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## BAD EFFECTS OF BREATHING IMPURE AIR.

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NOTWITHSTANDING the various inventions and improvements which distinguish the age we live in, it is lamentable to observe what little attention has been paid to the ventilation of apartments in which we are destined to pass the greater portion of our lives, and in which a constant and well-regulated supply of the element we breathe is so essential to mental enjoyment, as well as the sustention and prolongation of life.

This inattention can only be accounted for either by the want of education in the major part of that class of persons who call themselves builders, and who content themselves with executing their work, and getting it off their hands with as little expense and loss of time as possible; or an apprehension, on the part of those who aspire to the more elevated designation of architects, that the introduction of anything new would expose them to the charge of a want of taste, or of that acquaintance with the style of the ancients to which it is the fashion so strictly to adhere, imitation being, in their opinions, more deserving of commendation than originality of design, or a desire to meet the improvements of the age; and fashion, of more importance than health. If they construct our doors and windows in so superior a manner as to exclude every possible particle of air, they flatter themselves with having attained an advantage to which the inhabitants of ancient Greece and Rome did not aspire; and when they arrive at that degree of perfection which will enable them to exclude this element altogether, they will, no doubt, be entitled to an increased meed of praise from medical practitioners, heirs-at-law, undertakers, &c. They should, however, recollect, in their apparent anxiety for imitation, that the ancient architects of warmer climates did not overlook the necessity of a free admission of air; and also, that a constant supply and free circulation of this element is as necessary for sustaining life, as a given quantity for the combustion of the fuel we require to warm our apartments: our builders, nevertheless, only provide for the latter, as if the former, although the more important, was of minor consideration; or, that they conceived the chimney-draught sufficient for both purposes, when in reality it does not answer that for which it is principally intended; as by far the greater portion of the heat generated in our open fire-places is carried up the chimney by sharp currents of air from occasional openings of doors, or such crevices as it may force its way through. It is, moreover, frequently productive of serious bodily injuries, particularly to

those of delicate frames; while it cannot be sufficient for the purposes of wholesome ventilation, this air being colder than that already in the room, is consequently of greater specific gravity, and must form a lower stratum, not unfrequently felt by those placed round the fire, suffering from an undue proportion of heat at one side and of cold at the other.

It should also be borne in mind, that the openings of our fire-places being seldom more than three or four feet from the floor, the upper stratum of air which we breathe is neither removed nor purified by this under current, and must, from being breathed over and over again, be productive of most prejudicial effects, and that the contamination of this atmosphere is considerably augmented at night by the combustion of lights. It has been ascertained that the quantity of air breathed by an ordinary-sized person is about two thousand cubic feet per hour; and that two mould candles consume as much of the oxygen of this air as a human being; and that the nitrogen and carbonic acid gas which remain are peculiarly inimical to animal life, and that when carried up by the currents occasioned by combustion and respiration, they form an upper stratum where they remain, and must be repeatedly inspired before they make their escape into the chimney, the only ventilating flue with which our houses are provided.

It should also be observed, that the heat thus generated is in proportion to the quantity of oxygen abstracted from the atmosphere, which enters into combination with the carburetted hydrogen of the flame of candles, coal-gas, oil, or other inflammable matter, from which light is produced. That every cubic foot of carburetted hydrogen consumed unites, on an average, with two cubic feet of oxygen (that portion of the atmosphere required to support animal life); and that the product of this combustion is about two and a half inches of water and one of carbonic acid gas, which, when inhaled in its pure state, proves instantly fatal; and the greater the proportion we inhale, in addition to the vapors evolved from the lungs and skin, the more pernicious the effect.

Supposing, for example, that the perfect lighting of an ordinary-sized apartment requires fifteen cubic feet of carburetted hydrogen per hour, this would form about a pint and a half of water, and fifteen cubic feet of carbonic acid gas; for whenever carburetted hydrogen gas is burned with oxygen, or atmospheric air, these are the products of the combustion, whether the carburetted hydrogen is obtained from wax, tallow, oil, or coal. If, therefore, this lighting continues in an unventilated apartment for seven hours, one gallon of water is produced, the greater part of which will be deposited on the walls, windows, furniture, polished metal, or other cold surfaces with which it comes in contact; and to some articles of this nature it is known to prove highly prejudicial, in addition to the injury to health occasioned by an increased quantity of moisture, mixed with the air we breathe. As one of the principal functions performed by this air for the preservation of health, is to carry off with it a considerable quantity of vapor, in order to prevent its undue accumulation in the lungs, it is, therefore, evident, that after it has been already so loaded it cannot properly perform these functions, and that consumption and other complaints are thus frequently induced.

The prejudicial effects of carbonic acid gas (which is the same as the choke-damp of mines) as well as the nitrogen of the air, which is set free by the abstraction of the oxygen (and amounts in quantity to four times that of the oxygen), are well known, and ought by all possible means to be provided against. This has been attended to within the last few years in our public hospitals, and the mortality in consequence considerably decreased; and likewise in several of our manufactories and public establishments, where the diseases generated by the number of persons congregated in such establishments have been proportionably diminished. In the House of Commons, also, where hundreds of members, with hundreds of candles burning at night, tended so much to vitiate the atmosphere, important improvements in lighting, as well as ventilation, have been recently made; but in our domestic establishments little or no attention has been paid to this important subject, and the foundation of a variety of diseases must be the result, particularly from the foul air breathed at balls, or other crowded assemblies.

The confinement of air in our churches and places of public worship must also be highly prejudicial, as we are frequently exposed to an atmosphere, on entering one of these edifices in the summer months, ten or fifteen degrees below that of the external air, independent of the stagnant state in which it has been allowed to remain during a whole week, often vitiated, in a greater degree, by the gaseous matter evolved from human remains; and even in private houses much inconvenience is experienced from the stagnant state of the atmosphere in close and gloomy weather, as the entire basis of ventilation depends on the possibility of producing a constant circulation as well as supply of this element. Close stoves are also objectionable when made of iron, and heated to a certain temperature, as oxide of iron is produced by the powerful attraction of that metal for oxygen, and the formation of ammoniacal gas by the mixture of the nitrogen, which remains, with hydrogen, acting on our bodies and olfactory nerves.

But if stoves were constructed of masonry throughout, as in many other countries, or of fire-tiles, or porcelain plates, imbedded in mortar, with well-regulated flues, they would be far preferable to open fire-places; this substitution of imperfect conductors of heat being not only consistent with the soundest principles of economy in the preservation of heat, and its more uniform distribution through apartments, but more conducive to health than bringing the air in contact with iron stoves or pikes. Our desire, however, for polished metals in almost every department of our domestic appendages, united to the interests of the furnishing ironmongers, to whom these matters are usually left, must operate, in no small degree, in determining the prevailing taste for this commodity. Porcelain stoves may, nevertheless, be made sufficiently ornamental for those who prefer health to fashion; and when apartments are provided with well-regulated apertures and flues through their ceilings into the adjoining chimneys, to carry off the air vitiated by respiration and combustion, a sufficient degree of heat may be obtained with a sufficient supply of that element, without which it is impossible to maintain health.

The healthy appearance of those who pass the greater part of their

time in the open air, sufficiently indicates its advantages. Armies are also well known to have greater numbers on the sick-list when well housed, and what is considered comfortably settled in quarters, than when exposed in a campaign to the vicissitudes of the season for weeks and months, without any other covering than the canopy of heaven, or occasionally of a tent or hut, or the shade of a tree. These facts ought to satisfy us that we should admit the air as freely as possible, and provide, at the same time, for its escape through the ceilings of our apartments at all seasons of the year, as the temporary and often imaginary inconvenience of a little cold, when compared with the decided disadvantages of breathing impure air, is by far the lesser evil.

Where ventilation in large establishments or public buildings can only be obtained by artificial means, it is produced by pumping air in, or drawing it out, by a fan worked by steam, or other adequate power, and affording it the means of free circulation, either cooled, heated, or in its natural state, through well-regulated apertures in the floors, walls or ceilings; and in coal-mines, by flues or shafts, in which constant currents of air are maintained by the combustion of fuel or coal-gas. This system might also be easily introduced into houses already built by means of the existing chimneys, but with still greater facility, if our architects and builders were to direct their attention to these points when erecting new ones.

The importance of this subject has been frequently pointed out by scientific men of considerable eminence, without attracting that attention which would have been the means of preventing many persons from being imperceptibly hurried to an untimely end. It is, therefore, to be hoped that the powerful engine of the press will continue to lend its aid in exposing these evils, until it impresses upon the public mind, and more particularly upon our architects and builders, the urgent necessity of providing against them. Is it not possible to make the heat produced in the lighting of apartments available for their perfect ventilation? If any of these gentlemen succeed in so doing, they will be entitled to greater gratitude, for this achievement in the purification of an element so essential to the preservation of our lives, than any claimed by those heroes whose victories have contributed so much to the miseries of the human race, and the destruction of the human species. But we ought not, perhaps, to be so much surprised at the slow march of intellect in this respect, when we find so many centuries to have elapsed before it was so generally admitted, as at present, that pure water, another element bountifully supplied by nature, is preferable to any other beverage for insuring the health and happiness of mankind; and where we have so many temperance societies, and other advocates, for impressing upon the minds of our fellow-subjects the necessity of becoming converts to the imbibing of this element, in its pure state, ought we not with still greater reason to endeavor to make a similar impression as to the advantages of inhaling, with equal purity, the lighter fluid, of which we stand so much more in need, and which we so much more frequently require?—*London Lancet.*