CUTTING RAFTERS.

Here is a quick way to cut rafters that are to form a roof having one-third pitch, says the National Builder. Suppose the building to be roofed is 18 feet wide. Take half the width of the building, which in this case is 9 feet. Multiply this by 2½, and call the answer inches, giving in this case 22½ inches, or one foot ten and a half inches. Add this to half the width of the building, which gives the length of the rafter, 10 feet 10½ inches. Since this overruns, say 1-16 of an inch to the foot, it would make this measurement 9-16 of an inch too long. Call this a half an inch, which leaves the rafter 10 feet 10 inches in length. To put the matter plainly the following is presented.

18	9
4½	1—10½
22½	10 feet, 10½ inches.

This problem, though not exact enough for actual use, will enable the estimator to get the length of his rafters, nearly, on paper, if his roof is a one third pitch. In actual practice it is best to make use of the steel square when laying out a rafter, then the length and bevels may be obtained at the same time.

FREEZING OF QUICKSAND.

A piece of information, says Architecture and Building, that at this time is not without interest, when the freezing of quicksand is so often used by engineers in excavating for foundations, is brought forward by the London Architect. It says: Freezing is occasionally employed in the north of Europe as an auxiliary in the carrying out of foundations. The first application was in the Siberian mines. In order to reach the gold-bearing rock, which is in many places beneath strata of gravel and sand containing watery seams, the natural cold of the winter season is turned to account. The ground is kept clear of snow, so as to permit the cold to penetrate as deeply as possible, after which the surface is thawed by fires until a shallow layer of earth can be removed. The freezing is then allowed to proceed and the thawing operation repeated, and this is continued as long as the cold weather lasts. In this way, through the long Siberian winters, open excavations are made to the gold-bearing rocks, the depth attained being from 25 to 75 feet, according to the duration of the cold season. Artificial cold for purposes of excavation was used first by Poetsch in 1883. By his process of the circulation of cold brine through a series of buried pipes, the most difficult quicksand may be made hard enough to be excavated like rock. It was used in sinking a shaft at the Courrieres mines. Among the applications of the freezing process are the sinking of the shafts for the cylinders of the hydraulic elevator for the canal lift at Les Fontinettes, and the construction of a tunnel at Stockholm. The latter work was executed entirely by the introduction of cold air into the working chamber at the head of the tunnel, the cold preventing the infiltration of water until the beton lining was built, and the work of excavating and lining being carried on at temperatures ranging between 0 degrees and 25 degrees Fahr.

STORY OF THREE CHURCHES.

The following story comes from Waterloo, Ia., says Architecture and Building. The members of the Presbyterian church decided to erect a new place of worship. Stone was scarce; in fact, there were no quarries and no rock suitable for building purposes nigh at hand. At last their attention was called to what was apparently a large boulder which stood in the middle of a plain about eight miles from the town. This huge mass of rock was like an island in the midst of a vast sea. About eight feet of it projected above ground. The work of excavating this gigantic boulder was at once begun. When exposed to view it was found to be 28 feet high, 30 feet long and 20 feet wide. On this monolith the workmen began their labors with drill, hammer and dynamite, and the enormous rock was converted into building stones. The pieces were conveyed to the town, and before long a wonderful metamorphosis was apparent, and then this giant boulder, after resting undisturbed for countless years and buried by the deposits of ages, was transformed into a beautiful church. In its rough state this great rock is estimated to have weighed more than 2,500 tons.

To build a church from material taken from one boulder is certainly surprising, but not so much so as to build and complete a large wooden church from the timber of a single tree, no other lumber from any source being used, the building being the largest church edifice in the country. This building is situated in Santa Rosa, Cal., and was erected for the members of the Baptist communion of that place. The timber was taken from a redwood tree that grew in the neighborhood. The interior of the church was panelled and finished with wood, not a particle of plaster or other similar material being used. The floors, seatings, pulpit, roof and roofing were all formed from material taken from the same tree, and after the building was finished in every particular, stuff was taken from it to manufacture 60,000 shingles, besides a large quantity of scantlings, joists and other dimension stuff.

There is a Presbyterian church at Hepburnville, Pa., that was built by one man. It is a beautiful stone structure built from great boulders taken from Brobst Mountain. The name of the man who built this church was George Taylor, and he labored at it for more than six years, quarrying and cutting his own stone and putting them in place when opportunity presented. The building is 60×38 feet, with a square tower 60 feet high. Before the church was quite finished Taylor grew ill. His hammer, chisel and trowel were laid aside, and they were never again taken up by him. In his will it was found that he left the church and all its belongings to the congregation. There remained a small debt, which was partially wiped out the first Sunday service was held in the building. A subscription was raised and a pretty memorial window was erected by the congregation in honor of the aged and untiring builder.