

# A Cathedral. © Phil Emery

## Part 1. Gothic Architecture and the Basic Arch.

### Introduction

The architectural style of the great cathedrals of Europe built between c. 1200 and c. 1450 is known as Gothic, meaning "barbarous". This term was first used in the 16th and 17th centuries by scholars who saw the Gothic style as inferior to that of classical Greece and Rome, characterised by their mathematically consistent proportions. Gothic-style buildings, by contrast, show no such regularity. There are, for example, no rules which relate the span of an arch to its height, beyond those of aesthetics and physics. This makes the Gothic form an excellent medium for free expression and therefore lots of fun to model inside a computer.

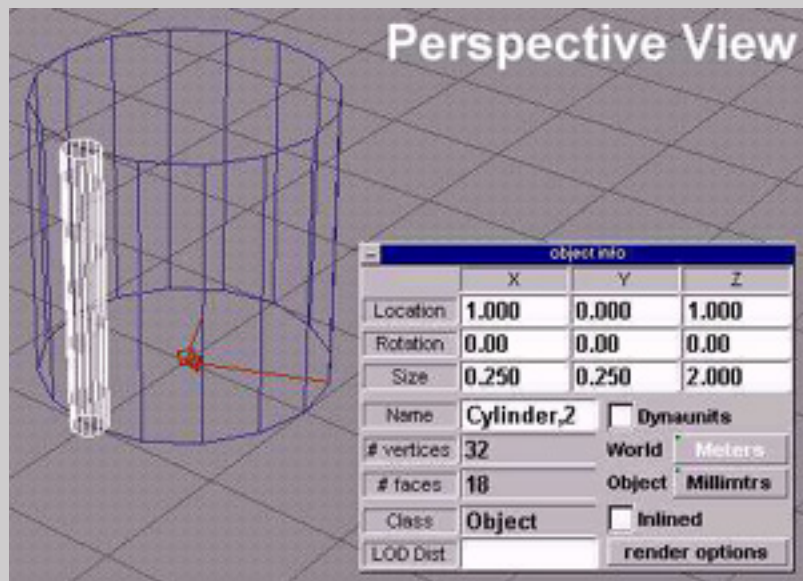
### The Gothic Arch

The Gothic, or pointed, arch is the defining characteristic of Gothic architecture. It is also the basic building block of a cathedral. However, before we can make an arch, we need pillars for it to spring from.

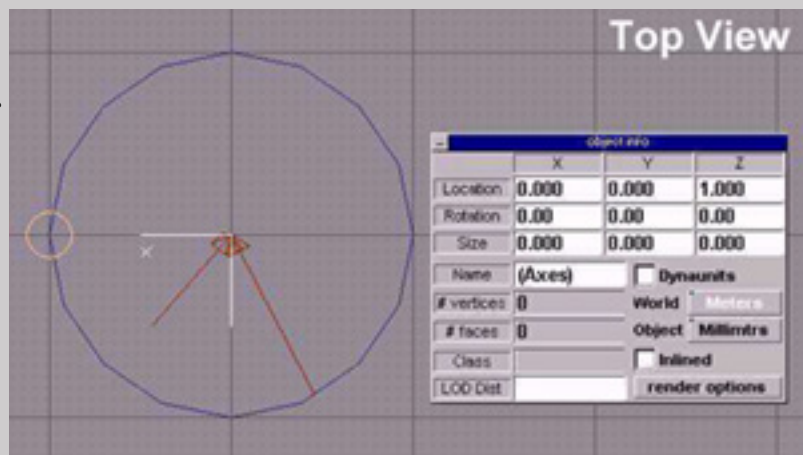
## Create a Pillar

Create two cylinders with 16 sides and a radius of 1.

Scale one of the cylinders so it is 0.25 units in X and Y, and move it to position (1,0,1).

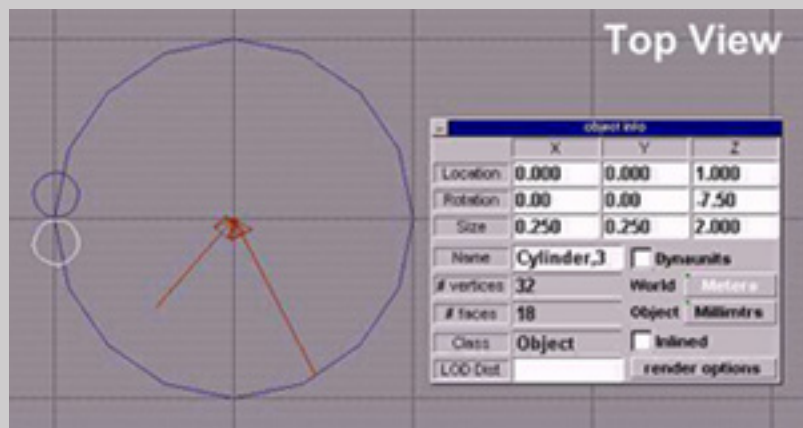


Hit the Axes button and move the axes of the small cylinder to (0,0,1). Then click the Axes button again to return to the small cylinder.

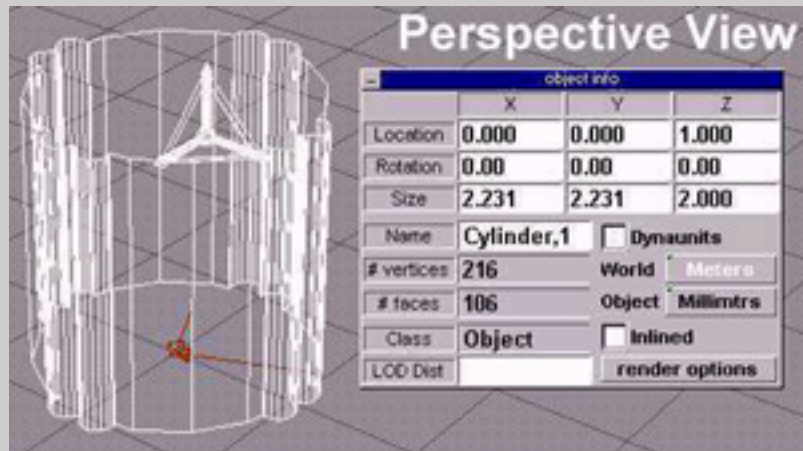


Rotate the small cylinder 7.5 degrees in Z.

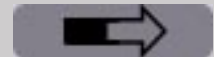
Copy it and rotate the copy to -7.5 degrees in Z.



Group the two small cylinders as siblings, copy them three times, and rotate the copies by 82.5, 172.5 and -97.5 degrees. Save the scene (as a precaution), then boolean union all the small cylinders with the big one. Save this object as gothcol.obj

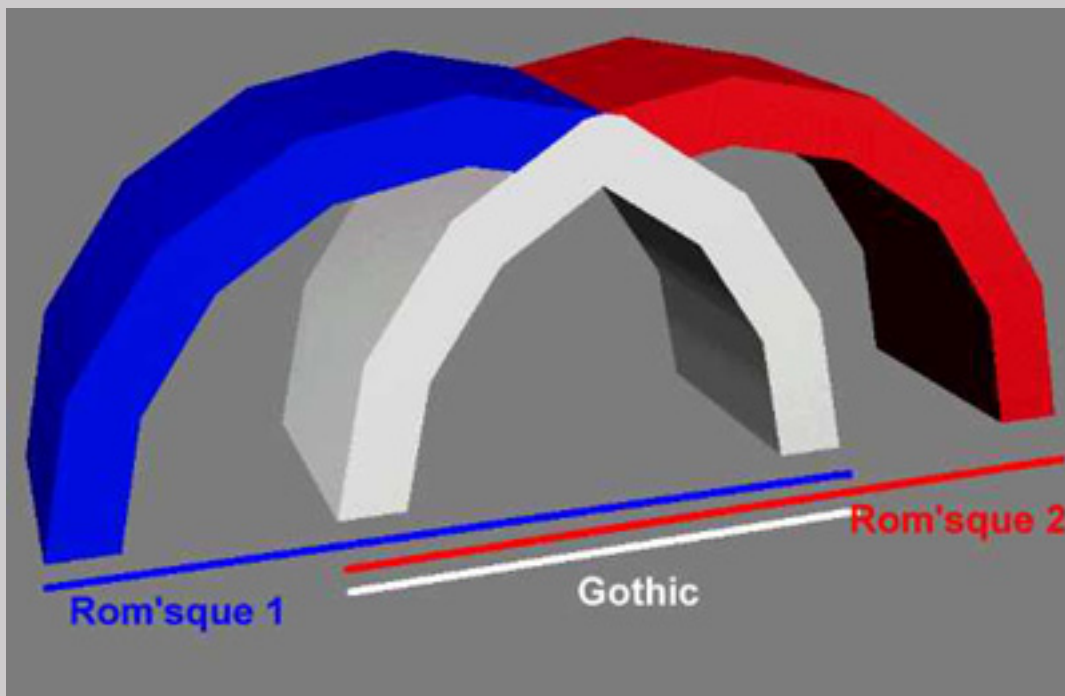


This is a very basic Gothic column. Try experimenting with the position, number, size and grouping of the smaller columns to achieve different effects.



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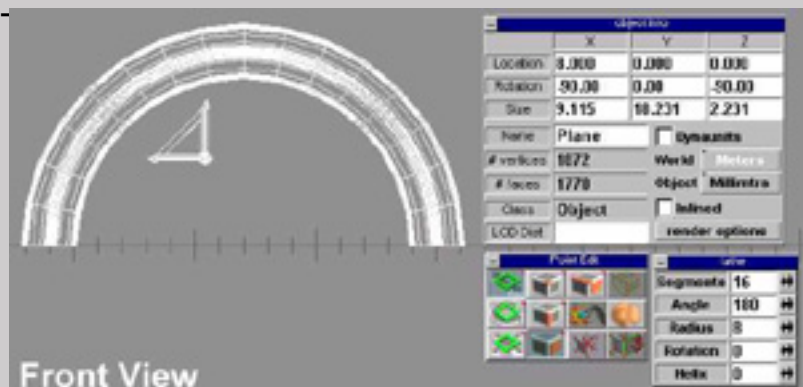
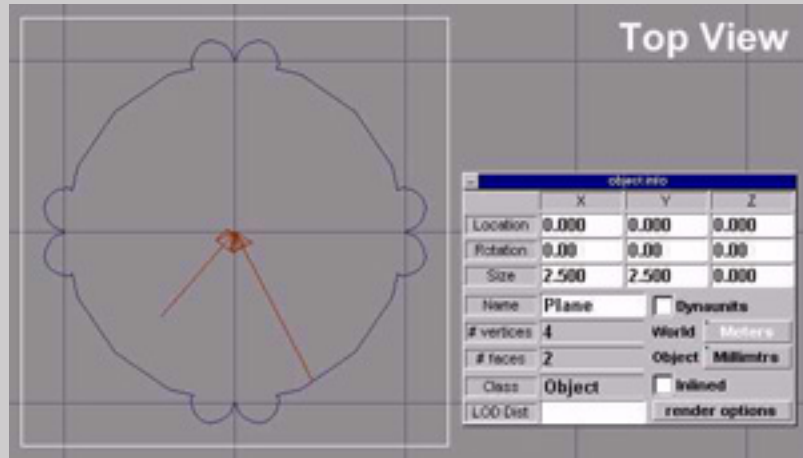
On this page, we finally create a Gothic arch! Everyone knows that you can tell a Gothic arch by the way it is pointed at the top. A rounded arch, also known as Classical or Romanesque, looks quite different. What is less well known is that a Gothic arch is simply a pair of romanesque arches which have been overlapped. Take a look at the following picture (if you don't believe me) and then get on with making your own!



## Create the Arch

Now that we have a pillar, we can make an arch. Start a new scene and load your favourite pillar. Move the pillar so it is at the origin and half above and half below the X,Y plane (eg if your pillar is 1 unit tall, put it at (0,0,0.5)). Create a plane primitive and scale it so it is bigger in X and Y than your pillar. Boolean intersect the plane with the pillar. Save this object as colslice.obj

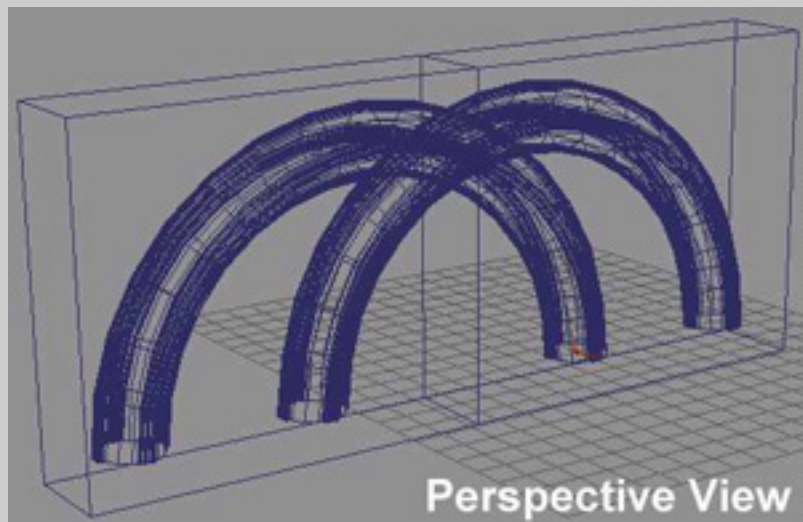
OK, now for the fun bit. Using the Point Edit: Faces tool, select the object you just made. Then right-click on the Lathe tool. In the pop-up box, set the segments to 16, the angle to 180, the radius to 8, and the





rotation and helix to 0. Click twice on the lathe tool. Wow! A Romanesque arch!

Now we get heavily into Booleans. You are strongly advised to save the scene before every Boolean operation, just in case. Copy the arch you just made and move it 6 units to the right (in my example, the original arch is at (8,0,0) and the copy is moved to (2,0,0)). Now create a cube, scale it to (13,3,11) and move it to (-1.5,0,4.5). Copy this cube and move it to (11.5,0,4.5). You should end up with a scene like this one.



Now for the Booleans. Switch to front view, select the left-hand arch and Boolean subtract the left-hand cube from it. Now do the same with the right-hand arch and cube. Now group the arch-halves as siblings. Hey! That's not bad! Just to finish off, load in your gothcol.obj , scale it to a size in Z that looks right, copy it and place it under the arms of your arch.

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