air-spaces two facts must be borne in mind, (1) the intensity of radiant heat varies inversely as the square of the distance from the source and (2) soon as a current, however slight, of air is formed in any air space, heat is carried by convection around in that chamber. Of course two air spaces are more effective than one, and three more than two, but there is an economic maximum dependent on the circumstances of each case.

MATERIAL OF CONSTRUCTION. Wood is best adapted for use in buildings of this character, being itself a non-conductor of heat, and not retaining the heat as does either natural or artificial stone, it permits the cheapest and at the same time the most efficient construction. In some municipalities certain regulations have been established governing the construction of all buildings within the "fire limits" and such laws usually are directed first to the material of construction; at such a point it will be well to consider the advisability of locating the proposed ice house beyond these fire limits to conserve the use of wood in the construction.

PLAN.—All ice houses should be built in sections, the size of section being governed by the quantity of ice used; in some cases it is advisable to construct across each section lateral partitions which will still further reduce the amount of ice exposed to contact with the outer air while part of the stock is being removed. At the centre of each section and at about the level of the first door should be placed a platform, say 6 × 10.

PROPORTIONS. Assuming that a cubic foot of ice weighs 57.2 lbs., a ton of solid ice would occupy about 35 cubic feet. Some years since, 40 cubic feet were considered ample in which to store a ton of ice cut in such sized cakes as are usually stored, but that allowance has been increased to 45 and even 50 cubic feet. Any organic matter, such as that generally employed—hay or sawdust—not only dirties the ice, but being dampened by the melting, soon begins to rot, decompose, and become foul. For this reason the use of any organic matter between walls is to be deprecated. The use of short fibre asbestos in the outer air space has been suggested, but not to our knowledge tried; however, at a weight of 12 lbs. per cubic foot and at a cost of $16 per ton in car load lots, f.o.b. New York, the expense is practically prohibitory. This asbestos, if used loosely, as it should be if used at all, settles after being wet, and though it still retains its spongy character, is reduced in volume, leaving the upper portion of its confining chamber empty.

SITE.—While little scope is usually given in the selection of a site there are certain precautions to be taken in order to secure a good bed. If the site chosen be on a little rise above the adjacent ground level, surface drainage will give no trouble; otherwise, provision for it, as well as for the water from the melting ice, must be made.

PREPARATION FOR THE BED.—Assuming the ground to be good, the excavation below frost line is made for the house foundations, and about two feet in depth inside the foundation for the reception of the bed. If the digging shows a clay soil, drains should be provided to carry off the water from the ice. and these drains should be air-trapped.

Cinders or gravel should then be placed in the excavation, as a bed whose top should be raised slightly above the surrounding ground level and inclined with an easy and gradual slope to the centre. On this bed, before ice is stored, rough hemlock plank should be laid with, say two-inch spacing to keep the ice off the bed itself, yet permit the water to pass through readily. A good concrete floor, well drained from the centre, would make a better job and be more satisfactory, but its cost precludes its general use in construction of this class.

FOUNDATIONS.—The foundations also, whether of wood, brick or stone, should contain an air space as a further insulation; heat may reach the storage chamber as well under as through the walls; in some cases this, we know, is the case.

CONSTRUCTION.—It is claimed by some that the side walls should be constructed with a batter, but your committee do not approve this idea; the idea is evidently to relieve the side walls of any pressure that may be brought upon them by the spreading of the mass of ice as it melts, but if the slightest care has been exercised in the storing of the stock, that condition will not be found to exist, especially as the ice naturally melts most on the outside of the mass; at any rate, in order to be effective, assuming such a condition to exist, the batter would have to be increased over any we have yet heard proposed.

If considered necessary, to resist wind pressure, etc., the sills may be tied to the foundation. They should, on a brick or stone foundation, be laid in a lime mortar in any event. The sheathing, with the exception of the outside, may be rough. While there will be three extra courses of this rough sheathing over what is usually found, the lumber is cheap and the results obtainable will fully warrant the slight increase in cost.

The paper used should be saturated (not painted or coated) and laid with laps to the centre of the sheet, virtually giving, then, two thicknesses of the paper in each lining. The sheets should be well cemented together, and the paper tacked securely to the sheathing. A paper similar in character to the "Giant" of the Standard Paint Co. is recommended, which running, say 80 to 85 lbs. per roll of 36 inches width, and containing 1,000 square feet, will cost about $6.25 per roll in place, including cement and tacks. With this paper should be used a cement similar to that used for roofing purposes, which must be flexible (not brittle), strong, inodorous, and lasting. The job, when properly done, will make each space air and water-tight. The construction here recommended is the best practice of commercial cold-storage houses, only so modified as to be cheap to construct, while yet retaining practically all the advantages of a more expensive construction.

At each gable end ample ventilators should be placed, permitting a free and full current of air over the ceiling of the storage chamber. The roof should be shingled and the valleys between sections well lined. There is nothing, apparently, gained by having the doors, through which to handle the ice, vertically continuous. A stiffer frame, freedom from excessive sag of the lower doors, and a closer, tighter fit of each door are secured by introducing a stiff sill framed under each door.

As may be inferred from the foregoing, we do not approve the use of tie-rods to "stay" the sides of the sections, because of their unreliability; they must of necessity sag under the weight of the superimposed ice, and then they either spring the side walls in, or, because of the low temperature and tension to which they are subjected, break; even in the latter event they spring the side walls more or less before they let go.

A rigging amply stayed should be located over each