Vitruvius to the Rescue

by L.L. Neuru

The Augustan age Roman writer Vitruvius was also a practicing architect. His work *De Architectura* contains a wealth of information not only on design and description of buildings, but on many other aspects of construction and related matters such as city-planning. It seems a learned book, and Vitruvius a practical and knowledgable architect. Nevertheless, there has been one scholarly opinion that Vitruvius wrote for enjoyment, that his advice was only 'literary' and not really suited to the practical realities of construction. I suppose that this impression was given by Vitruvius because in many of his sections on construction materials and methods, he seems vague; he discusses general properties of a material and does not give precise 'recipes' for making things like mortar, stucco and the like. On the other hand, I do not believe any of Vitruvius' critics ever tried to follow any of his vague recipes. Had they done so their opinion would have been very different.

I had the unusual and unexpected opportunity to test Vitruvius over a period of two summer seasons of excavation in the countryside of Roman North Africa. We were cleaning and studying a Roman villa whose hey-day was 4th to 7th centuries AD. We uncovered a floor which had suffered badly in the fire which had gutted a great part of the villa urbana in the early 6th century: It was a late 4th century mosaic pavement composed of a variety of geometric medallions set on a white background with a border of squared-wave pattern surrounding it. The fire had not only scorched the individual mosaic cubes (tesserae) but had also burnt out all of the grout between the tesserae: the cubes lay on their plaster bedding with nothing to hold them save the tenuous connection to the bedding under each cube. A filling of light ash lay between the cubes, nothing more than a nuisance to clean out later. This pavement was unexpected and unwelcome. The villa had certainly yielded floors, and floors with mosaics before, and we had long known about the fire. But previous floors had yielded good, solid mosaics, strong enough to leave in situ, or strong enough to leave for later removal and transport to a museum store-room. This particular geometric floor was not going to last. Conservation facilities at the museum were a long way away, and not feasibly transportable. We were out in the country, without electricity or water and certainly without any place to buy special consolidation materials to conserve this mosaic, or even to do emergency 'first-aid'. We had a genuine crisis on our hands.

It was suggested to us, by a retired architect who had lived in Africa and worked on many Roman sites, that we take a look at Vitruvius' recipe for mortar. He suggested that a genuine Roman-style mortar might work just as well as anything, or in our case, better than nothing. It was difficult to argue against this, so we turned to Vitruvius. In Book 2, Chapter 5 Vitruvius discusses the varied qualities of lime, one of the principal ingredients in mortar and stucco. Made from kiln-burnt limestone, it becomes a gray to white, heavy and dense to porous and lightweight substance after firing, depending on the quality of the original limestone. We had little choice sometimes in the quality of lime we were able to buy, but the guidelines Vitruvius provided did prove to be sound; the lighter, whiter lime made much nicer, smoother mortar. We slaked it (melted it down in water) until it stuck, to the stick we used to stir it, in a thick, even glue-like mass, which was the way Vitruvius said it ought to be. Then we added a mixture of 2/3 sand, having checked (by tasting) to see if it were river or sea sand, and 1/3 well-pounded brick, tile or coarse amphora sherds; we blended 2 parts of this dry mixture with one part of the wet lime, mixed thoroughly and slopped it between the cracks in the mosaic; it made a beautiful, solid grout. The tile we had pounded into the sand was reddish, and the sand an ochre colour; both coloured the mortar and although the original grout had been a beautiful white, the reddish-yellow cast to the replacement blended very well indeed with the burnt tesserae. Extra mortar was added very thickly on the exposed edges near a doorway where the floor had started to slip away into the cistern.

The Vitruvian recipe worked very well. What appeared to be 'vague' to some readers proved to be a rational and clear presentation of all the general characteristics of lime, sand and the technique of slaking. Vitruvius provided excellent guidelines which were applicable to a wide variety of types of materials and the problems which could be encountered using them, and while he did not provide one precise recipe, he provided one very general one which allowed the worker to adapt to the local materials and to thus produce a decent Roman mortar. And the mosaic floor? It has been standing in the open and has, over three years, seemed to grow more solid.