

## A SURVEY

The earliest known examples of art are the figures of animals drawn by cave-men. These drawings gave birth to the art of writing. Architecture, however, seems to have arisen from the worship of mighty stones, and it was through this reverence that the Egyptians built the great pyramids as everlasting resting-places for the dead.

The art of building seems first to have grown to strength in the valleys of the Nile and Tigris, and the art of the valley of the Tigris may have been prior to that of Egypt. More is known, however, of the origin of the buildings of Egypt than of those of Western Asia, and it is therefore with Egypt that the story of architecture begins.

A few years ago it was thought that no Egyptian work existed of a date prior to that of the *Great Pyramid* (p. 80) of the fourth dynasty, but recently much work of the first three dynasties has been found. The earliest tombs took the form of almost solid masses in rough brick whose walls leaned inwards; and the finest tomb of this type which has been explored is at Meydum, where the first pyramid proper is found.

There is a connection between these rough brick tombs or *mastabas* (p. 194) and the later pyramids; the primitive grave developed into the mastaba. This was transformed into the step-pyramid, which developed naturally into the final or perfect form of the true pyramid. The Great Pyramid is practically a great mastaba.

As early as the beginning of the dynasties, the vault, the dome, and the arch appear in Egypt. An arch in its simplest form is the upper part of a horizontal hollow in a mass of clay or gravel. The vault was thought of as a continuous convex shell, although

it was produced by the addition of cakes of mud of equal size. It was this uniform vault which later under the Romans became the basis of the magnificent concrete construction of that people. The wedge arch might quite naturally have had a separate origin. Children have often been observed to make experiments in bridging empty spaces, and similar experiments might well have accounted for the origin of the true arch of masonry which is not found in Egypt except as a later development after the brick arch had existed for some 2000 years.

Arches frequently appear on the Assyrian slabs. The art of the valley of the Tigris, as early as the eighth and ninth centuries B.C., displays many similarities to Greek art; and in later days strong and constant Greek influence may be seen in the art of Western Asia. Though in Egypt, Babylon, and Crete there were three different centres of early civilization representing three different continents, architecture is usually considered to a large extent an Egyptian art.

The first appearance of European art is shown to have been in the islands of the Aegean with its centre at Crete, and discoveries show clearly that there was at that time communication between this civilization and that of Egypt. Remarkable finds have been made recently in Crete pointing to a very highly developed culture; and round tombs with beehive domes found here closely resemble the *chambers* (p. 80) in some Egyptian pyramids. The chambered mounds of Brittany probably belong to the period of these pyramids; and possibly Stonehenge, which is not savage but built of wrought stone, has something of the same style in it.

No direct connection has been found between early Aegean art and Greek art, but it seems that it was for Greece to undertake the task of collecting and perfecting the gifts of Egypt. The most remarkable feature of Greek art is the rapidity of its rise to its zenith, and of its subsequent decline.

Greek architecture has two modes, the *Doric* (Frontispiece) and the *Ionic* (Frontispiece), names which correspond to those of 'native' and 'colonial,' or 'old' and 'new.' The typical *plan of a Doric temple* (p. 47) with a cella having a portico is derived from the architecture of the Aegean age. The curious Doric frieze with

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its *triglyphs* (p. 93) follows an old type of slab construction, and the cornice is an eaves-course of projecting rafter ends copied in stone. The older Parthenon at Athens was a fine example of seventh century Doric architecture. The Ionic style was more slender and graceful than the vigorous and masculine Doric. Its chief characteristic was a capital which was cut not from a square block but from a block which was longer one way than the other, the ends being curved into a spiral. The Ionic cornice with its *dentils* (p. 48) is simply a rendering in stone of the overhanging part of a flat roof.

The most famous example of Greek art at its highest development is the Parthenon, which was completed about 435 B.C. The Ionic order was probably adopted about the middle of the sixth century B.C. From a highly enriched form of the Ionic was evolved the luxurious *Corinthian order* (p. 171), an interesting example of which is the monument of Lysicrates at Athens.

To the Greeks we owe the most perfect type of tomb, also of theatres, and of stoaes or covered colonnades; and to descend to detail it is to their invention or improvement that we owe the modern mosaic floor, panelled doors, the *spiral stairway* (p. 174), and the turned legs of furniture. Nor, of course, are the gifts of Greece to the world confined to the list just given: for through Rome and Roman civilization Greece handed on some of its influence to the whole of Europe.

The debt of Rome to Greece, in this as in all the other arts, needs no proof; she received her gifts especially through the medium of Sicily where magnificent schools of architecture existed from an early period. When Rome had acquired all she desired of Greek art she soon outstripped all competitors, and in the first and second centuries A.D. she became the mistress of the world and the centre of its culture. Engineering, particularly military engineering, is the prominent feature in her architecture, and as such it is peculiarly rich in hints to modern builders, who may gather from her work methods of vaulting in concrete, and of building with pots and pipes, and even 'tricks of the trade' such as the use of crushed brick in mortar. The most typical Roman work was in concrete, and all the greatest buildings of Rome were faced with plaster.

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Ecclesiastical buildings form the most interesting branch of Roman architecture. The early church consisted of a fore-court, a nave with pillars, and an apse. This plan is called 'basilican'; a Roman basilica, or justice-hall, had very nearly this form, and the word 'basilica' seems to have had a general meaning much as our word 'hall.' However, the basilica was afterwards enclosed like a temple and adapted to various uses. A temple of rectangular plan found in Samothrace, an island of the Aegean, has been called by some writers the real prototype of the Christian basilica.

After the Peace of the Church in the fourth century Christian edifices were built all over the Empire. The Church of the Holy Nativity at Bethlehem is the most perfect early Christian church still existing. The remains of a small basilican church of this time have been recently unearthed at Silchester, near Reading.

Early Christian art leads to Byzantine art. Byzantium, or Constantinople, was from 330 A.D. the capital of the Eastern Empire, and in the sixth century was the centre of the arts; its greatest work is the church of Santa Sophia built by Justinian about 537 A.D. In recent times a large number of carved capitals has been discovered in Egypt, and these are so much like those found in Santa Sophia that it is only reasonable to assume some connection between them. It is quite probable that the school of carving which developed the Byzantine capitals was transferred to Constantinople from Egypt by Justinian. Several new architectural ideas were due to Byzantine builders. They gathered into groups windows with arched heads, they set moulded courses on walls, and they introduced the use of *corbel tables* (p. 66). The early Christian and Byzantine schools made the column carry the arch, and made the capital a bearing block of supreme beauty.

The change between antiquity and mediaevalism is seen at the age of Romanesque art,—the change from Roman art to Gothic art,—the turning-point in which seems to have coincided with the establishment of the power of Charlemagne in the ninth century.

In the fifth century the Gothic art spread from east of the Rhine over the whole Western Empire. In England, at the end of the sixth century, civilization came with the Church, and it is in this age, in which Santa Sophia was built, that we place the

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famous legends of King Arthur and his knights. In Gaul the arts were probably practised much as in Italy, and about 600 A.D. a school was founded in England. A school of building which rapidly developed in the eleventh century was that in Normandy. The Tower of London is a fine example of its work. Features of Norman architecture worthy of note are the banding and *chequering* (p. 56) of two different coloured stones, and the introduction of the type of plan in which chapels surround the apse.

Christian churches were once more built in this country after the beginning of the seventh century. St Wilfrid built one at Hexham, King Alfred one at Athelney, and an abbey church at Abingdon was founded in 675. Up to about 900 Saxon architecture would seem to have been mainly derived from early Christian and Byzantine examples. It seems probable that a special Eastern influence may have been introduced by some early monk, as patterns exhibiting the *braided decoration* (p. 103) known all over Europe in the eighth and ninth centuries in book ornamentation, and in stone carving, appear in Saxon England at an early date. The *half-quatrefoil* (p. 107) and *trefoil* (p. 102) arches also, which are probably Eastern in origin, appear in Saxon works—the trefoil, for example, is found on the side door of Ely Cathedral.

With the rebuilding by Edward the Confessor in 1050–66 of Westminster Abbey the Norman form of Romanesque appears in England, and the English-Norman art took a leading part in the progress of architecture to the Gothic. More churches were built in England between 1050 and 1150 than in any other country. The early part of the twelfth century was a time of great architectural activity, and several of the schools at this time seem to have attempted to attain to the leadership. With the settlement however of the centre of mediaeval thought and art at Paris, the race was decided in her favour, and with this period begins the most interesting epoch in the history of architecture, namely that of the Gothic style.

It is not easy to explain in words what perfect Gothic art is. It is frank, clear, energetic, and healthy. Some may perhaps understand it through the metaphor of one writer who regards a cathedral as it were so ‘highly strung’ that if struck it would give out a musical note. In Gothic art the idea of a building

with walls simply pierced for light, and supporting the burden of the roof, gives place to the feeling of a structure continuous throughout and energetic in every part. The wall rose up into tense shafts and piers from which soared forth the ribs of the *vault* (p. 239). The windows became *mullioned* (p. 68) and *traceryed* (p. 109), and the body a cage of stone. The earliest building properly to be called 'Gothic' is the abbey church of St Denis, near Paris, begun in 1140, followed by the cathedrals of Paris and Rheims.

It is from this parent French art that English Gothic was derived. Early English Gothic ends in 1350, the time of the terrible visitation of the Black Death after whose gloom the arts never recovered their former sweetness. At this date Later Gothic begins and two centuries before and after give the beginning and the end of English Gothic, in 1150 and 1550.

A somewhat detailed arrangement of the periods of English Romanesque and Gothic art together with a chronological table is given at the end of this survey.

The ruling feature of English Gothic at its highest is a spirit of sweetness which contrasts with the grandeur of the towering spires of France: its special contributions to the traditions of mediaeval Gothic art were the *octagonal chapter-house* (p. 59), the working out of several fine varieties of *open timber roofs* (p. 81), and the early elaboration of curvilinear tracery.

When the mediaeval culture matured, Italy was the most learned country in Europe. Its artists and scholars were in daily contact with the monuments of the past, and they naturally turned back to the glory of Rome that had been. The Renaissance in Italy therefore was a natural impulse, and the fashion, which had grown up in Europe, of imitating the most forward country compelled other countries to follow the lead of Italy. However, the Roman revival or renaissance has, as a whole, proved quite barren, and has left no offshoot.

Splendid works were wrought even in its dull maturity by Michael Angelo, Wren, and Inigo Jones; but in general the Renaissance style seems a style of boredom. The chief works that had to be built in this country were not temples with columns, but palaces with enclosing walls. In these structures

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the principal features were naturally windows, floors, and staircases, which were precisely the details for which there was least authority.

The Renaissance indeed had in a sense a mission to give a full explanation of the first principles of all arts, and Roman architecture was largely an art based on first principles. It is therefore in modern engineering,—almost entirely an art of first principles,—that we have to look for the most splendid architectural product of the Renaissance.

TABLE A.

Style	Date	
Saxon	1000	} <i>Romanesque</i>
Early Norman	1050	
Mature Norman	1100	
First Gothic	1150	} <i>Gothic</i>
Lancet	1200	
Geometrical	1250	
Curvilinear	1300	
<span style="border: 1px solid black; padding: 2px;">Black Death</span>	1350	} <i>Late</i>
Late Decorated	1350	
Mature Perpendicular	1400	
Rectilinear	1450	
Tudor	1500	
Elizabethan	1550	
Renaissance	1600–1650	

TABLE B.

<b>B.C.</b>					
3000	Egyptian	...	...	...	First Egyptian Dynasty Arch and dome on slabs
2000	...	...	...	...	Third Egyptian Dynasty Great Pyramid
1500	...	...	...	...	Cretan art at highest
1000	...	...	...	...	True arch of masonry
900	Greek	...	...	...	Greek art emerges
550	...	...	...	...	First Ionic building
435	...	...	...	...	Parthenon built
400	...	...	...	...	Greek art blossoms
<b>A.D.</b>					
1	Roman	...	...	...	Greek art decays
200	...	...	...	...	Roman art at highest
300	Early Christian	...	...	...	Churches built in Europe
327	...	...	...	...	Church of Holy Nativity built
537	Byzantine	...	...	...	Santa Sophia built
600	...	...	...	...	School in England
675	...	...	...	...	Churches built at Abingdon, Hexham and Athelney
800	Romanesque	...	...	...	Charlemagne reigns
974	...	...	...	...	Winchester Cathedral begun
1000	...	...	...	...	School in Normandy
1050	...	...	...	...	Westminster Abbey begun
1150	Gothic in England	...	...	...	Plantagenets, 1154
1250	...	...	...	...	Magna Carta, 1215
1350	...	...	...	...	Black Death
1450	...	...	...	...	Fall of Constantinople
1530	Renaissance in England	...	...	...	Tudors
1675	...	...	...	...	St Paul's Cathedral begun



## PART I

## CHAPTER I

## RECTANGLES

Take a piece of paper as in fig. 1 and fold it over as in fig. 2, making a crease  $AB$ . Then fold the paper again so that the point  $A$  exactly covers the point  $B$  and mark the creases  $OC$ ,  $OD$  as in fig. 3.

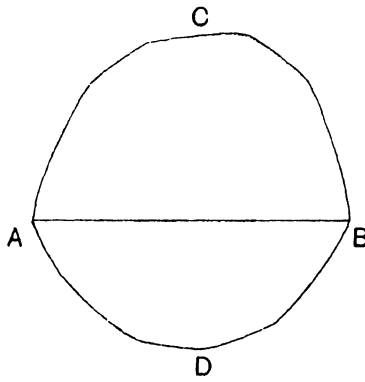


Fig. 1

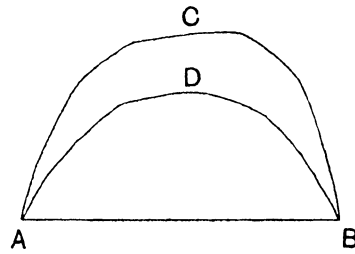


Fig. 2

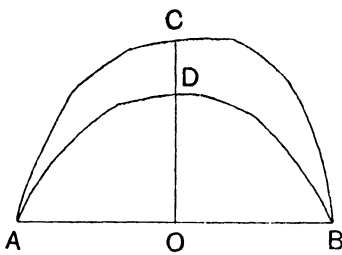


Fig. 3

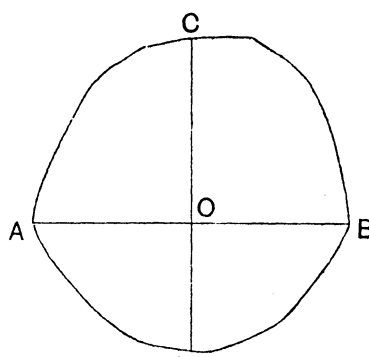


Fig. 4

Cambridge University Press

978-1-107-50558-2 - Model Drawing Geometrical and Perspective with Architectural Examples

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Excerpt

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If the paper be now unfolded, two straight creases will be seen crossing one another at  $O$  as in fig. 4.

What can you say about the angles  $AOC$ ,  $COB$ ,  $BOD$ ,  $DOA$ ? Refer to fig. 3.

If two straight lines  $AB$  and  $CD$  intersect at a point  $O$ , so that the four angles  $AOC$ ,  $COB$ ,  $BOD$ ,  $DOA$  are all equal, each of those angles is called a *right angle*.

How can you draw such an angle?

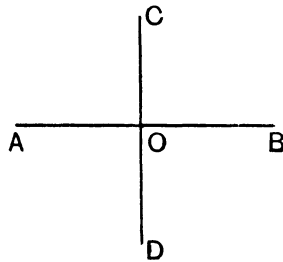


Fig. 5

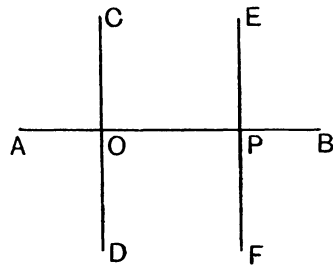


Fig. 6

Draw such a pair of straight lines and at any other point  $P$  in  $AB$  draw another straight line  $EPF$  at right angles to  $AB$ . Then the straight lines  $CD$  and  $EF$ , being drawn in the same direction, are said to be *parallel* to one another.

How do you draw two parallel straight lines?

Examples of parallel straight lines may easily be found, especially in woodwork, of which the plank with its parallel edges forms the basis. In stonework also parallel straight lines occur resembling those of woodwork, of which they must be regarded as imitations, since it is natural to assume that accurate workmanship in wood preceded that in stone.

Now draw two straight lines  $AB$  and  $DC$  parallel to one another, and another pair, viz.  $AD$  and  $BC$ , at right angles to  $AB$  or  $DC$ .

Are  $AD$  and  $BC$  parallel to one another?

The figure  $ABCD$  is called a *rectangle* and  $AC$  and  $BD$  are said to be its *diagonals*. Let  $AC$  and  $BD$  intersect at the point  $O$ .