Stadium Case Study

By Chris Myers

The Stadium was produced with the utilization of Maya and consists of 4,536,240 polygons. The stadium's purpose is for a video game format. It was origionally created for the course, 3-D Lighting and Rendering, as a design to be an environment for my vixen character. Its design was influenced by anceint roman architecture like the Roman colloseum. The stadium has both an exterior and interior which is suitable for a game environment.
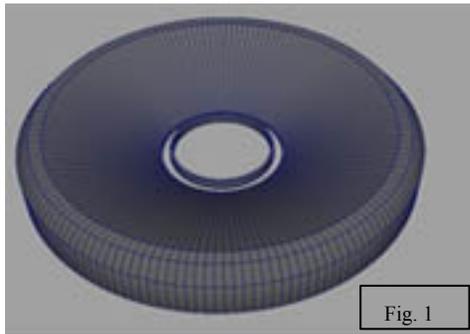

Fig. 1

The first step in crafting The Stadium was to create a cylinder and expand it until the desired size of the stadium's interior ring was reached. To form the basic shape, I used the polygon ring split tool to create a ring of faces on the stadium. (Fig. 1)
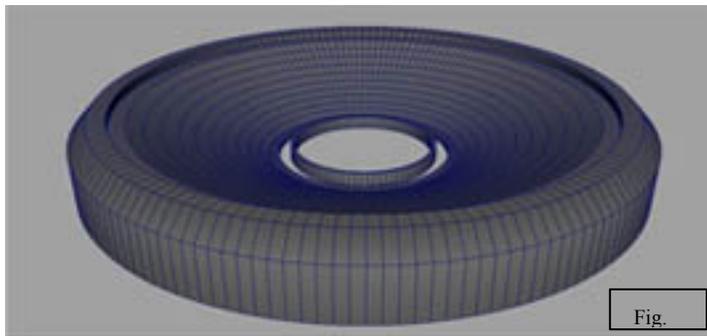

Fig.

I used the poly split ring tool to divide the faces where the stadium seats would be placed. With the utilization of the top view grid, I was able to make all the seats equal size, as well as adjusting the stadium bowl size to ensure that the seats would remain the same size. (Fig. 2)
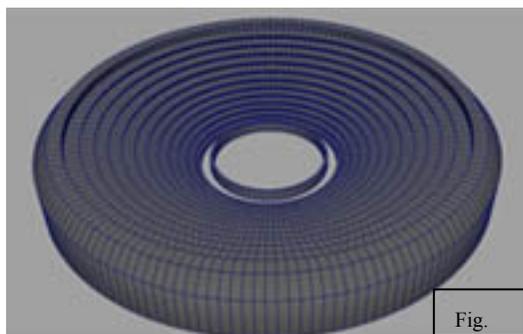

Fig.

I selected the rings with the select poly rings tool. Using the poly extrude tool I dragged the lines downward until they were jagged 90 degree edges. To ensure that the seats were flat required the used of the scale tool. (Fig. 3)

Next I created the second level of stairs using the same above processes and made a division with a walkway between the two levels. (Fig. 4)

Fig. 4
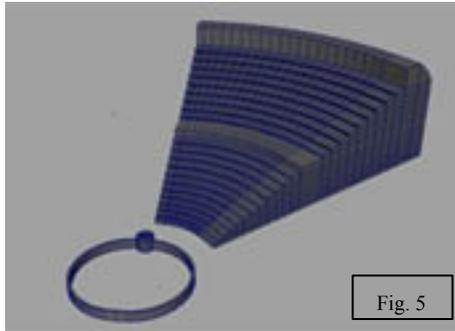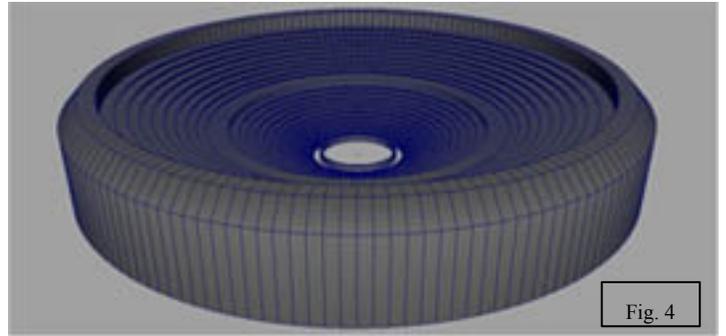
After determining the stadium size and shape, I split it into 1/8th its size and extruded a wall from the border. Then I moved the stadium shell to the side in order to produce a gap that would allow a center entrance point. (Fig. 5)

Fig. 5

Using the extrude tool on the side faces, I created a border wall, as well as the steps on the other side. To avoid a block like appearance of the seats, they were split and given a curve. (Fig. 6)

Fig. 6

Fig.
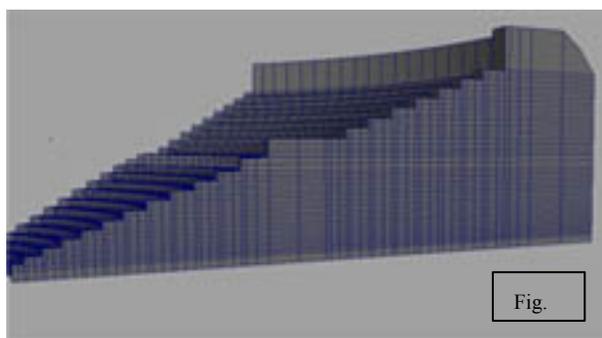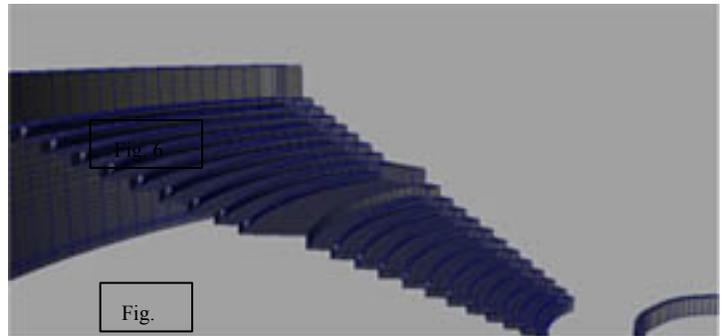
On the stadium wall, I used the insert edge loop tool to divide the faces into quads. (Fig. 7)

Fig.

I extruded out an archway from a cube polygon and

duplicated it until they were all directly against the stadium wall. Because the stadium faces were square and the archway was a round shape, I could not simply extrude out the desired shape. (Fig. 8)

Fig. 8
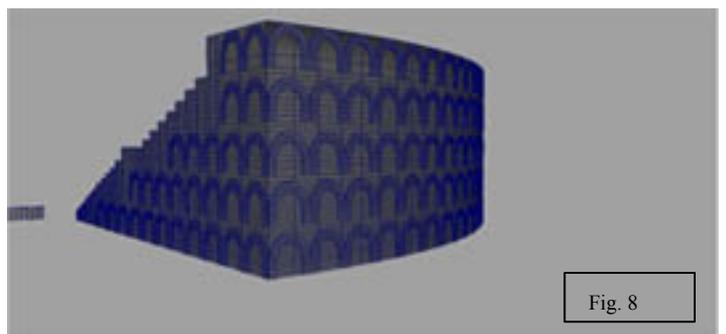
Merging the arc polygons with the stadium mesh enabled me to remove the faces in the interior of the arcs to cut away a hole. I then used the extrude tool around the borders of the arches to give it depth. (Fig. 9)
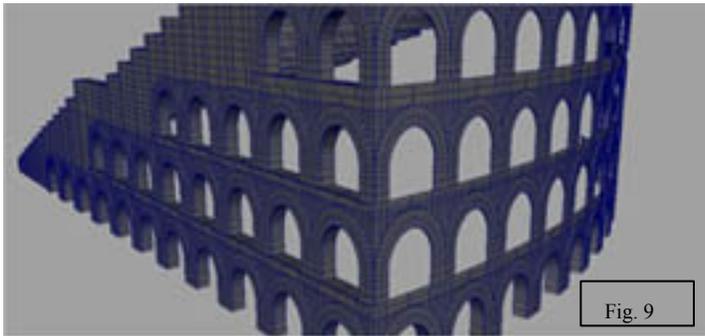

Fig. 9

Beginning the interior, I created the ceiling and archway that would connect to the stadium arcs. Creating one and then duplicating it enabled me to make each of the floors identical. (Fig. 10)


Fig. 10
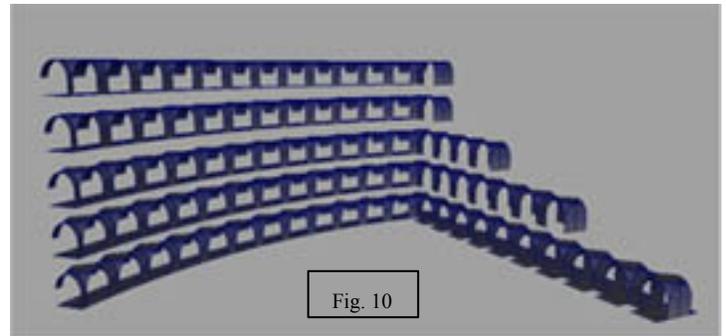
I duplicated the exterior arches and inverted the direction they were facing. Then I created another hallway even further inside of the stadium using the extrude tool. (Fig. 11)


Fig.
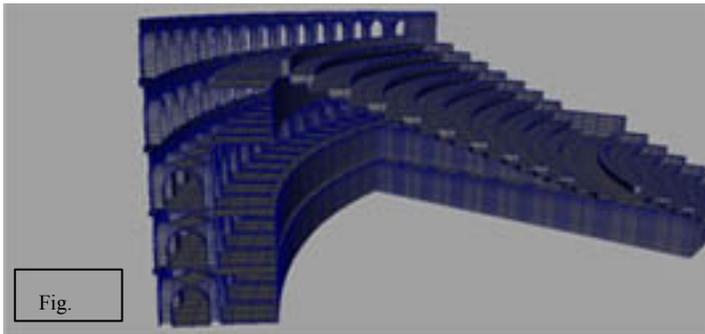
I created stairs inside of the second hallway from another polygon cube and then connected it with the stadium. I was able to create identical stairs by duplication. Then

I proceeded to position them around the stadium. At this time, I also created a rail at the top of the stadium. (Fig. 12)


Fig. 12
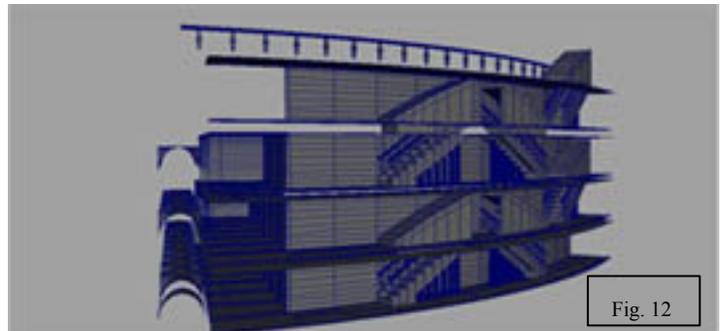
By duplicating the interior archways, I was able to create archways at the top of the stadium. The stairs reach the upper floor where a ramp acts as a ceiling. (Fig. 13)

Fig. 13
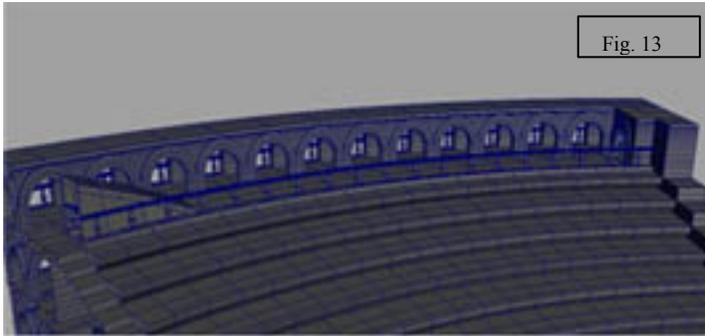
Except for the first floor, I fashioned a railing around the archways on every floor by using the extrude tool. The railing was not placed on the first floor because an entrance for individuals was needed. (Fig. 14)

Fig. 14
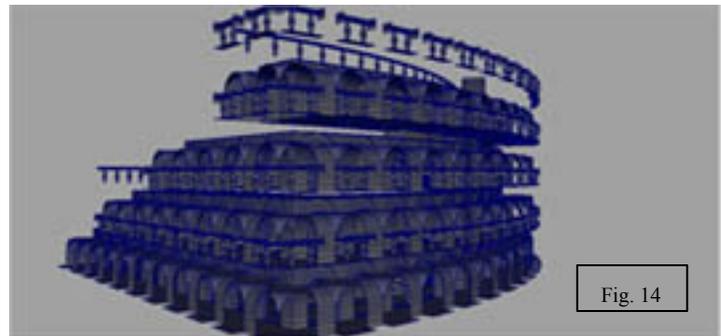
Using a new cube polygon, I created the faces for a door hinge. Cylinders were created to be the bolts placed into the hinges. A boolean is used to cut out the face so the bolts can fit in. (Fig. 15)

Fig. 15
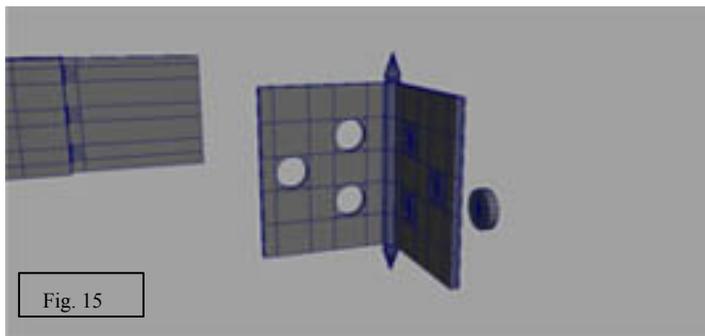
On the second hallway I used the poly split tool to allow me to extrude the faces for the doors. Pillars were created and duplicated. I then placed the duplicates along the wall. (Fig. 16)

Fig. 16
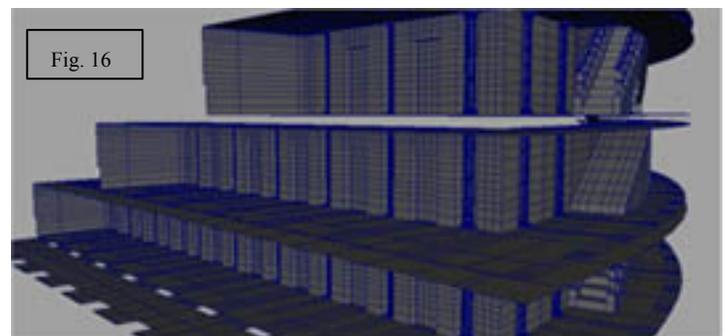
Duplicating the door hinges, I attached them to the doors and the door frames. I then extruded out handles and duplicated the doors. (Fig. 17)

Fig. 17
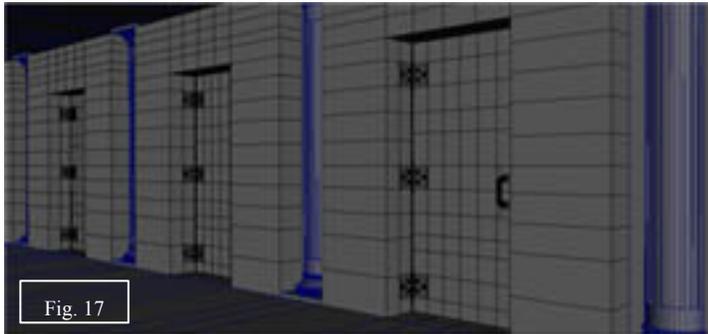
I created interior rooms behind the doors by using the extrude tool. I then duplicated the rooms and connected them to each of the door frames. (Fig. 18)

Inside the rooms are chains connecting the walls and seating slabs. The chains were duplicated and grouped together. Then each duplicate was placed in each room. (Fig. 19)
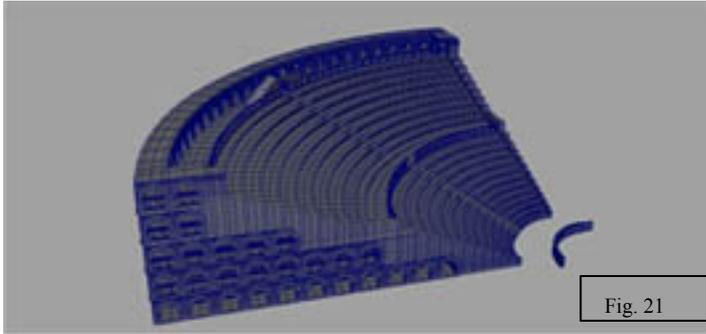

Fig. 18

Fig. 19
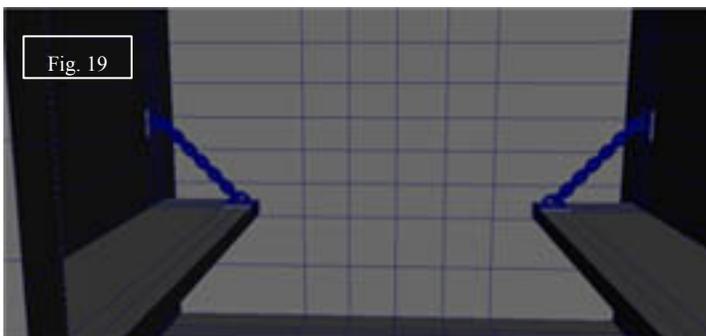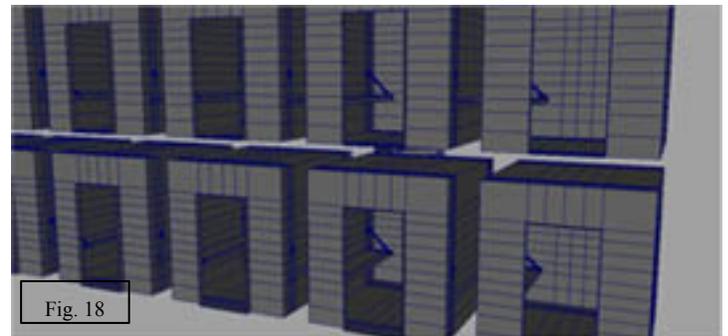
Once the Stadium was complete, I grouped all the meshes together for duplication. (Fig. 20)

and merged the two together. Then to make it one mesh I used the poly merge tool to merge the verticles. (Fig. 21)

After duplication, I mirrored the duplicate

Fig. 20

Fig. 21
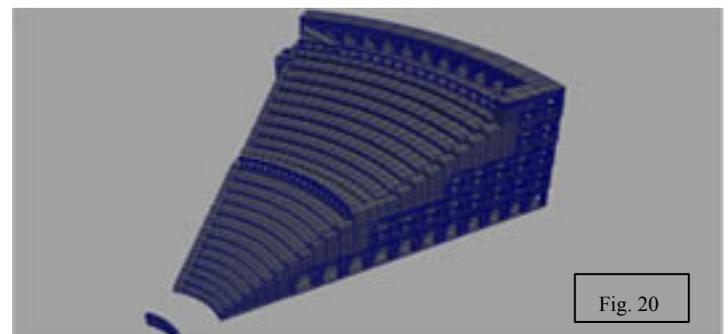
This is the sketch of the stadium. It was later revised and then drawn over in Photoshop for a cleaner look. (Fig. 22)

achieve because of its sheer size. Renders would take far too long and often caused Maya to crash. However, I achieved this by applying a toon shader to the mesh. Though, rendering still took four hours per frame. (Fig. 23)
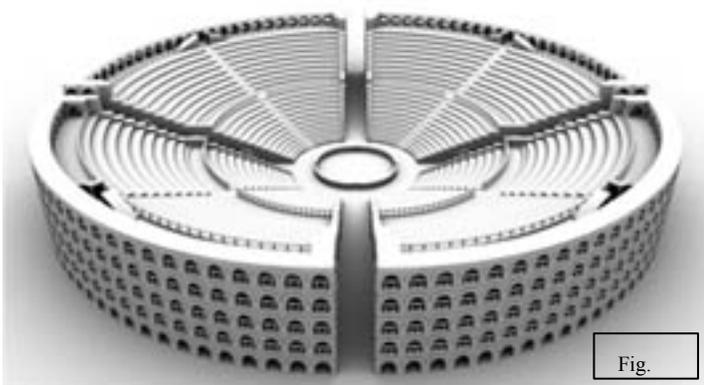
The stadium wireframe was difficult to

Fig.
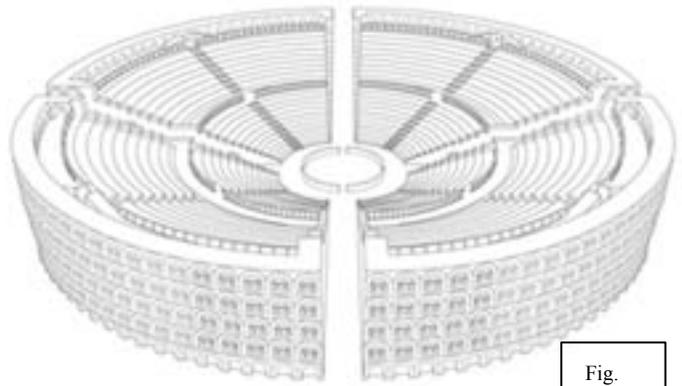
The occlusion pass was achieved by using a

Fig.
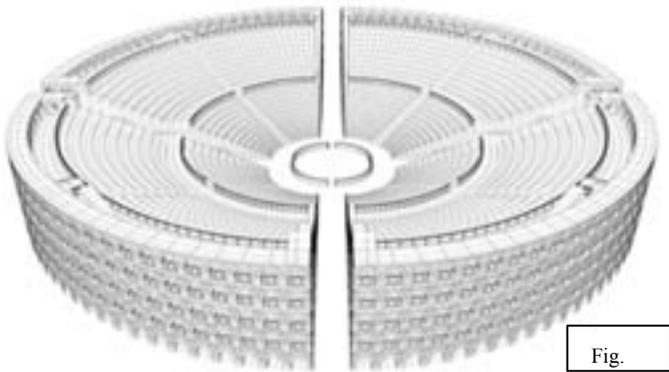
mental ray shader and attaching it to the stadium blinn. Underneath is a flat plane to ground it. However once again, the stadium's size caused a tremendous amount of render time. (Fig. 24)
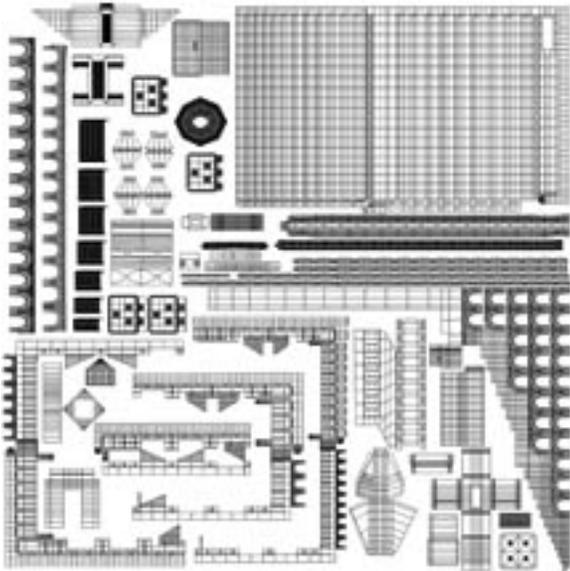

Fig.

Fig. 25

To UV map the stadium, I flattened the
surfaces of the shapes used in the stadium.
I only needed one copy of each shape;
that way each shape has identical meshes,
and have one map cover a large number
of meshes. (Fig. 25)

For the

Fig. 26

final render of the Stadium, I added a d
sand texture for the ground. I used a three
point lighting system and rendered with
Mental Ray. However, due to the enormous
size of the Stadium, the rendering process
could only be achieved by using the more
powerful computers. (Fig. 27)

For the purpose of UV texturing, I used a
grid to pattern the floors and brick and
mapped the floors and ceilings at a 90
degree angle. Using the brush tool and
eye dropper tool I sampled different
colors and brushed over the texture to
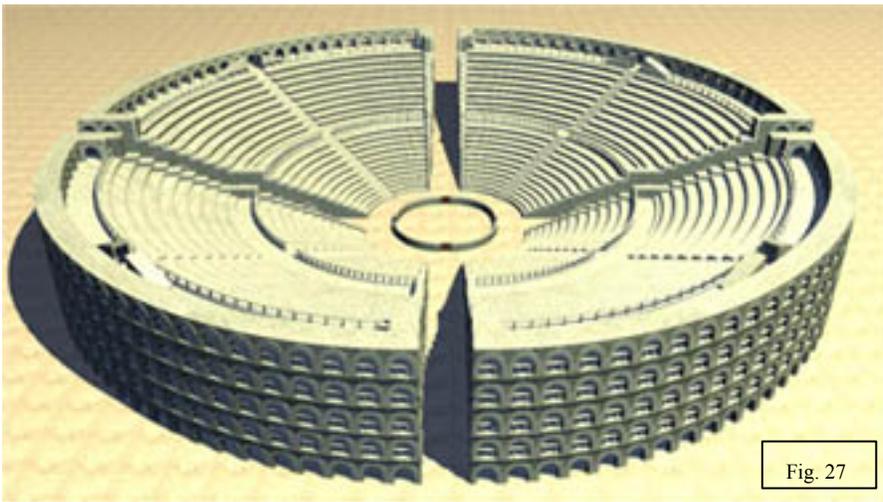give it a 'worn' look. (Fig. 26)

Fig. 27