VENTILATION.

[Following is the conclusion of the lecture delivered by Dr. Jacob S. Talmage at the Church University on Monday evening. The first part of the lecture appeared in last evening's NEWS.]

In connection with our present topic of air contamination the question of the effect of impure air upon the body is pertinent. We have an array of the best authorities to support the view that the breathing of foul air is productive of a multitude of ills. In the first place many specific diseases are caused by these means. Nervous disorders are common among those who dwell in foul air. Consumption is a frequent result of breathing contaminated air, as are also certain forms of sore throat, particularly Tonsilitis. This latter, resulting also by the breathing of air contaminated from the back flow from sewer pipes, is commonly known as sewer-air throat. Concerning its symptoms, Dr. Parkes, of London, has told:

"It is marked by great inflammatory swelling of the tonsils, very foul tongue, gastric derangement, accompanied by severe headache and intense depression. The temperature of the body is often not much raised, certainly not to a degree proportionate to the severe symptoms. Delirium and temporary loss of sense, together with the more prominent, are characteristic of acute illness resulting from the entrance of sewer-polluted air or water into the system."

But beside these specific disorders, the breathing of foul air tends to weaken all the bodily and mental powers. A body so subjected is rendered, for the part of its vitality, the capacity to resist the encroachments of disease is reduced, and the chances of an early surrender to the influences of a destructive enemy much increased. Let me call your attention to some authenticated instances of ill effects from this cause:

The extreme end of the winter of 1854 and 1855 was the occasion of domestic ventilation in that country to very primitive principles. A traveler there was shocked one night by the sight of a coach containing eight little chamber in which besides with all the male members of the family, so to be compelled to seek his bed, which consisted of but a few rails, pulled a cork from a knot-hole in the wall for a few minutes, and then replacing the cork, with a shiver returned to bed.—Spiner, 1855.

On the imagination of workers elevated as well as ignorant, the feeling still seems to be stereotyped, that the free, pure, unadulterated air of heaven falls upon the knee of infancy as the pigeon of sexual sleep, and that the longer the air circulates as a deadly poison, and sap the shaver's and brackets, sleeping and awake, air pretty generally supposed to deprive the objects of the most repulsive, potential attributes of what was originally breathed into the nostrils of the first great ancestors of the human race as the "breath of life."

During the English war in India in the last century, 146 persons were cast up in a room scarcely large enough to hold them. The air could enter only by two narrow windows. At the end of eight hours but 23 persons remained alive, and these were in a most deplorable condition. This prison is well called "The Black Hole of Calcutta." Every room that after the battle of Austerlitz, 300 Russian prisoners were confined in a cavern, where 150 of them died in a few hours. The stupid captain of the ship Londonderry, during a storm at sea, shut the hatches. There were only a cubic foot of space left for each person, and in six hours 90 of the passengers were dead.—Dr. Stark.

[The lecturer here cited numerous other instances, quoting Lord Derby, Dr. Newell, Dr. Youmans, Von Petzenkofer, Bersay, etc.] Continuing he said:

Yet how terribly negligent are a great part of mankind to this pressing requirement! Fortunately for our carpenters and builders attempts do their work imperfectly, and leave many uncertain through which air may enter our dwellings, against our knowledge and our consent. Not alone in our domestic habitations do we say the time-defiance of weakened minds and bodies by such unclean atmospheric surroundings, but in places of general assembly, to recipe daily, and so it is to say, in the place of worship erected to the professed service of godliness. Cleanliness was long age ranked next to godliness; it is now regarded as a part of godliness, and what uncleanness can be more disgusting, or more deliterious, than filth in the air we breathe? Is it any wonder that congregations go to sleep, within sound of a voice that may have been inspired, when the supplies surroundings have made the soul deaf to all reason and truth? Yet I have set in places of worship, where the lights could scarcely burn for want of supporting oxygen. Architects who plan public structures are now generally capable men, understanding the requirements in the way of ventilation, and usually they make adequate provisions, but the janitors, and others, in immediate charge of those buildings are prone to neglect every facility and to doom the audiences to a stifling and fishy atmosphere.

5. THE MEANS OF SECURING PROPER VENTILATION, constitutes the last and perhaps the most practical of the divisions of our subject. We have to provide for the removal of foul air and the introduction of a fresh and pure supply. I speak only of ventilation in this sense, that is, ventilation proper, though attempts have been made to provide a medical means of decomposing the foul emanations, and of supplying oxygen to neutralize the putrid; such methods, however, are now very generally abandoned except in the very small scale of divers cells, etc. To ventilate a room we must arrange for the entrance of fresh air, for the egress of foul; while a means of moving those great masses of air must be provided. Most systems of ventilation depend upon changes of temperature to effect the movement of air, or upon some mechanical contrivance, such as fans, wheels to force air into the room, thereby forcing out that already there, or by drawing air from the room, thereby tending to create a vacuum, in consequence of which other air will enter. Any source of rarefaction of the air will cause a displacement of the air, producing currents. In general the tendency of the warmer air will be to rise; then the cold air must fall in some other part of the room to restore the equilibrium. Air in contact with the cold walls or window, becoming specifically heavier because of the cold, will descend, and through cold, will exit, and the presence of such downward currents under these conditions may be shown by holding a lighted candle near the sill of a window. An excellent method of ventilation is upward outward whereby foul air may be removed from rooms, a by means of a ventilating flue alongside the heating flue. The warmth from the latter will cause the current of the air in the ventilating flue, air from the rooms may then be made to enter, openings from the rooms into the flue be properly arranged. Such openings should be provided with dampers whereby the flow (when) may be controlled. An objection to the use of such flues has been urged on the possibility of back currents, wherein smoke may be drawn downward from the top of the adjacent flue into the rooms. To obviate this difficulty, automatic valves should be used in connection with the registers. A simple form of such a valve is a sheet of zinc six or eight of this oil cloth, hung inside the flue, fastened at the top, covering the register opening. Such a sheet will yield to any pressure from the room toward the flue, but any current in the opposite direction will close the flue against the wall. The Arnott valve is constructed to work on the same principle, but consists of a sheet of metal hinged delicately so as to respond to very slight pressure.

The Tuille system of ventilation is based on one of the best methods for removing foul air from rooms. This requires a large central shaft running from the cellar to the top of the building, to each room adjoining openings are made into the shaft, both near the floor and near the ceiling; these are fitted with registers and valves. A clean pipe passing the length of the room; and the heat from this causes a violent upward current effectually aspirating air from the rooms.

An opposite tendency is seen in the Lyman ventilator, which consists of a box of coarse tin at the top of a large pipe; air in contact with the top becomes cooled and consequently sinks through the pipe and more air follows. In this way an hourly currents of fresh air may be carried downward and distributed over the beds of the sick, about desks and in other small ways. (Note—These devices at the time that lifted were well illustrated in the sections by drawings or models.) Mechanical means of effecting the movement of air bodies are usually efficient but expensive. Fans, driven by steam or water power, have been used in such a small way they are set on tables, desks and the like for producing local cooling currents. A larger way they are employed either to drive large volumes of air through the flues of a building or for aspirating air from the buildings so that more will enter.

In any system of ventilation ample care must be bestowed in providing both an inlet and an outlet for air; and on the neglect of one of these requisites the success of the other depends.

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