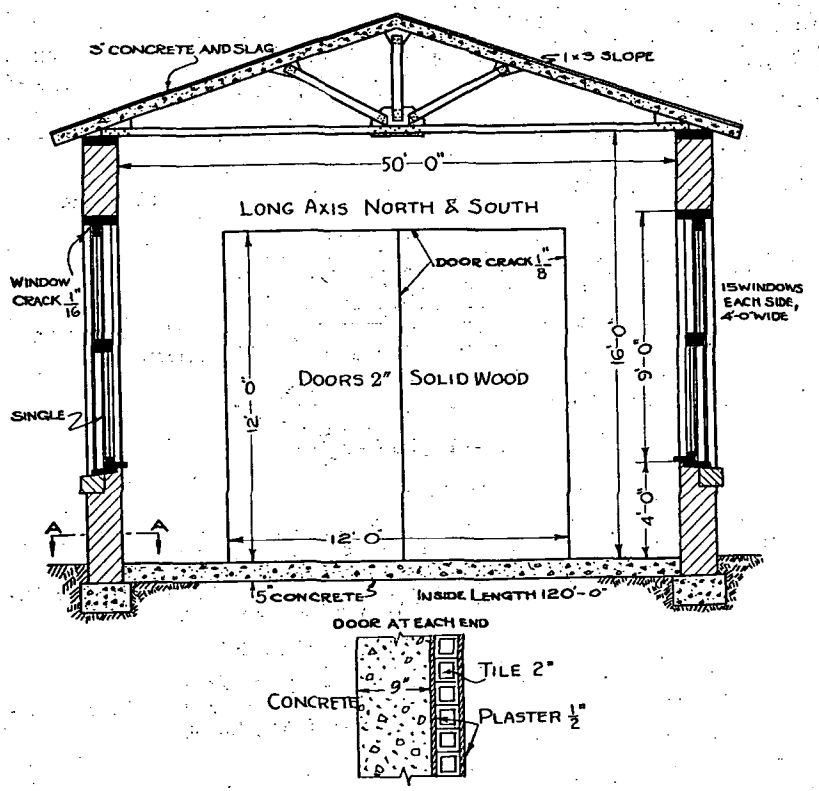

WALL SECTION A-A

FIG. 7. ELEVATION OF FACTORY BUILDING

$$U = \frac{1}{\frac{1}{K_1} + \frac{1}{K_2} + \frac{x_1}{C_1} + \frac{x_2}{C_2} + \frac{x_3}{C_3} + \frac{x_4}{C_4}} = \frac{1}{\frac{1}{1.34} + \frac{1}{4.02} + \frac{9}{8.3} + \frac{1}{1.14} + \frac{0.5}{8.0} + \frac{0.5}{2.32}}$$

$= 0.304$

The air temperature at the mean height of inside walls is greater than at breathing line. Mean height of walls is $16 \div 2 = 8$ ft., which $8 - 5 = 3$ ft. above breathing line. Allowing 2 per cent per foot above 5 ft., or $2 \times 3 = 6$ per cent, makes the mean air temperature $1.06 \times 60 = 63.4$ deg. fahr. The triangular areas in the end wall are practically at the mean height of the roof at which level the air temperature is 78 deg. fahr.

Roof: 3 in. concrete (stone), with slag surface built-up roofing.

$U = 0.610$ (Roof No. 216-c, Table 10-A)

The air temperature just below roof is higher than that at the breathing line. Mean height of roof is $16 + 4 = 20$ ft., or it is $20 - 5 = 15$ ft. above breathing line. Allowing 2 per cent per foot above 5 ft., or $2 \times 15 = 30$ per cent, makes the under roof temperature $= 1.30 \times 60 = 78$ deg. fahr.

Floor: The 5 in. concrete floor is laid on the ground, and hence there is only one surface coefficient $K_1 = 1.34$ = Average for surface in still air (Table 3)

$$U = \frac{1}{\frac{1}{1.34} + \frac{5}{8.3}} = 0.745$$

The air temperature at floor level $= 60 - 5 = 55$ deg. fahr.

Windows and Doors: Wood sash and doors with single thickness of glass. Take coefficient U for glass as 1.13 B.t.u. per sq. ft. per degree per hour for heat transmission (Table 12-A). Doors are solid wood 2 in. thick and coefficient $U = 0.382$ B.t.u. per sq. ft. per degree per hour (Table 12-B).

Infiltration: Window crack assumed $\frac{1}{16}$ in. and doors at $\frac{1}{16}$ in. By Table 14 (Part I) for a 10 mile wind velocity the leakage per foot of crack is 85 c.f. hr. for a plain window. The heat equivalent per hour, per degree is

$$85 \times .075 \times 0.24 = 1.53 \text{ B.t.u.}$$

and allowing for an 11 mile wind the factor becomes $1.53 \times \frac{11}{10} = 1.68$ (see preceding note). Allow twice this for door crack or $2 \times 1.68 = 3.36$.

CALCULATION SHEET
Entire Building
(See Fig. 7)

Building Material	Exposure	Width in Ft.	Height in Ft.	Area Sq. Ft. or Lin. Ft.	Coeffic. Trans. and Infilt.	Temp. Diff.	Net B.t.u.	Exposure Factor	Total B.t.u.
Concrete and Tile	N	½ × 50	8½	213	0.304	74.0	4,800	1.15	5,520
	N	50	16	656	0.304	59.4	11,850	1.15	13,630
Doors (2 in. wood)	N	12	12	144	0.382	56	3,080	1.15	3,550
⅛ in. Crack	N	1 pair doors		60	3.36	56	11,300	½* × 1.15	6,500
									29,200
Concrete and Tile	W	120	16	1380	0.304	59.4	24,950	1.15	28,700
Glass (Single)	W	15 × 4	9	540	1.13	59.4	36,200	1.15	41,600
⅛ in. Crack	W	Double Hung Windows (15)		450	1.68	59.4	44,900	½* × 1.15	25,800
									96,100
South Wall	Same as N	See above		.....	.....	.....	.....	½*	25,380
East Wall	Same as W	See above		.....	.....	.....	.....	½*	83,600
Roof, 3 in. Concrete and slag-surfaced built-up roofing	No Ceiling	52.5	120	6300	0.610	74	285,000	None	285,000
Floor, 5 in. Stone Concrete	On Dirt	50	120	6000	0.745	5	22,350	None	22,350
Grand total of heat required for building in B.t.u. per hour at + 4° with 11-mile Southwest wind									541,630

*Notes.—(1) This building has no partitions and whatever air enters through the cracks on the windward side must leave through the cracks on the leeward side. Therefore, only one-half of the total crack will be used in computing infiltration for each side and each end of building.