

The next matter of importance in the selection of a site is with regard to the nature of the soil. This is important from several points of view. Firstly it has been abundantly demonstrated that "dampness of soil is an important cause of phthisis to the population living on the soil," and the improvement produced by draining the subsoil in lessening the amount of consumption is marked. Where the soil is too damp this must be met, as far as possible, by careful drainage of the house and curtilage. On sand or gravel a house stands dry and warm, provided this subsoil drainage be efficient. On clay soils it is more difficult to avoid dampness. Another point to be attended to is that of the actual warmth of different soils. Some absorb heat much more readily than others, and are drier and, consequently, warmer to the feet. Soils give up their heat much more rapidly than they absorb it, and so cool at night very markedly. Sand, with some lime, forms the soil which absorbs heat most perfectly, then sand alone, and lastly clay—the heavier the colder. Thus, in the cold countries clay soils induce catarrhs, rheumatism, phthisis, etc., and sandy soils are much to be preferred. In hot countries sands are too warm for health and comfort unless covered with grass.

Of all the horrible insanitary arrangements devised for the direct induction of disease and ill-health the most diabolical are rubbish foundations. "Rubbish shot here" is the herald of disease and death. It is flagrant violation of all sanitation. The rubbish consists in every case, more or less, of decaying organic matter, animal and vegetable. This decomposes, and in doing so either evolves directly active poisons, or forms a capital nidus for their settling down. The houses are notoriously unhealthy, for when they are built upon rubbish the engendering of disease is converted from a probability to a certainty. Not only is it most unwise to actually bring poison-bearing rubbish to form foundations for houses, but every old drain, cesspool, and pit should be carefully cleared away. In the midst of stately piles of buildings certain houses have been known to be infested with typhoid fever, as it were smitten with pestilence, where old unremoved cesspools remaining and poisoning the inmates have been discovered, and their removal has been followed by the cessation of the local plague. It is of vital importance that the foundation of the house be free from poisonous material.

Having seen that the site is not infected with the material for a future host of doctors' and undertakers' bills, it is important to attend to the removal of the refuse and waste from the house, and to protect it from damp. Drains should not, if possible traverse a house, and when this is unavoidable, glazed earthenware pipes, laid in concrete or cement, carefully sealed up at the joints, and then covered by cement, should be used; and protected at the walls by relieving arches, to secure them from the effect of settlement. Ventilation of them should be provided at their entrance and exit, and access pipes should admit of ready entrance to them. They should also be periodically flushed, so as to secure them against accumulation in their interior.

To protect the house against damp it is necessary that a damp-proof course be laid over the whole of the foundation. This should consist of hard-glazed earthenware tiles, or slate laid in cement. In addition to this a dry area around the main wall is highly desirable. This is furnished by having an outer wall around the main wall, leaving a space betwixt them. Having so secured the foundation, the outer walls may be protected against the damp produced by driving rain either by covering them with slate, or a waterproof composition. Much of

the damp absorbing power of walls depends upon the nature of the materials used in their erection, and soft porous materials are most objectionable. The same may be said of floors, which should always be of wood, if possible, and well ventilated underneath. In many places flags are used instead, but they are much colder, and absorb damp more easily. But the most abominable of all floors is that made of bricks. The housewife notices that after washing them they quickly dry, and perhaps rejoices in her heart thereat. If so it is an ill-placed contentment, for the bricks absorb the water and remain cold and damp: causing much ill-health and disease.

The walls of the houses should be substantial, and stout enough to protect the dweller against external damp; in which respect houses being built in towns and suburbs are lamentably defective. The roof should be well united, and the rain should be collected into sufficient and well-jointed spouting, and carefully carried off either into cisterns or drains. If the former they should be efficiently drained, so as to secure the removal of the surplus water. Defective spouts and the saturation of walls with rain-water are efficient factors in the production of disease; and a damp house is inimical to health.

The spouting should converge to one or more down pipes which run from the roof into the drains. These down-pipes serve also another useful purpose. They serve to ventilate the drains and carry the sewer gas away from the house, and out into the air; so relieving the house from the danger of sewer-gas escaping from the water-closets, etc., and poisoning the house.

#### THE AIR SUPPLY.

The next point to consider about the house is its air supply. This is a point of no secondary importance. A free supply of air is necessary to the wants of the system, and that air must possess several requisites: it must be pure and free from hurtful constituents, and be furnished in good quantity.

Air is a mechanical composition of nitrogen and oxygen, the oxygen being about 21 per cent, by volume, and in addition to this 3 parts per thousand of carbonic acid gas. Water in the form of vapor, and traces of ammonia, may almost be regarded as normal constituents of the atmosphere. The oxygen is the essential element, the nitrogen being merely a diluent. Oxygen in an active condition is termed ozone. The consumption of this ozone by the respiration of animated creatures and the combustion of fires and flames, renders the air of towns much less invigorating than that of the open country or the ocean. Rebreathed air in close ill-ventilated rooms leads to a sense of lethargy and depression, not unfrequently combined with headache, as consequences of the imperfect removal of the carbonic acid, etc., and the absence of active oxygen. "The quantity of oxygen is sensibly diminished in the air of towns." The amount of carbonic acid varies under different circumstances, but not very markedly in the open air, where it never reaches one per cent.

Air to be pure must contain a normal proportion of its constituents: it ceases to be so when some are present in excess or are deficient. It becomes impure by the addition of foreign matters, either solid and merely suspended in the air, or gaseous and diffused through it. The suspended matters borne by the air by which we are chiefly disturbed are the products of imperfect combustion, or smuts. They are the nuisance of every large town, especially in dark, dull weather. They blow in through the finest crevices, and settle every-