inside and outside the opening, and on the force and direction of the wind.

The movement consequent on difference in temperature is almost constant, and may be fully relied upon when it is not effected by wind.

The method of calculating the quantity of air which will pass out of a room through an opening connected with a flue leading to the top of the house, such as a chimney—and which quantity will of course enter the room through an inlet when one is provided, and by some other channel when no special inlet is provided—in consequence of a difference in temperature, is called the

FORMULA OF MONTGOLFIER.

This was given in extenso in Volume II. of the Sanitary Journal; but as many of the readers of this are not in possession of that volume, those who have it will pardon the reinsertion of it here in a less extended form.

The Formula depends upon the following data:—

1. The temperature of the external air.

2. The temperature of the internal air, (as the air of the room).

3. The ratio of expansion of air by heat=0.002 for one degree, F.

4. The height of the column of internal air, from the floor of the room to the point of exit.

5. The rate at which a falling body is attracted by the force of gravity = 8.

6. The sectional area of the channel or aperture.

7. A variable co-efficient for loss by friction, depending on the shape and size of aperture or channel through which the air passes; in most cases there is a loss of one fourth.

Nos. 3 and 5 are constant, and are 0.002 and 8 respectively.

"The difference in the temperature (1 and 2) is found by an ordinary thermometer, and multiplied by nos. 3 and 4; the square root of the product is then taken and multiplied by nos. 5, 6 and 7; the result is the amount of air in cubic feet that enters and leaves the room in one second; multiplied by 60 we have the amount in one minute.

Height of air column.	DIFFERENCE BETWEEN INTERNAL AND EXTERNAL TEMPERATURE.						
	5°	8°	12°	16°	20°	25°	30°
50	254	322	394	455	509	569	625
45	241	305	374	432	483	540	591
40	228	288	353	407	455	509	558
35	213	269	330	381	426	476	522
30	197	249	305	353	394	441	483
25	180	227	279	322	360	402	441
20	161	204	249	288	322	360	394
15	139	176	216	249	279	312	341
10	114	145	176	204	228	254	279

The above table shows a few examples; the horizontal lines along the top gives the difference in temperatures outside and inside, and the perpendicular lines at the left side the height of the internal column of air in feet. The number at the junction of any two lines gives the amount of air in cubic feet per minute for a sectional area of one square foot, one-fourth being deducted for friction. For example, height of column of air, as in a chimney, from the floor, 45 feet; difference of temperature between internal and external air, 25 degrees: looking at the table we find opposite 45 (left hand column of figures) and under 25 (top row of figures) 540. That would be the amount per minute for an era of one square foot.

To find the amount per hour we have simply to multiply by 60, and if the sectional area of the opening be less or more than one square foot, we have also to multiply by the area stated as a decimal fraction.

The whole mass of air in a room is taken as homogenous, and the height of the air-column is always taken to be from the *floor* of the