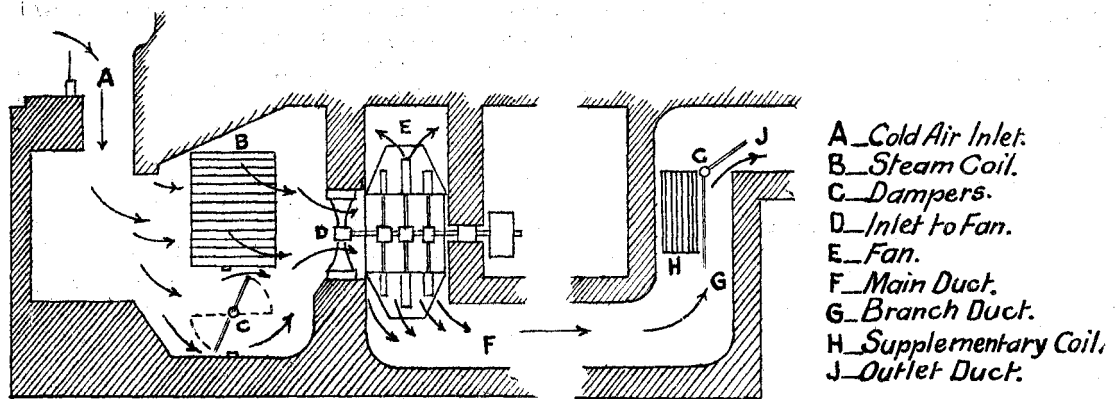




The mere hand-sketch above will show you what may be the arrangements necessary for the hot-water system; but there should be a mesh, furnished with a water-spray, spread on the outside of the fan, to filter and catch any of the impurities from entering the shafts. The sketch was suggested by an illustration in Billings's book on "Ventilating and Heating" in the Assembly Library, page 153, in which book there is much valuable information on this subject. From the sketch it is not difficult to understand that, if the basement was constructed, air of an even temperature and purity and in sufficient quantity could easily be distributed in tubes to all parts of the House.

For the quantity of air to be supplied per head, Dr. Reid, who devised the original scheme of ventilating the House of Commons, considered that a well-distributed supply of 10 cubic feet per minute was ample. In Germany from 20 to 25 cubic feet per minute is allowed for buildings used for this purpose. In Austria 25 cubic feet per minute is allowed; and in America from 10 to 30 cubic feet per minute. These figures do not allow for gas-burners. Each burner is known to consume from 45 to 50 cubic feet per minute, and just so much more air would be required to be supplied for each burner had the House been lighted with gas.

Of the quantity of air to be supplied, Dr. Parkes remarks (1892), "We cannot demand that the air of an inhabited room shall be absolutely as pure as the outside air, for nothing short of breathing in the open air can insure perfect purity at every respiration. In every house there will be some impurity of air. The practical limit of purity will depend on the cost which men are willing to pay for it. If cost is disregarded an immense volume of air can be supplied by mechanical contrivances."

Of the movement of supply Mr. Farrow has laid down these two rules for himself, but they appear to me too circumscribed: "Fresh air should never enter a room at a greater rapidity of current than 2ft. per second, while a rate of 1ft. per second is perceptible at the point of entry. The desirable rate of flow for a forced current in a main channel is about 600ft. per minute, while the inlet or suction-air passage to a fan should have one and a half times the area of the outlet or distributing-duct."

I have inquired into the velocity that air-currents may have without causing discomfort, and of what constitutes the least amount of cubic space through which the standard amount of fresh air, without motion, and of the rate that the supply-current may flow, and have in this found much diversity of opinion. Mr. Farrow, from whom I have already quoted, restricts it to two miles per hour, while Dr. Pettenkoffer, than whom there is no better authority, says that "by means of artificial ventilation air may be renewed six times per hour without creating any appreciable air-currents." It is safe to take a mean rate of flow between these two authorities as a data to calculate from to estimate the supply required by the House. And, as I am informed that the largest number of people in the House, including members, is 250, and this only on special occasions, and even then only for a short time, the following calculations may be taken as providing for a sufficient supply of fresh air for the House when in this crowded state:—

There are about 95,000 cubic feet of air in the House when unoccupied. Each individual of the 250 has therefore an initial supply of 380 cubic feet of air. And for this number of people in a hall of this size, if 1,200 cubic feet per hour be allowed for each individual, or 300,000 cubic feet per hour in the aggregate to be supplied, which I assume to be ample to maintain the air in a sufficiently pure state for respiration. Therefore, from this data the area of the main air-supply shaft must not be less than 11·34 superficial feet, and of the form prescribed by Mr. Farrow and others. The supply should be capable of being regulated to suit the number present in the House at any time. The fresh air from the main shaft can be conducted in smooth air-tight tubes, and distributed to all parts of the House, by openings at suitable places in the risers of the platform. There should also be openings placed round the walls of the House, and arranged so that the current will be given an upward direction, to counteract the effect of any downward flow of any cold air near the walls.

In the foregoing report I have endeavoured to explain what will temporarily ameliorate some of the defects pointed out to me in the present ventilation of the House of Representatives, though anything attempted with the air drawn from the faulty source must necessarily be of a temporary character. I have also endeavoured briefly to describe a system of ventilation that can be relied on as a certain success, and I have quoted the best authorities on this science in support of this contention. As to the cost, I cannot give an exact estimate at this distance from the engineers, but from analogy, and of the possibility of using a part of the old material, I should suppose the work could be completed