IV. Architecture.

Formerly every architect was a civil engineer, and every civil engineer was an architect, and in the olden time there was no reason why this should not have been. The wooden roof-truss was of the simplest form and of short span, and there were only the two simple building materials, stone and brick, and the vault and arch constructed with them must be in very confined limits. The noblest of the old works must have been structurally designed by their architects, because their artistic effect is in the scholarly treatment of the necessary construction. But gradually the one profession divided, as the field became so broad that one man's ability could not cover it; and now the two professions have become distinct, that of the architect and that of the engineer.

At no age in the world was there such an abundance of practical and theoretical appliances to architecture as at present. We know how to build the longest trusses for roofs and bridges, to properly adjust the strength of our masonry to do its most effective work, and our better knowledge of the exact sciences teaches us to do all this in the most skillful way, without waste of material.

The use of structural iron, unknown to the ancients, now enters so extensively into every large architectural work that its designing has made a profession by itself, and it is in this where lies a great danger to the architectural profession. Not that there should be any competition between the architect and engineer,—far from it; but they should work hand in hand, and both professions would be improved by such a relationship.

The architect should be able in any kind of work intrusted to him to at least carry so far forward the structural problem of a building, that the completed design should show that the constructions and its architecture flowed from one and the same mind. Civil engineering should be so well understood by an architect, that he should know when to call in a civil engineer. As an example: once in a lifetime an architect might be called upon to design the terminal station of a large railroad, with its wide train house, which must have no supports for its roof between the outside walls. Although in his student days he might have been able to design the necessary truss, he would not attempt to do such work now; it would be done far better by the engineer; but the architect would certainly block out a scheme which would harmonize with the design of the whole building, and the engineer would then be working in harmony with him. There can be no great artist who is not master of anatomy; neither can there be a great architect who is not master of construction.

Every architect should be able to design any roof-truss in the ordinary routine of work; he should be able to calculate the strength of wall, thrust of dome, or buttress,—and all of this without any aid from the engineer. Every day the importance of this knowledge becomes greater. With the accumulation of wealth our buildings will be larger, and so heavier; and as they are for investment, they must be built economically, with just the right amount of material.—no more, no less.

Art power is not enough to make an architect. The grandest effects in architecture have depended as much on construction as upon artistic knowledge, and this should never be lost sight of.

To design architecture, one must be thoroughly acquainted with what has already been done; for we must get our inspiration from the past, but make a living art of it by adapting it to our time and requirements. There is no end to such a study; the more one knows the more is opened up, and what at first may be laborious becomes enjoyment.

The architect must be liberally educated; he must be cultured, and accomplished; and