CALCULATIONS NECESSARY IN STEAM HEATING.

We have received a number of queries as to the amount of heating surface necesssary for certain rooms, and somewhat similar questions, that perhaps can best be answered by giving the rules necessary to be observed in this connection, says the Boston Journal of Commerce. There are two methods used, the direct and indirect methods; the former consisting of pipes in the room itself directly heating the air, and the indirect method, by heating the air in a chamber, and conveying it in air pipes to the room to be heated. The latter is not generally done in mills, so will not be considered, but only the direct method. This usually consists of pipes placed along the walls of the room, commencing near the floor, but sometimes by pipes placed overhead where there is shafting and belting to circulate the air. There are no iron-clad rules that can be put down with the assertion that they will do a certain amount of heating, because of the changing conditions. Wooden buildings require a greater amount of heating surface than stone, and stone more than brick. Where there is a large amount of glass more heating surface is required, and then the location of the room and its size and construction should be considered. For instance, a long narrow room, running alongside an outer wall, would require more heating surface than a square room of equal volume, because of the greater exposure to the atmosphere. The best method would be to allow the proper amount for all these conditions by a liberal use of the judgment. The heating companies have tables to figure from, based upon the results of their experiments, although they differ somewhat. For heating dwellings one square foot of heating surface is allowed, for from 40 to 50 cubic feet of air space, to heat to 70° with an outside temperature of zero, with low-pressure steam. For large stores one square foot will heat 125 cubic feet; smaller stores, 100 cubic feet; hotels, 125 cubic feet; offices, 70 cubic feet; and churches, 200 cubic feet. This will do for a general estimate.

For more absolute results the proper method is to consider the amount of exposed surface and the temperature desired inside, as well as the temperature outside, and the temperature of the steam. From careful experiments under actual conditions on large buildings, it has been found that a square foot of wall would transmit .70 to 1.25 units of heat per hour for each degree difference in temperature between the inside and outside. The difference between these results is due to the action of the wind, and the larger values must therefore be taken to give satisfactory results. This method may be followed, in designing the system:

From the desired temperature of the rooms, subtract the lowest outside temperature probable, and multiply by 1.25. This will give the heat units transferred per hour per square foot of exposed surface. Multiply this product by the area of wall surface exposed outside to obtain total heat units per hour.

To find the heating surface, from the temperature of the steam subtract temperature of the room, square the difference and divide by 100, giving heat units transferred per square foot of heating surface. Divide total heat units by this quotient, and the quotient then obtained is the heating surface for this pressure of steam.

Suppose, for example, a room in a cotton mill 300 feet long, 50 feet wide and 14 feet high, temperature 65° inside, lowest outside zero, steam of 10 pounds' pressure. The difference in temperature, $65-0=65° \times 1.25=81.25$ units transmitted per square foot per hour, times 9,800 square feet exposed $=796,250$ heat units required per hour.

Steam at 10 pounds pressure has a temperature of 240°, minus $65°=(240-65)$ 175°. This squared $(175°)=30,625$, divided by $100=306,25$ as the heat units transmitted from one square foot heating surface, hence $796,250 \div 306.25=2600$ square feet of heating surface. Three feet length of inch pipe will give one square foot of heating surface.

When a whole building is figured upon the roof must be included, and all steam pipes are included as part of the heating surface. For live steam, inch pipes are recommended as being the most effective.

1784 Notre Dame Street,
Montreal. October 11th 1890

C. H. Mortimer Esq.
Pub'r Canadian Architect & Builder
and Contract Record.

Dear Sir.

I have to inform you, that the following resolution was unanimously adopted, at the First Annual meeting of the Province of Quebec Association of Architects held in Montreal on 10th & 11th inst.:-

Moved by M. Perrault. Seconded by A. T. Dimlop.

We the Architects of the Province of Quebec now assembled in convention being satisfied that the Canadian Contract Record affords us a direct communication with the contractor. Resolved: That we pledge our support to it by using its columns when calling for tenders.

Yours truly
C. Clift
Secretary.

The diameter of the main from the boiler should be equal in inches to one-tenth the square root of the radiating surface in square feet, mains included. Return pipes should never be at three-quarters the diameter of the main. For heating by exhaust steam two-inch pipes should be used to heat from.

Prices of Building Materials.

LUMBER.

CAR OR CARGO LOTS.		
1¼ and thicker clear picks, Am. ins..	$30 00	@32 00
1¼ and thicker, three uppers, Am ins.		37 00
1¼ and thicker, pickings, Am ins.....		27 00
1 x 10 and 12 dressing and better.....	18 00	20 00
1 x 10 and 12 mill run.....	13 00	14 00
1 x 10 and 12 dressing.....	14 00	16 00
1 x 10 and 12 common.....	12 00	13 00
1 x 10 and 12 spruce culls.....	10 00	11 00
1 x 10 and 12 maple culls.....		9 00
XXX shingles, sawn.....	2 30	@2 35
XX shingles, sawn.....	1 30	1 35
Eastlake galvanized steel shingles, 24 W. G., per square.....		6 00
Eastlake galvanized steel shingles, 26 W. G., per square.....		50
Eastlake painted steel shingles, per sq.		4 00
Round pointed galvanized steel shingles, per sq.....		6 00
Round pointed painted steel shingles,		4 25
Round pointed, unpainted, Terne tin shingles.....		4 00
Manitoba galvanized, steel siding, per square.....		5 00
Manitoba painted steel siding, per sq.		3 50
Painted sheet steel pressed brick.....		3 50
Painted crimped steel sheeting.....		3 40
Price of Copper shingles according to weight		

YARD QUOTATIONS.		
Mill cull boards and scantling.....		10 00
Shipping cull boards, promiscuous widths.....		13 00
Shipping cull boards, stocks.....		14 00
Hemlock cantling and joist up to 16 ft.	12 00	12 00
" " " 18 "	12 00	13 00
" " " 20 "	13 00	14 00
Scantling and joist, up to 16 ft.....		14 00
" " 18 ft.....		15 00
" " 20 ft.....		17 00
" " 22 ft.....		19 00
" " 24 ft.....		21 00
" " 26 ft ..		23 00
" " 28 ft ...		25 00
" " 30 ft.....		27 00
" " 32 ft.....		27 00
" " 34 ft.....		29 50
" " 36 ft.....		31 00
" " 38 ft.....		33 00
" " 40 to 44 ft..		36 00
Cutting up planks, 1¼ and thicker, dry	25 00	26 00
" " board,	18 00	22 00
Cedar for block paving, per cord..		5 00
Cedar for Kerbing, 4 x 14, per M..		14 00
B. M.		
1¼ inch flooring, dressed, F. M.....	28 00	31 00
1¼ inch flooring rough, B. M.....	18 00	22 00
1¼ " dressed, F. M...	25 00	28 00
" undressed, B. M...	18 00	19 00
" dressed.....	18 00	22 00
" undressed	12 00	15 00
Beaded sheeting, dressed	22 00	35 00
Clapboarding, dressed.....		12 00
XXX sawn shingles, per M, 16 in....	2 65	2 75
Sawn lath. . . .	2 00	2 20
Red oak.....	30 00	40 00
White.....	35 00	45 00
Basswood, No. 1 and 2	18 00	20 00
Cherry, No. 1 and 2.....	70 00	70 00
White ash, No. 1 and 2..	25 00	25 00
Black ash, No. 1 and 2. .	20 00	30 00
Dressing stocks.....	16 00	22 00
Picks, American inspection.		40 00
Three uppers, American inspection....		50 00

BRICK—₱ M

Common Walling.....		$7 50
Good Facing		9 00
Sewer.....	8 50	9 00
Pressed Brick:		
Plain brick, f. o. b. at Milton, per M...		$18 00
" " 2nd quality, per M.....		14 00
" " 3rd " "		10 00
Hard Building.....		8 00
Moulded and Ornamental, per 100.....	$3 to	10 00
First quality, f.o.b. at Campbellville, per M		18 00
2nd " " " "		13 00
3rd " " " "		10 00
Hard Building.....		8 00
Ornamental, per 100.....	$3 to	10 00
Tiles.....		24 00
Stone.		
Common Rubble, Per Toise, delivered		14 00
Large flat " "		18 00
Foundation Blocks, " Cubic Foot..		
Slate: Roofing (₱ *squa—*):		
" red.....		16 00
" purple.....		9 00
" untading green.....		9 00
" black slate.....		7 50
Terra Cotta Tile, per sq.....		25 00
Ornamental Black Slate Roofing..		8 00
Sand:		
Per Load of 1½ Cubic Yards.....		1 5

PAINTS. (*In oil, ₱ lb.*)

White lead, Can.....	6 25	6 50
" zinc, Can.....	6½	7 50
Red lead, Eng.....	5¾	6¼
" venetian.....	1 60	1 75
" vermillion	90	1 00
" Indian, Eng.....	10	12
Yellow ochre..	5	10
Yellow chrome.....	15	20
Green, chrome...	7	12
" Paris.....	25	40
Black, lamp.....	15	25
Blue, ultramarine.	15	25
Oil, linseed, raw (*₱ Imp. gallon*)..	68	70
" " boiled " ...	72	75
" " refined, " ...	78	80
Putty.....	2¾	2½
Whiting, dry.....	75	1 00
Paris white Eng., dry.....	90	1 25
Litharge, Am.,.....	6½	8
Sienna, burnt.....	15	20
Umber, "	8½	12

CEMENT, LIME, etc.

Lime, Per Barrel of 2 bushels, Grey		40
" " " White		55
Plaster, Calcined, New Brunswick		2 00
" " Nova Scotia.....		2 00
Hair, Plasterers', per bag.....		1 00
Cement, Portland, per bbl...	2 80	3 00
" Thorold, "		1 50
" Queenston, "		1 50
" Napanee, "		1 50
" Hull, "		1 50

HARDWARE.

Cut Nails:		
American Pattern, 1¼ inch, per keg...		4 15
" " 1½ to 1¾ inch, per keg		3 40
Canadian Pattern, 1¼ inch, per keg...		3 65
" " 1½ to 1¾ inch, per keg		3 15
" " 2 to 2¾ inch; "		2 15
" " 2½ to 2¾ inch, "		2 90
" " 3 inch and larger.....		2 65
Steel nails 10c. per keg extra.		
Finishing nails, 1 inch, per keg... ...		5 75
" " 1¼ inch, "		5 05
" " 1½ " "		4 50
" " 1¾ " "		4 20
" " " and larger....		3 15