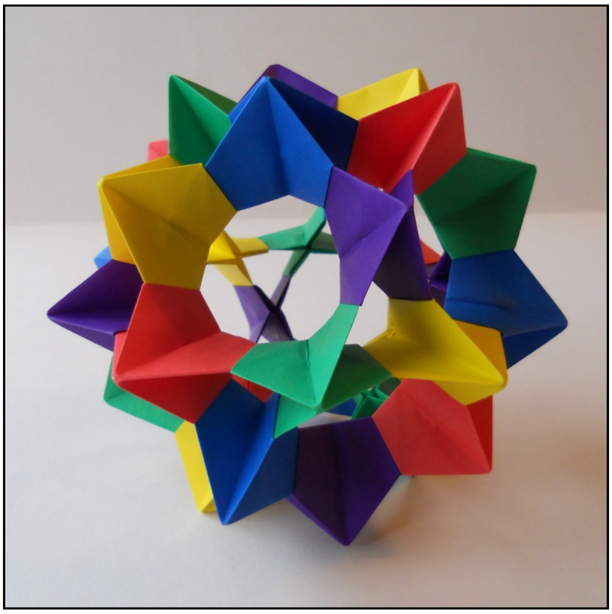
Electra



The 30-piece version of Electra is probably my best known modular design. It dates from 1989 and was somewhat revolutionary at the time because of its use of a mixture of folding geometries.

The name Electra is, of course, drawn from Greek mythology, but also references the similarity of the design to one of those, now somewhat outdated, pictures of electrons surrounding a nucleus in their shells.

My first Electra was assembled from 30 modules which were folded using standard folding geometry. I soon discovered, however, that the angles of the design, and the strength of the assembly, could be improved by using mock platinum folding geometry to create the angle at which the pockets were set (see pictures 10 and 12). This change of angle not only improved the geometry but also allowed the tabs to extend very slightly around the corner between two arms of the module (see picture 22), thus allowing them to hold together much more firmly, especially during the assembly phase. The original module now survives in the 24-piece design, which cannot be made from the hybrid version, and also, unfortunately, in many unauthorised instructional videos on the internet.

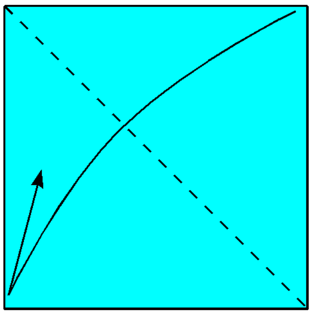
These diagrams show you how to make 30, 60, and, purely for the sake of completeness, 24 and 12 module Electra designs.

Electra 30 is more usually just known as Electra.

Making Electra 30

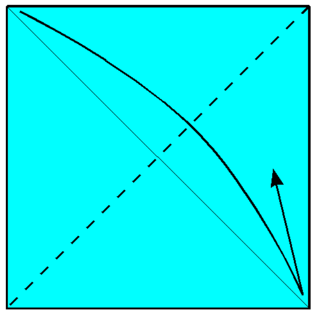
You will need thirty squares of paper. These diagrams show you how to make Electra 30 using six squares in each of five contrasting but complementary colours.

1



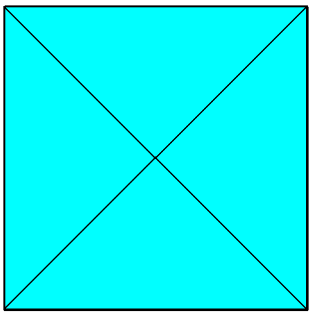
1. Fold in half diagonally, then unfold.

2



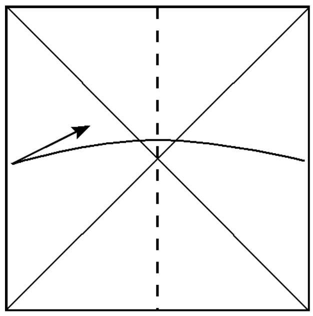
2. Fold in half diagonally in the opposite direction, then unfold.

3



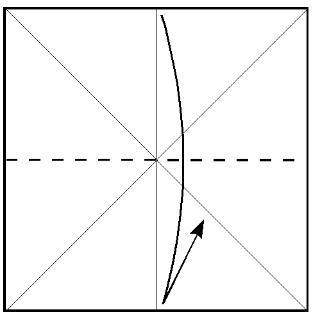
3. Turn over sideways.

4



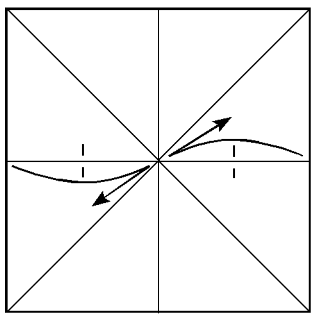
4. Fold in half sideways, then unfold.

5



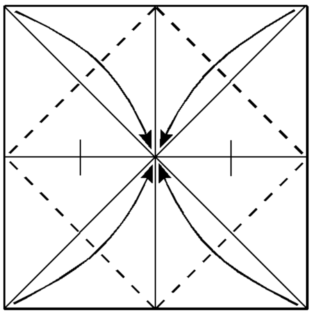
5. Fold in half downwards, then unfold.

6



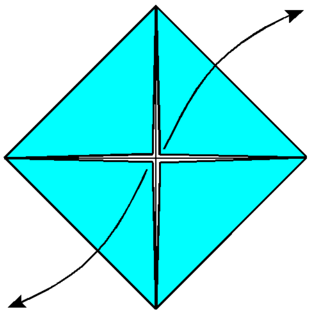
6. Fold both outside edges into the centre, then unfold, but only make two small creases at the centres of the folds.

7



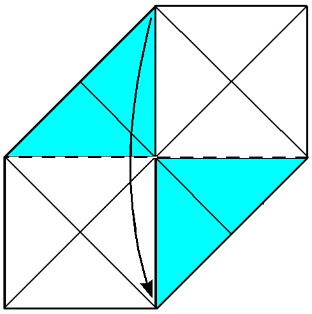
7. Fold all four corners into the centre.

8



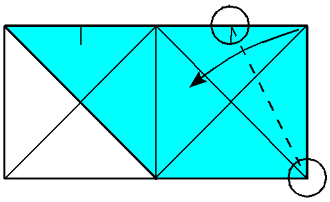
8. Open out the top right and bottom left front flaps.

9



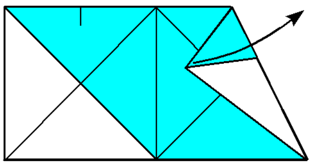
9. Fold in half downwards using the existing crease.

10



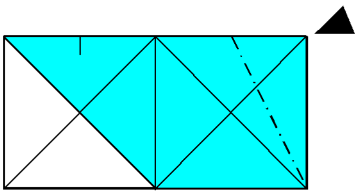
10. Fold the right edge inwards, using one of the short creases made in step 6 to locate the top end of the new crease and making sure the bottom right corner remains sharp.

11



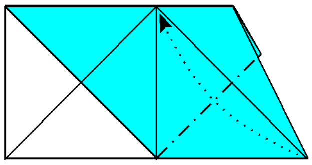
11. Open out the fold made in step 10.

12



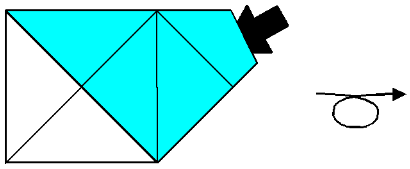
12. Turn the top right corner inside out in between the layers using the creases made in step 10. You will need to reverse the direction of the crease in the front layer.

13



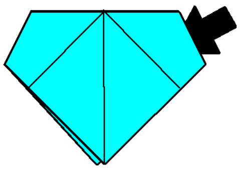
12. Fold the bottom right corner backwards in between the layers using the existing crease.

14



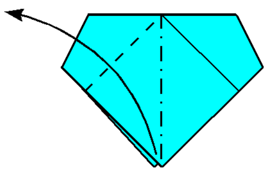
13. This should have created a secure pocket in the position shown. Turn over sideways ...

15



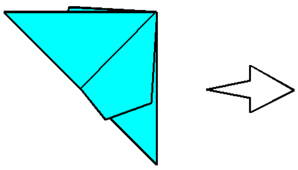
15. ... and repeat folds 10 to 13 on the other half of the paper to create a second secure pocket.

16



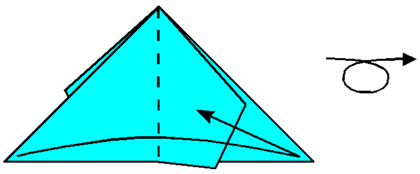
16. Pull the bottom point of the front layer upwards to the left and flatten to look like picture 17.

17



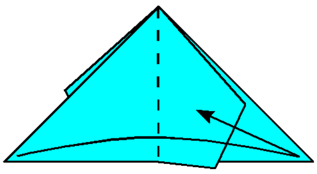
17. Arrange to look like picture 18.

18



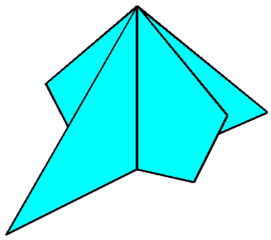
18. Fold the left hand front flap across to the right, then unfold. Turn over sideways.

19



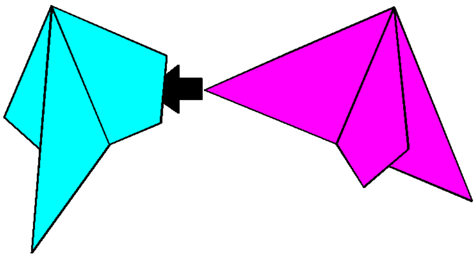
19. Repeat fold 18 on the new left hand front flap then bring both short arms out to the side.

20



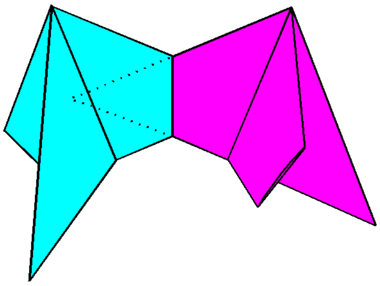
20. The module is finished. You will need thirty in all, six in each of five colours.

21



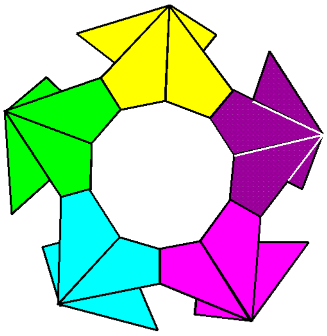
21. Two modules go together like this.

22



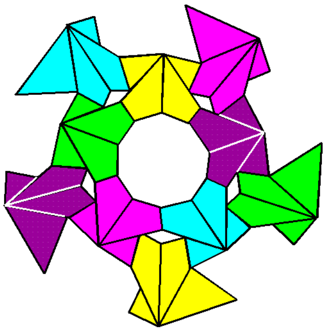
22. Because of the angle of the fold made in step 10 the tip of the tab goes beyond the centre crease and becomes trapped by the central fold of the host module.

23



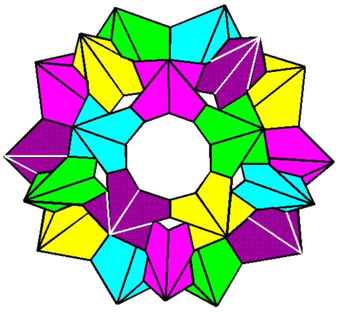
23. Begin assembling Electra by putting five modules together to form a five-sided ring like this.

24



23. Add a further five modules to surround this five-sided ring with three-sided rings, keeping to the colour scheme shown.

25



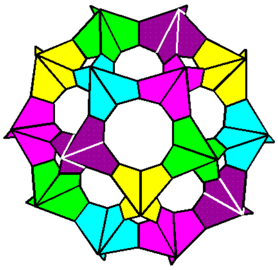
25. Continue adding modules until Electra is complete. The underlying structure of Electra is that of an icosidodecahedron. Every five-sided ring is surrounded by three-sided rings and every three-sided ring by five-sided rings. If you keep to this structure as you add the modules Electra 30 will automatically form. The colour scheme can also easily be extended to the design as a whole. Electra also works well when made in a carefully chosen patterned paper.

Electra 60

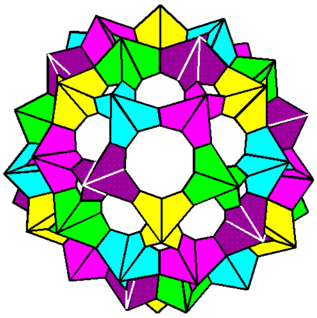
As the name suggests, Electra 60 is a development of Electra 30 that uses twice as many modules. The module is the same as the module for Electra 30.

The extra work aside, it is equally easy to fold and assemble, equally robust and at least equally as beautiful as the original, much better known, design.

You will need sixty squares of paper. These diagrams show you how to make Electra 60 using twelve squares in each of five contrasting but complementary colours.



Begin by putting five modules together to form a five-sided ring, then add twelve more modules to surround it with four-sided and three-sided rings in the pattern shown here, keeping to the colour scheme shown.



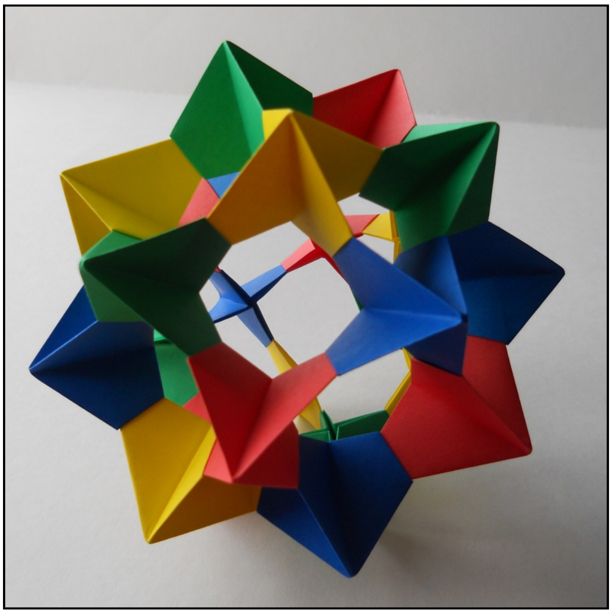
Continue adding modules until Electra 60 is complete. The underlying structure of Electra 60 is that of a rhombicosidodecahedron (see page 13). Every five-sided ring and every three-sided ring are surrounded by four-sided rings. The five-sided and three-sided rings touch at the corners. If you keep to this structure as you add the modules the Electra 60 design will automatically form. The colour scheme shown here can also easily be extended to the design as a whole. Electra 60 also works well when made in a carefully chosen patterned paper.

Electra 24

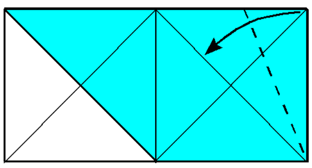
Electra 24 is made using the original Electra module which is folded using only standard folding geometry.

You will need 24 squares of paper. These diagrams show you how to make Electra 24 using six squares in each of four contrasting but complementary colours.

Begin by following steps 1 to 9 of the instructions for making Electra 30.

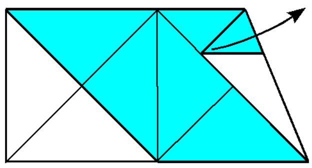


10



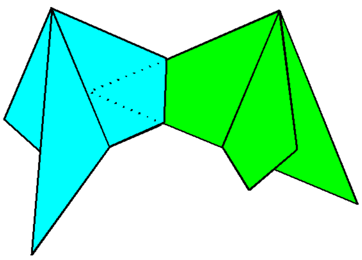
10. Fold the right edge onto the nearest diagonal crease.

11



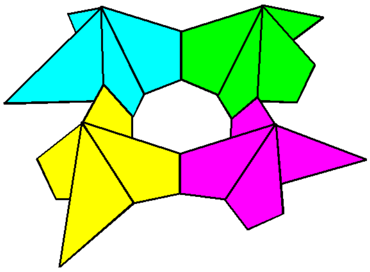
11. Open out the fold made in step 10, then turn over sideways and repeat steps 10 and 11 on the other half of the paper, then follow steps 13 through 21. Make all 24.

22



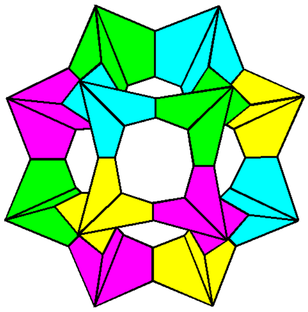
22. In this case the tab does not go into the pocket of the host module beyond the line of the centre crease. This means the modules will not hold together so well.

23



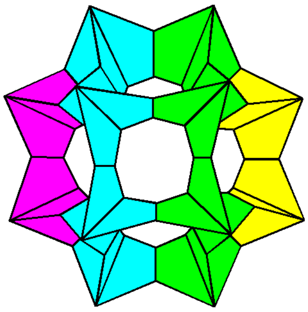
23. Begin assembling Electra 24 by putting four modules together to form a square ring like this.

24



23. Continue adding modules until Electra is complete. The underlying structure of Electra 24 is a rhombicuboctahedron. Every four-sided ring is surrounded by three-sided rings and every three-sided ring by four-sided rings.

25



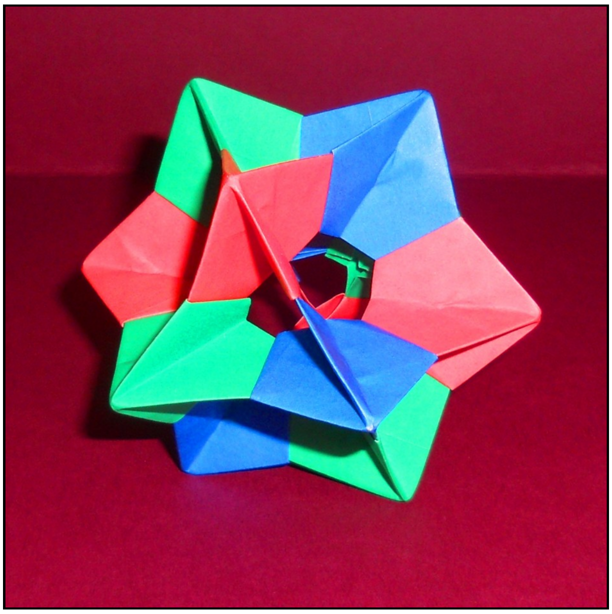
25. You could also colour Electra 24 like this.

Electra 12

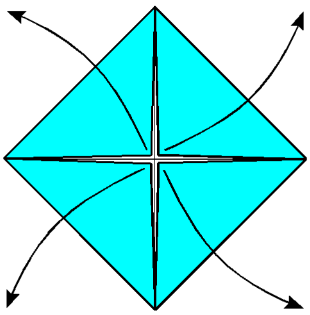
A 12-piece version of Electra can be obtained by varying the angle at which the pockets are set.

These diagrams show you to make Electra 12 from four squares in each of three contrasting but complementary colours.

Begin by following steps 1 through 7 of the instructions for Electra 30.

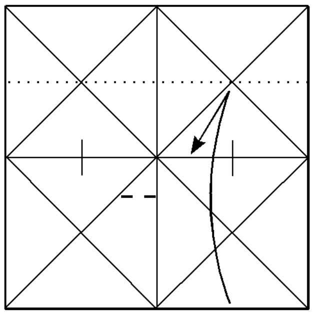


8



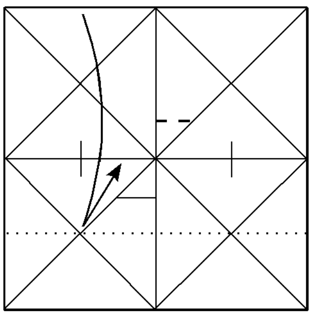
8. Open out all four front flaps.

9



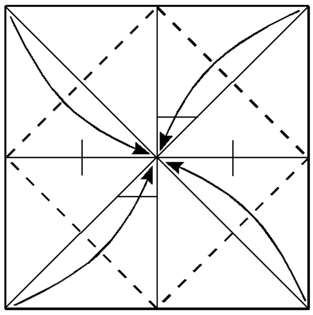
9. Fold the bottom edge upwards to the position marked by the dotted line, make a tiny crease in the position shown, then unfold.

10

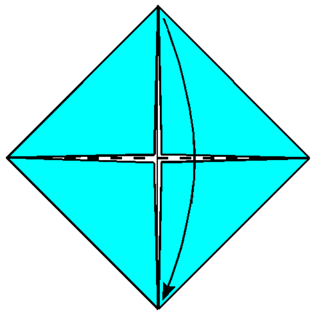


10. Fold the top edge downwards to the position marked by the dotted line, make a tiny crease in the position shown, then unfold.

11



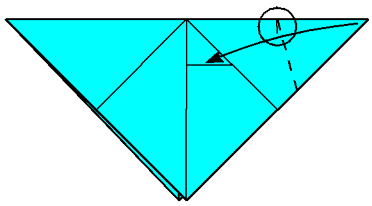
12



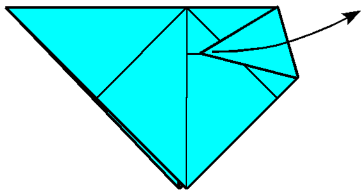
11. Remake the folds made in step 7.

12. Fold in half downwards.

13



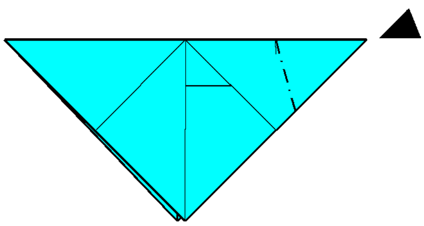
14



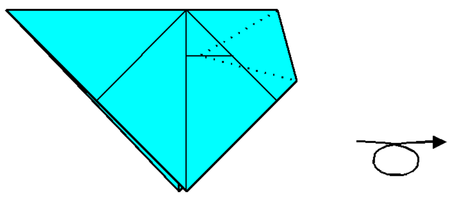
13. Fold the right corner onto the crease made in step 10 making sure the top of the new crease starts from where the crease made in step 6 intersects the top edge.

14. Unfold.

15

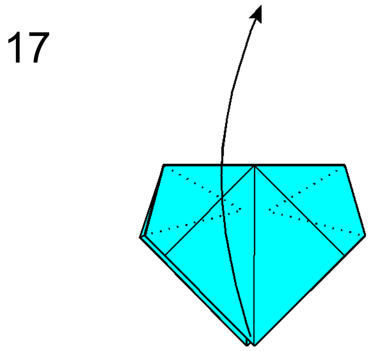


16

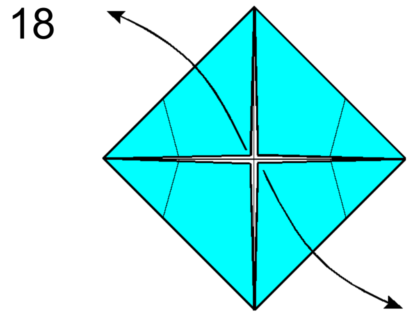


15. Remake the fold made in step 13 in between the other layers.

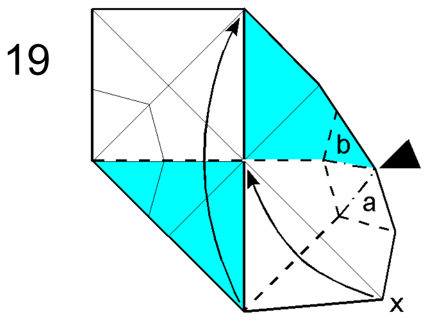
16. Turn over sideways and repeat steps 13 through 15 on the other half of the paper.



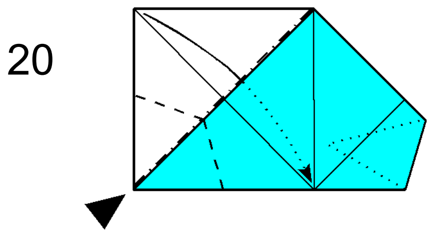
17. Open out upwards.



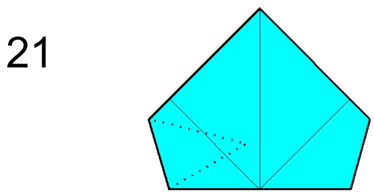
18. Open out the top left and bottom right front flaps.



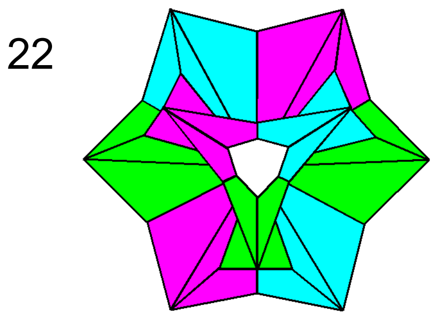
19. Remake the fold made in step 15 so that folding point x to the centre and folding the paper in half upwards traps the folds to form a pocket.



20. Repeat fold 19 on the other half of the paper.



21. Follow steps 16 through 20 of the instructions for Electra 30 to create the finished module. Make all 12.



22. The modules can be assembled to look like this. Electra 12 is finished.