Answer.—From Table 1 it will be found that this condition in still air has an effective temperature of 86.6 deg., while if the air has 300 ft. velocity it will be found from Table 5 that it will have an effective temperature of 83.8 deg. Cooling of 2.8 deg. will be produced by the 300 ft. air velocity.

In practice these theoretical values will not be fully achieved. Therefore an allowance should be made for an increase in temperature and a decrease in humidity of the diffusing air before it strikes the occupants. The clothing worn and the kind of work done will also have a retarding effect. The experimental evidence now available, of the laws governing the cooling of the human body is of great value in predicting just what may be expected of a definite air velocity at a given temperature and moisture content when directed upon the body of lightly clothed individuals. Complete reports with other detailed examples of the use of Laboratory Human Comfort Data are to be found in the A. S. H. V. E. TRANSACTIONS, Vol. 27-32 for 1921 to 1926 inclusive.

There are many applications for these data. In warm weather it is especially desirable to have greater comfort in school rooms, theaters, auditoriums, also factories, foundries, iron, steel and glass works, mines and other places where workers are subjected to extreme temperature conditions. Maintaining comfortable conditions indoors in summer when the thermometer registers about 95 deg. is a more complicated problem than maintaining the proper condition in winter.

Effective cooling, using cold water or refrigeration, frequently is resorted to in theaters and other public buildings and this practice may be expected to increase. While increased comfort due to cooling is expensive and while it may generally be considered a luxury there are few other luxuries which offer as much real comfort for the money expended. The fact that provision for cooling in hot weather is not found in more homes, clubs and places of assembly is largely due to the fact that possible comfort to be attained, from this source has not been clearly demonstrated to the building public by the air conditioning engineer.

CHAPTER XIX

SYSTEMS OF VENTILATION

VENTILATION, whether natural or mechanical, means the displacement of vitiated air from any enclosure and its replacement with fresh air. The systems may be classified as follows:—

Method of Supply	Method of Exhaust
Window	Gravity
Gravity	Fan
Fan	Gravity
Fan	Fan (with or without recirculation)

In addition to the above, there is also employed a method requiring fan supply without any exhaust fans or gravity exhaust duct work, the exhaust depending entirely on natural leakage around doors and windows and through open entrance doors. This system is utilized in theatres and auditoriums where air cooling and refrigeration is employed in which a large percentage in varying quantities is recirculated. The air forced outward by interior excess air pressure is equivalent in volume to the percentage of outside air taken in by the supply fans.

The movement of air in natural ventilation systems is produced by the difference between the density of the column of air in the ducts and the density of the outside air. The greater the difference in temperature between the two columns of air the more rapid the air movement.

In mechanical systems the circulation of air is maintained positively and uniformly regardless of outside air conditions and when properly designed and operated they will furnish any required temperature or humidity under automatic control.

Five methods of fan application in heating and ventilating are common, as follows:

1. Fan system supplies both heating and ventilation.
2. Fan provides air for ventilation, direct radiation supplies heat.
3. Fan provides air for ventilation and portion of heating, remainder supplied by direct radiation.
4. Fan system does entire heating (no ventilation supplied).
5. Fan system provides ventilation exclusively.

Typical installations of the first type of system will be found in churches, theatres, auditoriums and other places of assembly requiring a relatively large amount of ventilation and little heating. The second type of system is usually provided in hotels and office buildings where only certain rooms need ventilation. Experience has shown that the third type is economical for schools, manufacturing plants doing special work, hotels and other places where a properly controlled air volume is essential.

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