hot tar. Yet, if the roof leaks it is at this time the repairs are required. In such cases take the best Portland cement, mix with about one quarter of sand, and see that it is well mixed while in a dry state. Put in the mixture just enough water to allow of its working with a trowel—don't make as fluid as mortar—apply to the leak and "trowel" it well. As the cement will harden under water, the fact of the gravel and felt being wet will not affect its efficiency in the least.

QUESTIONS AND ANSWERS.

A CORRESPONDENT, living in Montreal, asks for information regarding "the weight of different kinds of roofing, floors, stud-partitions finished, outside walls, of wood, brick, and stone, etc.?" In answer to these enquiries, the only thing we can do is to give the weight per foot, per yard, or per square; and having these, it will be an easy matter to ascertain the weight of any given roof, floor, partition or wall.

Commencing with roofs, we find the authorities giving the following figures:—

(1) Slate Roofs: The average weight of one foot of slate laid on a roof, is 7½ pounds (Kidder). If pine, hemlock, or spruce is used for roofing boards, one square will weigh, if green, 300 pounds; if half seasoned, 270 pounds; if dry, 250 pounds (Hodgson.) In a piece of roof ten feet square, making 100 feet, there should be five rafters not less than 2″ × 6″ × 10′, each of these containing 10 feet of lumber, making a total of 50 feet, the weight of which, if dry, will be 125 pounds. This will then make the weight of one square of a slated roof, as follows:—

Slate	750 lbs.
Dry roofing boards	250 "
Dry rafters, 2″ × 6″	125 "
Total weight	*1125 lbs.
If we place building paper under the slates, we add for each square	15 lbs.
and to this may be added nails	4 "
which brings the total up to	1144 lbs.

Sometimes a layer of mortar is placed under the slates, the mortar being spread about ⅜ of an inch thick. The average weight of mortar so laid is a little over two pounds to the foot. This would add, say, 225 lbs. to the load, less 15 lbs. for paper which will not be required if mortar is used. The actual weight will then stand at

	*1125 lbs.
Nails	4 "
Mortar	225 "
Making a total of	1354 lbs.

In making calculations for the size of timbers to be employed to sustain a roof of any kind, wind pressure must not be overlooked as an important factor. A roof calculated to sustain any given load, and no provision made for wind-pressure, would come to grief with the first wind storm that struck it. The usual figures allowed to meet this contingency are 40 lbs. to the square foot, but, as a matter of fact, hurricanes, cyclones and tornados sometimes have a velocity of 100 lbs. to the square foot; but, roofs being sloping, rarely get more than a pressure of 40 lbs., which would add to the weight of the roof, under wind stress, 4000 lbs., making an actual total the bearing timber of the roof must resist, of 1354 + 4000 = 5354 lbs. per square. This, however, is not all, as provision must be made for rain and for snow. A slate roof should be made strong enough to resist a pressure of 10,000 lbs. to the square, or 100 lbs. to the square foot.

(2) Shingle Roof:—One square of shingles laid 5 inches to the weather, pine or cedar, will weigh, if dry, 125 lbs (Vogdes). According to Trautwine, it requires two pounds of 4-penny nails to lay a square of shingles; but we don't think this estimate is correct. In practice we have found that it takes a little more than 3 lbs. of nails to properly lay a square of shingles. Taking these figures as our guide, we find that the weight of a shingle roof, including roof boards, five rafters "2 × 6", and mortar laid under the shingles, to be per square:—

Shingles	125 lbs.
Dry roofing boards	250 "
Nails for roofing boards and shingles	7 "
Mortar	225 "
Total	732 lbs.

To this must be added wind pressure, also weight of snow and rain. Many architects build their roofs sufficiently strong to resist a pressure of 90 pounds to the square foot, a resistance that will prove equal to any stress that may arise.

(3) Galvanized Iron Roofs:—According to Kidder, the weight of a square foot of No. 16 guage galvanized sheet iron laid on roof, is 4½ pounds: that would equal 425 lbs. to the square, including solder, nails and battens. About 25 lbs. may be added to or taken from this figure per square, per guage, according as the iron used is heavier or lighter. The other factors are the same as for a slate or shingle roof.

(4) Tar or Composition Roofs vary in weight according to the quantity and quality of materials used; they average, however, about 200 lbs. to the square, being somewhat heavier than shingles and lighter than slates. The wood and timber work to be the same as for other flat roofs.

(5) Tin Roofs are about one-third as heavy as galvanized iron roof covering as given in the foregoing, but the formulas for timber and lumber are the same.

(6) If a roof is covered with corrugated sheet iron, the weight will be about ⅓ more than it would be if covered with flat iron of the same guage.

(7) Roofing Tiles of the ordinary kind weigh 16¼ pounds to the foot, so that a square of tiling would weigh 1625 pounds. Other factors in the roof would be the same as already exhibited in slate and other roofs.

With these figures before him, from which many formulas have purposely been avoided, the intelligent workman will have no difficulty in determining the weight of any given roof formed of the materials specified in the foregoing.

The weight of inside partition walls that are formed by 2 × 4 scantlings, lathed and plastered on both sides, plastering done in three-coat work, is reckoned to be, when the plastering is "green" or wet, about 200 lbs. per yard of surface. This, of course, means both sides, or two yards, plaster measurement. When dry, it will weigh about ⅓ less, or 133 pounds. If the studding is 2 × 6, add six pounds to these figures, and if the partition is boarded on one side, but lathed and plastered on both sides, add 18 lbs. more to the yard, and if boarded on both sides and lathed and plastered on both boarding, add another 18 lbs., making a total weight of one yard of a 2″ × 4″ partition, lathed and plastered in three-coat work on both sides, as follows:

Lathed and plastered only	133 lbs.
Boarded on one side, add	18 "
Boarded on the other side also	18 "
Total weight per yard	169 lbs.

The weight of any partition may be obtained, approx-