slightly less than for roof *C*. The combined normal transmission and solar radiation transmission through the south and west walls at 4:00 p.m. is obtained from curves *TS* and *TW* in Fig. 3.

The normal heat transmission through the south glass, floor and partition is determined by application of Formula 1. Solar radiation transmission through the south glass can be neglected. The solar intensity *I* for the south side at 4:00 p.m. is 29. Applying a shade factor of 0.28, the calculated solar radiation transmission is $29 \times 0.28 = 8$ Btu per square foot per hour which is less than the normal transmission, therefore the total heat gain can be taken as that due to normal transmission.

Solar radiation intensity on the west glass at 4:00 p.m. from Table 4 is 211 Btu per square foot per hour. As explained in the text, normal transmission can be neglected because it is small in comparison with solar radiation transmission.

To determine the heat gain from the outside air it is necessary first to determine the volume of the outside air to be introduced. Since the show windows are sealed so as not to permit infiltration and since there are only three doors in this store through which infiltration can take place, it is obvious that infiltration of air will be a negligible quantity. The volume of the store is 21,600 cu ft. Good practice indicates that in a store of this character there should be a minimum of from 1 to 1½ outside air changes per hour. On a basis of 1½ air changes the volume of outside air to be introduced would be 32,400 cfh. The minimum ventilation requirements as given in the CODE OF MINIMUM REQUIREMENTS FOR COMFORT AIR CONDITIONING[10] are 10 cfm per person. On this basis the ventilation requirements would be 30,000 cfh. Since this will produce approximately 1½ outside air changes per hour, 30,000 cfh will be considered in this application.

To determine load imposed by occupants it will be found from Table 4, Chapter 2 that the average person standing at rest will dissipate 431 Btu per hour and that the moisture dissipated is 0.199 lb per hour.

To determine the latent heat load, the sum of the moisture evaporated from occupants and that to be removed from outside air is multiplied by the latent heat of evaporation at the temperature at which the moisture is condensed in the conditioner. Since outside air is positively introduced, a mixture of outside and recirculated air passes through the conditioner. To remove the moisture, the air must be cooled to a temperature below the dew-point of the mixture. To obtain an approximate value of the latent heat of evaporation, assume that the air is cooled to 55 F. At this temperature, $h_{fg} = 1062.7$ Btu per hour (steam table).

COMBINED NORMAL AND SOLAR RADIATION TRANSMISSION:

SURFACE	DIMENSIONS	AREA SQ FT	BTU PER HOUR PER SQ FT	BTU PER HOUR
S Wall	(30 ft x 12 ft) − 155	205	3	615
W Wall	(60 ft x 12 ft) − 321	399	2.5	998
Roof	60 ft x 30 ft	1800	11	19,800
Total				21,413

NORMAL TRANSMISSION:

SURFACE	DIMENSIONS	AREA SQ FT	U	TEMP. DIFF. DEG F	BTU PER HOUR
S Glass	2 (2 ft 6 in. x 7 ft) + 2 (10 ft x 6 ft)	155	1.13	15	2,627
Floor	26 ft x 54 ft	1404	0.34	5	2,387
N Partition	30 ft x 12 ft	360	0.34	8	979
Total					5,993

[10]Code of Minimum Requirements for Comfort Air Conditioning (A.S.H.V.E. TRANSACTIONS, Vol. 44, 1938, p. 27). Reprints of this code are available at $.10 a copy.

SOLAR RADIATION THROUGH GLASS:

W Glass. $A_G = 3\,(14\text{ ft} \times 6\text{ ft}) + (8\text{ ft} \times 6\text{ ft}) + (3\text{ ft} \times 7\text{ ft}) = 321$ sq ft

$H_G = 321 \times 0.28 \times 211 = 18{,}965$ Btu per hour (Equation 2).

OUTSIDE AIR:

$H = \frac{Q}{v}(h_o - h_i)$ (Equation 3).

$v = v_a + \mu v_{as}$ (Equation 17, Chapter 1).

v_a = specific volume of dry air at 95 F = 13.97 cu ft per pound (Table 6, Chapter 1).

v_{as} = difference between volume of saturated mixture and specific volume of dry air at 95 F = 0.82 cu ft per pound (Table 6, Chapter 1).

μ = per cent saturation at 95 F dry-bulb and 75 F wet-bulb = 38.4 per cent (by calculation, Chapter 1).

$v = 13.97 + (0.384 \times 0.82) = 14.28$ cu ft per pound dry air.

$h_o = h_a + \mu h_{as}$ (Equation 19, Chapter 1).

h_a = specific enthalpy of dry air at 95 F = 22.80 Btu per pound (Table 6, Chapter 1).

h_{as} = difference between enthalpy of saturated mixture and specific enthalpy of dry air at 95 F = 40.25 Btu per pound (Table 6, Chapter 1).

$h_o = 22.80 + (0.384 \times 40.25) = 38.26$ Btu per pound dry air.

μ at 80 F dry-bulb and 67 F wet-bulb = 50.2 per cent (by calculation, Chapter 1).

$h_i = h_a + \mu h_{as} = 19.19 + (0.502 \times 24.32) = 31.40$ Btu per pound dry air (Table 6, Chapter 1).

$H = \frac{30{,}000}{14.28}(38.26 - 31.40) = 14{,}410$ Btu per hour.

W_o = humidity ratio of outside air at 95 F and 75 F = $0.384 \times 0.03652 = 0.01402$ lb water per pound dry air. (Equation 14, Chapter 1).

W_i = humidity ratio of inside air at 80 F and 67 F = $0.502 \times 0.02221 = 0.01115$ lb water per pound dry air. (Equation 14, Chapter 1),

Weight of water to be removed $= \frac{Q}{v}(W_o - W_i) = \frac{30{,}000}{14.28}(0.01402 - 0.01115) =$ 6.03 lb per hour.

OCCUPANTS:

$50 \times 431 = 21{,}550$ Btu per hour.

$50 \times 0.199 = 9.95$ lb water per hour evaporated.

LIGHTS:

$4200 \times 3.413 = 14{,}335$ Btu per hour.