

this work. With the foregoing before him, and the figures given in the first paragraph in this issue, the estimator should have no trouble in determining the cost of a small frame house, so that both owner and contractor will be dealt justly with.

IN making an estimate on stairs of any kind it must always be remembered that there is one more riser than treads in every flight of stairs. This is owing to the fact that the floor at the foot of the stairs and the floor at the landing take the places of treads, though not counted as such. The width of the tread does not include the nosing or projection; thus a 10 inch tread will measure $11\frac{1}{2}$ inches, as the nosing will project from the face of the riser $1\frac{1}{2}$ inches, or at least the thickness of the stuff which forms the tread. The run of a stair is the distance between the face of the first riser to a line perpendicular to the face of the last riser in the flight. The height of the riser always includes the thickness of the tread, so that the first riser must be made narrower by the thickness of the tread than the other risers that are placed above it. In laying out a stair having a "winder" in it, it is customary to make the centre of the "winder" treads the same width as the "flyers" or regular treads. The cost of ordinary stairs, either open or cased, may be obtained by finding the number of feet in each flyer and riser, and counting the steps and risers and strings adjacent, allowing generally one foot in length of string for each riser. Allow for timbering the carriage underneath the stairs, when such work is done. After ascertaining the number of feet of lumber in one step and riser, with one foot in length of strings included, multiply by the whole number of risers in the flight, allowing three straight steps for each winder or swelled step, where there are such. An allowance of two will be sufficient when there is no furring underneath. Allow four for quarter platforms and six for half platforms. No allowance need be made usually for landings unless large. Double the cost of all dressed lumber. Figure pine at 5 cents per foot, oak at 7 cents per foot, walnut at 12 cents per foot. For ornamental brackets of pine allow 16 cents each, and oak or walnut 30 cents each, or per foot of fascia if the bracket is continuous. For all hand railing put up plain multiply number of square inches on cross section by 3 cents, which will be the price per foot for pine, and multiplied by 4, will give the price of birch, oak or sycamore, while 5 will give the price in walnut. Crooks, ramps and goose-necks should be figured at three times their length. The prices of balusters, plain and ornamental, and of newels in regular or special styles, may be obtained at any woodworking establishment where a wood-turner is employed, or from regular dealers who make a specialty of wood turning and who will gladly send catalogue of design and price list if applied to.

Too much care cannot be taken in reading and studying the specifications for a building of any kind. Often these important documents are very loosely drawn or worded. Ambiguous phrases and misleading expressions find their way into specifications sometimes, that were never intended by the architect to convey the meaning the estimator extracts from them. If the estimator has a "doubt" on any item he is figuring on, he should not send in his tender until that doubt has been

made a certainty either on one side or the other. It will not do to let the matter pass on the estimate as uncertain, as it may be an overcharge, and thereby cause a loss of the work, or an undercharge, and cause a loss of money to the contractor. The architect should be asked to explain, and his rendering should be noted as a memo, with day and date, in order to prevent subsequent disputes. With a loosely drawn specification contractors are obliged to bid on a certain amount of chance, and this risk must be paid for by the owner, for it is not to be expected that the contractor will accept a risk without a corresponding remuneration. In a long experience in matters of this kind, we have always found that the more exact the details were in a specification, and the greater amplitude given them, the closer were the figures of competing contractors, and the nearer to a correct value of the work was presented in each tender. On the other hand, it is frequently the indefiniteness of the specification that proves the cause of such divergence of bids. Plans and specifications drawn up and prepared by country carpenters, who have had little or no experience in works of any magnitude, are dangerous instruments for builders to meddle with, if possessed of honest intentions. The number of "outs" and "omissions" and misplaced and alarming phraseology, often prove such a source of endless dispute and contention, that the specifications become a veritable Pandora's box to everyone concerned. Of course, an experienced contractor will read in a rurally prepared specification, a great deal between the lines and protect himself accordingly, but the new beginner should make it a point to have every "foggy" detail made clear before submitting his tender. It does not follow that because a specification may be "hazy" that the drawer of it up does not know what he wants or intends, for as a mechanic and a builder and draughtsman, he may be quite an expert; but the drawing up of a perfect specification requires a quality of a much higher order, the chances of acquiring which seldom fall to the lot of country builders, though it must be acknowledged that under the circumstances our suburban builders perform their mission fairly well.

Concrete and Cement Work.

In estimating the cost of concrete work much depends upon the cost of the raw materials used, the kind of concrete made, and the use it is to be put to. In building concrete is used for several specific purposes, as follows:

- 1st. Footings and foundations of walls.
- 2nd. For cellar walls.
- 3rd. For the walls of superstructures.
- 4th. For the filling of arches in fire-proof structures.
- 5th. For cellar floors and walks.

Concrete is prepared in several ways, and of several materials, Portland cement being the base, as follows:

Portland cement used in all cases.

Cement 1 part.	Broken stone 3 parts.	Gravel. 1 part.	Sand 3 parts.
" 1 "	" bricks 3 "	" .. 1 "	" 3 "
" 1 "	Cinders 4 "	" .. 1 "	" 2 "
" 1 "	Pebbles 2 "	" .. 2 "	" 3 "
" 1 "	Broken stone 3 "	Cinders.. 2 "	" 2 "
" 1 "	Coarse slag.. 3 "	Fire clay 1 part.	" 3 "

Mixed with clean water.

To the cost of the several ingredients to be worked into the concrete, add the labor of preparing, and the cost of mason's wages in placing in building, as follows: A good laborer will prepare a cubic yard of concrete ready to put into a wall or footing in one and a half hours; a