"The discharge of outlets is much more certain and constant if the air can be warmed. The chimney and open fire is an excellent outlet—so good that in dwelling-houses, if there are proper inlets, no other outlet need be made. When rooms are large, and more crowded, other outlets are necessary; the heat of the fire may be farther utilised by shafts round the chimney, opening at the top of the room, or, in other words, by surrounding the smoke-flue with foul air shafts.

"Gas, if used, should in all cases be made to warm an outlet tube, both to carry off the products of combustion, and to utilise its heat. The best arrangement appears to be to place over the gas-jet a pipe to carry off the products of combustion, and to case the pipe itself with a tube, the opening of which is at the ceiling; the tube carrying off the gas products is hot enough to cause a very considerable draft in its casing, and thus two outlet currents are in action, one over the gas, and one from the ceiling round the gas-tube. A modification of the lamp proposed in 1846 by Mr. Rutter answers very well, and is now coming into use, as arranged by Mr. Ricketts.

"In various other ways the heat of fire and lights may be taken advantage of. There will be seldom any difficulty in arranging the inlets and outlets, and in obtaining a satisfactory result, if these principles are borne in mind, viz., to have the fresh air pure, to distribute it properly, and to adopt every means of securing the outlets from cold or of artificially warming them, and of distributing the air, which, in spite of all precautions, will occasionally pass down them.

"In hot climates, when outlet shafts are run up above the general level of the building, it would be of advantage to make them of brick work, and to colour them black, so that they may absorb and retain heat."

The outlet opening in the wall of the room should always, when possible, be on the side of the room opposite to that of the inlet. And the higher the escape flue extends, the greater will be the extractive force, the less the atmospheric pressure.

ARTIFICIAL VENTILATION.—This is carried on either by *extraction*, drawing the air out of a room—the *vacuum system*, or by *propulsion*, forcing the air into and through a room—the *plenum system*.

Ventilation by *extraction* is produced by the application of heat, so as to cause an upward current, by a steam jet, or by a fan or screw, which draws out the air.

Of *extraction* by *heat* the common chimney, above referred to, is a well known example. When the fire is burning, there is a constant current up the chimney, in proportion, of course, to the size of the chimney and the amount of fire.