

slab and the air of the room. Therefore, by maintaining the temperature of the surface above the dew point of the air in the room, insulation is very effective in correcting condensation troubles.

INSULATION RESISTANCES OF VARIOUS BUILDING INSULATIONS

| MATERIAL                       | RESISTANCE PER 1" THICK |
|--------------------------------|-------------------------|
| Keystone Hairfelt.....         | 3.69                    |
| Cork.....                      | 3.24                    |
| Cabot's Quilt.....             | 3.12                    |
| Flaxlinum.....                 | 3.04                    |
| Fibrofelt.....                 | 3.04                    |
| Celotex.....                   | 2.67                    |
| Lith Board.....                | 2.64                    |
| Insulex—12 lb. per cu. ft..... | 2.5                     |
| Insulex—20 lb. per cu. ft..... | 1.6                     |

## PART II

### CHAPTER XV

## VENTILATION

VENTILATION is the science which has to do with the maintenance of such indoor air conditions as are most conducive to proper health and comfort. Practical ventilation results may mean anything from the very best to the very poorest in quality and from the maximum to nothing in quantity. Ventilation perfection is, however, a very definite thing which may be defined as follows:

That atmospheric condition in every part of indoor space occupied by human beings which is continually maintained with a proper amount of oxygen; free from dust, bacteria, objectionable odors, poisonous and other objectionable substances; with suitable air movements and at the temperature and humidity quality shown within the zone of human comfort as defined by the joint research work of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, the United States Bureau of Mines and the United States Public Health Service.

Taking this as the highest aim of ventilation and calling it 100 per cent the other extreme of 0 per cent of ventilation may be defined as follows:

That atmospheric condition in any part of indoor space occupied by human beings where one or more of the above enumerated factors is or are maintained so as to separately or collectively inflict death or permanent injury upon human beings.

Between these two extremes are the wide range of conditions met with in practice.

Good ventilation may be defined as follows:

That percentage of perfection of the above factors which is warranted by the requirements of human health, comfort and efficiency on the one hand and expense and labor to produce these conditions (wherever they do not naturally exist) on the other.

The science of ventilation began its existence with, and is still growing out of, the fact that wherever human beings assemble within an enclosed space the atmosphere within this space will become vitiated, unless proper provisions are made to prevent it. It is the difficulty of determining and applying these proper provisions of prevention that has kept physiologist and ventilating engineers busy for so many years endeavoring to produce something like satisfactory results.

The commonly accepted usage of the term *vitiated atmosphere* has for a long time continued to designate conditions which cause unpleasant, uncomfortable or unhealthful physiological reactions, but our interpretations of the true causes and meanings of these reactions have undergone many vital changes with the progress of the art and our growth in its knowledge.