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SCHOOL MAGAZINE.

HEALTH DEPARTMENT.

VENTILATION.—(*By F. Schuman, C. E.*)

AIR SUPPLY.

Air Vitiated.—The following are some of the vitiating causes :

1st.—Respiration and transpiration of human beings.

2nd.—Respiration and transpiration of animals.

3rd.—Burning of lamps and gas-lights.

4th.—Operations generating smoke.

5th.—Operations generating dust and its disturbance.

6th.—Mechanical and chemical processes, generating steam and gases.

An adult man, under ordinary circumstances, requires for respiration and transpiration 215 cubic feet per hour, to be multiplied by a factor so that the per cent. of vitiation shall not exceed certain limits.

Every cub. ft. of gas consumed requires for complete combustion (the air remaining pure) 1800 cub. ft. per hour.

Every lb. of oil or candles consumed requires 18.000 cub. ft. per hour, or ten times as much as gas.

Air Supply.—The following formulæ will demonstrate the necessity of a greater supply of pure air than is vitiated by an adult per hour, so that the percentage of vitiation will not exceed certain limits.

Let V = Volume of fresh air in cub. ft. to be supplied per hour.

v = Vol. of air vitiated per hour = 215 cub. ft. per adult.

p = Percentage of vitiation admissible.

C = Cubic contents of room to be ventilated.

V_1 = Volume of pure air in room after a time, t.

v_1 = Volume of vitiated air in room after a time, t.

After a time, t, V and v, approach certain values, V_2 and v_2, that is :—

$$V_2 = C\frac{V}{V + v}$$

$$v_2 = C\frac{v}{V + v}$$

should, for instance, only so much air be supplied as is vitiated, that is, $V = v$,

then $$V_2 = \frac{C}{2}$$

and $$v_2 = \frac{C}{2}$$