PROBLEMS IN PRACTICE

1 ● The hand on a pressure gage attached to a steam line indicates a pressure of 15 lb per square inch and the barometric pressure is 14.7 lb per square inch. What is the absolute pressure, in pounds per square inch, being exerted by the steam?

The absolute pressure exerted by the steam in the pipe is equal to the pressure indicated by the gage plus that exerted by the atmosphere.

Total pressure = 15 + 14.7 = 29.7 lb per square inch.

2 ● Outline the procedure to be followed in taking room temperatures.

In taking room temperatures, a standard mercury thermometer should be used, with care taken that no part of the observer's body is nearer than 10 in. to the thermometer bulb. The thermometer should be held at least 5 ft away from any window, door or opening; it should be at least 12 in. away from any wall, and should be between 3 and 5 ft from the floor.

3 ● What advantages other than its sensitiveness, has the U-tube draft gage or manometer for measurement of low pressures?

Inherent accuracy without calibration and low cost of the essential parts, which are glass tubing and an ordinary scale.

4 ● Are thermocouples as accurate as mercury thermometers?

Within the range which can be measured with both instruments (below 1000 F) either one may be made as sensitive as the service requires. The accuracy of a thermocouple temperature measurement depends chiefly on:

1. An accurate calibration of the wire.
2. The sensitiveness of the electrical instrument.
3. Accurate cold-junction control.
4. Proper placement of the sensitive junction.

5 ● Is room temperature accurately measured by the ordinary wall thermometer?

No. Wall thermometer measurements may be several degrees in error as compared with an observation properly made in the zone of occupancy.

6 ● When an anemometer is used for measuring the air discharged from a grille or register, does it read the velocity through the gross face area or the velocity through the net free area?

Neither. If either of these velocities is required, it should be calculated by means of Equation 1.

7 ● Do common errors made in humidity determination produce a result that is too high or too low?

A higher relative humidity than the true value is likely to be found, either because there is insufficient velocity over the wet-bulb or because the reading is not taken at the right time.

8 ● What is the purpose of the carbon dioxide determination?

It is an index of the adequacy of fresh air supply and also an indicator of air distribution.

Chapter 41

TERMINOLOGY

Glossary of Physical and Heating and Ventilating Terms Used in the Text, Standard Abbreviations, Conversion Equations, Drafting Symbols, A.S.H.V.E. Codes

Absolute Humidity: See *Humidity*.

Absolute Pressure: The sum, at any particular time, of the gage pressure and the atmospheric pressure.

Absolute Temperature: The temperature of a substance measured above *absolute zero*.

Absolute Zero: The temperature (−459.6 F) at which the molecular motion of a substance theoretically ceases. This is the temperature at which the substance theoretically contains no heat energy.

Acceleration: The rate of change of velocity. In the fps system this is expressed in units of one foot per second per second.

$$a = \frac{V}{t}$$

Acceleration Due to Gravity: The rate of gain in velocity of a freely falling body. In the fps system this is 32.174 feet per second per second.

Adiabatic: An adjective pertaining to or designating variations in volume or pressure not accompanied by gain or loss of heat. When a substance undergoes adiabatic expansion, since it does not receive heat from without, the work which it does is at the expense of its internal energy, and therefore its temperature falls; similarly, when it is adiabatically compressed its temperature rises.

Adsorption: The adhesion of the molecules of gases or dissolved substances to the surfaces of solid bodies, resulting in a concentration of the gas or solution at the place of contact.

Air Cleaner: A device designed for the purpose of removing air-borne impurities such as dusts, fumes and smokes. (Air cleaners include air washers and air filters.)

Air Conditioning: The simultaneous control of all or at least the first three of those factors affecting both the physical and chemical conditions of the atmosphere within any structure. These factors include temperature, humidity, motion, distribution, dust, bacteria, odors, toxic gases, and ionization, most of which affect in greater or lesser degree human health or comfort.

Air Infiltration: The inleakage of air through cracks and crevices, and through doors, windows and other openings, caused by wind pressure or temperature difference.