INCONSISTENCY IN DRAWINGS OF DIOCLETIAN'S MAUSOLEUM BY G. NIEMANN FROM THE POINT OF VIEW OF STANDARD ROMAN ROOF PITCH AND OF MODULAR SIZES OF TEGULAE

The modulation of roof tiles is of especial interest. As laid, they have a modular breadth (parallel to the ridge) of 1½' or 1 cubit, whilst their manufacture length is 2'. This is reduced by the overlap and the roof pitch to 1½' projection on plan, so that each roof tile's net cover is a square cubit of plan. This implies a standardisation of roof pitch, something that we have not yet tackled. Dr. Kurent does not, unfortunately, enlarge on this: probably for shortage of evidence. By scale from his drawing I find the pitch to be 5 : 2. (from the Review of the book The Modular Reconstruction of Emona, by M. Detoni and T. Kurent, Ljubljana 1963, published by Mark Hartland Thomas, O.B.E., M.A., F.R.I.B.A., M.S.I.A., secretary of the Modular Society, in The Modular Quarterly, London, Spring 1964).

The evidence was found in the still standing Mausoleum and Vestibule of the Diocletian's palace in Split. To accomplish our long overdue research on standardisation of the Roman roof pitch we had to compare our measurement with the sizes found by Georg Niemann and published in his monumental book Der Palast Diokletians in Spalato (K. K. Oesterreichisches Archæologisches Institut, Alfred Hölden, Wien 1910).

In our comparison of Niemann's sizes and drawings we detected a different presentation of the mouldings finishing the top of the Mausoleum's walls under the roof.

Niemann's drawing No. 79. Gebälk am Mausoleum on the page 65 depicts the following profiles (listed upwards):
- an architrave, consisting of a fascia, ovolo, fascia, ovolo, cavetto, and a filet;
- a frieze, composed of a filet and fascia;
- a cornice of dentiles, of a drip with the undercut edge to throw of rain water, and of a cyma recta, but without a crown. The still existing crown is made of corona (or fascia) and a cymatium immediately under the roof.

Niemann's verbal description of the same moulding on the same page: Darauf folgen noch sechzehn fast gleich hohe Quaderschichten

Several Niemann’s drawings disagree in their presentation of the Mausoleum’s topmost moulding: His Tafel VII, Aufriß des Oestlichen Peristylflugels und Schnitt durch das Vestibül; Wiederherstellung, signed G. Niemann 1906, shews moulding without crown. But his Tafel X, Aufriß der Domkirche mit dem Campanile, signed G. Niemann 1904, and his Tafel XI, Die Domkirche von Südwesten gesehen, signed G. Niemann 1905, present the complete moulding as we know today. Again, his Tafel XIII, Schnitt durch das Mausoleum und Aufriß der Vorhalle des Vestibüls, signed G. Niemann 1906, his Tafel XIV, Das Mausoleum, signed G. Niemann 1905, and his Tafel XV, Blick auf das Peristyl und seine Umgebung, signed G. Niemann 1908, omit the crown.

Chronologically arranged, Niemann’s two early Tafels, No. X and No. XI, from 1904 and 1905 respectively, one a perspective and the other an elevation, are correct. Four later Tafels, No. XIV, signed 1905, No. VII and No. XIII, both from 1906, and No. XV, made in 1908, present the deficient moulding. The first three show a geometrically constructed section (or Wiederherstellung according to Niemann). The last one is a geometrically constructed horizontal section of a perspective. All four are typical cabinet work, probably none of them checked in situ again.

The origin of this lapsus is probably the incomplete drawing of the detail in question, Niemann’s illustration No. 79. Gebälk am Mausoleum.

To compensate the shorter moulding Niemann increased the inclination of the roof to about 35° to get the pinnacle to the right height.

The angles of Roman roofs are either one quarter or one third of a right angle, i.e. 22°30’ or 30°. The 22°30’ angle corresponds with the pitch 5 : 2, as found by M. Hartland Thomas; the 30° angle makes the pitch somewhere between 5 : 3 and 7 : 4.

The standard Roman tegula, common in Mediterranean Countries, 2 pedes long and 1 cubitus wide, on the roof of the 5 : 2 pitch has in the horizontal projection the modular length of 5 trientes and in the vertical projection the modular height of 2 trientes. The same tegula on the roof of the 30° pitch has his horizontal and vertical projections 1 cubitus and 1 deunx respectively.

A smaller standard tegula from Aquincum, 5 trientes long and 4 trientes wide on the 5 : 2 roof is reduced to the modular length of 1 palmipes (=5 palmi) and the modular height of 1 semis (=2 palmi). On the 5 : 3 roof its modular sizes are 1 palmipes and 1 dodrans. Or, in other words, 5 palmi and 3 palmi.

Still smaller tegula found in Bignor (Britannia), 4 trientes by 3 trientes large, on the one quarter or on the one third of the right angle pitch, offers no modular sizes expressible in Roman units.
This inconsistency in Roman modular dimensioning of tegulae asks for an explanation. The hypothesis of the largest tegulae and the smallest roof pitch for the sunny Mediterranean, smaller tegulae for the wetter inland, and of the smallest tegulae on the steepest pitch for the rainy North, is not substantiated. The one half of the right angle roof pitch composed by 4 trientes to 3 trientes tegulae does not make horizontal and vertical projection of its components modular. Equally, the two thirds of the right angle or even the one half of the right angle pitch with the same type of tegulae result in non modular projections.

The assumption that the modular practice was not always in vigour in the far away Britain seems probable.

Ljubljana.

T. Kurent.

BIBLIOGRAPHY

1. The composition of the moulding on top of the Mausoleum’s walls.
   Niemann’s illustration No 79. Gebälk am Mausoleum consists only of der Architrav, der Fries, and das Zahnschnittgesims.
2. Correction of the Niemann’s section of the Mausoleum’s dome. The omission of the crown on the roof makes pitch on the Niemann’s drawing steeper and the pinnacle higher than in reality.
3. Section through the Mausoleum and the peristyl. The Mausoleum roof pitch is expressible with the ratio cubitus : deunx, or 18 : 11, slightly more than 7 : 4, which approximates the tg 30°. The Vestibule roof pitch is expressible with the ratio cubitus : septunx, or 18 : 7, slightly more than 5 : 2, which is the closest approximation to the tg 22° 30’.
4. Large Roman tegula, a specimen from Pula, 1 cubitus wide and 2 pedes long. Its manufacture sizes are reduced, taking in account the overlapping joint, to the modular length on the horizontal and to the modular height on the vertical projection. Thus, its manufacture sizes on the one quarter of the right angle roof pitch result in 5 trientes to 2 trientes modular sizes. On the one third of the right angle roof pitch its modular sizes are 1 cubitus and 1 deunx.
5. Medium Roman tegula, a specimen from Aquincum, 4 trientes wide and 5 trientes long. Its manufacture sizes are reduced, taking in account the overlapping joint, to the modular length on the horizontal and to the modular height on the vertical projection. Thus, its manufacture sizes on the one quarter of the right angle roof pitch result in 1 palmipes to 1 semis modular sizes, which equals 5 palmi to 2 palmi. On the one third of the right angle roof pitch its modular sizes are 1 palmipes and 1 dodrans which equals 5 palmi to 3 palmi.
6. Small Roman tegula, a specimen from Bignor, 4 trientes long and 3 trientes wide, on the one quarter or on the one third of the right angle roof pitch offers no modular sizes expressible in Roman units.
MOLDING - ILL. 79 GEBÄLK AM MAUSOLEUM
PAGE 65 OF NIEMANN'S DER PALAST DIOKLETIANS

CROWN IS MISSING IN NIEMANN'S DRAWING NO. 79 AND IN HIS TAFELN NO. VII AND NO. XIII

FILET AND FASCIA

CORONA (FASCIA)

CYMA RECTA

DENTILS

FILET

CAVETTO

OVULO

FASCIA

OVULO

FASCIA

SECHZEHN - QUADERSCHICHTEN - WALL
THE MODULATION OF THE ROOF TILES IS OF ESPECIAL INTEREST AS LAID, THEY HAVE A MODULAR BREADTH (PARALLEL TO THE RIDGE) OF 1 3/4 OR 1 CUBIT, WHILST THEIR MANUFACTURE LENGTH IS 2. THIS IS REDUCED BY THE OVERLAP AND THE ROOF PITCH TO 1 3/4 PROJECTION ON PLAN, SO THAT EACH ROOF TILE'S NET COVER IS A SQUARE CUBIT OF PLAN THIS IMPLIES A STANDARDIZATION OF ROOF PITCH, SOMETHING THAT WE HAVE NOT YET TACKLED DR. KURENT DOES NOT, UNFORTUNATELY, ENLARGE ON THIS PROBABLY FOR SHORTAGE OF EVIDENCE BY SCALE FROM HIS DRAWING I FIND THE PITCH TO BE 5 2.

THE MODULAR RECONSTRUCTION OF EMONA, MILICA DETON AND TINE KURENT, LjUBLJANA, 1963, REVIEWED BY MARK HAVERLAND THOMAS.

THE MODULAR QUARTERLY, SPRING 1964.