heat transmission, to apply correction factors to the values of (I). Solar radiation factors and solar absorption coefficients have been determined[3] as indicated in Fig. 2 and Table 6 respectively.

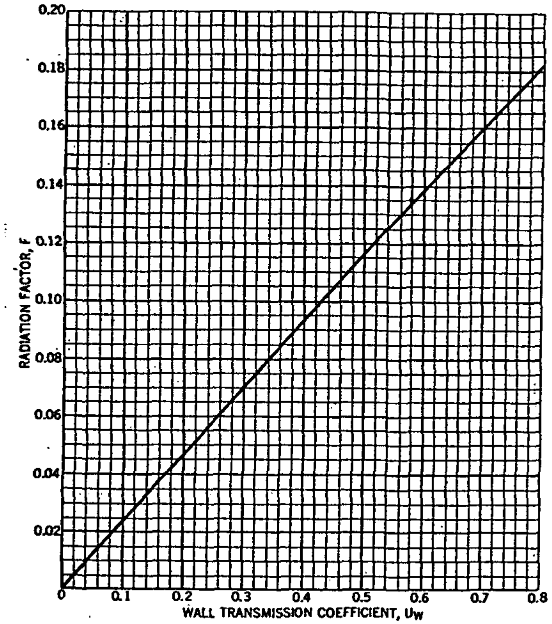

FIG. 2. SOLAR RADIATION FACTORS

The solar heat conduction through a wall or roof exposed to the sun may be expressed by the formula:

$$H_R = A\ F\ a\ I \qquad (2)$$

where

H_R = Solar heat transmission, Btu per hour.
A = Area of wall or roof, square feet.
F = Percentage (expressed as a decimal) of the absorbed solar radiation which is transmitted to the inside (Fig. 2).
a = Percentage (expressed as a decimal) of the incident solar radiation which is absorbed by the surface (Table 6).
I = Intensity of solar radiation striking surface, Btu per hour per square foot (Tables 2, 3, 4 and 5).

The total amount of heat conducted through a wall exposed to the sun is the sum of H_t and H_R from Formulas 1 and 2.

[3]A Rational Heat Gain Method for the Determination of Air Conditioning Cooling Loads, by F. H. Faust, L. Levine, and F. O. Urban (A.S.H.V.E. TRANSACTIONS, Vol. 41, 1935, p. 327).

TABLE 6. SOLAR ABSORPTION COEFFICIENTS FOR DIFFERENT BUILDING MATERIALS

SURFACE MATERIAL		ABSORPTION COEFFICIENT (a)
Very Light Colored Surfaces	White stone Very light colored cement White or light cream-colored paint	0.4
Medium Dark Surfaces	Asbestos shingles Unpainted wood Brown stone Brick and red tile Dark-colored cement Stucco Red, green or gray paint	0.7
Very Dark Colored Surfaces	Slate roofing Tar roofing materials Very dark paints	0.9

The calculation of heat transmission through walls and roofs does not take into consideration the heat capacity of the structure nor the consequent time lag in the transmission of heat. In the case of massive walls the time lag may amount to several hours[4]. Thus in many cases the wall transmission cannot be added directly to the cooling load from other sources because the peak of the wall transmission load may not coincide with the peak of the total cooling load and may even occur after the cooling system has been shut down for the day. The data in Table 7 were taken from A.S.H.V.E. research papers and whereas they result from a study of experimental slabs, they give an approximate idea of the time lag to be expected in various structures.

Solar Radiation Transmitted Through Glass

Windows present a problem somewhat different from that of opaque walls, because they permit a large percentage of the solar energy to pass through, a small amount is reflected and the balance is absorbed by the glass. The amount absorbed depends upon the character and thickness of the glass and the angle between the sun's rays and the glass. The temperature of the glass is raised by the absorbed heat and this heat is then delivered to the air on the two sides of the glass in proportion to the the difference between the glass and air temperature.[5]

TABLE 7. TIME LAG IN TRANSMISSION OF SOLAR RADIATION THROUGH WALLS AND ROOFS

TYPE AND THICKNESS OF WALL OR ROOF	TIME LAG, HOURS
2-in. pine	1½
6-in. concrete	3
4-in. gypsum	2½
3-in. concrete and 1-in. cork	2
2-in. iron and cork (equivalent to ¾-in. concrete and 2.15-in. cork)	2½
4-in. iron and cork (equivalent to 5½-in. concrete and 1.94-in. cork)	7¼
8-in. iron and cork (equivalent to 16-in. concrete and 1.53-in. cork)	19
22-in. brick and tile wall	10

[4]Loc. Cit. Notes 1 and 2.
[5]Heat Absorbing Glass Windows, by W. W. Shaver (A.S.H.V.E. TRANSACTIONS, Vol. 41, 1935, p. 287).