

Miscellaneous.

Ventilation—Its Necessity and Neglect.

In referring to this subject we are aware that we risk disgusting our readers by introducing a theme which has become hackneyed and threadbare by incessant repetition in newspapers, books, lectures, and by other means. Still it is none the less important, and that it is habitually ignored by thousands of otherwise sensible people is our excuse for a few practical suggestions.

The last generation paid no attention to this matter, at least in this country. They had no need. Dwellings were sufficiently ventilated without resort to special appliances for that purpose. The fires generally used were of wood, or if coal was employed, it was burned in an open grate. The houses were not hermetically sealed boxes, with double windows, thick walls, and closely fitting doors and window sashes. The old-fashioned fire-place, or even the Franklin grate, gave large egress to the vitiated air, while the numerous cracks around doors and windows furnished sufficient pure air from the external atmosphere. Coal gradually usurped the place of wood for fuel, and compelled the introduction of stoves, furnaces, and ranges, which gave out their heat, not only by imperfect radiation, but by the contact of hot iron plates with the air. This had the effect, in a close room, to destroy the natural humidity of the atmosphere, and for want of ventilation a prejudice against stoves and coal was engendered, as productive of diseases. Perfect ventilation will remove these causes of complaint. The heat generated by the combustion of coal, whether anthracite or bituminous, when burned in a close stove, is not necessarily deleterious.

Oxygen, from its quality of supporting combustion and sustaining life—itself a form of slow combustion—was formerly called the "vital fluid." The effect of a fire in a room is to use up and absorb the oxygen of the air, rendering it unfit for breathing. To sustain life, therefore, as well as combustion, a fresh and continual supply of oxygen is needed. Yet this gas alone, unmixed with hydrogen and nitrogen, is not fit for either purpose—life or combustion. In either case it destroys—acts too rapidly—in one instance producing fever, and in the other destroying the fuel too rapidly. Ventilation, therefore, is as necessary for the fire as for the lungs. The fire of a stove is not the only source of the deterioration of the air in our rooms. Gas lights, lamps, and candles, absorb a large amount of the oxygen, and if the products of combustion are not visible in smoke, or unconsumed carbon, we flatter ourselves that no deterioration of the atmosphere of the room is caused. There is no combustion without the generation of carbonic acid, a gas as fatal to animal organisms as any drug in the apothecary's collection. Because we do not see this in the form of a smoke or a noxious vapor, we provide no means for its escape, and no means for introducing pure air. For our ordinary fires we are compelled to do this, as the results of their combustion would soon render our rooms uninhabitable.

It is calculated that each person consumes, on an average, five cubic feet of air in an hour; or, rather, extracts from it that portion capable of supporting respiration. Put one hundred persons in a room, as a hall, containing 22,500 cubic feet of atmospheric air, a room thirty feet long, twenty-five wide, and thirty high, and in four and a-half hours the air would be unfit to breathe. The increase of carbonic acid gas would soon prove deleterious. It is a beautiful provision of nature that this gas, ordinarily much heavier than atmospheric air, is, when first exhaled from the lungs, lighter than the surrounding air, and rises. In time, however, it cools and descends to our level, when we are compelled to inhale it again. For this reason low studded rooms are not healthy.

But if ventilation of rooms is necessary, it must not be supposed, what some have asserted and attempted to prove, that the proper ventilation of rooms adds nothing to the cost of heating in cold weather. If fresh supplies of air are introduced, these supplies must be heated to produce the requisite temperature, which necessitates an additional consumption of fuel. The object sought is, however, well worth the increased expense entailed.

It is unfortunate that our houses, especially our dwellings, have not been constructed, heretofore, except in rare instances, with ventilation as one of the objects. We must, then, adopt temporary measures to insure a fresh supply. For this purpose the opening of a window at the top and the admission of pure air by a door, or the lower portion of a window, on the opposite side of the room, is the most feasible means for ventilation. Currents of air must be avoided, and this can be done, in a measure, by stretching across the aperture a screen of thin muslin, or, better, perforated thin plates of tin or other metal. To be sure this is an imperfect and not altogether satisfactory method of reaching the object sought, but it is better than no ventilation.

This is a subject too important, and comprising too many conditions, to be justly considered in so brief an article as this. Our object is, however, to call attention to the necessity of proper ventilation, in the hope that it may awaken inquiry and stimulate to some exertion in the right direction.—*Scientific American.*

Copying and Reducing Pictures.

A recent number of the *British Photographic Journal* gives some specimens illustrating this new mode of copying and reducing pictures, or printed or written documents. The number referred to contains a reduced original lithograph picture; and three *fac similes* of different sizes, of an entire page of the journal, all perfectly readable, although one is reduced from a superficies of 73 inches down to 03½ inches. The process is thus described:—

"A sheet of india-rubber of the thickness of cardboard is fixed by the edges to a suitable frame, the mechanism of which is so constructed as to cause, by the simple operation of turning a handle, the web of india-rubber to be expanded equally in every direction and to any extent. Of the very ingenious mechanism employed for this expansion it is unnecessary for us to speak; let it suffice to say that the action is very uniform and under control. The four sides of the frame to which the