3. A 90/90 problem.

On extremely humid days in the eastern half of North America, a common complaint is that the air temperature is 90°F and the relative humidity is 90 percent. Is this really possible?

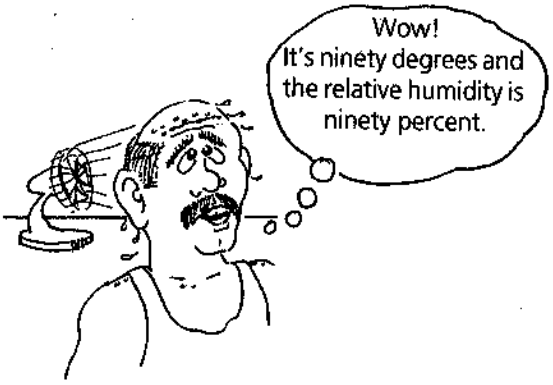

Figure 1

a. To find out, first calculate what the actual vapor pressure (e) must be for a relative humidity of 90% with an air temperature of 90°F. Use the formula for relative humidity given in problem 2e, and the vapor pressure given in Table 1. (Remember, additional information on the use of the formula is given on p. 124 of your textbook.)

Actual Vapor Pressure, e, = _____ mb

b. Now, to determine what the dew-point temperature must be with an air temperature of 90°F and relative humidity of 90 percent, simply find in Table 1 (vapor pressure table) the dew-point temperature that corresponds to the actual vapor pressure you calculated in (a).

Dew-point temperature with 90°F air temperature and 90 percent relative humidity = _____ °F.

c. In your textbook on p. 118, Fig. 5.12b, notice that even in the humid Gulf States, the average dew-point temperatures for July are *much* lower than that which you calculated for a day with an air temperature of 90°F and a relative humidity of 90 percent. Consequently, although it is remotely possible, it is extremely improbable that you will ever experience a day when the air temperature is 90° F and the relative humidity is 90 percent.