

an example, the sun shines from morning till mid-day in the front, and from mid-day till the evening in the back of the house. But in a street running east and west, the houses on the south side get scarcely any direct sunlight—in winter none at all—in front; while those on the north side are equally unfortunate as regards the back rooms. No apartment can, in my opinion, be considered a perfectly wholesome one which does not enjoy direct sunlight during some part of the day. But if an apartment must be so situated that it cannot have sunlight, it is some compensation that it have very large windows, so that it may get as much diffused daylight as possible.

Purity of air cannot be maintained in a house unless it be thoroughly dry. Setting aside the not inconsiderable quantity of water produced by our own breathing and by the combustion of gas, oil, and candles, the air in a house is liable to be rendered unwholesome from excess of moisture, 1st, by absorption of water from the rock or soil below, and, 2nd, from the porous stone of which the building is constructed. Not only is the air loaded with moisture from these sources, but it is rendered impure from the exhalations of fungous vegetation or dry-rot, which at the same time destroys the joists and other carpenter work, and seriously affects the stability of the house. It is a mistake to suppose, as many do, that dry-rot attacks only the wood in the basement storey. It is a common occurrence for the ends of joists built into porous stone to become affected by fungous vegetation; and it is frequently seen in pulling down old tenements that the ends of the joists are quite gone, and that, probably, for many years the joists have been resting only on the plaster cornices of the rooms. The remedy is the use of 'shoes' of glazed fire-clay or other material, which are built into the wall, and into which the ends of the joists are placed. The 'shoes' should be somewhat larger than the joists, which should be kept in position by little wedges of wood, so that air can play freely around the end of the joists. Such protected joists will last for hundreds of years, if other circumstances are favorable.

The porosity of most varieties of building stone is remarkable. In the paper to which I have already referred I have given, besides other properties, the quantity of water capable of being absorbed by the stone when air-dried. By weight it ranges from 3.4 per cent. in the celebrated Craigleith stone to 7.2 per cent. in the red sandstone found in Wemyss Bay, on the Firth of Clyde. The significance of this property of porosity is still more readily appreciated if we take the amount of water absorbed by bulk instead of weight. 100 parts by measure of the hardest and best freestone take up about 8 quarts of water, and the inferior kind 12 to 15 parts. A cubic foot of the stone will therefore absorb from 5 to 9 lbs. of water, or from half a gallon to nine-tenths of a gallon. The absorption of water by certain kinds of stone is so rapid that in slight showers of rain the whole of the water that falls is imbibed; and although a great part of this evaporates afterwards from the surface of this stone, a portion must always find its way inwards, and this is especially the case when the surface of the stone is kept constantly wet by continued rain.

Another property of freestone is its power of permitting the passage of air or other gas by transpiration and diffusion. A cube of stone varnished over on four sides and enclosed in the other two in an air-tight case provided with inlet and outlet tubes, permits the passage of coal gas to such an extent that the gas can be lighted and will continue to burn, even although the pressure is not more than an inch of water. The same thing applies to other building stones which we, more or less, possess, and to bricks, unless these have been exposed to a temperature high enough to flux the material of which they are made. The quantity of air diffused into and out of a house by the walls must be very considerable, and as it is a process that is constantly going on, it must necessarily exercise an appreciable influence in maintaining the purity of the air in dwelling-houses. If, however, the stone or brick is saturated with water, the porosity is, for the time being, destroyed; or if there is any air diffused at