XXVI. *Observations on the mode adopted by Masons at various and distant periods in forming a Straight Head over an Aperture. By SYDNEY SMIRKE, Esq. F.S.A., in a Letter to Sir HENRY ELLIS, K.H., F.R.S., Secretary.*

Read 1st February, 1838.

DEAR SIR,

12, Regent Street, Feb. 1, 1838.

IT was remarked by the late eminent engineer, Mr. Milne, that in his tour through the classical regions of Europe, he derived more professional benefit from an examination of the construction of ancient masonry than from any other subject that engaged his attention. Although it is not to be expected that the Antiquary will regard this subject with equal interest, yet I think a little experience will convince him that a careful consideration of the technical construction of ancient buildings is not wholly devoid either of utility or interest, and may render him important assistance in determining their date. In confirmation of this I need only point to the admirable essay of one of our most distinguished members, Mr. Hamilton, on the Ancient Fortresses of Greece, in the fifteenth volume of *Archæologia*; an essay which I have always regarded as a model of antiquarian inquiry, and one not surpassed in point of interest and value by any of our published Transactions.

But it is not only on classic ground that this subject demands attention, nor is it upon works of the earliest antiquity alone that our examination of the artifices of construction can be advantageously bestowed. I am persuaded, that, if as much attention were paid to the substantial details of structure visible in our own old buildings as has been given to the contour of mouldings and other purely ornamental forms, much light would be thrown upon

the disputed chronology of these and similar works, and many data of general application might perhaps be established. This is a vein of inquiry to which I beg leave to invite the attention of intelligent and competent observers, and in the pursuit of which I think they may anticipate a profitable result.

As an example of the sort of inquiry which I have suggested, I submit to you some sketches (Pl. XXVII.) explanatory of the mode adopted by masons at various and distant periods in forming a straight head over an aperture.

No. 1 is a representation, drawn from detailed memoranda taken by myself in 1825, of the lintel over the great doorway leading into the cella of the temple usually called the Temple of Concord, on the site of the ancient Agrigentum, in Sicily. The date of this building, like most of the Greek remains in that island, is unfortunately unknown; Biscari and other Sicilian antiquaries consider it to belong to a period subsequent to the Punic war, because Diodorus states all the temples of Agrigentum to have been either burnt or wholly destroyed by frequent sieges, whereas this building is remaining tolerably perfect: but this does not appear to me conclusive evidence, for, although the columns, entablature, and cella walls are certainly in better condition in respect to their masonry than most other Greek remains, yet this might fairly be classed among the *ædes sacræ exustæ* of Diodorus, inasmuch as every combustible portion of it is wholly destroyed. There is so much purity and genuine Greek character throughout this beautiful temple, that I cannot consider it to be the work of any period later than the reduction of Sicily under the Roman power.

It is manifest that, to whatever period we attribute this work, the principle of the arch was still unknown to the builder, for it is not to be supposed that they would have taken the pains to quarry, convey, and lift up so ponderous a block of stone as that which forms the lintel, nor would they have resorted to the singular contrivance here seen for relieving this stone from the pressure of the superincumbent masonry, had they known that with much less cumbrous stones they could have made equally sound work.

The opening in the masonry over this lintel appears to have been intended for the double purpose of relieving it from the weight above and of forming a passage-way through the tympanum or gable, and above the level of the ceiling of the cella.

What the purpose or meaning may be of the two small curves at the top I cannot guess, nor have I ever heard any explanation proposed.

The joints of all this masonry are without cement, and nothing can exceed the beautiful precision of the work; you will not fail to observe the pains taken to preserve uniformity in the vertical joints, without sacrificing too much of the bearing ends of the lintel; this minute attention to the appearance of the joints on the inside surface of the walls of the cella affords a satisfactory, and I think, conclusive proof that there was no painting nor any superficial finishing of any kind to the walls of the cella.

No. 2 shews the masonry of the square-head of one of the adyts of the Emissario to the Lake at Albano. The blocks of stone composing it are of the dark brown tufaceous substance, commonly called peperino; the joints are very close, and apparently without cement; these circumstances, according to the theory of Winckelmann, distinguish works of a date prior to the commencement of the Roman Empire; but I cannot place confidence in the opinion that has attributed this work to a period before the siege of Veii. The evidence that has been adduced leads, I think, *only* to the conclusion that the Lake of Albano had at that time an Emissario, but it is not therefore to be assumed that any part of the present masonry bears that early date. The evidence afforded by the construction of the work strongly corroborates the doubt above expressed. There is here an example of what workmen call a skeme-arch, where, in fact, the principle of the arch is carried out less simply than in arches of ordinary form, and which therefore may be presumed to be rather a subsequent refinement upon a previously known arrangement; but, as there is the best evidence to prove that the arch was unknown in masonry at so early a period as that of the siege of Veii, viz. the fourth century before the Christian era, I would infer the great improbability of the date ascribed by some to this specimen of the straight-arched head.

In the third example we have another variety of the skeme-arch, from the head of the doorway into the building at Ravenna, known as Theodoric's Tomb: the rebate or shoulder in the radiating joints is a singular expedient quite unknown, to the best of my belief, in any work of classic times, although, as I shall shew below, it became somewhat prevalent in the ensuing ages. It seems to indicate a distrust of the principle of the arch; but its inutility will

be readily recognised by any mason of the present day. The commencement of the sixth century may be regarded as the date of this example.

No. 4 presents us with a piece of masonry upwards of a thousand years later than No. 3: it is the straight lintel over the centre doorway at the west end of Rochester cathedral. Here we have another elaborate contrivance shewing but little science on the part of the artificer. The joints appear externally to be exactly vertical, although I presume that, within the surface and out of sight, they radiate like the joints of a skeme-arch; otherwise it is difficult to understand how these stones can support the weight imposed upon them; certainly the excrescences on the sides of the stones by which they are locked into each other, and which in mason's language would be called a *joggle*, have but little effect in keeping them up. The face of these stones is, as you well know, richly carved, each with a separate device; they are irregular in size, the abutment stones being very dissimilar: indeed a great want of correspondence and regularity of structure prevails throughout, not only this doorway, but the whole west front of the edifice in question, and it is difficult to believe that any working drawing could have been prepared for the guidance of the masons in the execution of their work.

This fourth example brings us down to the commencement of the twelfth century, the date which I presume may be confidently assigned to the west front of Rochester cathedral.

For the sketch, No. 5, I am indebted to a friend, who, however, does not vouch for its minute correctness. It is stated to be the representation of the masonry of a chimney opening in an old kitchen at Edgcot, Northamptonshire. Although the capacious opening here shown is not covered by a straight head, as in the preceding cases, the pointed arch which spans it is so nearly flat as to entitle it to our notice on the present occasion. I know not the age of this example, but I presume it to be of the later period of the Pointed style.

It is worthy of observation that the break or shoulder in the radiating joints is discernible in some semi-circular arches at the Gothic tomb in Ravenna, above referred to; and I have also noticed this singular contrivance in the engraved representations of an old building of the Pointed epoch at Cairo.

The occurrence of the same peculiarity of structure in localities so distant

N^o 1.

From the Temple of Concord, Agrigentum.

N^o 2.

From the Emissario at Albano.

A Modern Masonry.

N^o 3.

From the Tomb of Theodoric, Ravenna.

N^o 4.

From the West Front of Rochester Cathedral.

N^o 5.

Chimney opening at Edgcot, Northamptonshire.

Sketches explanatory of the Mode adopted by Masons at various and distant periods in forming a straight head over an Aperture.

from each other, a peculiarity unknown to classic art, and long disused in modern art, is a curious fact, and might perhaps suggest interesting reflections ; but I forbear to indulge in any speculations on this subject.

The five examples here brought into juxta-position to shew the efforts of workmen to produce the same effect with the same material, at periods and in places so widely distant, serve to illustrate the condition of the arts at their respective periods.

Nothing can exceed the beautiful precision and masterly execution of the masonry in the first, or Greek, example ; its excellence is indeed sufficiently attested by the comparatively complete state of the work, notwithstanding the lapse of more than twenty centuries, the devastation of war, and the still more destructive earthquakes of which Sicily has been the scene. But art was still young, and the progress of mechanical knowledge not great: the arch was unknown, and the Greek mason had no resource but the obvious and inartificial one of forming his straight doorhead with a block of depth and strength enough to bear its burthen, notwithstanding the trouble that necessarily attended the process.

The second, or Roman example, has still much of the excellence that characterises the workmanship of classic times ; and indicates moreover, that since the date of the preceding example, a stride had been made in the progress of the science of construction that was destined to effect a total revolution in architectural design, for cuneiform stones are here used to form a flat arch.

The third example, of what may truly be called the Gothic period, strongly marks the decadence of good art ; although the masonry is executed with much precision, the rebate or shoulder in the radiating joint is a piece of mistaken construction that would not have been made in better times.

The fourth, or Norman example, and the fifth, of a still later period, illustrate that elaborately artificial manner which, both in design and construction, characterises the mediæval architecture of Europe.

I remain, dear Sir,

very faithfully yours,

SYDNEY SMIRKE.

SIR HENRY ELLIS, K.H. F.R.S.
Sec. S.A.