LETTERS TO THE EDITOR

Sir:

Mr. Branner's rebuttal in the October 1961 issue is a somewhat confusing document. After a courteous opening paragraph he proceeds directly to the bewilderment.

Thus he starts his second paragraph by saying that I stated his 'downright error' was in his orientation of the keystone triangle. I did not say that nor, as a matter of fact, did I say what that error was—assuming that it would be obvious that it was in his description of how the diagram was to be drawn. I repeat here that the method described is a geometric impossibility. The fact that it may be accomplished by the use of a marked square does not alter the case.

He then goes on to say that I believe that 'the thickness of the arch is determined by the length of the radius and by the type of arch to be constructed'. I neither said nor meant this and the rest of my points do not 'flow from this assumption'.

What I did say was that the diagram could be used to determine the relation between the intrados-extrados height of the keystone and the depth of the voussoirs.1

The next to last paragraph is perhaps the most baffling of all. In his point (2) Mr. Branner states that 'the main arcades all rise to the same height'. Yet in a personal letter written earlier he made the point that 'furthermore not all the peaks are at the same level'.2 The contradiction is puzzling, but not important. Neither Mr. Branner—or anyone else—can say whether or not these arches are all the same height without measuring each one carefully.

As for his point (3) in this same paragraph his first alternative proceeds to a false conclusion. The accompanying diagram is offered in evidence.

The dotted arch ABC is an entirely conventional third-point arch such as appears to have been the basis of the main arcades of Chartres. With centers at D and E it is based on a span of 7.050 m. from center to center of columns.

Consulting Lassus' plan3 it is obvious that this arch will readily fit the three bays west of the west aisle of the transepts. To fit in the fourth bay west and in the second bay east of the east aisle of the transepts requires only such adjustment as is easily accomplished with the wide mortar joints of mediaeval masonry.

To fit the fifth arch west and the first and third east requires considerably more. Yet it is really a simple enough exercise in stereotomy.

1. It is hard to believe that these diagrams were ever used for anything else. Either of the two dimensions may be given and the other determined. The relation is a very important one to both the designer and the mason. It can of course be computed, but the method is a long and tedious one and the diagram yields a result that is correct within a few millimeters. The only type of keystone that can be laid out this way is rarely found.

2. Italics are Mr. Branner's.


On the left-hand side of the diagram point F is located as the center of a voussoir of precisely the same depth as that of the typical arch. With F and B as centers and radius AE sweep arcs that intersect at point H. Then with H as center and the same radii with which the original arch was drawn sweep in the smaller one. The marked squares4 show how the voussoirs are then laid out. These will be precisely the same size and shape as those of the typical arch.5

Similarly for the larger arch—the third east. Locate point G and with G and B as centers and radius CD (CD=AE) locate point K. Again the arch is drawn with the same radii as the dotted one and the voussoirs laid out with a marked square. These are also the same size and shape as the typical arch.

The same thing appears to apply to the transverse arches in the aisles.6 It certainly applies to the main arcades in the transepts.

Whether or not it was done at Chartres, it was often desirable to have as much stonework as was possible cut at the quarry to save

4. The square is marked with 2 on the short arm and \(\sqrt{140}\)—taken from spiral B—on the long arm.

5. The question as to whether there are seven or eight voussoirs between the spring line and the key in all but the largest arches is happily settled by the photograph reproduced as Plate 1 in Mr. Branner's newly published Gothic Architecture (New York, 1961). There are seven.

6. This depends to some extent upon the actual height of these arches. Three different sections available for consultation give three different heights. If the latest (Branner, Burgundian, pl. 7a) is correct then the diagram will cover. Otherwise it must be somewhat modified to give the proper result.
transportation costs. Here all the voussoirs could be cut from a single pattern leaving only the keystones and one of the blocks below the spring lines to be specially made. Even these could be cut in the quarry if the proper dimensions were furnished.

All that would be necessary would be the span of the arch. The layout shown here could then be made on the quarry floor at full size and the keystone and other blocks cut to fit.

A careful scrutiny of the drawing will show that the height of the smaller arch and the typical one appear to be different. They cannot be the same with this method of layout, but the differences are inconsequential—particularly at something over forty feet above the floor.

The computations used to determine the exact theoretical differences are too tedious to be reproduced here. Suffice it to say that the extrados of the smaller arch is 0.014 m. too high and the intrados 0.018 m. too low. Thus the key is 0.032 m. deeper than that of the typical arch.

All this seems at first glance to agree with Mr. Branner's first alternative of his point (3). If he had said that the Villard diagrams for the third-, fourth-, and fifth-point arches can be used only for such arches and no others he would have been entirely correct. As it is he says that the spiral cannot be used to 'determine' the keystones geometrically.

As the drawing shows the spiral may be used for a whole series of arches of a given family wherein all the voussoirs are identical.

If all this is 'organic' and, therefore, somehow wrong, how does Mr. Branner believe that the Chartres arcades were laid out?

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9. Similarly the extrados of the larger arch is 0.008 m. too low and the intrados 0.009 m. too high. Thus the difference in extrados height between the smaller and larger arches is 0.022 m. Since the arches are something like seventy-five meters apart this difference is inappreciable.

10. See note 1.

BOOKS


During the last fifteen years the understanding of architecture in the Roman world has been much facilitated by the publication of a number of important books and articles. This leap forward has been characterized by studies such as those of H. Bloch (brick stamps, 1947), J. B. Ward Perkins (Roman and early mediaeval relationships, 1947), the late Miss Marion Blake (construction, 1947, 1959), G. Lugli (construction, 1957), L. Crema (a good handbook, 1959), G. Carettoni and others (a magnificent treatment of the marble plan of Rome, 1960), and F. E. Brown (a succinct exposition of the general subject, 1961). These scholars, like all recent serious writers on the architecture of later Mediterranean antiquity, have closely attended the steady, useful production of Professor Axel Boëthius, who for thirty-five years has been presenting the results of his studies to architectural historians and archaeologists.

Boëthius has devoted himself over the years to problems connected with Vitruvius, town planning, streets and their shops, houses and palaces, market buildings, and the insulae or apartment buildings of Imperial times. His studies have been practical and straightforward, based upon an intimate acquaintance with the monuments and a thorough knowledge not only of Vitruvius and his ambient, but also of the many though widely scattered pertinent passages in other ancient texts. From this work he has fashioned stimulating, original conclusions. These are concerned with Greek and Etruscan influences upon planning and design in the Roman world, the characteristics and classification of certain utilitarian and domestic building types, relationships of such influences and types to aspects of Latin culture, and lines of connection between Roman forms and later Western architecture.

The present book, a revised version of Jerome lectures given at the American Academy in Rome and again at the University of Michigan, covers a good deal of this ground and makes more readily available those results of Boëthius' work that were originally published in Swedish. The subtitle is more accurate than the title, for about four-fifths of the text are given over to discussions of early Roman towns, Etruscan and Greek influences upon them, and the popular domestic architecture of the Imperial capital with its legacy to the middle ages; only the remaining portion deals with Nero's innovatory and extraordinary palace. It is, in short, a fairly detailed statement, well illustrated and usefully documented, of most of the author's major interests and convictions.

The first half of the book contains a discussion of town planning and townscapes in central Italy during the Republican period. The Roman preoccupation with axial symmetry is seen to have been heavily influenced by Oriental, non-Greek designs transmitted to Latin centers through the agency of the Etruscans, a disposition reinforced by the subsequent wave, in later Republican times, of Hellenistic thought and practice. Boëthius maintains that Roman rectangular planning cannot be traced to later Bronze Age and Iron Age villages but must have been developed as a result of interaction among Latin, Etruscan, and Hellenistic cultures, the latter two drawing upon the same eastern sources. The crucial period would have been the third century B.C.; if this is correct, the great imperial town and camp plans cannot be considered as fossils from the dis-