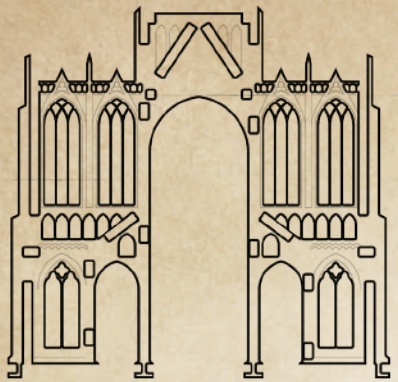
Notes and Instructions for a

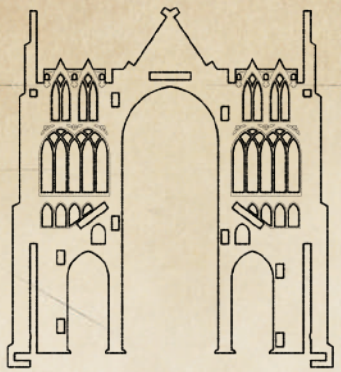
MODEL OF A GOTHIC CATHEDRAL

by Joseph Fatula

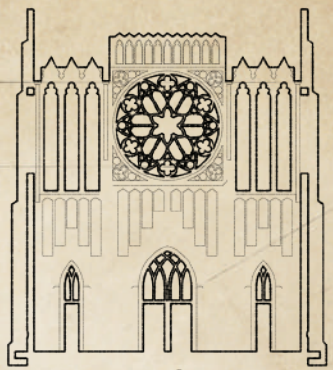
LUMENARIS



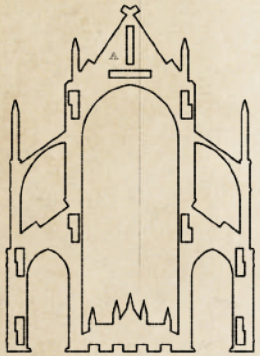
2x transept wall



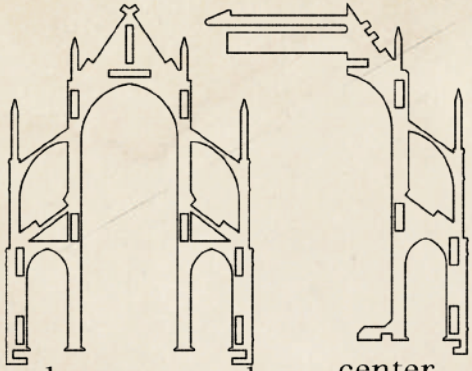
west wall



west facade

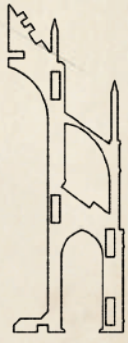


altar panel

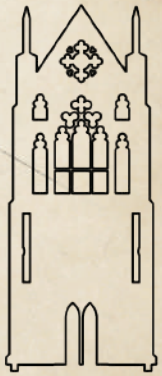


7x buttress panel

center buttress

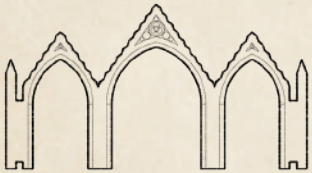


2x diagonal buttress

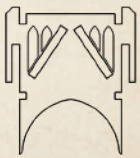


2x transcept panel

wet spires



west porch

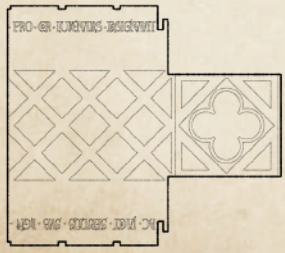


2x crossing wall

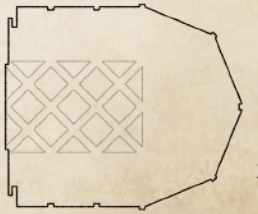
crossing brace

2x transept porch

nave west floor

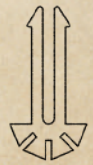


nave east floor

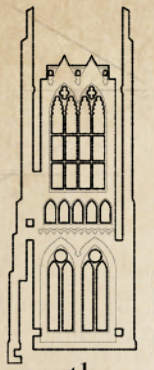


chancel floor

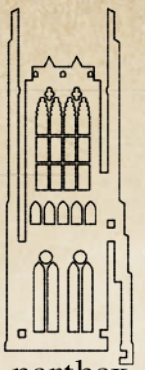
2x transept floor



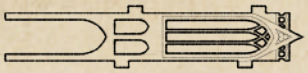
apse joiner



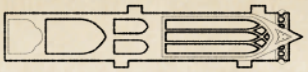
narthex south wall



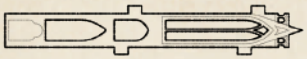
narthex north wall



12x clerestory panel



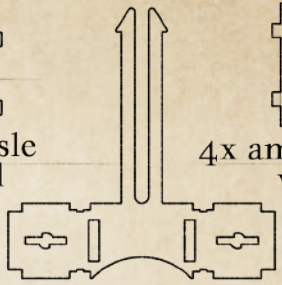
6x choir panel



4x apse panel

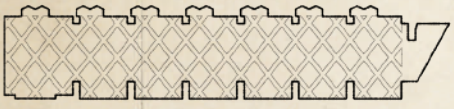
18x aisle wall

4x ambulatory wall

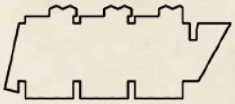


narthex brace

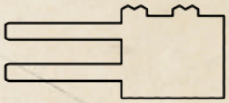
retrochoir joiner



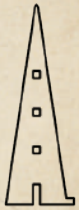
nave roof 1



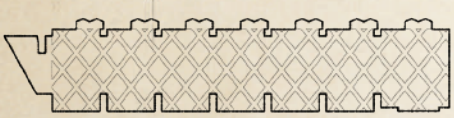
choir roof 1



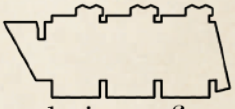
2x transept roof 1



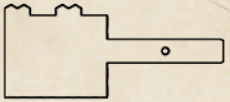
4x spire roof



nave roof 2

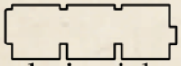


choir roof 2



2x transept roof 2

2x nave aisle roof



choir aisle roof 1

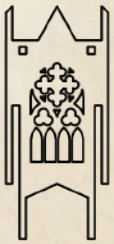
choir aisle roof 2

3x apse roof

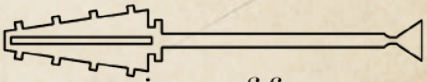
8x tower roof

4x ambulatory roof

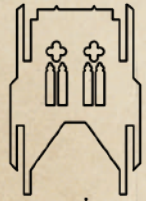
2x spire 3



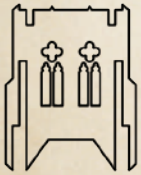
2x spire 4



spire roof frame 1



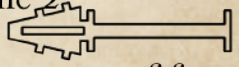
2x spire 1



2x spire 2

spire roof frame 2

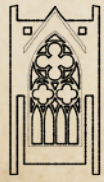
spire brace



2x tower roof frame 1

tower facade

2x tower back



4x tower side

2x tower roof frame 2

2x tower brace


SPIRE
ROOF
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TOWER
ROOVES
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CHANCEL
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CROSSING
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NAVE
page 6
NARTHEX
page 3

1 NARTHEX

At the western end of the cathedral is the *narthex*, where worshippers enter for services and where baptisms are performed.

Parts needed:

west wall	west facade	2× tower backs
narthex brace	west spires	4× tower sides
narthex south wall	west porch	2× tower braces
narthex north wall	tower facade	

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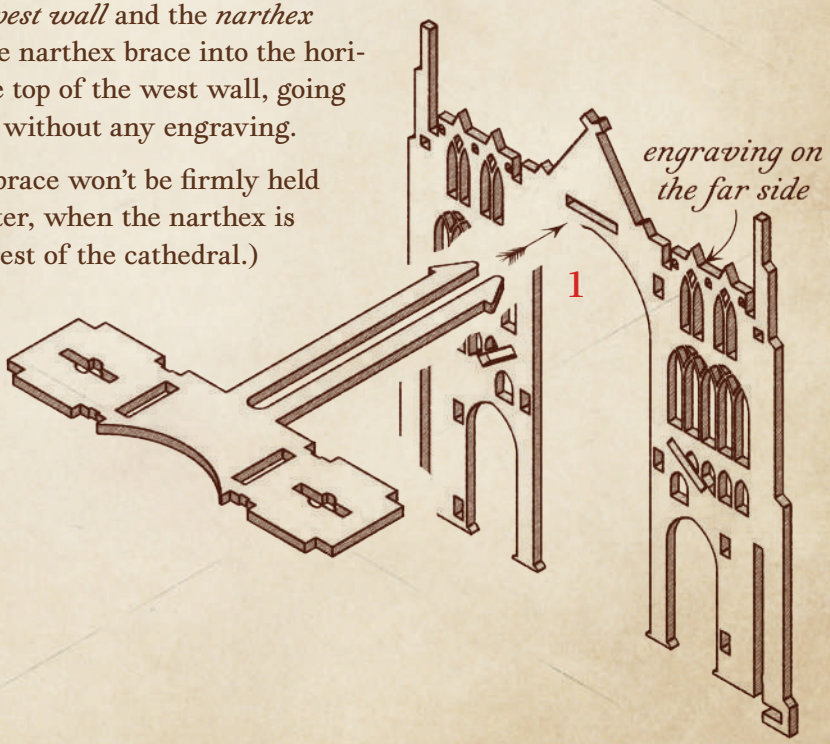
1 Start with the *west wall* and the *narthex brace*. Insert the narthex brace into the horizontal slot at the top of the west wall, going in from the side without any engraving.

(The narthex brace won't be firmly held in place until later, when the narthex is attached to the rest of the cathedral.)

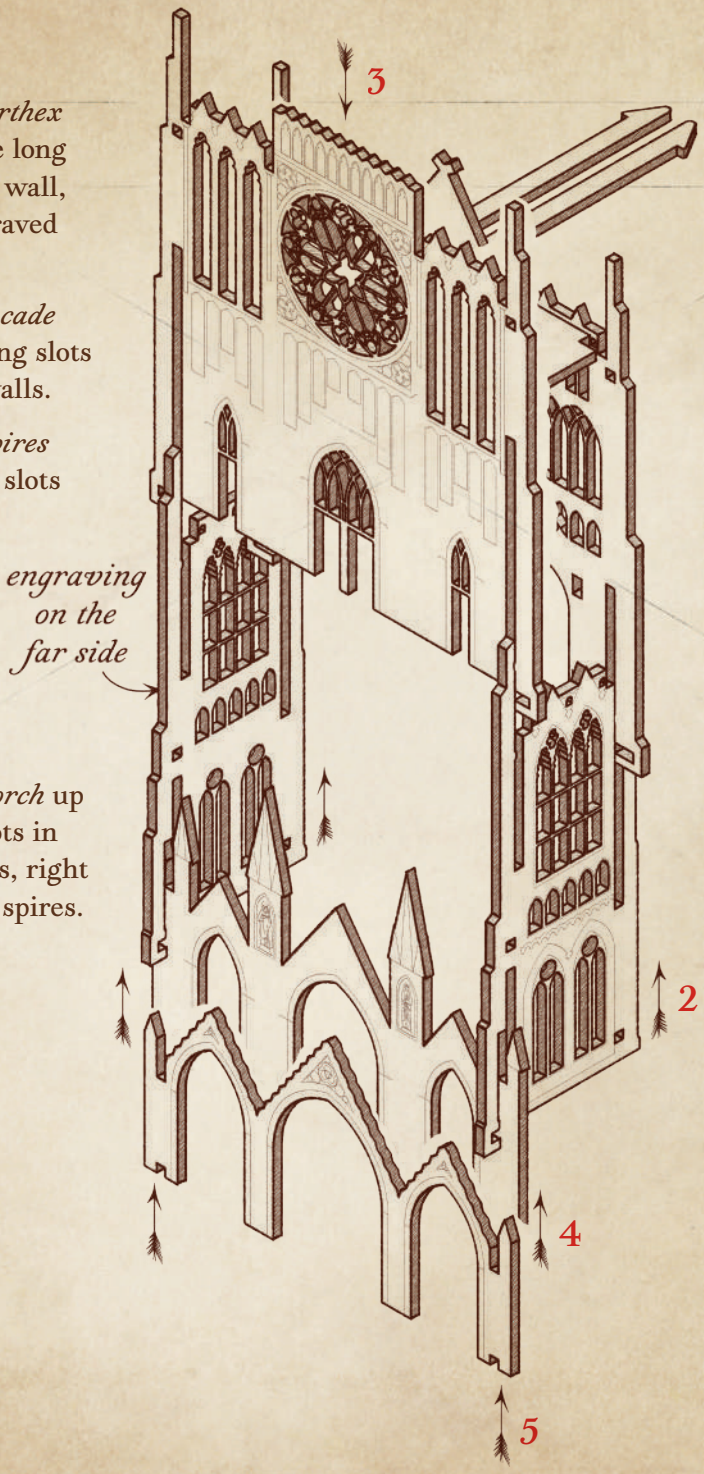


2 Slide the two *narthex walls* up into the long slots in the west wall, keeping the engraved sides facing out.

3 Slide the *west facade* down into the long slots in the narthex walls.

4 Slide the *west spires* up into the wide slots in the narthex walls. The west spires go in the part of the slot against the west facade.

5 Slide the *west porch* up into the short slots in the narthex walls, right against the west spires.



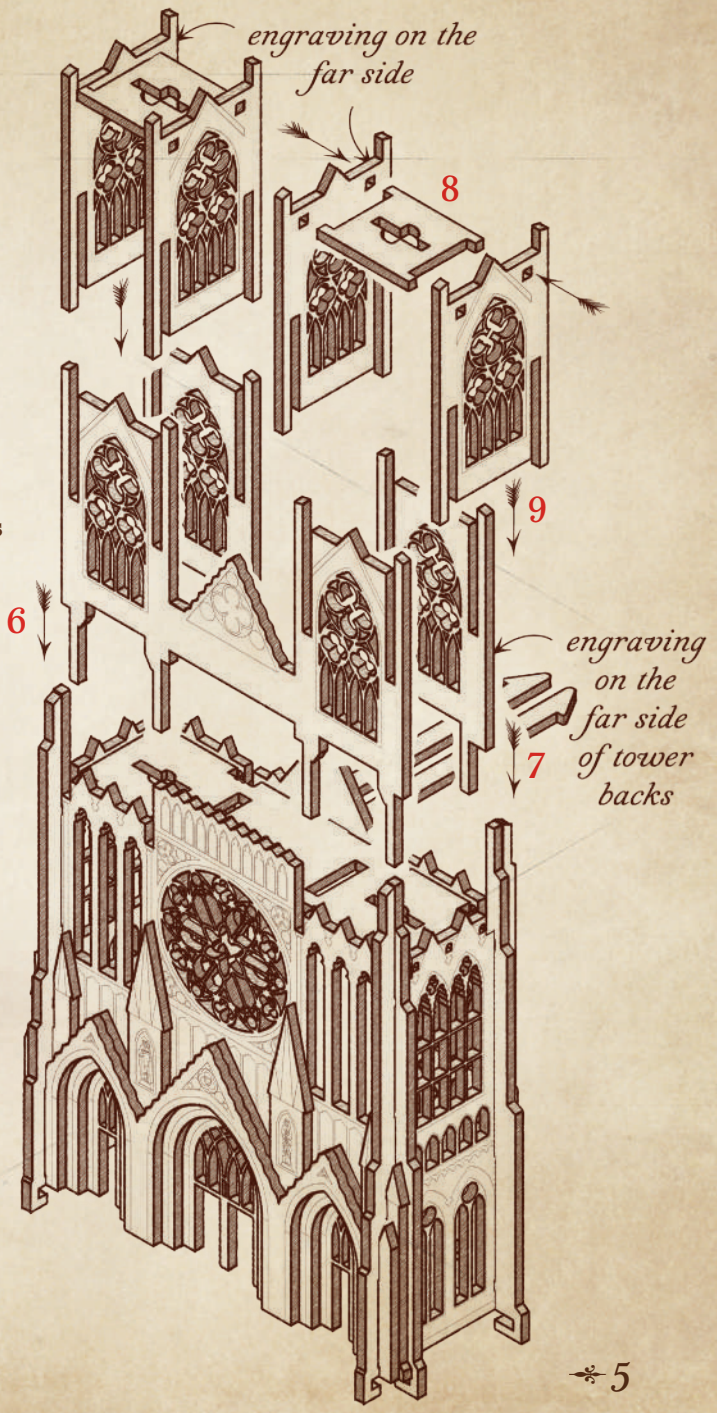
6 Slide the *tower facade* down into the short slots in the top of the narthex walls, just to the inside of the west facade.

7 Slide the two *tower backs* down into the other short slots in the top of the narthex walls, just to the inside of the west wall.

8 Take two *tower sides* and a *tower brace*. Insert the tabs of the tower brace into the holes in the tower sides, keeping the engraved sides facing out.

9 Slide the tower sides (with the brace between them) down into the slots in the tower facade and one of the tower backs.

Do the same with the other two tower sides and the other tower brace.



II NAVE

THE LONG CENTRAL portion of the cathedral is the *nave*, a space large enough for thousands of people to gather at once.

Parts needed:
nave west floor
nave east floor
5× buttress panels
10× clerestory panels
10× aisle walls
2× nave aisle rooves
nave roof 1
nave roof 2

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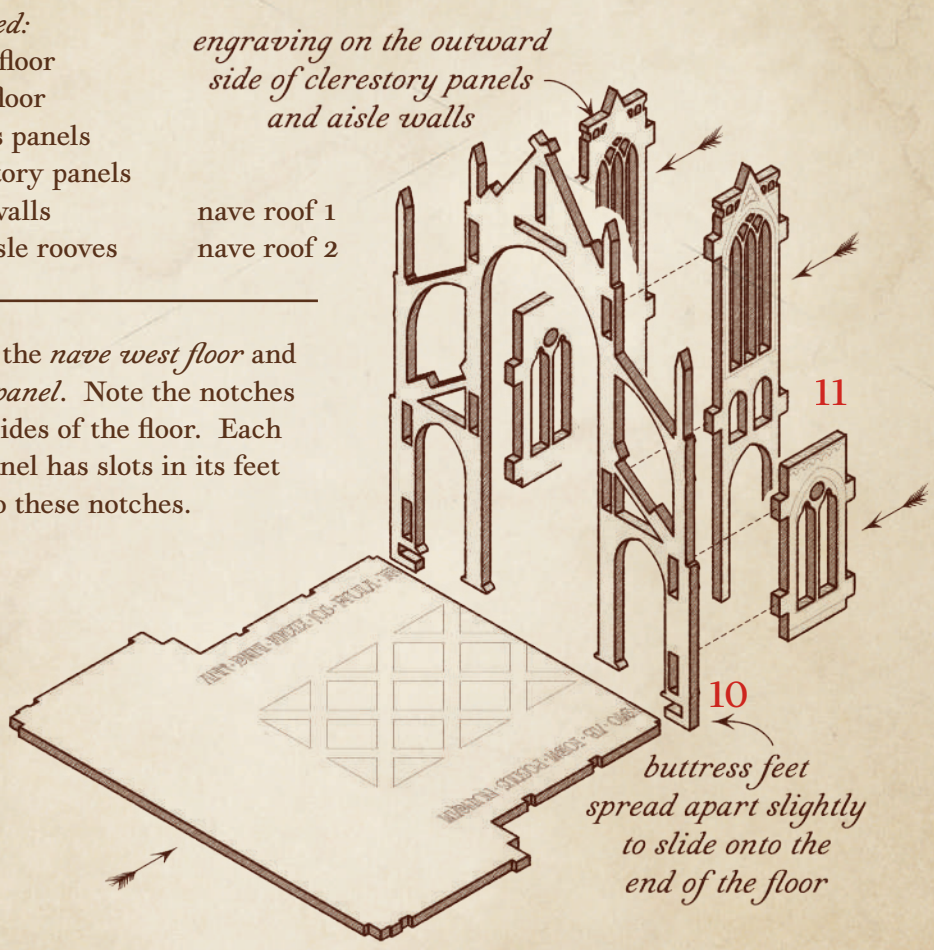
10 Start with the *nave west floor* and a *buttress panel*. Note the notches along the sides of the floor. Each buttress panel has slots in its feet that fit into these notches.



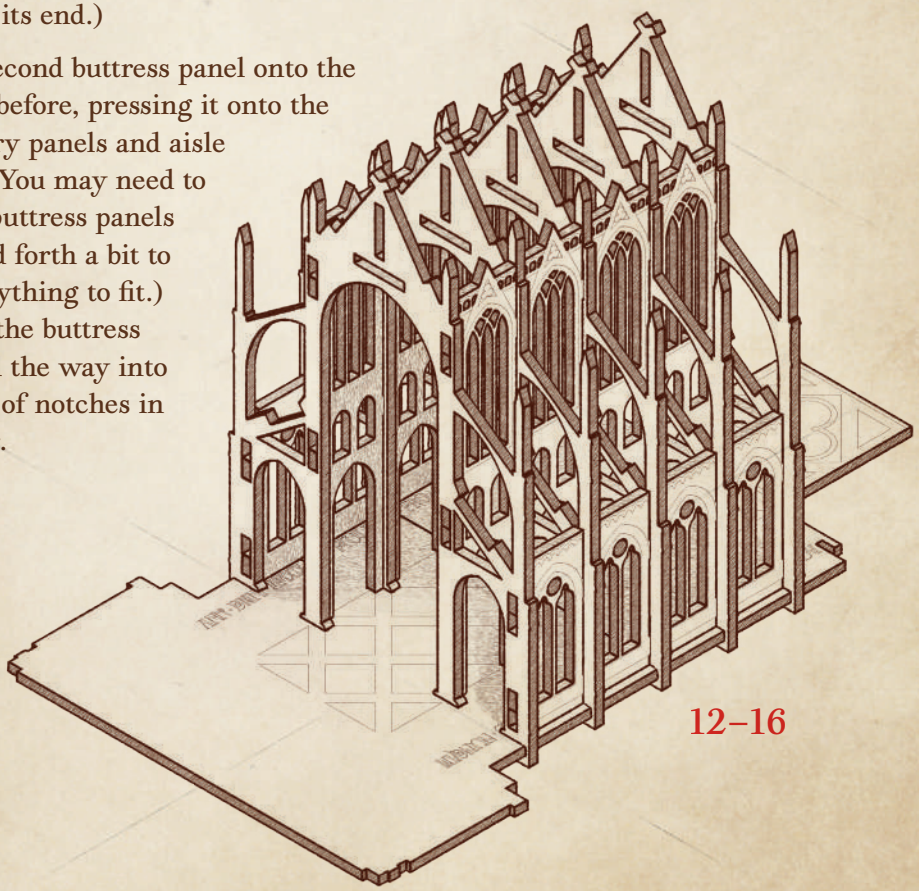
Insert the narrow end of the floor into the feet of the buttress panel, then work the buttress panel all the way to the farthest pair of notches in the floor.

11 Insert two *clerestory panels* and two *aisle walls* into the buttress panel, on the side towards the narrow end of the floor. Keep the engraved sides facing out.

Note that the clerestory panels used here have two thin feet at the bottom, unlike the choir panels that are solid across their base.

(If these parts keep falling out of the buttress panel, lay the buttress panel face down at the edge of a table to assemble the nave on its end.)

12 Add a second buttress panel onto the floor as before, pressing it onto the clerestory panels and aisle walls. (You may need to tilt the buttress panels back and forth a bit to get everything to fit.) Wiggle the buttress panel all the way into the pair of notches in the floor.



12–16

13 Add another set of clerestory panels and aisle walls as before, pressing them into the buttress panel you just added.

14 Add a third buttress panel, pressing it onto the other parts. (The feet on this buttress panel will only go partway onto the west floor.)

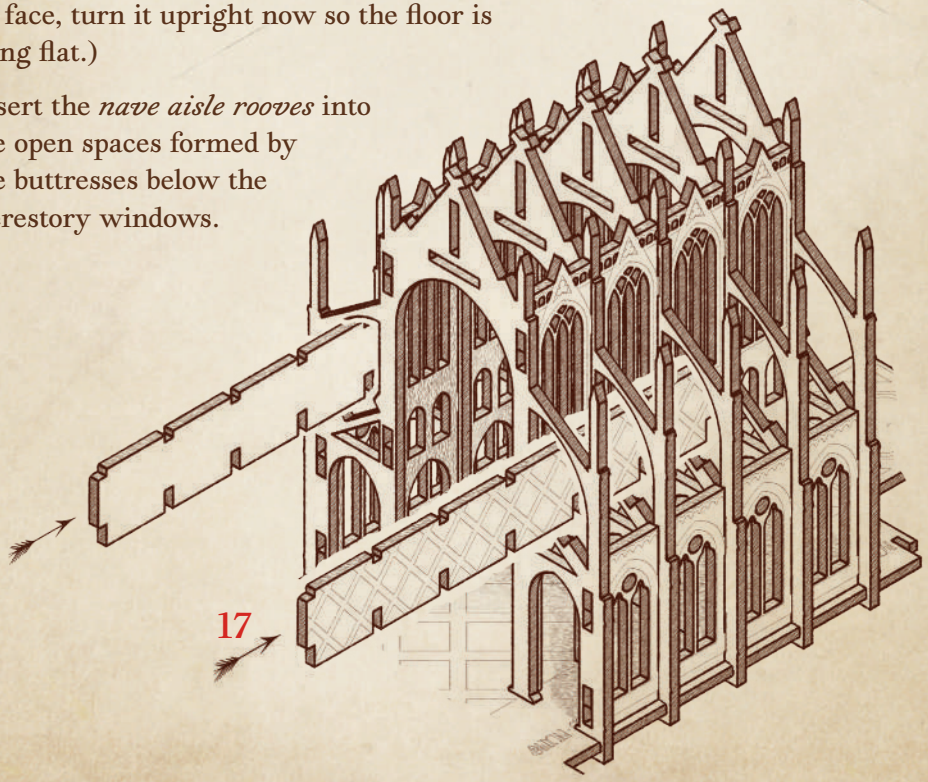
15 Take the *nave east floor* and add two buttress panels to it with clerestory panels and aisle walls between them.

16 Join the nave east floor to the nave west floor, bringing together the matching ends of the two floors. As you do so, add a set of clerestory panels and aisle walls between the buttresses of the two floor pieces.

At this point the nave should have five buttress panels, with all the spaces between them filled with clerestory panels and aisle walls.

(If you assembled the nave by laying it down on its face, turn it upright now so the floor is lying flat.)

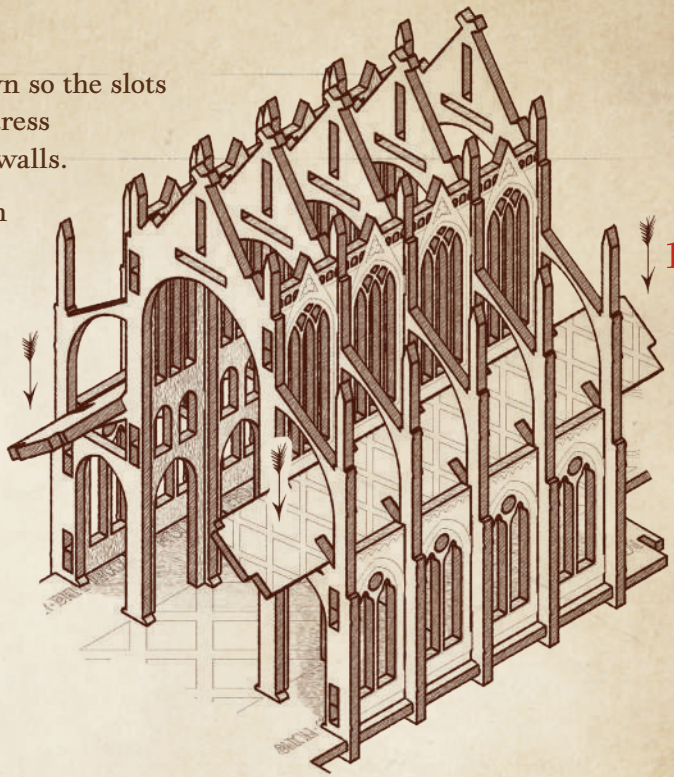
17 Insert the *nave aisle rooves* into the open spaces formed by the buttresses below the clerestory windows.

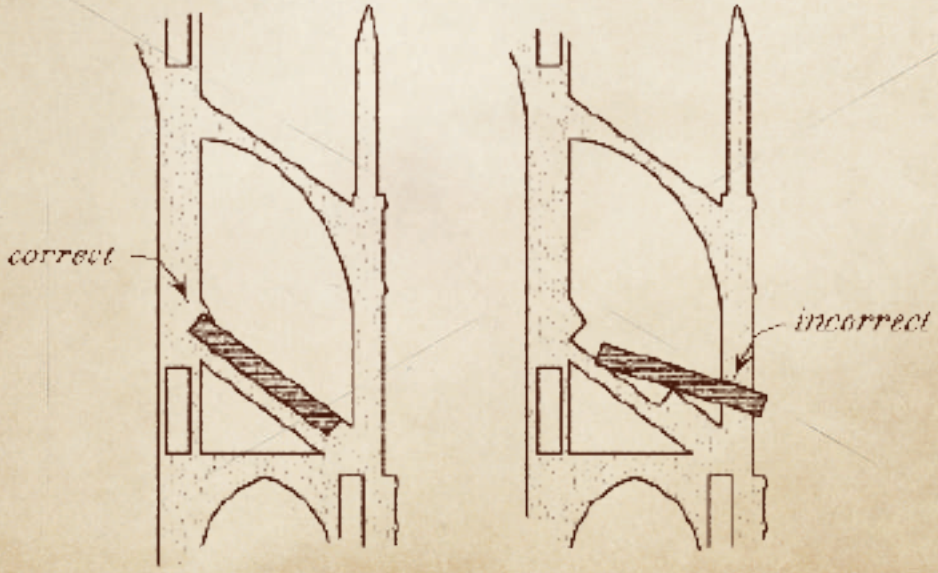


Press each aisle roof down so the slots fit onto the tabs on the buttress panels just above the aisle walls.

Lean the top edge of each aisle roof inward, pressing it onto the tabs just below the clerestory windows.

Look at the underside of the aisle rooves to make sure they are laying flat against the ribs of the buttress panels.

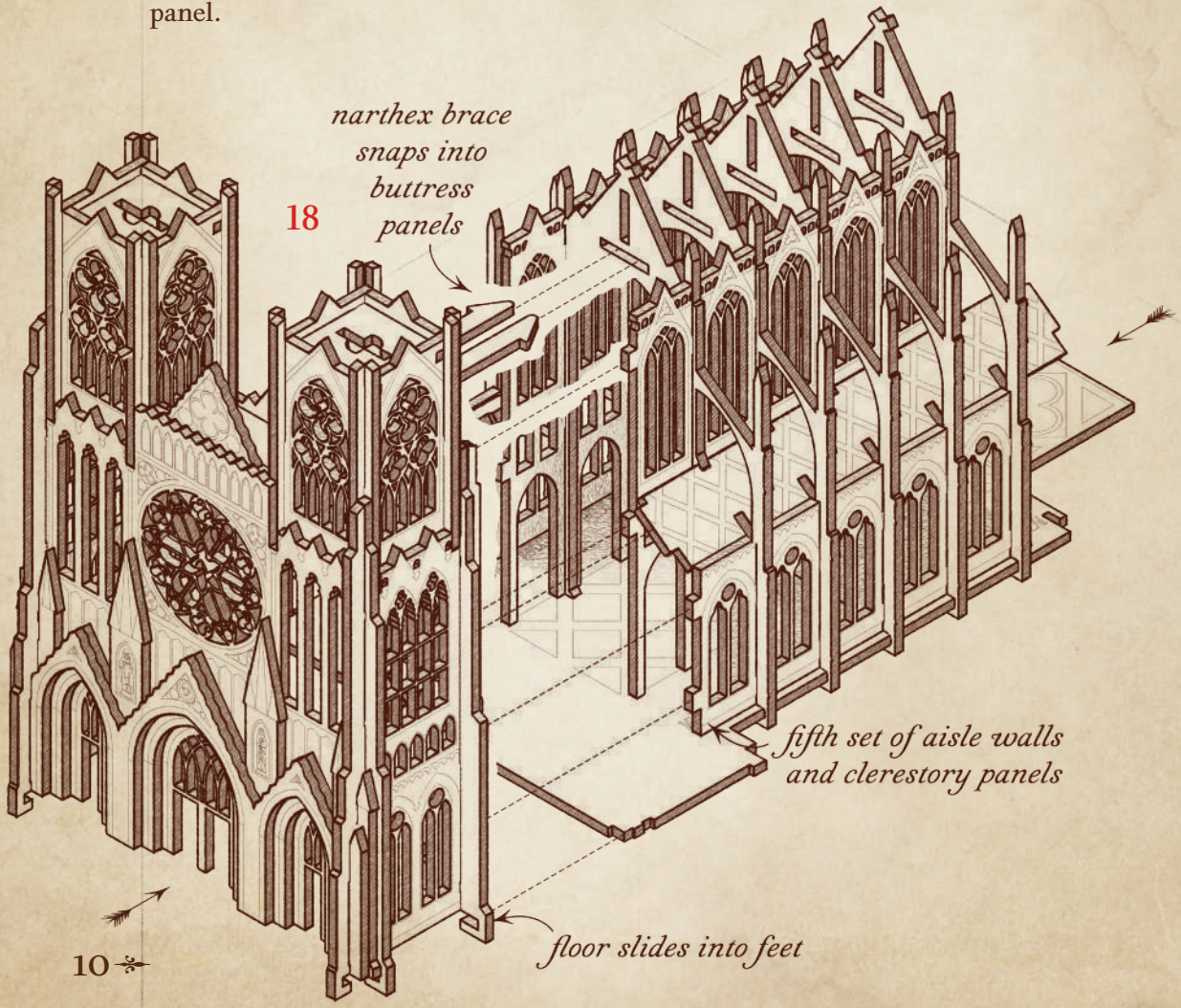




18 It's time to attach the nave to the narthex. Several parts will be joining together as you go, so take your time.

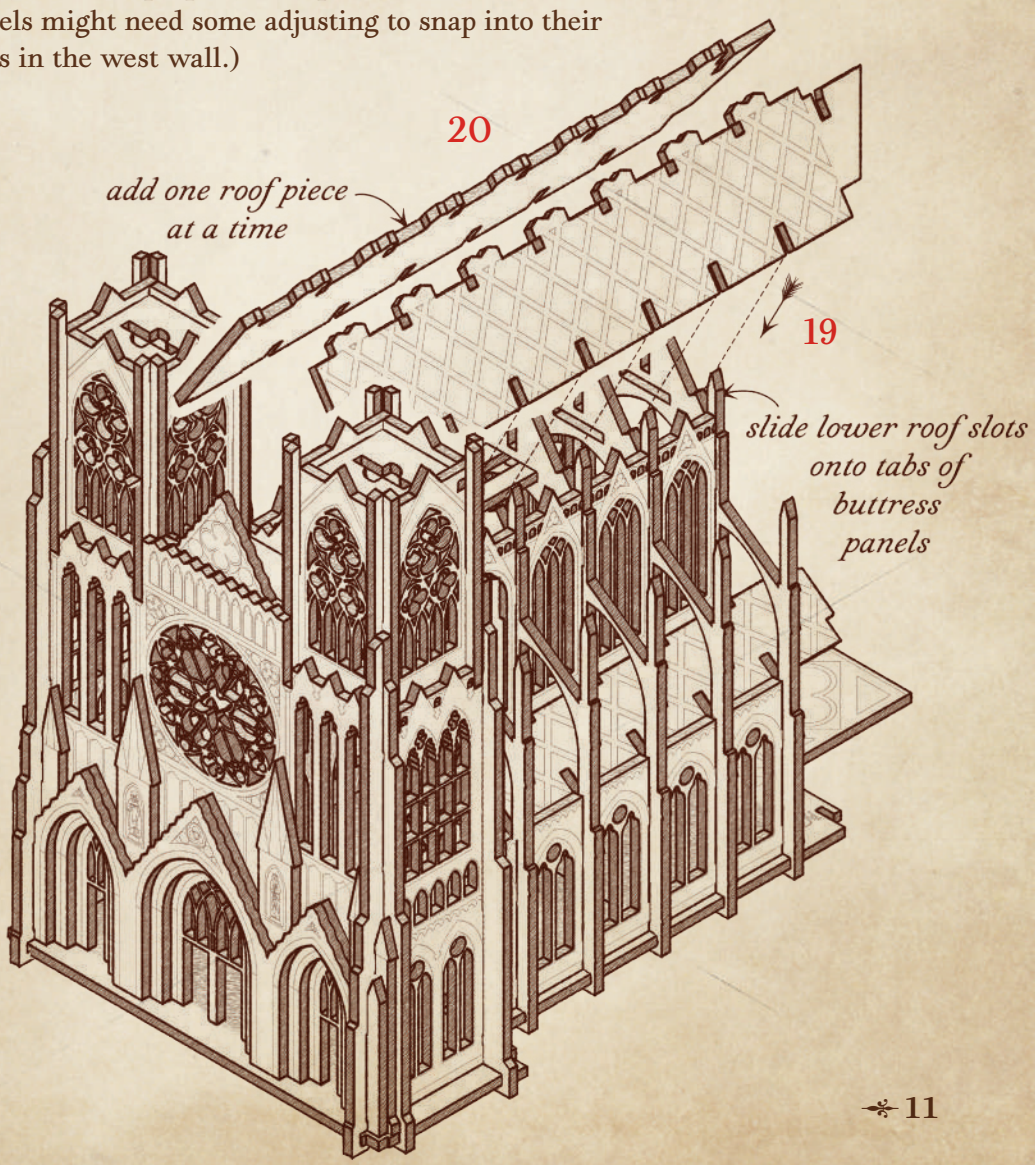
Slowly slide the wide end of the nave west floor into the feet of the west wall. (By the end of this step, this floor will extend all the way into the feet of the west facade and the narthex walls.)

While you're sliding the floor into the narthex, align the end of the narthex brace with the slot in the top of the first buttress panel.



Before the nave and narthex are fully joined, add a fifth set of clerestory panels and aisle walls between them, inserting them into the first buttress panel and the west wall.

Once the nave and narthex are fully connected, check to make sure everything is seated properly. (In particular, the last clerestory panels might need some adjusting to snap into their slots in the west wall.)



19 Add one of the *nave roof* pieces on top of the nave, with the flat end against the back of the tower facade. Press the bottom edge of the nave roof downward first, then lean the top edge down onto the pegs at the top of the buttress panels.

20 Add the second nave roof piece the same way. You may need to squeeze the two roof pieces together at the ridgeline to get them to snap into place.

III CHANCEL

THE EAST END of the cathedral is called the *chancel*, mostly reserved for the use of the clergy and the choir.

Parts needed:

altar panel
apse joiner
center buttress
2× diagonal buttresses
4× apse panels
4× ambulatory walls
retrochoir joiner
chancel floor
2× buttress panels
4× choir panels
4× aisle walls
choir aisle roof 1
choir aisle roof 2
choir roof 1
choir roof 2
4× ambulatory rooves
3× apse rooves

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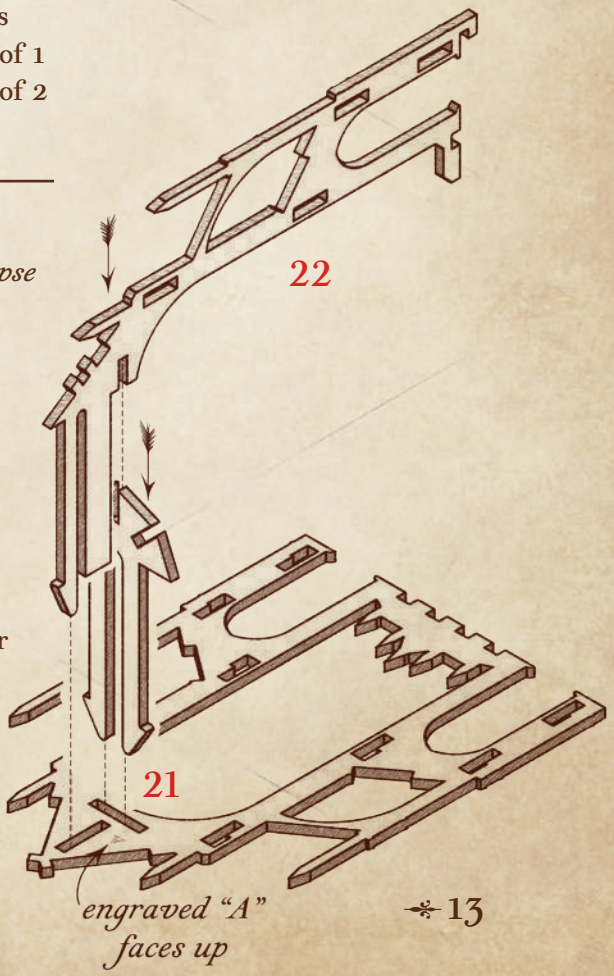
21 Start with the *altar panel*, laying it flat with the engraved side up. Insert the *apse joiner* into the horizontal slot.

This is the foundation for the *apse*, a complex rounded section of the cathedral. The apse is easier to assemble with the altar panel lying flat at the edge of a table, with the points of the apse joiner hanging off the edge.

22 Insert the long tabs of the *center buttress* into the vertical slot of the altar panel, sliding the buttress into the slot at the end of the apse joiner.



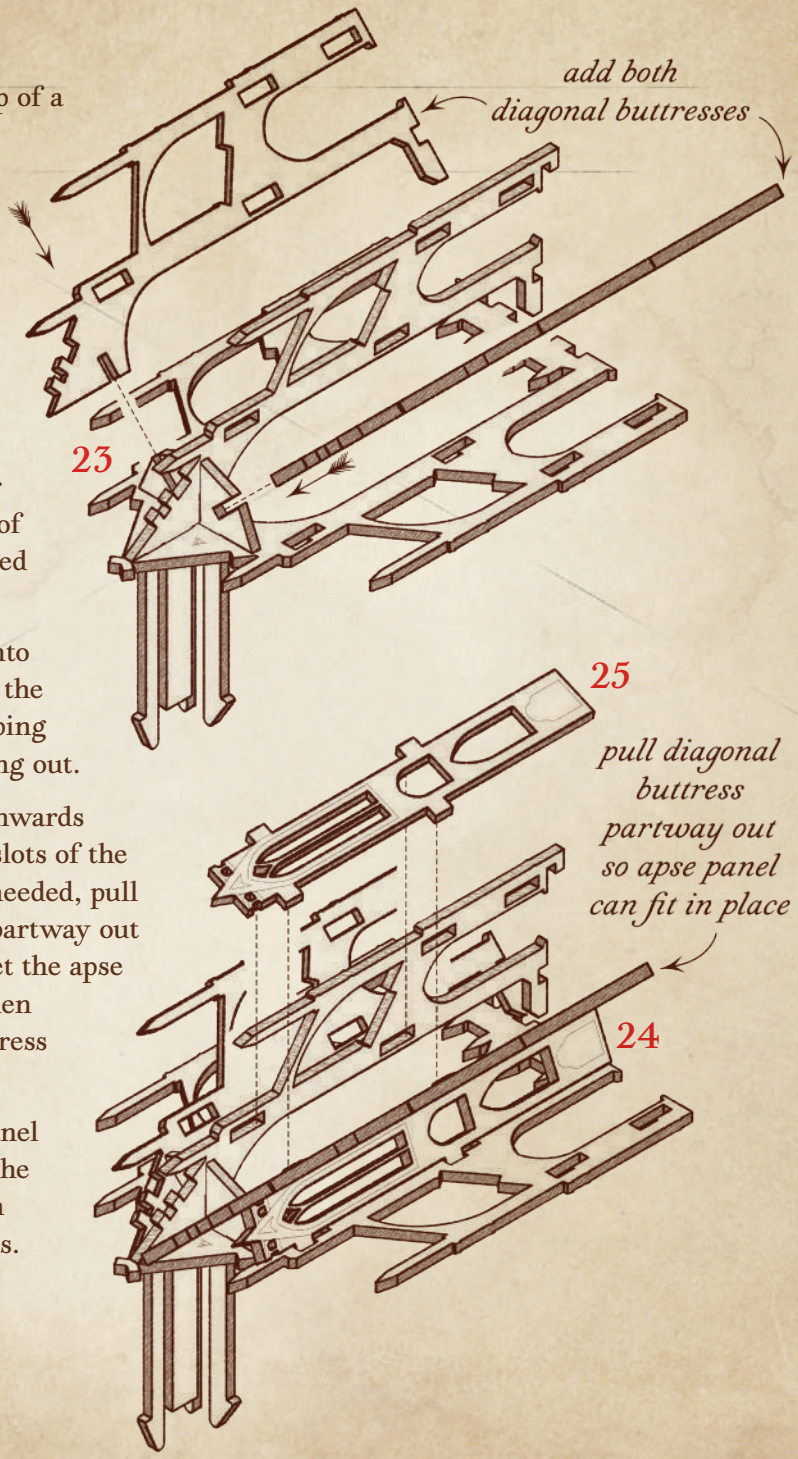
23 Slide the slot at the top of a *diagonal buttress* onto one of the diagonal slots of the apse joiner. Add the other diagonal buttress in the same way.

(As you build the apse, most of the pieces will fit together loosely until the ends of the buttresses are locked together in step 30.)

24 Insert an *apse panel* into the altar panel next to the diagonal buttress, keeping the engraved side facing out.

Tilt the apse panel inwards so its tabs fit into the slots of the diagonal buttress. If needed, pull the diagonal buttress partway out of the apse joiner to get the apse panel to fit in place, then push the diagonal buttress back in.

25 Insert another apse panel into the other side of the diagonal buttress, then into the center buttress.



26 Add the other two apse panels in the same way.

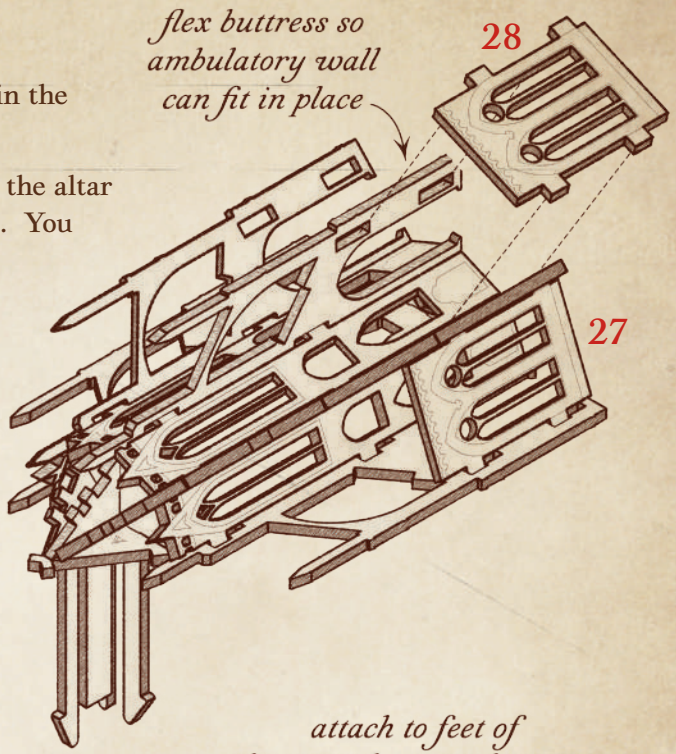
27 Insert an *ambulatory wall* into the altar panel and one diagonal buttress. You may need to flex the diagonal buttress a little to get the ambulatory wall to fit in place.

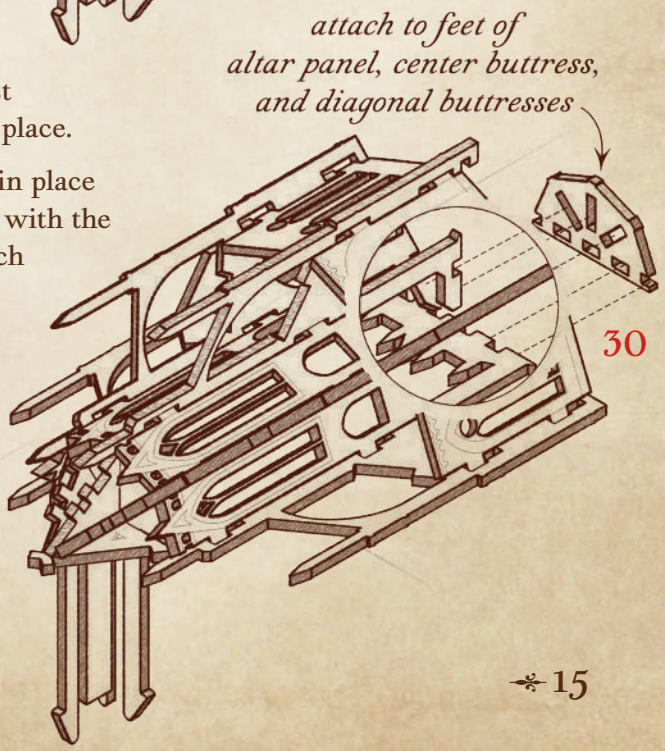
28 Insert another ambulatory wall into that diagonal buttress and the center buttress.

29 Add the other two ambulatory walls in the same way.

30 Press the *retrochoir joiner* onto the feet of the altar panel, center buttress, and diagonal buttresses. It may be easiest to align it with the altar panel first then wiggle the buttresses into place.

Once the retrochoir joiner is in place (which may take some fiddling with the buttresses) the apse will be much more stable. This is a good time to turn the apse upright.

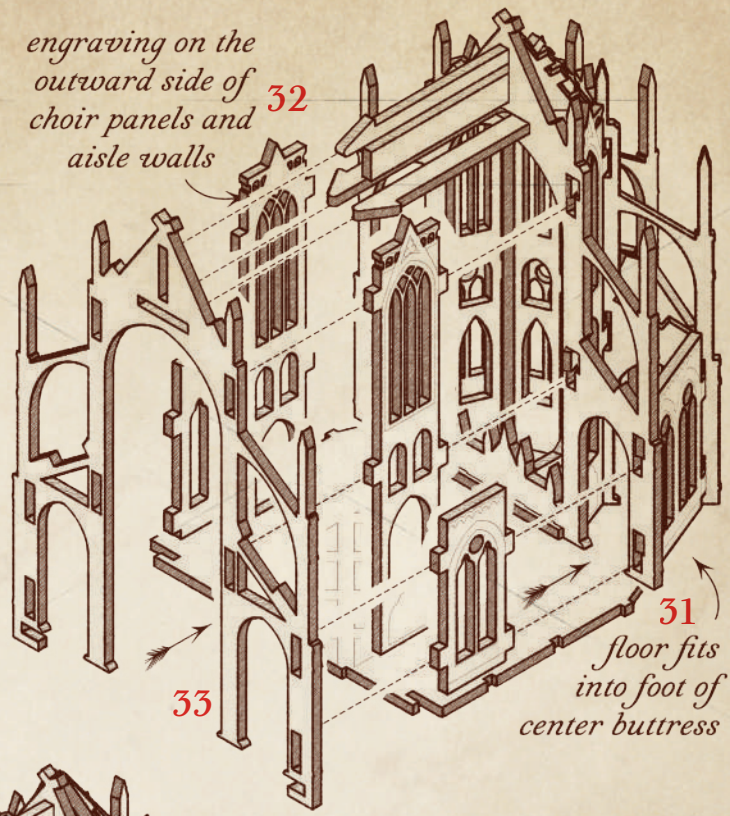




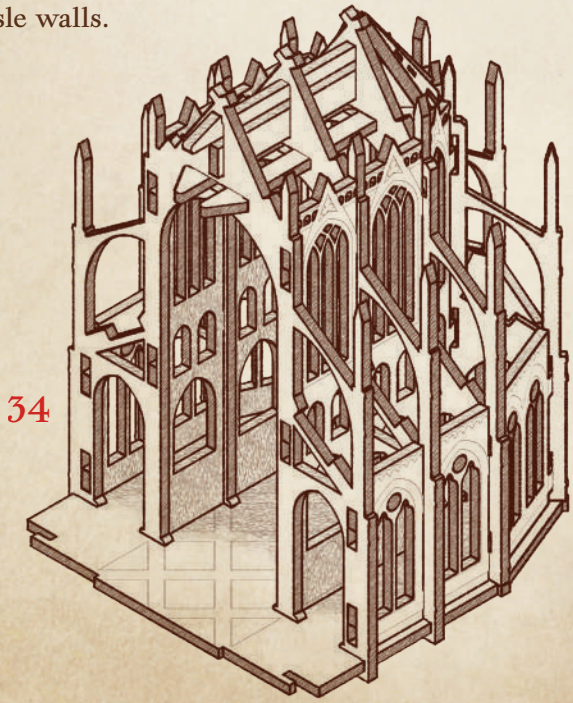
31 Slide the slot at the pointed end of the *chancel floor* into the foot of the center buttress.

32 Insert a pair of *choir panels* and a pair of aisle walls into the altar panel, keeping the engraved sides facing outward.

33 Slide a buttress panel onto the chancel floor, guiding the apse joiner and center buttress into their slots. Press the buttress panel onto the choir panels and aisle walls.



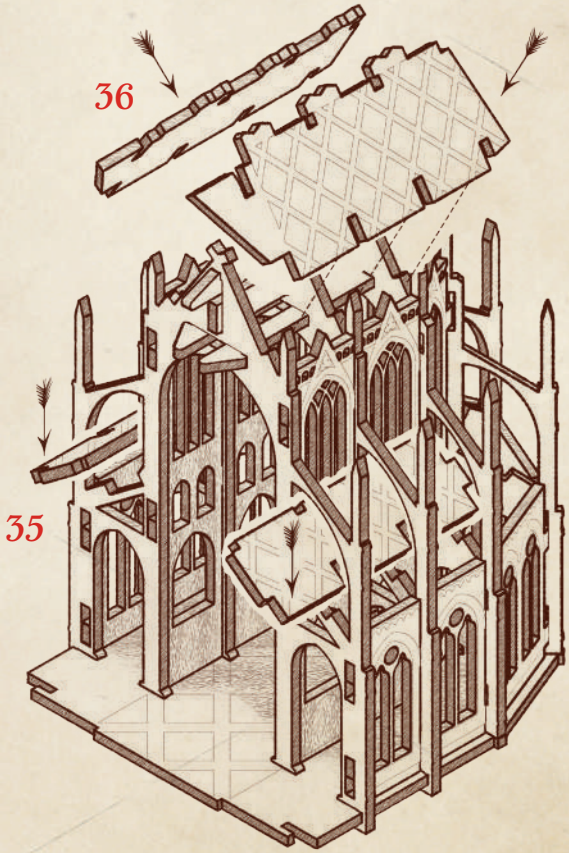
34 Add a second set of choir panels, aisle walls, and buttress panel the same way.



35 Add the *choir aisle rooves* in the same manner as the nave aisle rooves (step 17). The narrow tabs on the choir aisle rooves go towards the rounded apse, while the wide tabs go towards the flat end of the chancel.

The long slots are supposed to be on the downward side. If they are not, swap the two choir aisle rooves.

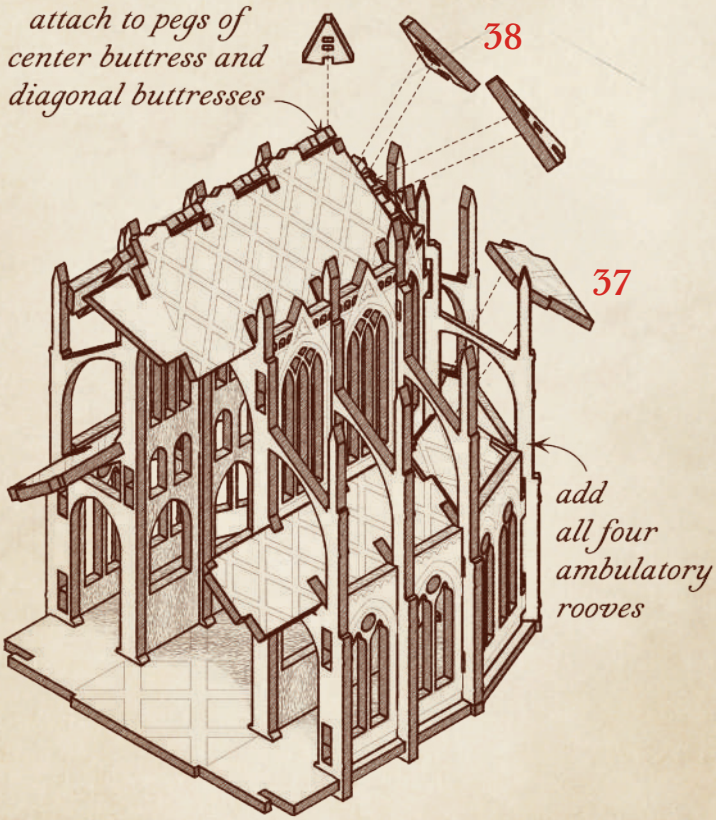
36 Add the *choir rooves* to the top of the buttress panels, with the pointed ends facing toward the flat end of the chancel.



37 Set the *ambulatory rooves* in place over the ambulatory walls, supported by the altar panel, diagonal buttresses, and center buttress.

If you drop a roof piece into the ambulatory, the easiest way to remove it is usually to turn the entire cathedral upside down.

38 Press the *apse rooves* onto the pegs at the top of the diagonal buttresses and center buttress.



IV CROSSING

At the center of the cathedral is the *crossing*, where four arms radiate out: the nave to the west, the chancel to the east, and a pair of *transepts* leading north and south. Atop the crossing sits the *spire*, tall enough to be seen from miles around.

Parts needed:

2× transept walls
crossing brace
2× crossing walls
2× transept roof 1
2× transept roof 2
2× transept porch
2× clerestory panels
2× choir panels
4× aisle walls
2× transept floor
2× transept facade
2× spire 1
2× spire 2
2× spire 3
2× spire 4
spire brace

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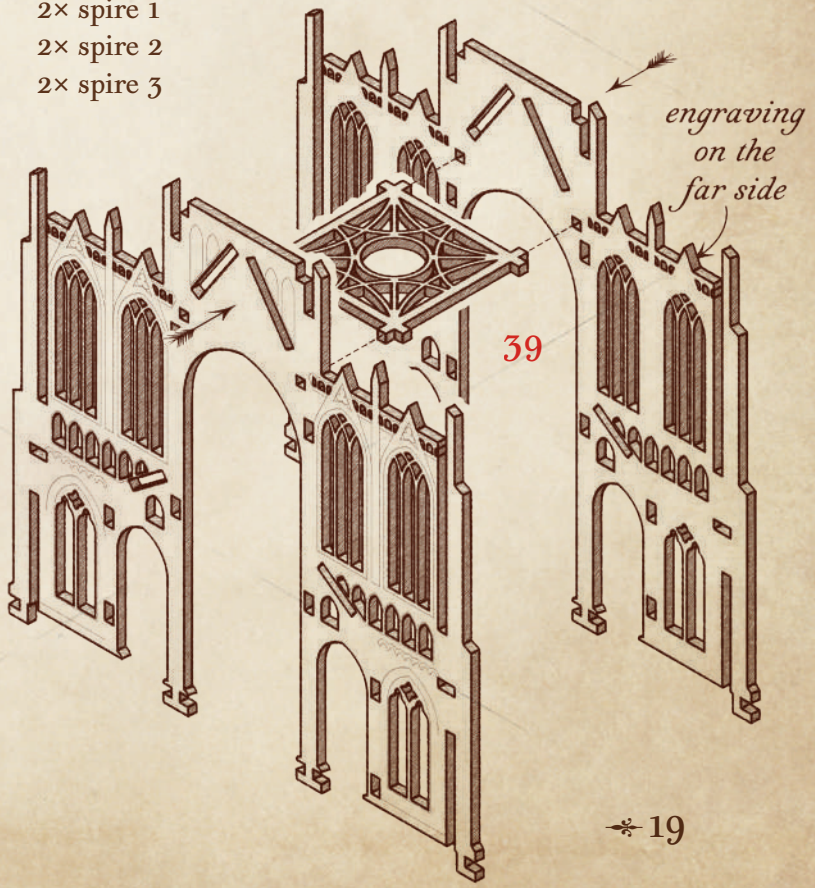
39 Take the two *transept walls* and the *crossing brace*. Insert the tabs of the crossing brace into the holes at the top of the transept walls, keeping the engraved sides facing out.



40 Slide the two *crossing walls* down onto the slots at the top of the transept walls, keeping the engraved sides facing out. Tilt the crossing walls so the tops lean inward and the points at the bottom spread outward. This allows the crossing walls to slide over the tabs protruding from the crossing brace.

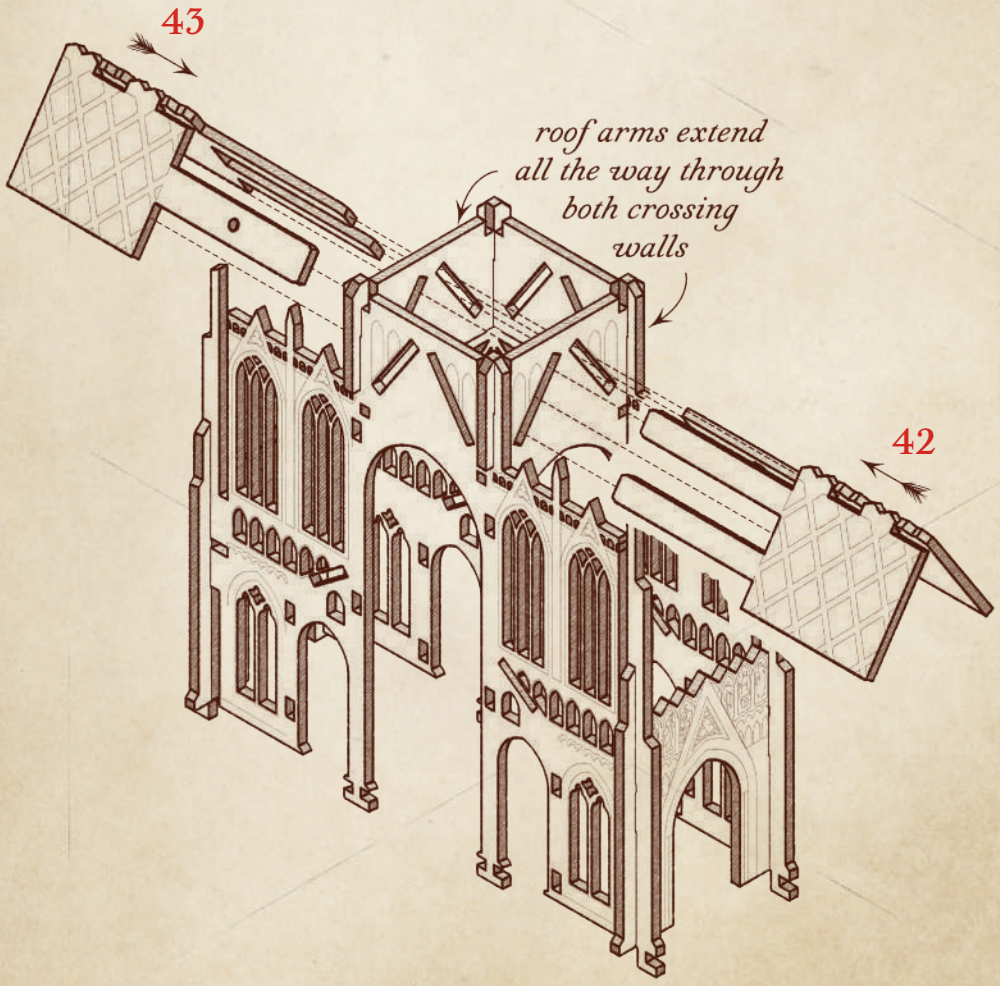
Once the crossing walls are all the way down, make sure the tabs of the crossing brace extend into the holes in the crossing walls.

41 Slide the *transept porches* up onto the slots at the base of the transept walls.

If the fit is too tight, gently pull the upper points of the porch outward just a bit as you slide the porch into place.

42 Match a *transept roof 1* with a *transept roof 2*, then insert their tabs into the slots in one crossing wall, then all the way into the slots of the opposite crossing wall.

43 Add the other two transept roof pieces from the other side.



44 Attach the nave to the crossing. As before (when you attached the nave to the narthex in step 18) several parts will be joining together as you go, so take your time and make sure all parts are lining up correctly.

Slide the end of the nave east floor into the feet of the transept wall.

Before the nave and crossing completely come together, add a sixth set of clerestory panels and aisle walls between the last buttress of the nave and the transept wall.

Insert the pointed ends of the nave roof into the slots in the transept wall.

The last few parts to come together may need to be wiggled a bit to fit into place. Make sure the nave east floor fits into the transept wall on the far side of the crossing.

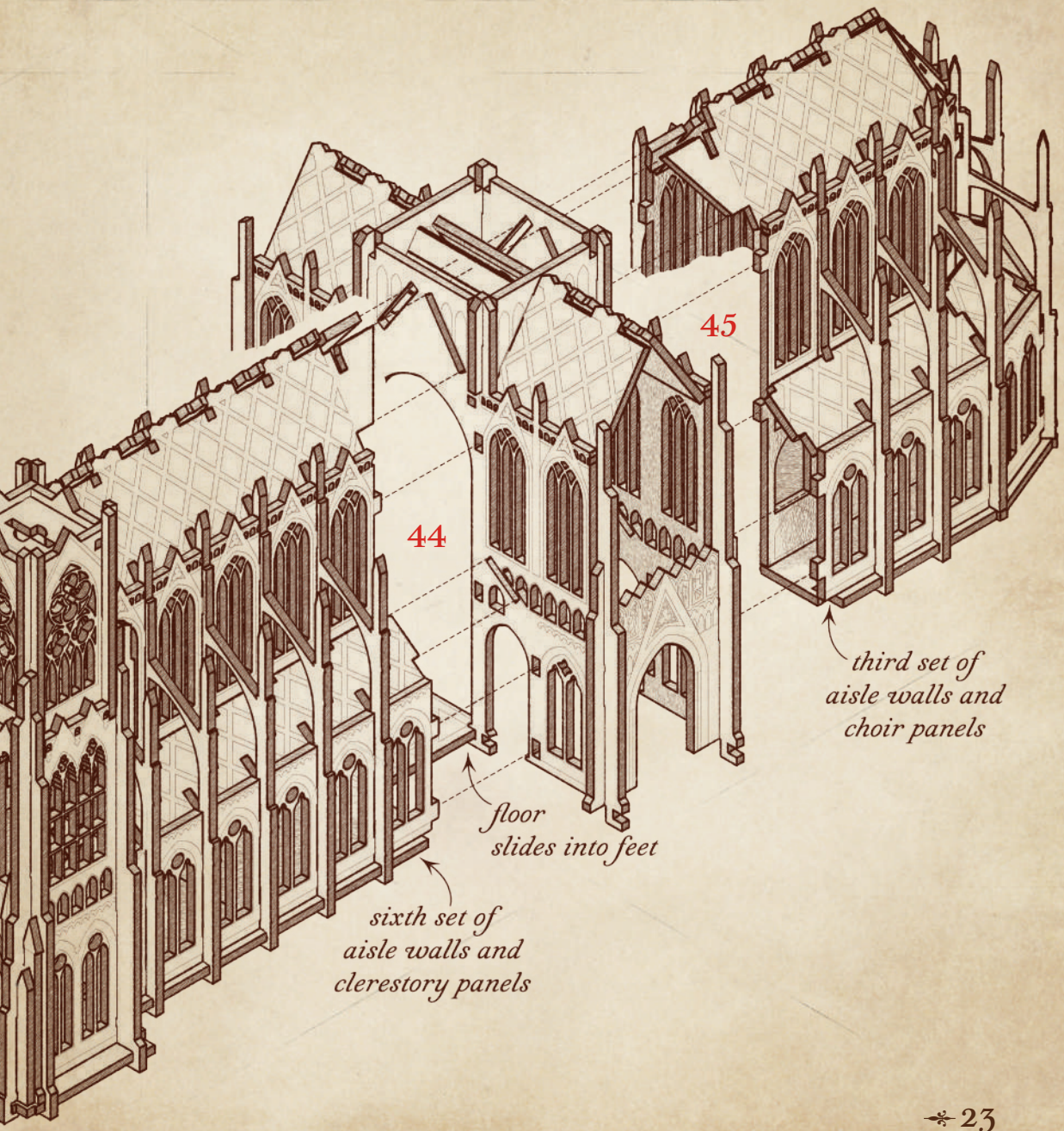
45 Attach the chancel to the crossing. As before, take your time and make sure all parts are lining up correctly.

Add a third set of choir panels and aisle walls between the last buttress of the chancel and the transept wall.

Insert the pointed ends of the choir roof into the transept wall. Make sure the chancel floor fits into the feet of the transept wall.

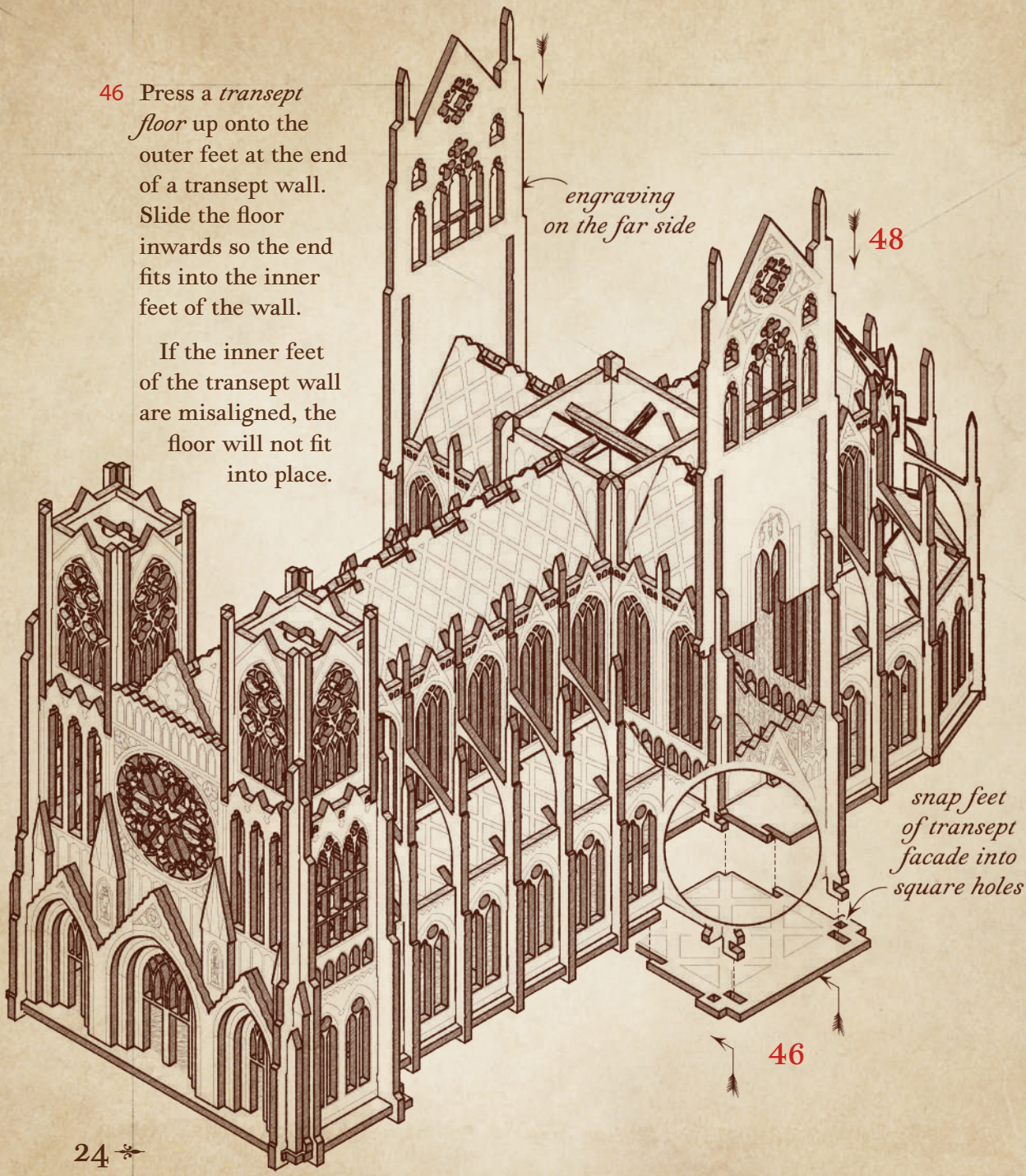
Now that the nave and chancel have been joined to the crossing, be careful not to lift the cathedral by the ends, as that may pull it apart, undoing the last two steps.

Once the transept floors have been added (in the next two steps) the nave, crossing, and chancel will be locked together by their floors, making the cathedral much sturdier.


45
44
third set of
aisle walls and
choir panels
floor
slides into feet
sixth set of
aisle walls and
clerestory panels

46 Press a *transept floor* up onto the outer feet at the end of a transept wall. Slide the floor inwards so the end fits into the inner feet of the wall.

If the inner feet of the transept wall are misaligned, the floor will not fit into place.



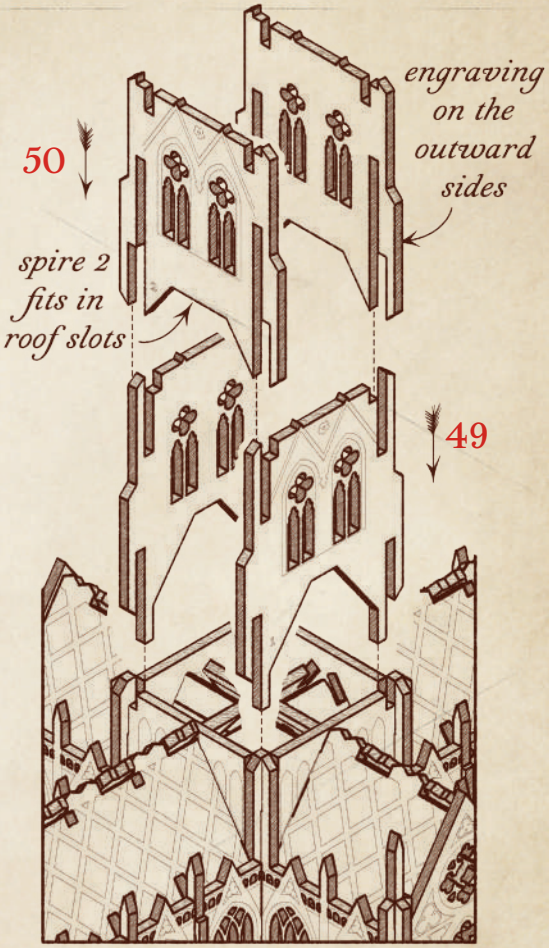
Make sure the inner feet are partially on the nave east floor and partially on the chancel floor.

47 Add the other transept floor in the same way. These floors lock the base of the nave and chancel to the crossing.

48 Slide the *transept facades* down onto the long slots at the ends of the transept walls, just to the inside of the transept porches. The feet at the bottom of the facades fit into square holes in the transept floors.

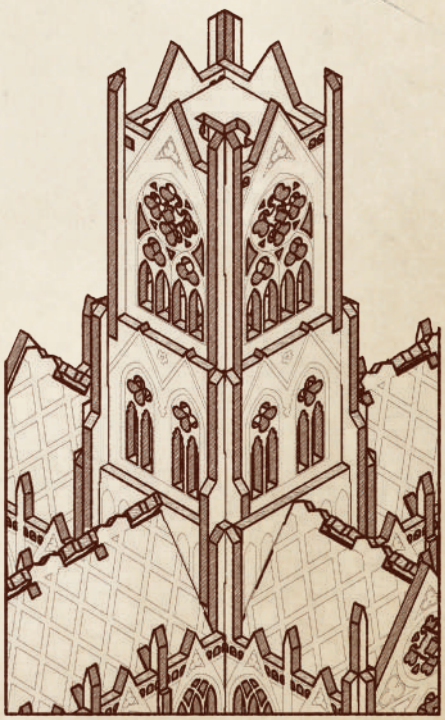
49 Slide the *spire 1* pieces down into the slots at the top of the transept walls.

50 Slide the *spire 2* pieces down into the slots of spire 1, then into the pointed ends of the rooves, locking the top of the nave and chancel into place.



51 Slide the *spire 3* pieces down into the slots of spire 2.

52 Insert the *spire brace* into the holes in the *spire 4* pieces, then slide the spire 4 pieces into the slots of spire 3.



v TALL ROOVES

THE POINTED rooves of the spire and the towers are the last pieces to be added to the cathedral.

Parts needed:

spire roof frame 1
spire roof frame 2
2× tower roof frame 1
2× tower roof frame 2
4× spire rooves
8× tower rooves

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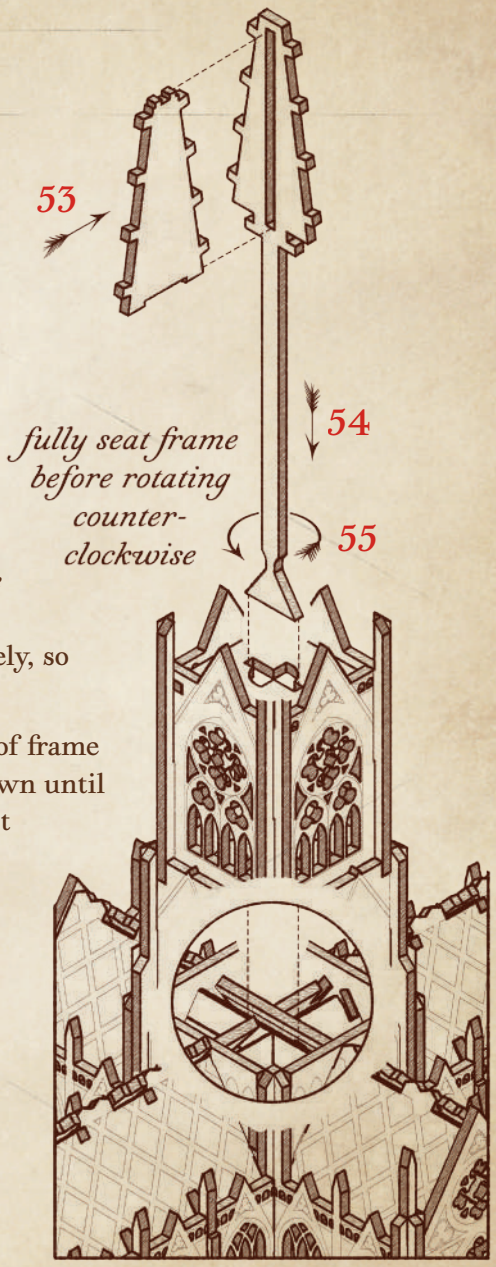
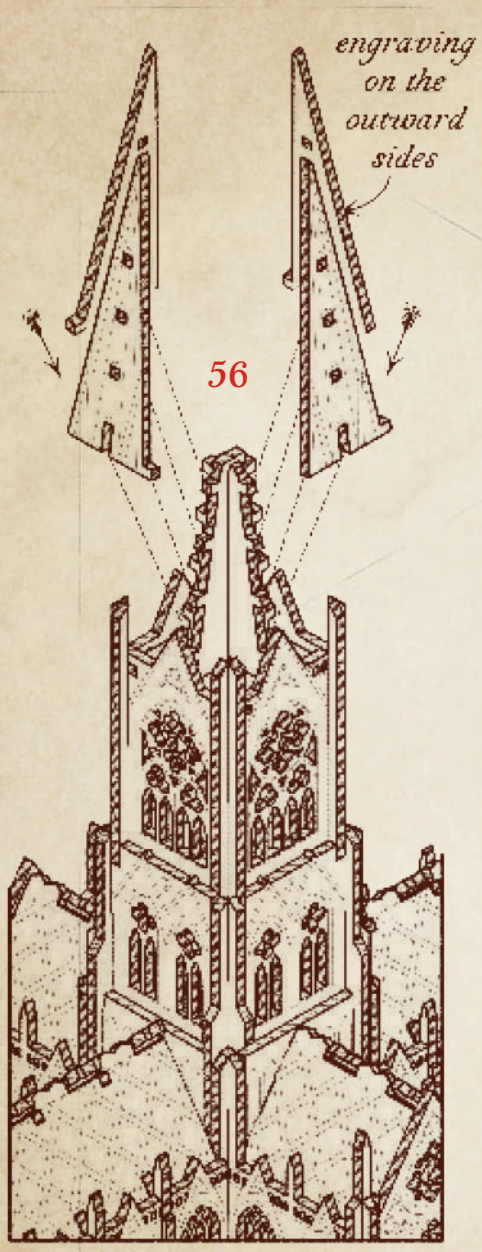
53 Slide *spire roof frame 2* into the slot of *spire roof frame 1* so the narrow ends of both pieces are pointing upwards. These fit loosely, so hold them together for the next step.

54 Insert the bottom triangular end of spire roof frame 1 into the slot in the spire brace. Slide it down until it goes through the slot between the transept rooves.

55 Twist the spire roof frame 90°, locking it in place.



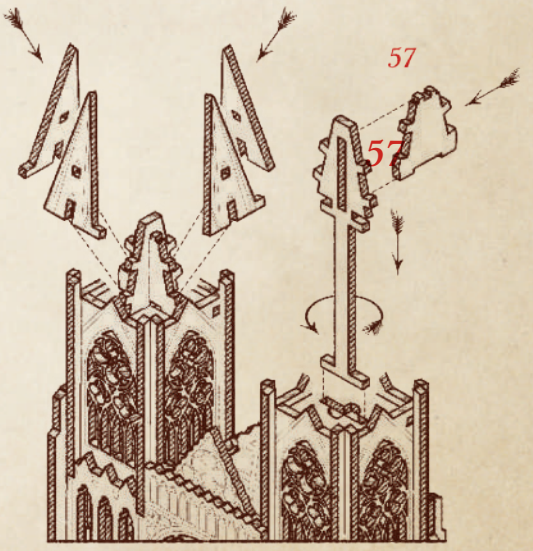


56 Press the *spire roof* pieces onto the pegs of the roof frame.

57 Add the tower roof frames and roof pieces in the same way. (If the tower roof frames are unable to turn, you may need to press up on the bottom of the narthex brace through the windows in the west façade.

Congratulations, the cathedral is complete!

If you finished it in under a century, feel free to brag to any other cathedral builders you might meet.



VI Architectural Notes

This cathedral follows the Gothic architectural style that flourished throughout Europe from the 12th through 16th centuries. It combines several variations on the Gothic style.

A central spire as wide as the crossing below is typically English, as seen on Salisbury Cathedral (spire built in 1320). Continental Gothic cathedrals usually have a thinner spire, allowing the rooves of the nave, chancel, and transepts to meet.

A rounded apse at the east end is common in French cathedrals, such as Notre-Dame de Paris (apse completed in 1182). English cathedrals generally have a squared-off east end, similar to the transepts.

The west front of this model is based largely on the cathedrals of Reims (1211-1275) and Laon (c. 1150-1230) in northern France. Some of the engravings on the west front are based on statuary from Cologne Cathedral (19th century after medieval originals) while the figures on the transept porches are from Salisbury.

The model is built at 1:220 scale (Z model railroad scale). At 15.28″ long, 7.06″ wide, and 14.72″ high, it would be equivalent to a cathedral 280′ long, 130′ wide, and 270′ high.

The typefaces used in this document are *Geographica* from Three Island Press, based on the hand of 18th century cartographer Thomas Jefferys, and Peter Baker's *Bury Caps*, based on the majuscules of the 12th century Bury Bible. A few ornaments are from Laura Worthington's *Adorn*. Nemo potest ponere praeter id quod positum est.