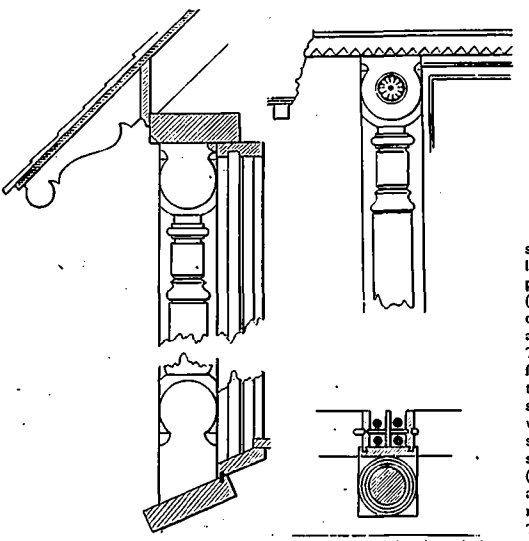
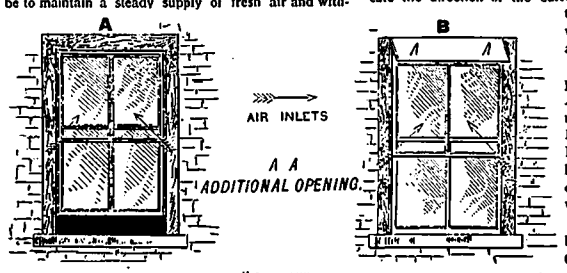
HEATING AND VENTILATING SCHOOL HOUSES.

THE principle and aim of ventilation are thus explained in the United States work on School Architecture :—"Briefly, the aim of ventilation should be to maintain a steady supply of fresh air and withdrawal of foul at all parts of the room, removing the products of respiration and organic particles as fast as thrown off, and leaving no corner stagnant or unswept by the purifying current."



FIGS. 1 AND 2.



FIGS. 3 AND 4.

The author adds :—"Nothing can take the place of aeration by means of open windows. Artificial ventilation, though required for changing the air when the windows are necessarily closed, is insufficient, even under the best of circumstances, unless the room is from time to time thoroughly refreshed and purified by the sweep of the free winds through all its windows widely opened. Such an atmospheric washing should be secured three or four times daily in all weathers. The process affords opportunity for this. No fixed transoms or immovable arched bends should be permitted to exist over windows.

Besides the general airings, in which all the windows are thrown wide open, it is possible and very desirable during three-fourths of the year to keep some of them partly open. If they extend to the ceiling, as shown in fig. 1, the upper part at least of the south windows, in rooms properly supplied with other fresh air inlets, may be pretty widely opened in the coldest weather without causing a noticeable draught. Such openings, if on the leeward side, often interfere with the action of extraction shafts by drawing to themselves the current of escaping air; but this, with care, might be minimized.

There are times, however, when the windows cannot be opened with safety. But means must be taken for ensuring the withdrawal of the respired air from the room in some other way. Dr. D. F. Lincoln, in the report to the New York State Board of Health on School Hygiene; speaking of window "air inlets," says of them :—

"No apparatus that can be named will do as much good, at a very small cost, as the window board—that is a plain piece of board, as long as the window is wide, and from four to eight inches in width. The lower sash is raised, the wood is inserted and the sash is shut down upon it. The air enters (as shown in fig. 5) in a thin stratum, passing upwards between the upper and lower sashes in a nearly perpendicular direction, without causing perceptible draught. Fig. 5 (to the right) represents a double window provided with a board, the air entering at A. This gives great protection from the cold, and also enables the air to enter the room slightly warmed by contact with the lower pane. All four sashes of double windows should be moveable. At B (in the other window) there is a different arrangement for mild autumn or spring weather. The board is made wider and is placed an inch or two from the sash, in such a way as to direct a current upwards. The arrows indicate the direction of the currents entering the room through each kind of window when the boards are arranged as directed.

Dr. Oldright, in his paper on "*Heating Homes*," published in the report of 1883 of the Provincial Board of Health, makes the following suggestions for dealing with windows without pulleys, by—

1. "Having a piece of board nailed on to the top sash of the window, slanting upwards, to direct the current in that direction.

2. "Raising the lower sash and filling in the space left under it by a piece of board, as shown in the accompanying diagram. The air gets in through the space left between the lower part of the upper sash, and the upper part of the lower one.

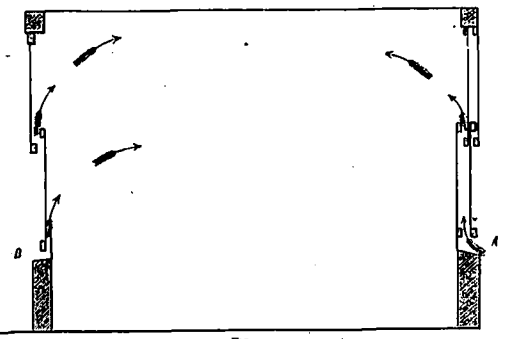


FIG. 5.

3. "A board placed just inside the lower window frame will act in the same way when the latter is slightly raised.

4. "Placing wire screens in spaces of entrance of air. Sometimes they are tacked to the window frames and folded up when the windows are closed.

5. "By louvred openings.

6. "By double panes, with an open slit at the bottom of the outside one and at the top of the inside one, thus giving an upward current.

The ordinary system of heating rural schools is by means of a stove. In most cases this system is unaccompanied by any plan of systematic ventilation, or of securing pure air from *outside* the building. The door and windows (the latter often tightly shut) are often depended upon for such fresh air as they may casually admit to the school room. Efforts have been made by our Public School Inspectors to remedy this great evil, and to introduce a system of heating by hot air, a system the very principle of which is to displace the vitiated air already in the room. An example of an Inspector's success in this direction is furnished by Mr. David Fotheringham, Inspector of North York, in the shape of a plan of heating by hot air, which has been adopted, on his recommendation, by the trustees of a public school near Newmarket. Mr. Fotheringham has furnished a

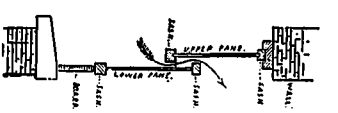


FIG. 6.

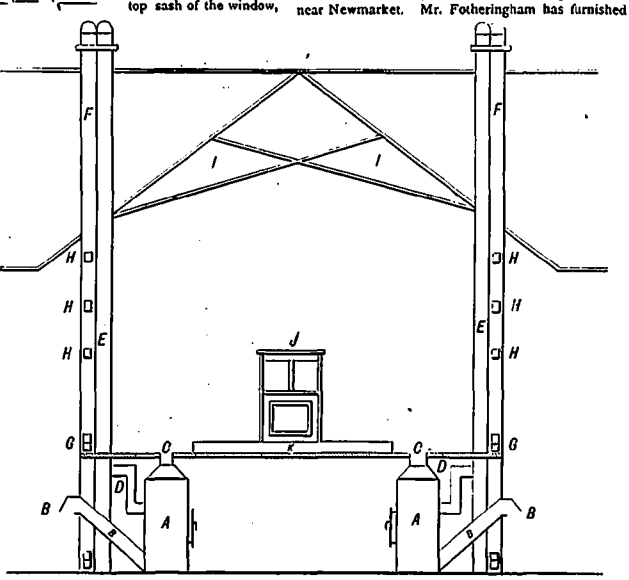


FIG. 7. A.A.—Hot Air Furnace. B.B.—Cold Air Duct. C.C.—Hot Air Registers. D.D.—Smoke Pipes. E.E.—Chimneys. F.F.—Ventilation Shafts. G.G.—Cold Air Escapes. H.H.—Ventilation Registers. I.I.—Principal rafters—giving air space of 16 feet at sides, and 20 feet in the centre of the room. J.—Glass Door. K.—Teacher's platform.