

In designing for a lower warm-air register temperature, say 160 deg. fahr., the factors 111, 166 and 200 become 80, 140 and 166 (Fig. 1 at 160 deg. fahr.), and the resulting equations are:

$$\text{Leader areas for first floor, square inches} = \frac{H}{80} = \text{approximately } 0.012H \quad (4)$$

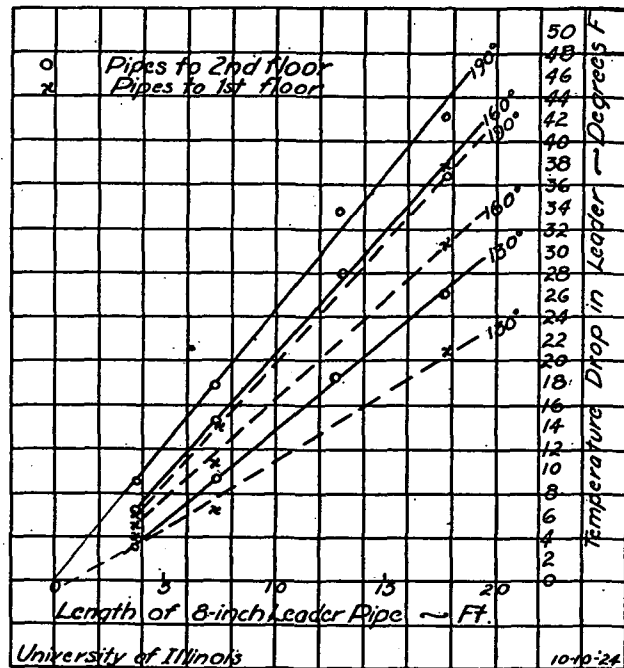


FIG. 2. LOSS IN TEMPERATURE IN 8 IN. LEADER PIPE OF VARIOUS LENGTHS AT DIFFERENT REGISTER TEMPERATURES

$$\text{Leader areas for second floor, square inches} = \frac{H}{140} = \text{approximately } 0.007H \quad (5)$$

$$\text{Leader areas for third floor, square inches} = \frac{H}{166} = \text{approximately } 0.006H \quad (6)$$

These equations are applicable to straight leaders from 6 to 8 ft. in length. Longer leaders must be very thoroughly covered or else the vertical stacks must be increased in area as discussed under wall stacks. If some provision is not made for these longer leaders, the air temperature may be much lower than anticipated and the room will not be properly heated.

While Fig. 1 takes care of the drop of temperature in straight leaders up to 8 ft. in length connected to stacks having about 75 per cent the area of the leader, the designer must make allowances for all other

conditions. The temperature drop in leaders of various lengths at three different register temperatures is shown in Fig. 2.

Leader sizes should in general be not less than obtained by equations (1) to (3) nor should leaders less than 8 in. in diameter be used. It is not considered good commercial practice to specify diameters except

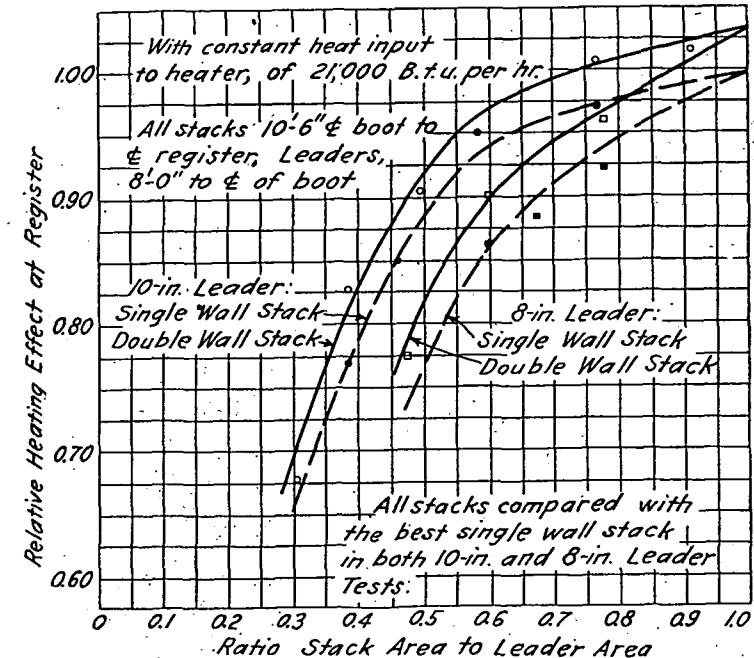


FIG. 3. RELATIVE HEATING EFFECT OF STACKS AT CONSTANT HEAT INPUT TO FURNACE

Note.—Pipe bare, bright tin except asbestos strips for joints.

in whole inches, although there is no real reason for not using half inches if necessary. The tops of leaders should be at the same elevation as they leave the furnace bonnet, and from this point there should be a uniform up-grade of 1 in. per foot of run in all cases. Leaders over 12 ft. in length are to be avoided or receive very special attention.

WALL STACKS

The wall-stack for an upper floor should be made not less than 70 per cent of the area of the leader which has been selected from Fig. 1. So long as the leader is short and straight as was the case for Fig. 1, such a practice is probably justified since the loss (Fig. 3) in capacity occasioned by the smaller stack is not very serious for stacks having areas in excess of 70 per cent of the leader area. For leaders over 8 ft.