given on page 24 of Bulletin No. 120, published by the University of Illinois, and it is found that at a temperature of about 195 deg. there was obtained 125 heat units per sq. in. of leader per hour to the first story. Hence dividing 1,000 by 125 will give us 8 sq. in. per 1,000 heat units.

Therefore 10.4 x 8 = 83.28 sq. in. area of pipes or leaders to the room if it is on the first floor. This is about the area of a pipe 10 in. in diameter.

If the same temperature of 195 deg. is assumed for determining the second and third story pipes or leaders, the area of them should be respectively 5 sq. in. to the second story and 4 sq. in. to the third story, per thousand heat units exposure. Thus, for a similar room on the

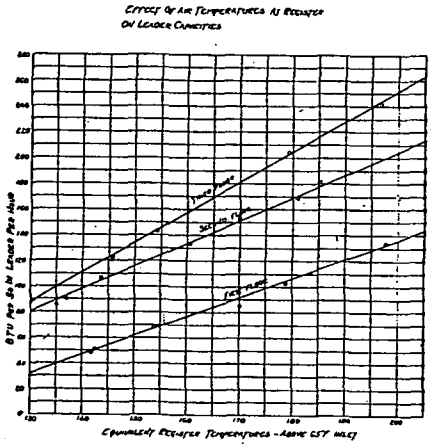

FIG. 1. CHART FOR DETERMINING LEADER PIPE SIZES

second floor, the area of the pipes would be 52 sq. in. or an 8 in. diameter pipe to the second story, and 41.64 sq. in. or a 7 in. diameter pipe to the third story.

It was decided by the Committee to allow 6 sq. in. to the second story, and 5 sq. in. to the third story, which is equivalent to a temperature of about 176 deg. Thus, the pipe to the second story would be 9 in. diameter, and to the third story 8 in. diameter. Undoubtedly, the code will be amended so as to provide for a lower temperature to the first story, the same as has been provided for the second and third. This will mean allowing 9 sq. in. per thousand heat units, or 93.6 sq. in. in the leader pipe, or 11 in. diameter instead of 10 in. as the present code provides in the foregoing example.

Reducing the allowable temperature from 195 deg. to 176 deg. evidently increases the area of the leaders to the first story more than 20 per cent above what is now the average practice, but it will avoid the necessity for maintaining such high temperatures to get sufficient heat, will be conducive to economy, and will avoid so many unsatisfactory plants.

In everyday practice when calculating the size of the leaders to the various rooms in the building, one would proceed about as follows:

Wall 10 ft. + 10 ft. + 12 ft. x 9 ft. = 288 sq. ft.
Glass 16 sq. ft. x 2 = 32 sq. ft. = G.

Net wall surface = 256 sq. ft. = W.
10 ft. x 12 ft. x 9 ft. = 1080 cu. ft. space = C.

C = 1080 ÷ 800 = 1.35 M. B.t.u.
W = 256 ÷ 400 = 6.40 M. B.t.u.
G = 32 ÷ 12 = 2.66 M. B.t.u.

(Heat units in thousands) 10.41 x 8 = 83.28 sq. in. = 10 in. dia. 1st floor
10.41 x 6 = 62.46 sq. in. = 9 in. dia. 2nd floor
10.41 x 5 = 52.05 sq. in. = 8 in. dia. 3rd floor

Should it be the reader's opinion that an air change 1½ times per hr. should be provided for, instead of 1 air change per hour, then substitute 600 in place of the factor 800; or if it is thought that 2 air changes per hour should be allowed because of unusual exposure to high winds, or the frequent opening of doors, or because of poor construction, then use 400 in place of 800.

It is seldom that a contractor will undertake to connect a leader from a furnace to a sun-room and agree to heat it to the same comfortable temperature as any other room in the house. This is probably due to two reasons, one being that the sun-room usually is at a very considerable distance from the furnace and the other reason is due to the unsatisfactory results he has obtained in his efforts to heat such a room. This latter has likely been caused by the fact that he has never realized that fully one-third more capacity would be required in the leader pipes than would be required for a similar room of usual construction.

As an example; consider a room of the same size as in the previous case, but one that has 160 sq. ft. of glass instead of 32 sq. ft. as before, and owing to this large glass exposure 2 air changes per min. will have to be provided for; the size of the leaders would then be as follows:

Total wall surface = 288 sq. ft.
Total glass surface = 160 sq. ft.

Net wall surface = 128 sq. ft.
Cu. ft. space = 1080

1080 ÷ 400 = 2.70
128 ÷ 40 = 3.20
160 ÷ 12 = 13.33

19.23 x 8 = 153.84 sq. in. = 14 in. dia. pipe
19.23 x 6 = 115.38 sq. in. = 12 in. dia. pipe
19.23 x 5 = 96.15 sq. in. = 11 in. dia. pipe

It will be noted that the area of the leaders is almost double the size required in the previous instance.