

in words, after a time, t , half the volume would be pure and half vitiated; this proves that it is not sufficient to supply just so much as is vitiated, because a room in good condition must not contain more than from 5 to 15 per cent. of vitiated air, therefore,

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

$$V_2 = Cp,$$

$$C = \frac{p}{1 - p}, \text{ and}$$

$$\frac{V}{v} = \frac{p}{1 - p}$$

$$V = v \frac{p}{1 - p}$$

$$v = \frac{p}{\frac{p}{V}}$$

$$v = \frac{1 - p}{p}$$

$$p = \frac{p}{V + v}, \text{ hence when}$$

$p = .02, .03, .04, .05, .06, .07, .08$; V will be 49, 33, 24, 19, 16, 13, 12, times v respectively. Consequently, a room to contain not more than from 15 to 2 per cent of vitiated air must be supplied with from 5.6 to 49 times more fresh air than is vitiated, plus the quantity required for

illuminating purposes. The following are some of the values for p , when $v = 215$ cub. feet per hour:

Dwellings = .15 by day

" = .10 by night

Workshops = .10

Theatres and churches = .10

Schools = .15

Hospitals = .07 by day and night

" = .04 during epidemics.

Example.—A hall $40 \times 40 \times 20$, having 30 occupants, and illuminated by 30 gas-lights, each consuming 4 cub. ft. of gas per hour; how much pure air must be supplied per hour, so that the limit of vitiation shall not exceed .10 per cent.?

$$v = 215 \times 30 = 6450$$

$$V = v \frac{1 - p}{p} = 6450 \frac{1 - .10}{.10}$$

$$= 6450 \times 9 = 58050$$

cub. feet for the occupants, and for illuminating per hour $1800 \times 30 \times 4 = 216000$; therefore, total per hour = $58050 + 216000 = 274050$.

$$\text{The air in the hall changes } \frac{274050}{32000}$$

= 8.56 times per hour, and the inlet areas required for a velocity of 1.5 ft. per second

$$= \frac{274050}{1.5 \times 60 \times 60} = \frac{274050}{5400}$$

$$= 50.7 \text{ sq. ft.}$$

ENGLISH DEPARTMENT.

OXFORD LOCAL EXAMINATIONS.

Julius Caesar.

No. 1.—Quote passages showing the closeness with which Shakespeare follows his authority in this play.

All through this entire play we are astonished at the remarkable fidelity of Shakespeare to his authority. All

the incidents as related by Plutarch are transferred without change to the drama, and it only remains for Shakespeare to animate the whole to give life and action to the characters and reality to the events.