions which paroxysms of asthma produced, till five months before his death ; but this occurred at 41. Sh. during the latter part of his life was able to work but a day or two in a week : he died at 53. D. had paroxysms of various length, but worked till five or six months before his death, which took place at 46. N. was found dead in his bed, at the age of 44.

Two old men, however, I have found and examined. R. is 69 years of age, and commenced cropping about 11. He says he has been temperate. For the last two years he has been able only to *set handles*. He has a wretched and decrepit appearance ; and is scarcely able to undress himself for exploration by the stethoscope. Chest flat and inclining forwards ; scapulæ projecting. Auscultation indicates partial pneumonia

solidification of portions of the lungs, and chronic bronchitis ; dilatation of the heart, with hypertrophy of both ventricles. He suffers much from cough, and expectoration. Exhalation by pulmometer, only 90 cubic inches. H. is 65 years of age ; commenced cropping at 14 or 15, and has been much employed in *dry beating*, (the department of most dust.) He has taken much liquor. For the last four or five years he has been unable to crop. He complains of difficulty of breathing, constant but aggravated by catarrh ; of cough, and expectoration of thick matter which appears to vary from mucus to pus. He cannot lie down. His chest is ill-formed, and respiration heaving. Percussion and the stethoscope indicate congestion of some parts of the lungs, hepatization of others, and hypertrophy of both ventricles of the heart. Exhalation by the pulmometer 115 cubic inches.

The three following I believe furnish tolerably fair specimens of the general state of croppers who have been some years at the employ.

M. is 49 years of age, and has been a cropper since 14. He is much fresher-looking than his fellows. He has always been temperate. Except a slight crepitous rale on the right side of the chest, the stethoscope indicates no disease. He has no cough, and has been subject to no difficulty of breathing, except when working on dusty pieces. He has then been scarcely able to walk home. Exhalation 171.

S. 47 years of age, temperate, has been at work from 14, till the last year. He complains of an increasing difficulty of breathing which affects him all the year, and of a cough which harasses in winter. He suffered most distress in respiration when employed in *dry beating* ; and at length a slight dust obliged him to retire, and lie down. On the right side of the chest, respiration is preternaturally loud, and accompanied sometimes with a sharp chirping, sometimes with a base sound ; on the left it is deficient, and in several parts a crepitous sound introduces each inspiration. Exhalation, 110 cubic inches.

R. a stout and tall, but pale, man of 41, has been a cropper from boyhood, but of late years, like a majority of these artizans, has been frequently out of work. He states himself to be temperate. He has been long subject to paroxysms of asthma ; which terminate by expectoration. He has the respiration sonorous, or bronchial in every part except the infra-axillary and mammary regions. Exhalation, 151 cubic inches.

On the whole, it appears that the employ excites disease in the bronchial membrane and the lungs, and through this obstruction perhaps of the pulmonary structure, hypertrophy of the heart. Intemperance, however, assuredly diminishes the resisting power of the constitution, and exalts the disease of employ.

At p. 14, the words *Labourers in Husbandry* should be omitted. For such oversights, and many typographical errors, I offer no other apology than continual interruption by more urgent engagements, and the repeated suspension of the press.

A reference to the index is required for several employments mentioned in different sections.

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