Supplement to AP-ART Compendium

2018 – 2025

Stewart Coffin

Introduction:

This all got started back in the late 1960s when I was literally sick of making fiberglass kayaks and seeking some healthier way to earn a living. So I tried designing artistic polyhedral models that came apart, hence the name AP-ART. Soon I got the idea of puzzles, and my first crude brochure in 1970 had the title "Unusual Puzzles." My design philosophy has usually been *simpler is better*, meaning using the fewest number of pieces to achieve some objective. And that brings up the question of difficulty. Few of these designs are intended to be very difficult. Even solving one like Scrambled Scorpius can be simply a matter of trying all hundred or so possible combinations. Some are trickier, such as involving rotation or coordinate motion, but Rosebud even came with an optional assembly jig. But then there is the special category of puzzles designed for friends involved in the International Puzzle Party, and more specifically the puzzle exchange or design competition, where extreme difficulty might even be considered an asset.

Dozens of my designs involve mating two halves of three pieces each, with all pieces typically non-symmetrical and dissimilar. This is done to increase difficulty, but they usually come with pencil marks inside showing the solution, which one can erase if they want to. I even use those marks all the time as an expedient in putting my own models back together. One time I found one in pieces with no such pencil marks, and after trying for half an hour or more to put it back together I tossed it into the wastebasket. That served as a reminder for me – more difficult is not necessarily better. Life is so short.

In 2018, I assembled and published via the Internet my *AP-ART, a Compendium of Geometric Puzzles*, more commonly called simply my *Compendium*. It was intended to be an all-inclusive summary of nearly all my creative attempts over the span of half a century in the categories of novel mechanical and geometric puzzle designs. I estimate that if one includes all the trivial variations, it contains nearly a thousand designs. In hindsight, if I were doing it all over again, I might leave out at least half of the least inspired ones.

When I published my *Compendium*, I thought I was finished with my puzzle work. I had just moved from an apartment in Lexington to live with Valerie in Concord, leaving behind a good woodworking shop and photo studio. Then in 2021 we moved again, from Concord to Carlisle where we are now, with an even more limited woodworking space. But as many of my friends know, a few other times I had announced my intention to quit puzzle work and pursue some other activity that the world seemed to be more desperately in need of these days, only to return to puzzles. Indeed, for the past few years I have been combining those two efforts, with much of my time now spent trying to expand and improve my website *stewartcoffin.com*, intended as a public service. Now at 94, I seem to be running low on new puzzle ideas, or perhaps just less inspired. Even more to the point, it may be about time to stop fumbling around with little wooden blocks on the table saw or trying to glue them together with shaking fingers.

In preparing this *Supplement*, sometimes I find it useful to look back at what I have already done. I am not in the habit of saving models once they have served their purpose, but occasionally I have need to remake one. This is not always easy, as sometimes my directions or graphics are vague. But my *Compendium* was never intended to be a woodworking manual, nor could it be since my woodcraft skill is limited. I think the one best description for all this would be geometric recreations. I hope some non-woodworking readers may find all this interesting just to browse through.

The only power tool needed for most of this work is a table saw, although a belt sander also comes in handy (Obviously, for some a drill press is also needed.) In production you will not see any measuring instruments on my workbench. All sawing is done with special jigs that hold the work securely, accurately, and SAFELY in place, as described in the Appendix of my *Compendium*. I have always used a small 8-inch table saw with ½ HP motor, perhaps slightly safer than a larger one. The sawing operations are clearly not for the unskilled or inexperienced. I shudder at the thought of a child using a table saw. I still have all my fingers after all these years, but perhaps I have just been lucky. Sawdust can be unhealthy to breathe, and using a face mask when working is advisable. I have learned to avoid using certain woods such as cocobolo, acle, and especially mansonia. Different woods can affect different woodworkers.

This compilation of new designs is roughly chronological, same as before, but with N for new. The occasional suffix X is meant to stand for experimental, although I suppose that could be applied to almost any. Note the missing of catchy names in many cases. I just got tired of trying to come up with ever more new ones. In a departure from the original publication, I have made more effort this time to use for illustration models made by others, whose workmanship far exceeds mine.

Before the main body of this *Supplement*, which starts on page 9, I am including for good measure as Part One a photo gallery of designs included in the original *Compendium* but here improved in some way, either by attractiveness or functionality. This is often done by use of multiple attractive exotic woods purposely arranged in color symmetry as an additional functional aspect of the puzzle.

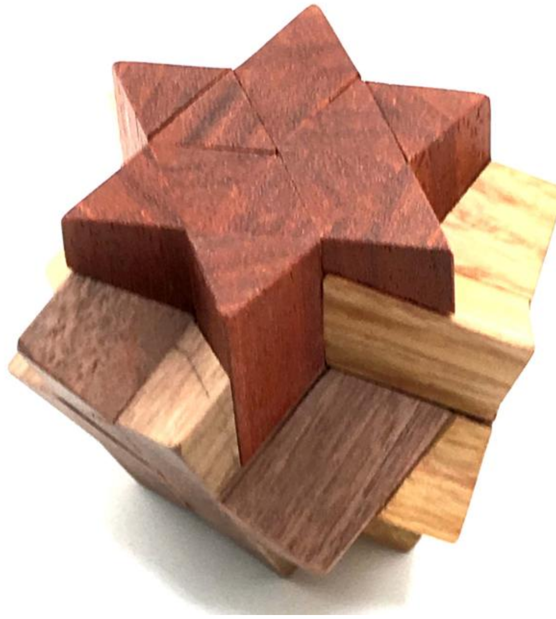
Shown on the cover are my versions of the first, second, and third stellations of the rhombic dodecahedron, truly a Stellar Family. The woods are padauk, poplar, oak, and Bolivian rosewood, all arranged in symmetry with like woods mutually parallel. All pieces are dissimilar and non-symmetrical (see page 25), and there is only one symmetrical solution to each. The "first" stellation, upper left, gets special mention. You will not likely find that shape mentioned in any mathematical text on stellations of the R-D. What is usually shown for the first stellation is a twelve-pointed star. I came up with that shape in 1971 as a model for one of the Geo-Logic series to be molded in styrene. That same year it also appears as my #4, Four Corners in four woods, but this 2025 version is the only one that can truly be called a puzzle, with six dissimilar non-symmetrical pieces. It does meet the mathematical definition of stellation, as well as being a satisfactory puzzle.

Part One. A photo gallery of designs listed in the original *Compendium* but here improved. Labeled M for modified or X for experimental.

11-M. Double Hex Prism in 4 woods: padauk, purpleheart, primavera, mahogany.

12-M. Triangular Prism in 4 woods: purpleheart, padauk, red oak, poplar.

13-M. The General in four woods: poplar, padauk, walnut, canarywood.



14-M. Augmented Second Stellation in 4 woods: purpleheart, mahogany, padauk, satinwood.

60-M. Super Starnet in twelve woods:

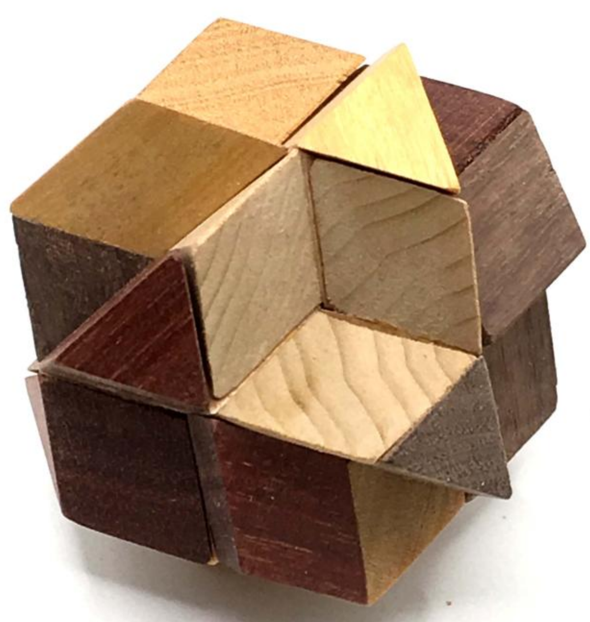
padauk
so. yellow pine
cherry
primavera
poplar
peroba rosa
Afr. mahogany
red elm
chakta viga
rosewood
canarywood
Osage orange

192-X. Prism Cell reduced, in mahogany and poplar.

Note: This is but one of several examples of a polyhedral shape being shaved down to be more nearly cubic. This can be done by either sawing or sanding. Sawing can be risky, and extra care must be taken to hold the work firmly and SAFELY in place. Sanding is slower but safer. What I like most about sanding as the final step, especially with shapes that lend themselves to it such as Starnet (above) and this one, is that it tends to hide some of my less than expert woodworking. For finishing on the belt sander, I use special frames that position the work accurately in place, and my sander has been modified to hold them.

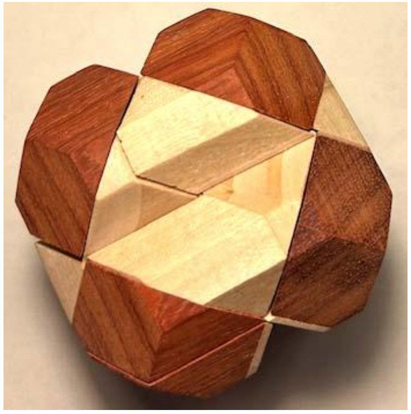
200-M. Fancy That in four woods: padauk, walnut, red oak, unknown.

207-M. The Park, in 4 woods: padauk, walnut, yellowheart, poplar.



207-X. The Park, reduced.

This is a variation of one of my favorite designs (above) here shaved down a bit to be more nearly cubic, giving it quite a different appearance. It accidentally got included in a box labeled experimental designs that I sent to Mark McCallum. When I wanted to include it in this Supplement as something new, he sent me photos of the pieces so I could make a reproduction. But then the markings on the pieces F-E-N-W-A-Y gave it away. The Park was designed for use in the puzzle exchange of the International Puzzle Party held in Boston in 2006, and the markings were of course intended as helpful hints at order of assembly. Woods are padauk and unidentified. Care must be taken in not shaving any more than the amount shown here, as some of the glue joints are already weakened.



23-M. Colored Scrambled Scorpius.

I have recently been experimenting with making the Scrambled Scorpius in multiple woods with contrasting colors. Each of the six pieces is made up of four legs, for a total of 24. One variation uses three different woods, another six kinds, and yet others eight and twelve kinds. In each version, like colors are arranged in some sort of axial symmetry, which might be an aid in solving, depending upon the particular arrangement. Many ways are possible, and I try to make it helpful. But then along comes the ultimate version with 24 different woods. No longer is color any help in solving. Ah, but wait. The legs are numbered 1-24, so mate piece 1-2-3-4 with piece 5-6-7-8, and so on. What fun!

Shown here is the 12-wood version. There are many different ways that pairs can be arranged in twofold symmetry, but this is my favorite with them diametrically opposite. In this version, all 12 woods are visible no matter which way viewed.

It looks like I have skipped using two kinds of wood, or four kinds. But I have some ideas about those and look forward to trying them out.

Part Two. More Recent Designs.

N-1, Vexit. This is obviously a color variation of Jupiter, one of my earliest AP-ART designs going back to 1971, and I don't know why it has taken so long to come up with this novel 10-wood version. The following is taken from the proposed instruction sheet.

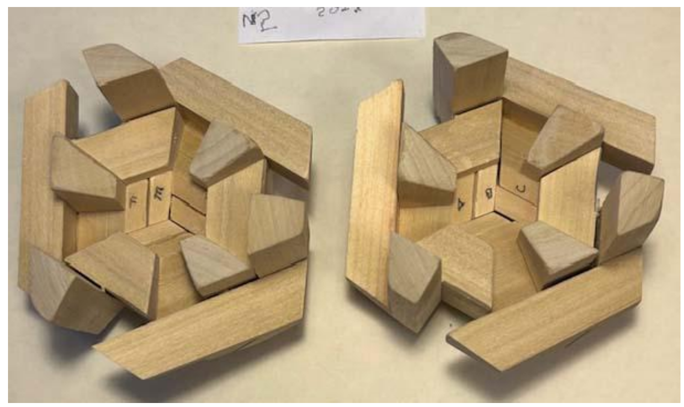
Note that Vexit is made of 60 sticks in 10 colors, six of each color, joined in fives to make 12 dissimilarly colored pieces. The first step, if not already done, is to assemble with each of the 20 triangular indentations one solid color, as shown below, with all opposite indentations the same color. In other words, in a form of threefold axial color symmetry. There is only one way. Then, how many of the four other ways can you discover to assemble with some form of axial color symmetry?

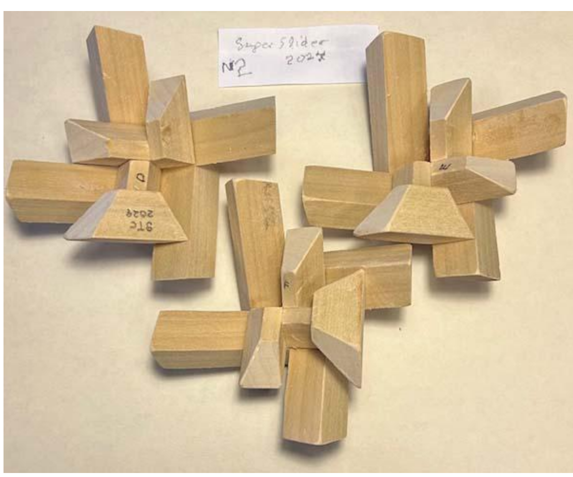
How many ways of assembly can you find in which no two colors touch each other. This gets more complicated, depending upon face contact, closeness end to end, or end close to edge. But for simplicity let's just say face-to-face contact only. There are four ways that do this and a great many more ways that don't.

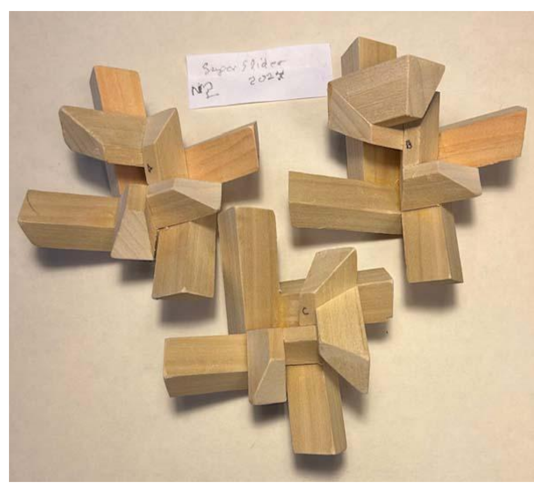
Woods used: yellowheart, bloodwood, purpleheart, peroba rosa, African blackwood, cocobolo, bocote, sapele, canarywood, and walnut. Made by Mark McCallum.

N-2. Spider Slider with Garnet inside.

The idea for this first appeared in Chapter 20 of my book *The Puzzling World of Polyhedral Dissections*. See also the *Split Star* in my later book *Geometric Puzzle Design*. It may violate my rule of simplicity, and it is fairly difficult to make, but then I did have fun making it, and some might find it fun seeking the one not very difficult solution. Note the pencil marks inside showing the solution. Wood is poplar, which I like to use for experimental models. This basic design has many possible variations, both inside and outside. In the example shown, outside is the #5 Spider-Slider and inside is the A-B-C—D-E-F Garnet. Inside and outside are glued together, resulting in six complicated puzzle pieces with only one solution and one order of assembly.



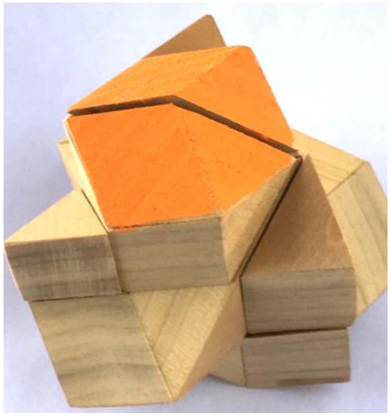


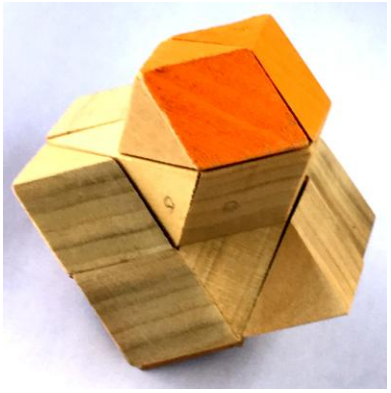


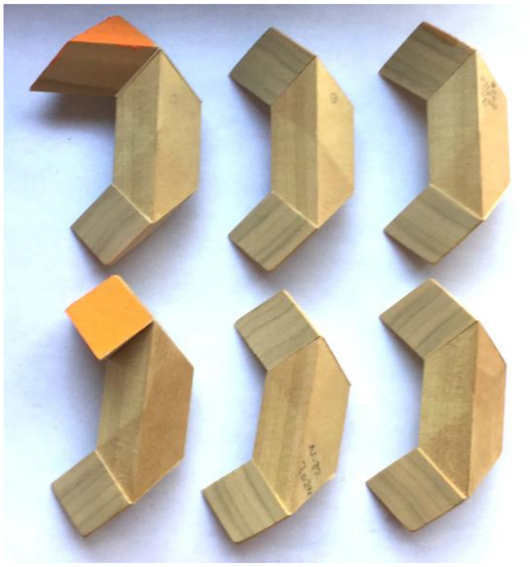
N-3. Lighthouse.

Lighthouse consists of six simple pieces, four of which are identical. There are two symmetrical solutions, which might be described as squat and upright. Too simple to be included? I don't think so. It was fun to make, and someone may have fun playing with it.

All six pieces are built with a center block to which are added a right-handed prism block on one end and left-handed on the other end (see Appendix). Then two colored prism blocks are added, one right-handed and one left-handed. This model is poplar, and the two colored blocks are painted to simulate the shining beacon light.





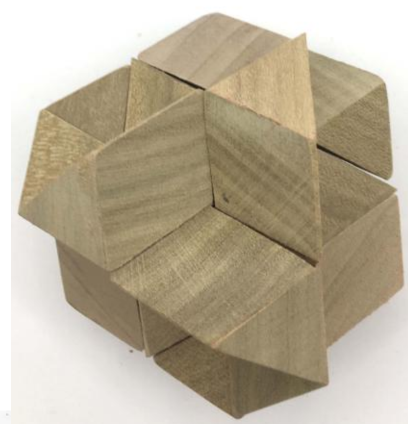


N-4. Four pieces in rectangular tray.

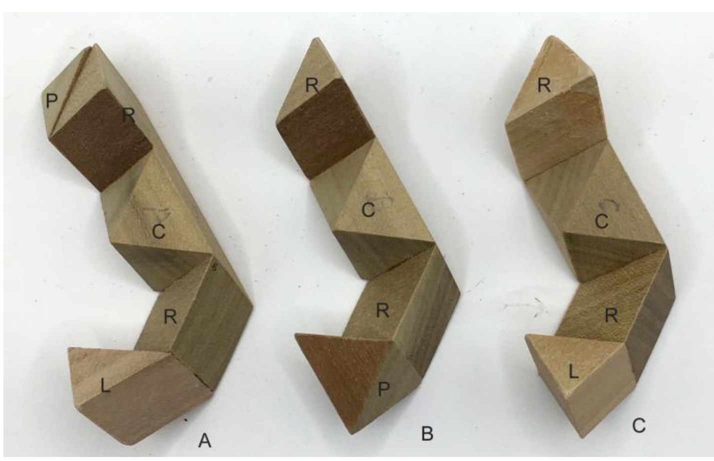
Perhaps it may look too simple to be included here. But I had fun designing it, and quite a bit of trial and error, and even science, went into this project before arriving at this one satisfactory design. It is not as easy as you might think. Try it on your friends and see.

There is always the question of whether or not unintended solutions exist. I don't know of any way to be completely sure, but on this one I am pretty sure. My other basic design rule is that all pieces be dissimilar and non-symmetrical. Also, I want the solution to look like a neat well-planned design and not just a jumble.

N-5. Simple as A-B-C.

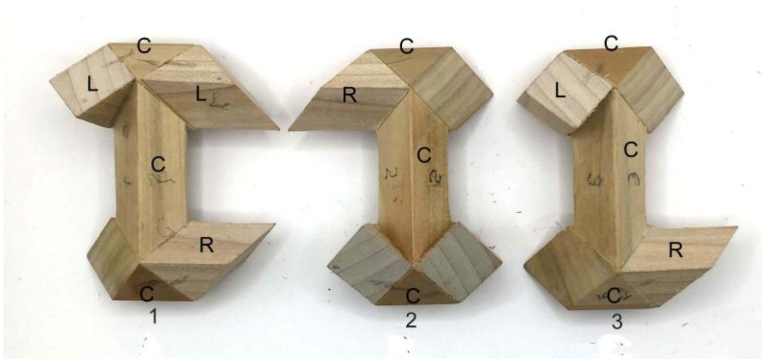


There are three kinds of pieces, A, B, C, and two of each. The puzzle goes together by mating two halves of three pieces, so naturally one would assume ABC plus ABC. Ah, but why make things that easy? It is, however, fairly easy to make. All six pieces are made with standard AP-ART building blocks, here in poplar. This is a redesign of a puzzle of the same name #111-C in my *Compendium*. It is here further simplified, easier to make, and I think more attractive. Assemble A-A-C clockwise, B-B-C counterclockwise.



N-6. Twister.

This design has six dissimilar pieces, only one solution, and only one axis of assembly. It goes together by the usual mating two halves of three pieces each. Both halves are assembled with coordinate motion. Some rounding of edges is required for this, which might be considered a design defect. Construction is fairly simple using standard building blocks C, L, and R, (see Appendix). First half is assembled by joining pieces 1 and 2, then twisting piece 3 into position.



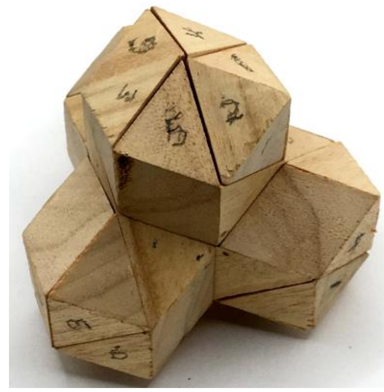
Second half is assembled by joining pieces 4 and 5, then twisting piece 6 into position, hence the name.

4 5 6

The two halves are then joined to complete the assembly.

N-7. Colored Four Corners.

The six dissimilar non-symmetrical pieces are the same shape as my old #34 Augmented Four Corners (1981) but here in six colorful woods in each "corner" arranged in symmetry. If you can figure out the color scheme, it might help in finding the one solution. Also shown is the model with numbering scheme used in the fun of gluing up. Woods are zebrawood, padauk, yellowheart, purpleheart, mahogany, oak, poplar, with primavera in center.

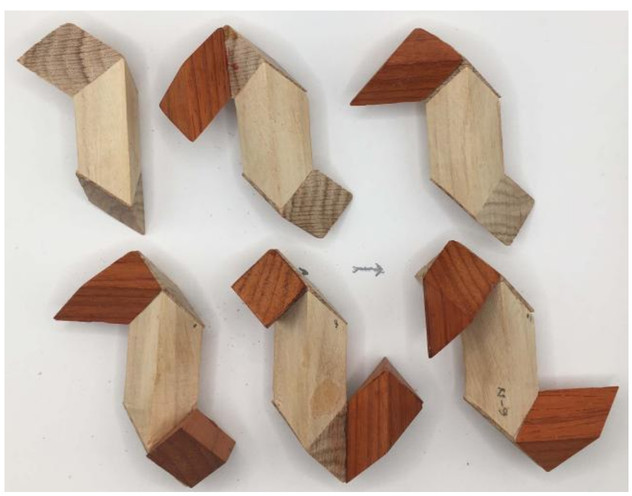


N-8. New Four Corners.

The shape may resemble the old #34 Augmented Four Corners and also N-7 above, but this is a new design, so simple that I don't know why it has lain in waiting until now. The six dissimilar pieces, all but one of which is non-symmetrical, assemble essentially one way only by the usual mating of two halves. One half assembles by tricky rotation. The construction of the six pieces begins with a six-sided center block and two right-handed prism blocks for each piece (see Appendix), here in primavera and oak. Then four right-handed and four left-handed prism blocks are added, here in padauk, to complete the construction. As AP-ART puzzles of this sort go, this must be just about the simplest and easiest to make, yet fun to assemble.

N-9. Newer Four Corners.

In designing combinatorial puzzles of the sorts listed in my *Compendium*, my usual design approach is to use all dissimilar and non-symmetrical pieces, as that increases the number of possible trials at seeking the solution, with preferably one only solution, while accomplishing all that with the fewest practical number pieces. Design N-8 above does this quite neatly except for that one symmetrical piece, which has been corrected in this redesign. The piece on upper left has been slightly shortened, so the lower added block is a pyramid block instead of a prism block, thus this piece is no longer symmetrical. The piece on lower right has a corresponding tetrahedral block added, barely visible as indicated by the arrow. It is not quite as easy to make as N-8, so take your pick.

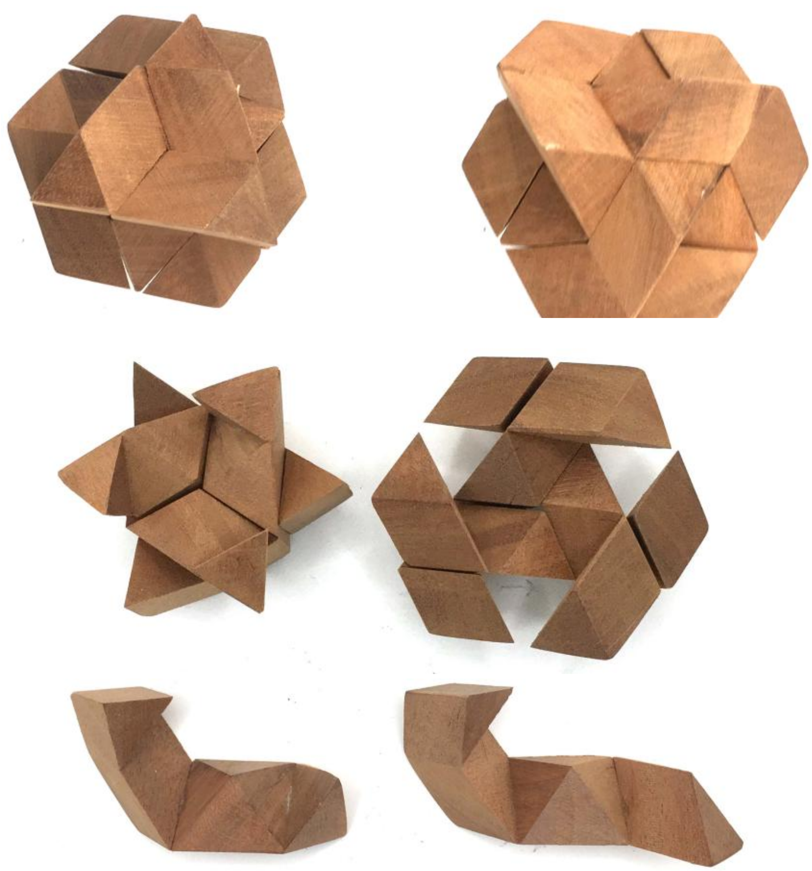


N-10. Difficulties.

An unusual shape with an unusual name. Viewed from the top one way it is a triangle surrounded by a hexagon. Viewed other side up, it is a threefold spiral. The three pieces in each half are identical, and they are made from the usual AP-ART building blocks. Each half assembles by intriguing coordinate motion.

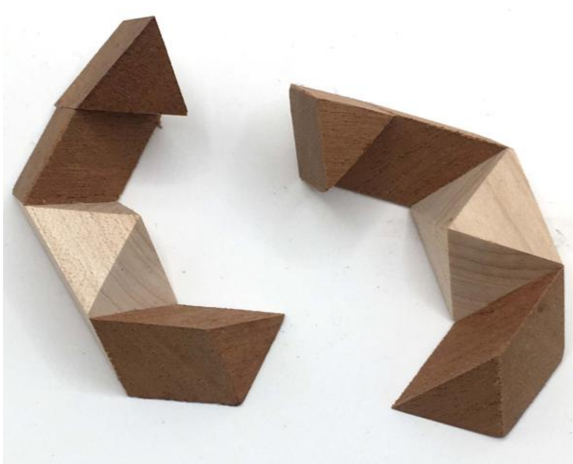
The name has nothing to do with difficulty of assembly, which rates about average. This design was among several I tinkered with recently, possibly just using up some scraps of lumber and an urge to be creative. They all ended up in a box labeled "Experimental." When I decided I had no further use for them, I sent the whole lot to Mark. But then I came up with this idea of a Supplement and decided to include some of those experimental designs such as this one. Mark sent me photos of the pieces, from which I was finally able to make this model. I made a few changes, such as making the three pieces in each half identical, which I think is an improvement.

Figuring out the construction of the pieces again was not easy, and getting them to fit together smoothly was also a challenge. So the only thing easy was coming up with the name. Keep that in mind if you try to make this one. Some sanding of edges and faces may be required to assemble without use of force. Wood is mahogany.

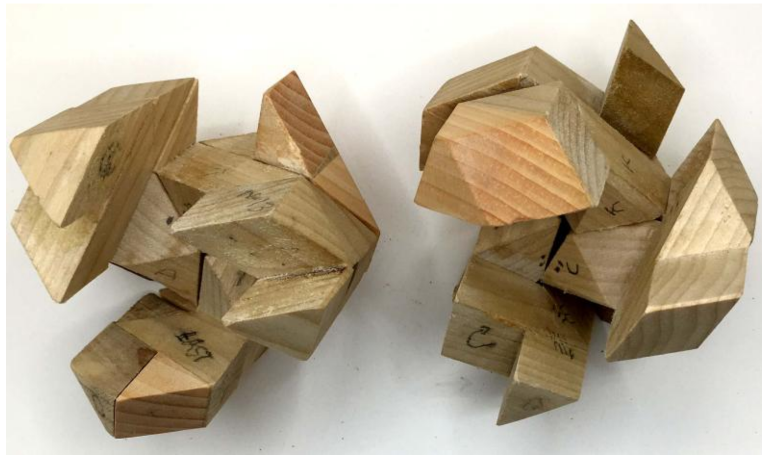


L R C T L R C R

N-11. This new design could be considered a sequel to Rosebud, easier to make and easier to assemble. Each half is made of three identical pieces that go together with neat coordinate motion. The two halves are mirror image of each other, and the three pieces in each half are likewise mirror image of those in the other half. Final step of assembly is mating the two halves to form an attractive polyhedral sculpture with threefold symmetry. Some other shapes are also possible. Pieces are made using standard AP-ART building blocks, C, L, and R. Woods here are maple and mahogany.



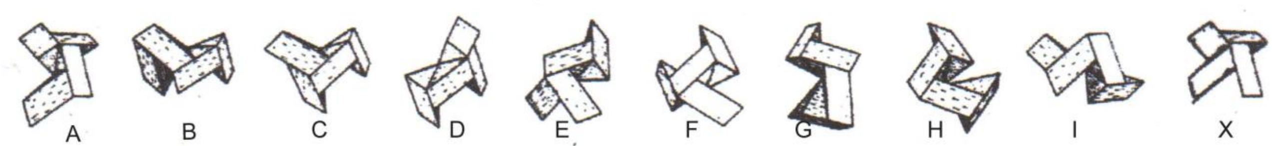
N-12. R-D. This one also goes together by mating two halves of three pieces each. Both halves go together by tricky coordinate motion, and some rounding of edges is necessary. Final shape is rhombic dodecahedron. All blocks are standard AP-ART building blocks.



N-13. Alphabet Stew.

More than just another puzzle, Alphabet Stew is a concept in recreational mathematics. It grew out of my design #60 Garnet, first made in 1984. To the nine non-symmetrical pieces shown on page 85 of my *Compendium*, add the symmetrical cross piece to make ten. The game is to discover how many different ways any six different pieces may be assembled into the Garnet shape (left below) but with vertices flattened to make six additional square faces as shown as on center and right, and with the center slightly hollowed out. That number is now known to be around a dozen, varying slightly depending upon how much the center is hollowed and how much force one is willing to use.

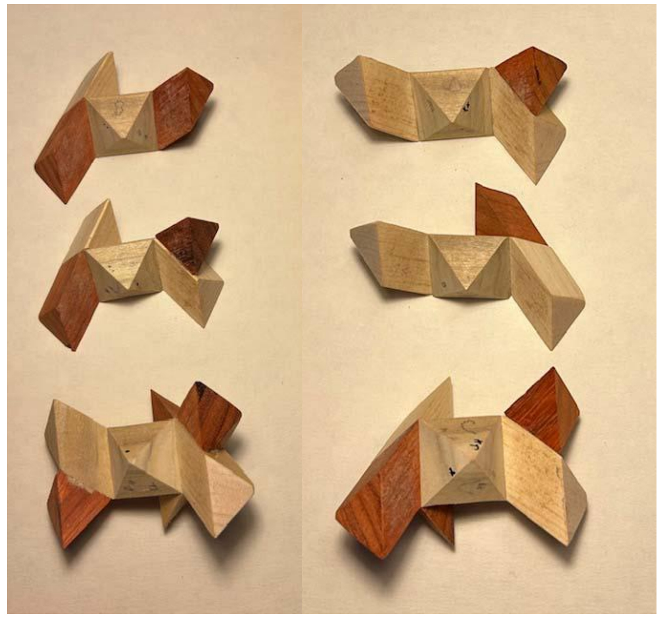
The ten standard A-S pieces are shown below. If duplicate pieces are used, or three-block and five-block pieces included, the number of solutions must be in the hundreds. Much of this was investigated and reported about ten years ago by Bob Finn. A set of six pieces has generally been assumed, but perhaps five or seven should also be considered. One looks especially for unusual solutions involving rotation, coordinate motion, or sequential assembly. Much of this is explained and summarized in an article that can be found by searching on the Internet for "Alphabet Stew by George Bell."

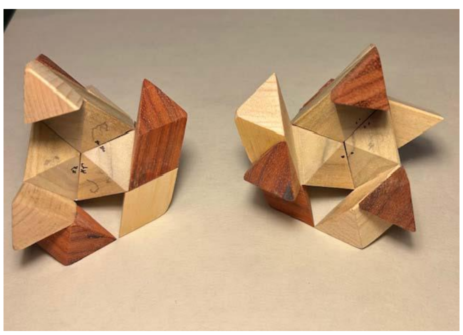


My hope was that the idea of seeking solutions for A-S might catch on with the public as a form of recreational puzzle, such as with Rubik's Cube, and that sets of pieces could be mass produced by injection molding. But it now looks like this is not going to happen, and perhaps it is just as well. The world is spared being flooded with ever more plastic and A-S remains where it probably belongs, as an intriguing concept and mathematical recreation. I also still prefer to see it made in wood such as the one shown above, finely crafted in maple and granadillo by Dave Rossetti using the A-B-E-F-I X set that I will label N-13.

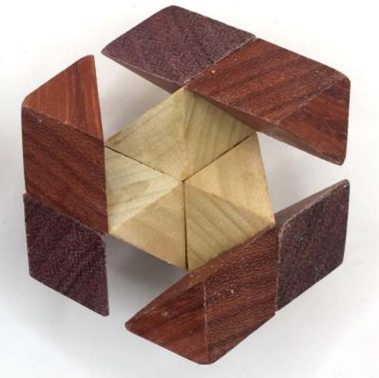
I have accumulated 30 pages of notes listing possible A-S combinations, some routine and some with special featured. Among all those, my favorite set, now labeled N-14, is C-D-F-G-I-X. It is unusual by involving both rotation and serial interlock. They are all the same final shape. I am now discarding those notes. I think it might be better sometimes just to leave things unpublished and let others enjoy re-discovering.

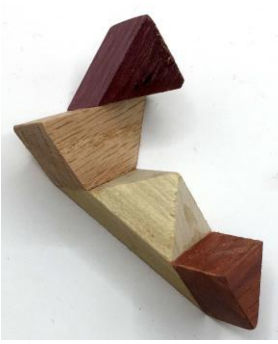
N-15. The original Second Stellation #14-A (1990) is here revised yet again. The idea this time was to modify the original Second Stellation to reduce the number of solutions from two to one. Success! As usual, all standard AP-ART building blocks are used, and this version is quite easy to make. Woods here are primavera and padauk.



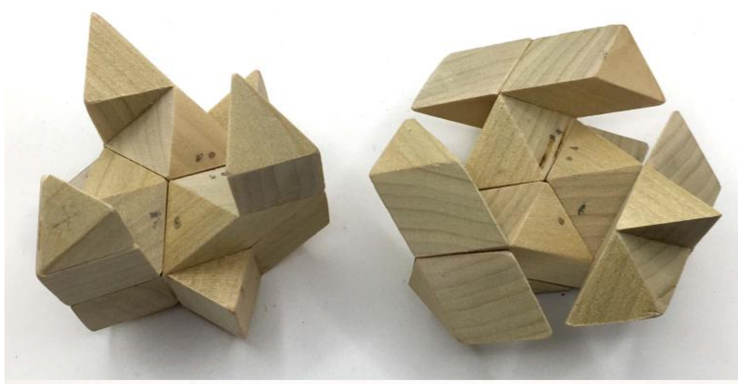


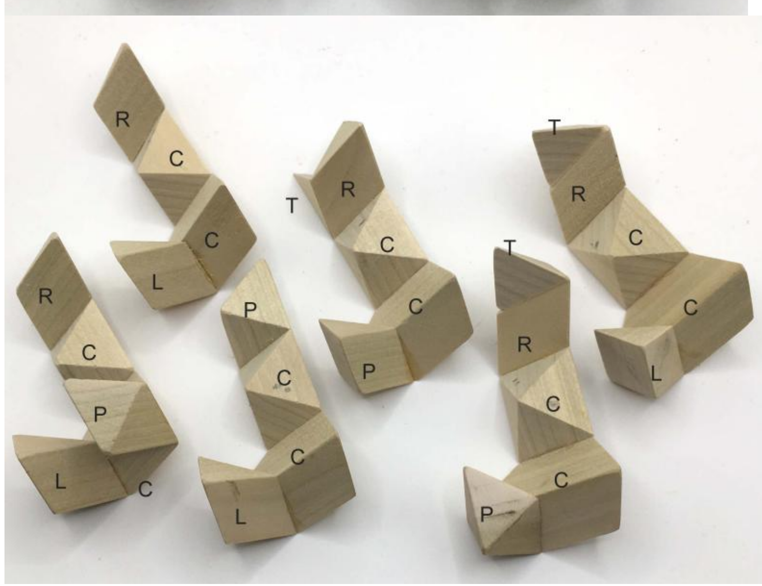
N-16. What Fun! Six identical pieces form two dissimilar halves by simple but amusing coordinate motion, which then slide together to complete the assembly with threefold axial symmetry. Standard AP-ART building blocks are use - C, L, and R. Woods here are poplar, oak, padauk, and purpleheart. Fairly easy to make and fun to assemble. Not sure what to call this shape. Perhaps just polyhedral.





N-17. More Fun. This is a variation of N-16 above but this time with six *dissimilar* pieces. How many different ways can they be assembled? And how many of those solutions are symmetrical other than the one shown below? This is one of several new designs where I have not yet made the effort to investigate questions like that. I think it might be More Fun to just leave things that way.





N-18, Two-in-One. N-19, Rainbow. N-20, Octet-in-Wood. N-21, Think Again.

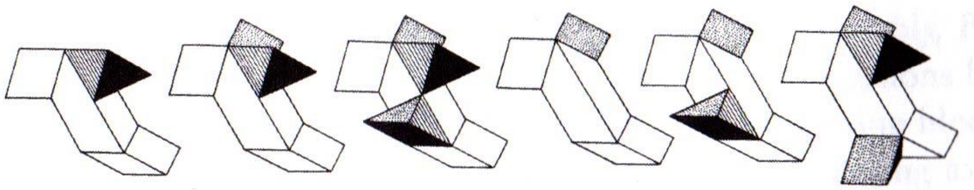
These are yet more variations of the good old #14 Second Stellation. You can probably tell from that serial number that it goes back nearly to the beginning of AP-ART. About 100 Second Stellations were made from 1981 to 1985, mostly in combinations of various fancy woods.

I always considered that design to be a lucky discovery. The six dissimilar pieces represent all possible non-symmetrical combinations of the two kinds of end blocks, while producing a neat solution with the usual polyhedral symmetry. It is also fairly easy to make. The one apparent fault was having two solutions rather than just one. And now, half a century later, I realize that actually made it even more interesting (if only it had dawned on me sooner).

In the first version, N-18, *Two-in-One*, which uses two dissimilar woods, the two solutions can be recognized by the three-fold axial color symmetry of one solution (left photo) which will be lacking in the second solution. So now we have doubled the fun by seeking both solutions. Furthermore, knowing that, perhaps you can find the symmetrical solution by using logic rather than random search. This shape is called *Augmented Second Stellation* in my *Compendium.* As shown below (center), it can be shaved down to be more nearly cubic. An octagonal shape is also possible.

Next is N-19, *Rainbow.* In the symmetrical solution shown on right, six dissimilar woods of contrasting colors are used. Note that the shape has four threefold axes of symmetry, i.e. octagonal. In the symmetrical solution, when viewed along any of these axes, the triangular central shape shows three dissimilar woods. Furthermore this central trio is surrounded by a hexagonal ring made up of the other three colors. And this is true along all eight axial views. Think of the design then as a little amusement in combinatorial mathematics.

The next model in this prolific family of Second Stellation variations is N-20, *Octet in Wood*. In the symmetrical solution all of the eight dissimilar woods are seen when viewed along any one of the eight three-fold axes of symmetry. In the center are three dissimilar woods, surrounded by a six-pointed star with the next three woods arranged in two-fold symmetry. Then surrounding all is a hexagonal arrangement of the remaining two woods in three-fold symmetry. The woods in this model are padauk, yellowheart, purpleheart, oak, tulipwood, primavera, cherry, and mahogany.



Last one in this series is N-21, *Think Again.* Here is yet one more variation, this time using twelve dissimilar woods. In the symmetrical solution, the two end blocks of like woods are located side by-side next to each other in reflexive symmetry as shown. You might think that with this feature, solving the puzzle ought to be a snap. Well, think again. This is my favorite of the four, and a good one to end on. The woods are padauk, yellowheart, mahogany, primavera, canarywood, oak, purpleheart, zebrawood, bubinga, poplar, pau rosa, and cherry. Standard AP-ART building blocks C, P, and R are used, and in each of the six pieces all blocks are dissimilar woods. Thus we begin and end with stellations of the R-D. All but perhaps the third stellation (cover photo) are fairly easy to make, and fun to play with.

Puzzles for All Ages

Nearly everyone must have had at least a few amusements among his or her childhood treasures based on the simple principle of taking things apart and fitting them back together again. Indeed, many children show a natural inclination to do this early in life. Constructing things out of wooden sticks or blocks of stone must surely be one of the most primitive and deeply rooted instincts of mankind. How many budding engineers do you suppose have been boosted gently along toward their careers by the everlasting fascination of a mechanical construction set? I know I certainly was. Even after life starts to become more complicated and most childhood amusements have long since been left by the wayside, the irrepressible urge to join things together never dies out.

Construction pastimes in the form of geometrical assembly puzzles have a universal appeal that transcends all cultural boundaries and practically all age levels. Young children catch on to them most quickly. One of the puzzle designs included in my book *Geometric Puzzle Design* was the inspiration of an eight-year-old, and children younger than that have solved many of them. So much, then, for the presumptuous practice of rating the difficulty of puzzles according to age level, with adults of course always placing *themselves* at the top! Likewise, almost anyone from school student to retiree having access to basic workshop facilities should be able to fabricate many of the puzzles that are described in my *Compendium* and can be found on my website *stewartcoffin.com* including the two below.

One of the puzzles shown is the familiar complete set of twelve pentominoes, made of brightly colored cubic blocks joined together different ways and packed into a 3x4x5 box. It is intended for my four-year-old great-grandson Rowan. The other is the *Half-Hour Puzzle*, with six dissimilar pieces that fit one way only into a 3x3x3 cubic box. It is for my two-year-old great-granddaughter Juliana. Are they too young for these puzzles, you may ask. I don't think so. Rowan will have fun creating various new constructions, and the intended solution can come later. Likewise, Juliana should be able to fit the final piece into place, and to progress upward from there. (Added note: Already done.)

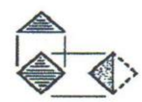
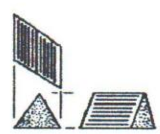
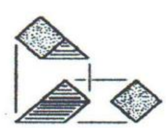
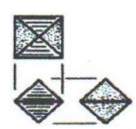
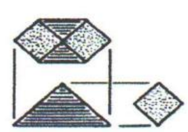
APPENDIX — BUILDING BLOCKS

Most of the designs based on the diagonal burr have puzzle pieces fashioned from polyhedral blocks derived from dissections of the rhombic dodecahedron. If the geometry of these pieces is not entirely clear to the reader from the drawings alone, some hands-on experience with the blocks should help to clarify things. If the requirement for accuracy is set aside for the moment, they are all easy to make, even with hand tools.

For our purposes, the tetrahedral block is taken as the most basic unit, although of course it could be further subdivided ad infinitum. Many of the blocks are made equally well from either square or triangular stock

Many of the drawings refer to the building blocks by their letter designation (i. e. **T** for the tetrahedral block).

Many designs also use triangular stick segments of various lengths.

		Triangular Stock	Square Stock
T	**Tetrahedral Block** Basic Unit — Made from triangular stock without waste or square stock with waste		
P	**Rhombic Pyramid Block** Two Tetrahedral Block (T) Units — Made from triangular stock without waste or square stock with waste		
R	**Right-Handed Prism Block** Three Tetrahedral Block (T) Units — Made from either triangular stock square stock without waste		
L	**Left-Handed Prism Block** Three Tetrahedral Block (T) Units — Made from triangular stock without waste or square stock with waste		
O	**Squat Octahedron Block** Four Tetrahedral Block (T) Units or Two Rhombic Pyramid Blocks (P) — Made from square stock with waste		
C	**Six-Sided Center Block** Six Tetrahedral Block (T) Units or Two Prism Blocks (R or L) — Made from square stock without waste		
Δ	**Triangular Stick Segment** Various lengths