

**AN ATTEMPT TO DEFINE
THE GEOMETRIC
PROPORTIONS OF
GOTHIC ARCHITECTURE**

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An attempt to define the geometric proportions of Gothic architecture by Robert William Billings

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ROBERT WILLIAM BILLINGS

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THE GEOMETRIC
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GOTHIC ARCHITECTURE**

AN ATTEMPT
TO
DEFINE THE GEOMETRIC PROPORTIONS
OF
GOTHIC ARCHITECTURE,
AS ILLUSTRATED BY THE
CATHEDRALS OF CARLISLE AND WORCESTER.

BY
ROBERT WILLIAM BILLINGS.

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INTRODUCTION.

FEELING convinced that the architects of our ancient Ecclesiastical Architecture were guided in their designs and proportions by geometric principles, the author of this work puts it forth as the result of his studies upon one building, in the hope that it will meet with that kind consideration on the part of his professional brethren who feel interested in the elucidation of the elements of their art, which all reasonable theories, divested of visionary schemes, ought to command.

The application of the circle, or intersecting circles, to the plan of Gothic buildings is not new; but the application of scales, composed of a regular division of parts of that figure, fixing both the position and substance of the columns within the building, besides the various parts of the elevation, has hitherto been unknown; and the author, consequently, claims the invention or re-discovery of this principle, if it be really that which the ancient architects used, as his own. From the variety in the proportion of every part of our Cathedrals, he cannot possibly conceive how any other rule could have regulated the design.

He brings the present attempt forward for the purpose of inducing other architects to examine carefully all buildings with which they may come in contact, with the view of elucidating their principles;—to discover, if possible, the causes which produced the beautiful proportions visible everywhere in the works of our forefathers, in contradistinction to our own too frequently miserable attempts at imitation.

An eminent Architect, who has looked over the Essay, objects to the theory of scales here advanced, on account of those used in the Plan and

Elevation of Carlisle being different; but this is only imaginary, for by making the scale of the former twenty-four parts of the radius of the circle of the width, instead of eight, the scale for the elevation would be twelve parts of this scale, as each compartment is exactly one-fourth of the whole width of the Cathedral.

The circles projected on the fifth and sixth points of the present scale would then be upon the fifteenth and eighteenth points, and in the elevation of each compartment the numbers would be exactly doubled. The object, in the representations given, has been to reduce the scales to the smallest number of parts.

R. W. BILLINGS.

AN ATTEMPT,

ETC.

THE interest taken by many architects, in the geometrical analysis of the Great East Window of Carlisle Cathedral, in the author's publication on that building, has induced him to devote further attention to the subject, in order to find, if it really existed, the projection of the different parts of the Plan and Elevation of the Cathedral itself, so that an Architect by the aid of mere mechanical diagrams, without reference to any measured plans, might be enabled to project another building, either one atom larger or smaller, in perfect proportion with the original model.

The reduction of any art, to a system, by which the time and labour of the professor can be spared, is at all times a highly desirable object, and any thing tending to elucidate its principles ought to command the attention of all admirers of that sublime science, which in countries whose political and social power has long existed but in name, alone remains to testify the genius of their former possessors, — in the contemplation of whose architectural remains, we lose sight of all their wars and conquests, and acknowledge the triumphant reign of science over the petty quarrels of man. Our own architectural remains, will render Britain celebrated when, like the nations of antiquity, we shall, in the rise and fall of states, sink into decay, and all our glories and conquests be forgotten.

While so much remains of the results of the architectural study of our forefathers, vulgarly denominated Goths, little or nothing is left of the means by which they attained that amazing union of lightness and strength, for which the Ecclesiastical Architecture of the thirteenth, fourteenth, fifteenth, and sixteenth centuries, is so justly celebrated over that of all preceding or succeeding ages to the present time.

The principal argument used against Gothic Architecture, by the admirers of classical architecture, is, that unlike the latter, it owes all the beautiful combinations of its various parts to chance or caprice of the architect, instead of being the result of fixed and harmonious proportions. With all respect and admiration of Greek and Roman architecture, are not all the

proportions of their parts, the arch excepted, rather the result of a most refined taste, instead of geometrical forms, which were undoubtedly used by the architects of the miscalled dark ages, and which appear palpably on the very face of their productions. Let it be understood that this is not meant to hint in the slightest degree against the refined beauty and perfection of the orders, the object being simply to raise the character of a style of Architecture, hitherto unfavourably put in contrast on account of its supposed want of guiding principles.

In early times, until the subversion of what is termed the Norman or circular style, it is probable, from the extreme simplicity of its forms that no intricate figures were used for regulating the proportions of the various parts; but in after times, when an extraordinary flow of lines and intricacy of geometrical forms in the tracery came into general use, can it be for a moment asked, whether such uniform beauty as is every where recognizable in the architect's productions, was the result of highly cultivated science or mere chance? All unprejudiced persons must unhesitatingly say that such results could not be produced from the latter cause.

An evidence of the simplicity just mentioned occurs in the elevation of a compartment of the Norman nave of Gloucester Cathedral, as delineated in the great folio work of the Society of Antiquaries of London, Plate XII. The massive columns, which are exceedingly lofty, are one square and a half of the width; the arch above is half a square; the triforium is half a square; and the clere-story and groining one square; making the whole internal elevation three squares and half of the width of the compartment, as marked on the margin.

Were all the proportions of Gothic buildings projected in a similar manner to this, there would evidently be no occasion for another word upon the subject; but it is a well-known fact, that the different parts of almost every one of our Cathedrals vary in the most marked manner.

Clere-story, 1 square.
Triforium, $\frac{1}{2}$ square.
Arch, $\frac{1}{2}$ square.
Column, $1\frac{1}{2}$ square.

Unfortunately for the students in Gothic Architecture, all drawings or designs of our ancient buildings have been most carefully destroyed, most probably by the architects themselves, who as freemasons would endeavour to keep their principles strictly secret. Had this not been the case we should certainly have discovered some of their drawings, the time of their execution only extending over a period of about six hundred years, because upon every other subject we meet with documents almost as many thousand years back. What is more to the matter, do we not meet with the builders contracts and even their bills?

Without further preface we will at once proceed to the subject of the essay, the positions of which are, that in the projection of the plans of the nave and choir of Carlisle Cathedral, the architect was guided by the repetition of a circle, whose diameter in the first or Norman part was the extreme width of the building, not including buttresses; and in the second part or choir, erected about 200 years after the nave, the diameter of the circle was the width between the internal walls; that the distribution and even the substance of the columns or piers, was regulated by some recognisable subdivision of the same circle; and lastly, that a circle, or arcs of a circle, regulated by the width of each compartment thus formed, was the basis upon which the heights of the different portions of the interior were framed, viz. the choir, columns and arches above them, the triforium, the clere-story, and ceiling. These positions we shall now endeavour to maintain by a minute examination of the proportions of this building, being the result of a survey which has occupied two years.

The system here attempted is not like the productions of system builders in general, invested with the objection that the facts are collected in order to bear out a favourite or pre-arranged theory, for here it has sprung from the opposite cause.

Before entering upon the description, let it be perfectly understood that it is not asserted that the precise divisions applied to the plan of Carlisle would answer to any other building, but that by modifications of the division of the circle, to be discovered by careful measurements and calculations, we might be enabled to fix laws for the reproduction of the great proportions of any building with the most unerring accuracy and a saving of time in the future practice of the architect, almost incredible. We do not hesitate to affirm that