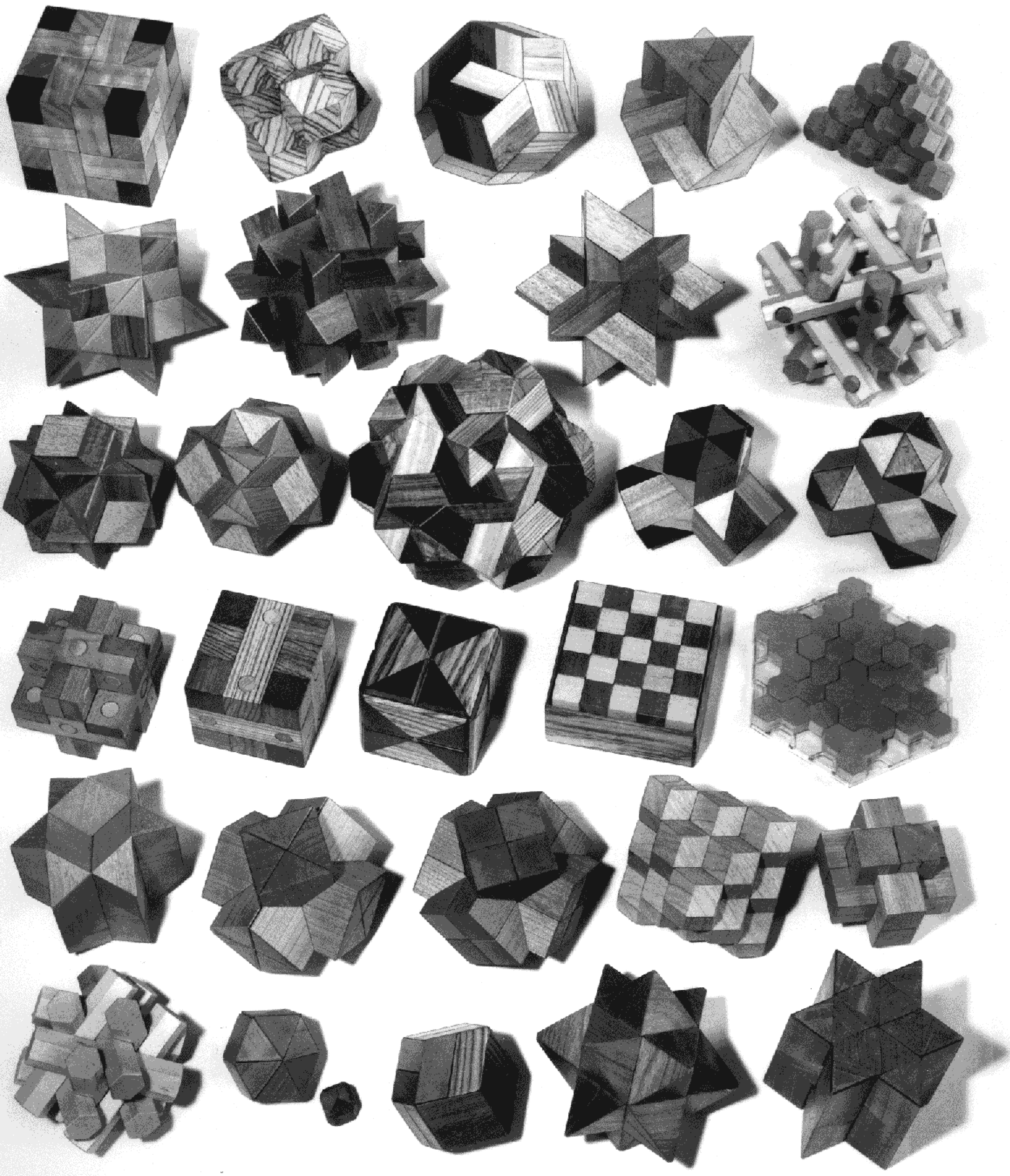
Puzzle Instructions & Ephemera

Stewart T. Coffin

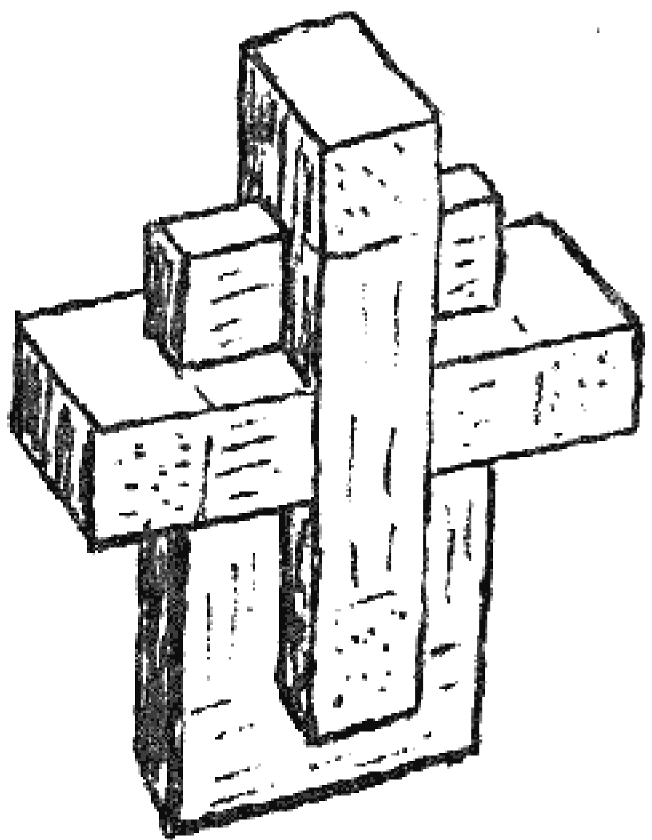


Revised Edition 2011

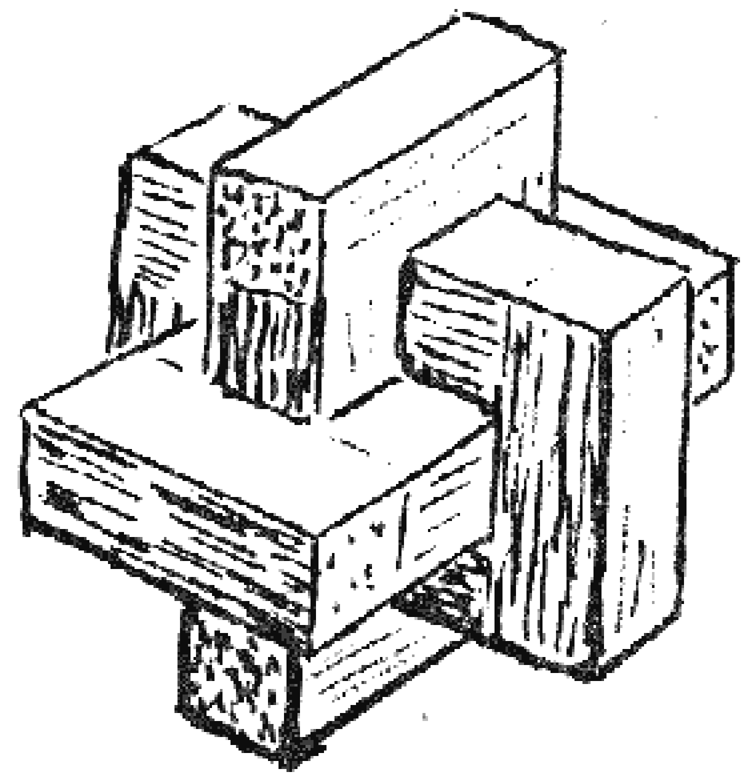
STEWART T. COFFIN

Puzzles

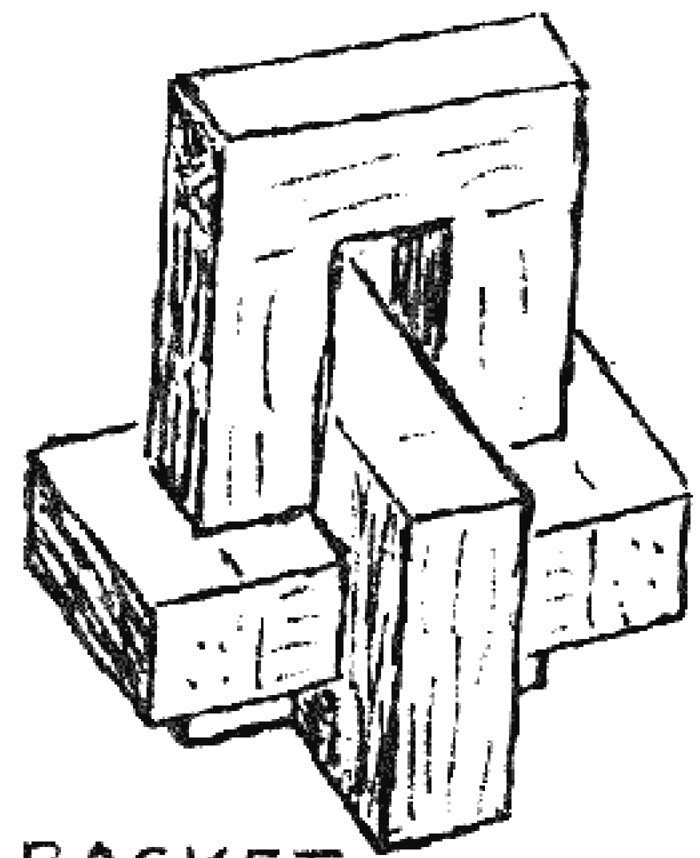
OLD SUDBURY RD. RFD 1 LINCOLN, MASS. 01773



WINDMILL



OCC-WOOD



BASKET

The OCC-WOOD Puzzle consists of three large pieces and two small blocks. The assembled puzzle is shown in center above. This is a new version of an ancient puzzle design. A minor variation Basket is shown at right. Be sure to include both blocks when re-assembling these - they make it harder to disassemble. To do Windmill, omit one block. What other shapes can you discover? With two sets?

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Puzzles

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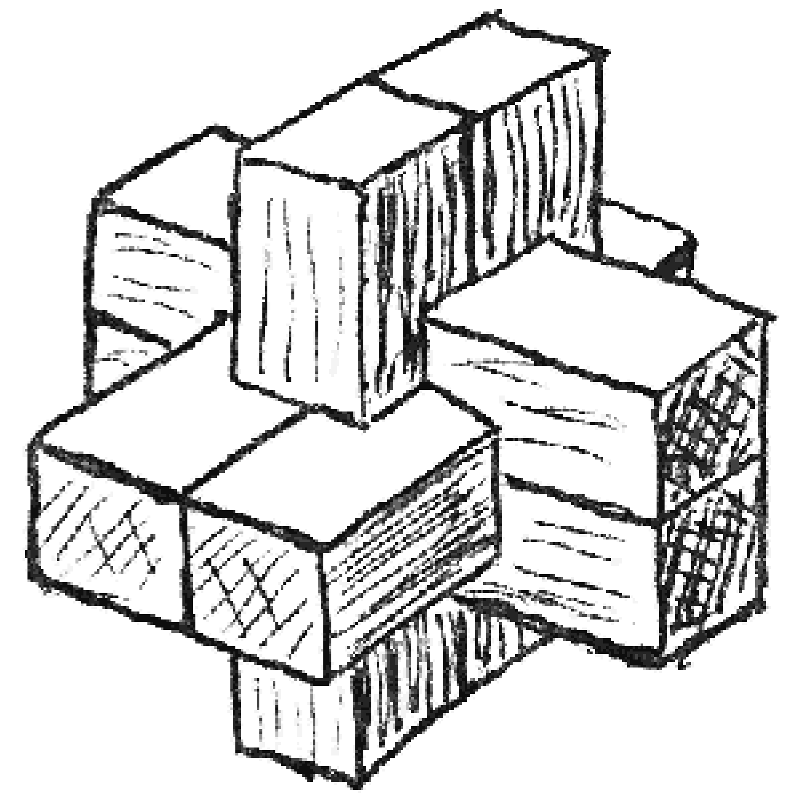


Instructions for REC-TANGLE Puzzle

Those of you who are familiar with the AP-ART line of interlocking puzzles will appreciate the fact that these puzzles are based on geometrical principles pure and simple. While I have gone to great pains to make some of them fiendishly surprising and confusing to solve, it has been done without trickery or concealed mechanisms of any sort. Since this puzzle is somewhat of a departure from that policy, I think it only fair to explain. Some will recognize this design as a new version of the old "Triple Cross" puzzle, which was often whittled of wood, and had three pieces. It was very easy to disassemble, and only slightly harder to put back together. This puzzle slides apart in exactly the same manner. The first step of disassembly is hindered, however, by a dowel which is loose in the hollow center and jams the action. To start, it is necessary to shake the dowel until it becomes lodged in a hole. You can tell by the sound when this happens. The pieces are then ready to slide apart. It takes patience. It also helps a great deal if you know where the hole is located. Close examination will reveal that one of the pieces is slotted. The hole is in that piece, opposite the slot. The rest is up to you. The puzzle can be made relatively simple by omitting the dowel when reassembling.

#1 THE ORTHO-CUBE PUZZLE

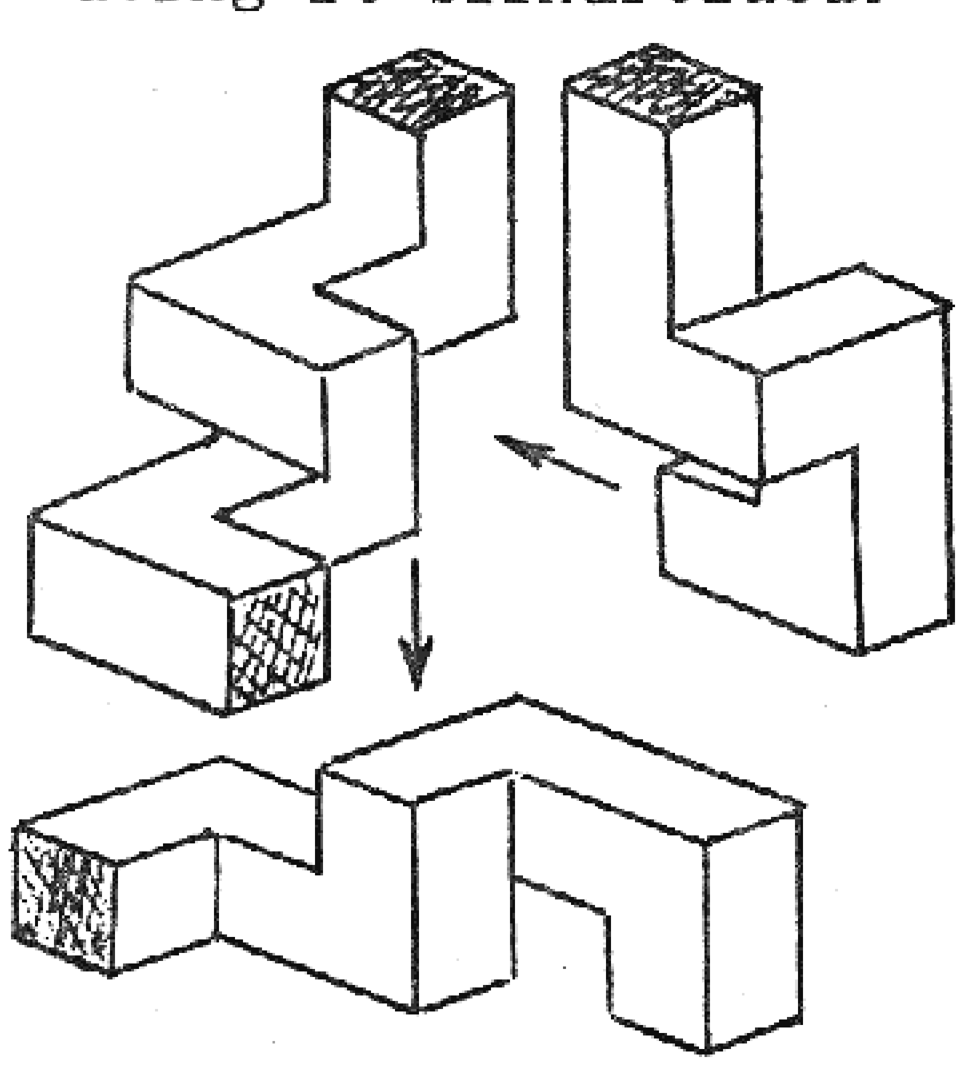
What is it? In geometrical terms, ORTHO-CUBE is a twelve-piece cubic interlocking puzzle. It possesses a dual order of symmetry, making it unique among all known puzzles of this type.

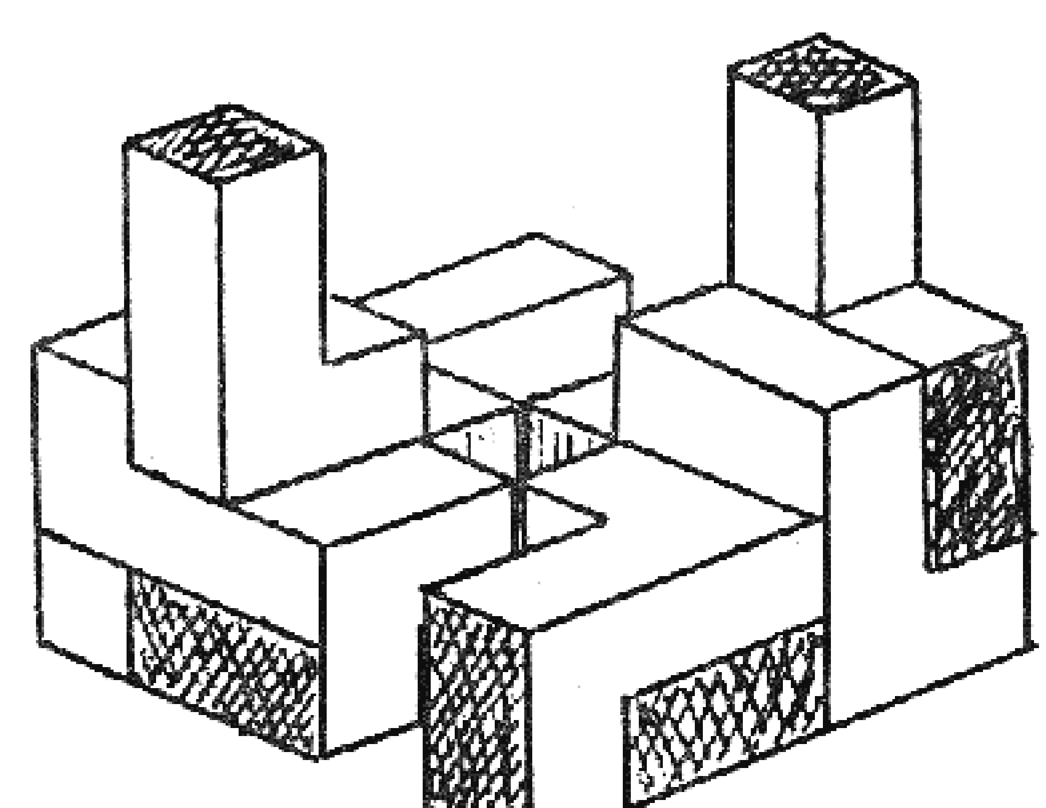
Why the Holes? The involute concavities in the center of each face are a functional aspect of the design, as you will soon discover.

How came the name "ORTHO"? Orthogonal means perpendicular or rectangular, having right angles. Also, in Greek Mythology, Orthrus was a two-headed monster. Or, to stretch the point a whisker, Orphic pertains to Orpheus, hence mysterious, occult, enchanting; also Orphism, an art form characterized by non-representation of form and space, otherwise known as, of all things, Cubism.

Does it Come Apart? Of course. Find a face that has two dark squares (rather than rectangles) and push on both of them. Voila, you now have two halves which are completely identical. Carefully set one half aside for future reference. With the other half, slide the two corner sections toward each other, rotate them slightly, and you now have two quarters which are likewise identical. Set one of these aside also. At this stage, the quarters are inclined to disintegrate spontaneously into three non-identical pieces.

To Reassemble Nothing could be easier. Just repeat the above in reverse order, copying the quarter and half that were (hopefully) set aside. Once the first step of ORTHO-CUBE is thus memorized, its dual symmetry makes it relatively easy to master, despite its apparent complexity, and soon you can amaze your friends by doing it blindfolded.



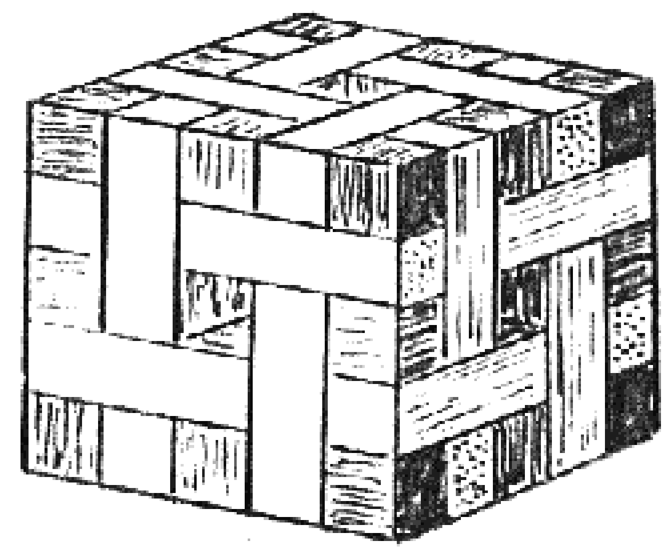


About the Construction ORTHO-CUBE was designed and is made by Yankee craftsmen, in a unique family operated puzzle shop on a rural New England homestead. The wood is native birch. The finish (smell it) is a special homemade formula containing beeswax produced right on the farm.

STEWART T. COFFIN
Puzzles
OLD SUDBURY ROAD
LINCOLN, MASS. 01773

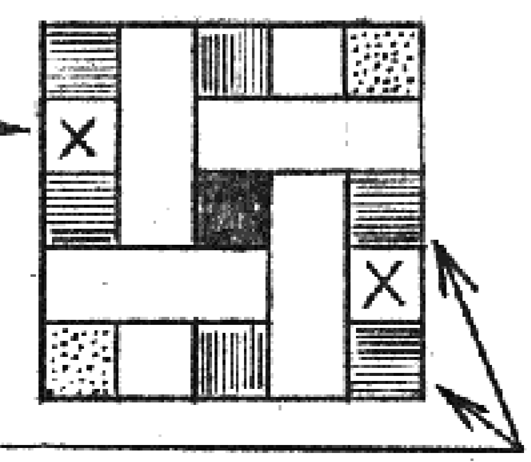
#1-A

THE CUBE Puzzle



What is it? In geometrical terms, THE CUBE is a twelve-piece cubic interlocking puzzle. It has dual symmetry, making it unique among all known puzzles of this shape. Notice that the identical pattern appears on each of the six faces.

To Disassemble This can be tricky - random poking or shaking may or may not produce the desired result. Place your index fingers through holes on opposite sides, and press with thumbs on blocks shown at right: Try different sides until something happens. Or, examine closely the blocks on either side of the thumb positions, until you find two pairs that all show side grain rather than end grain. (Secret hint: the key blocks are between them.)

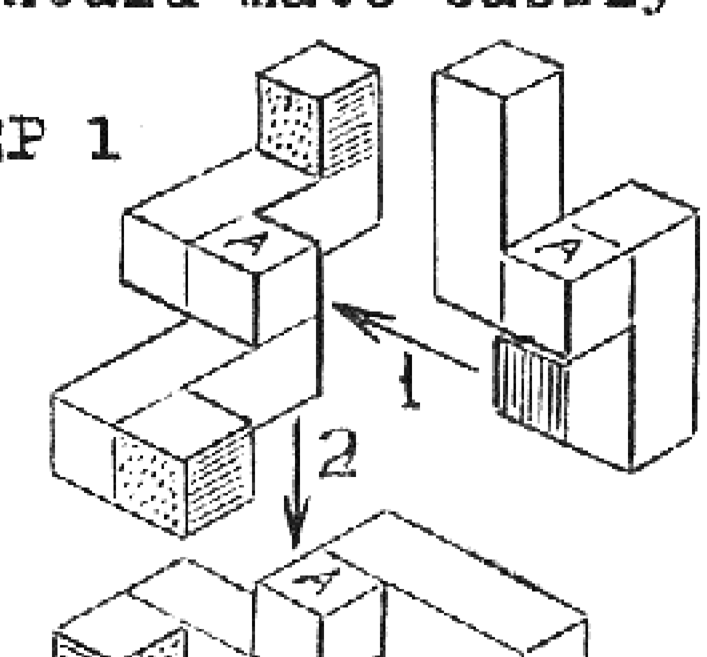


Voila! You should now have two halves which are completely identical. Carefully set one aside for future reference. With the other half, slide the two corner sections toward each other, rotate them slightly, and you now have two quarters which are also identical. Set one of these aside too. The other quarter should now come apart easily into three dissimilar pieces.

To Reassemble What could be easier? Simply repeat the above in reverse order, copying the quarter and half that were (hopefully) set aside. Note that the first three pieces must go together one particular way, and also in a particular order. Once this first step is memorized, the dual symmetry makes it relatively easy to master, despite its apparent complexity. Soon you will amaze your friends by doing it blindfolded.

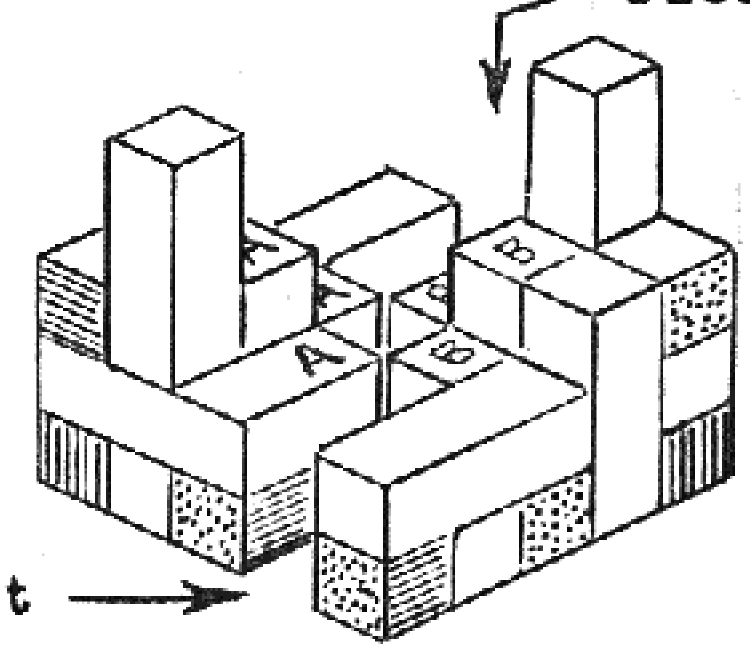
The first two steps of assembly are illustrated below. Very little force should be required. In the final step, the two halves should mate easily if they are aligned with care.

STEP 1



Note: letters all face same way

Piece C in this slot



When mating halves, for best fit, put piece D in this slot

STEP 2

Notes on the Construction See if you can identify the different cabinet woods used in THE CUBE. All of the colors are natural - no stains are ever used. The finish can be restored with wax. If a piece should happen to break and require cementing together again, care must be taken to align the parts carefully. These pieces are sawed, sanded, and glued by a craftsman using a set of ingenious jigs which are maintained accurate to a few thousandths of an inch.

For Tom Rodgers: Piece No. 1

Supplementary Instructions for 1986 edition of The Cube Puzzle, 1-A.

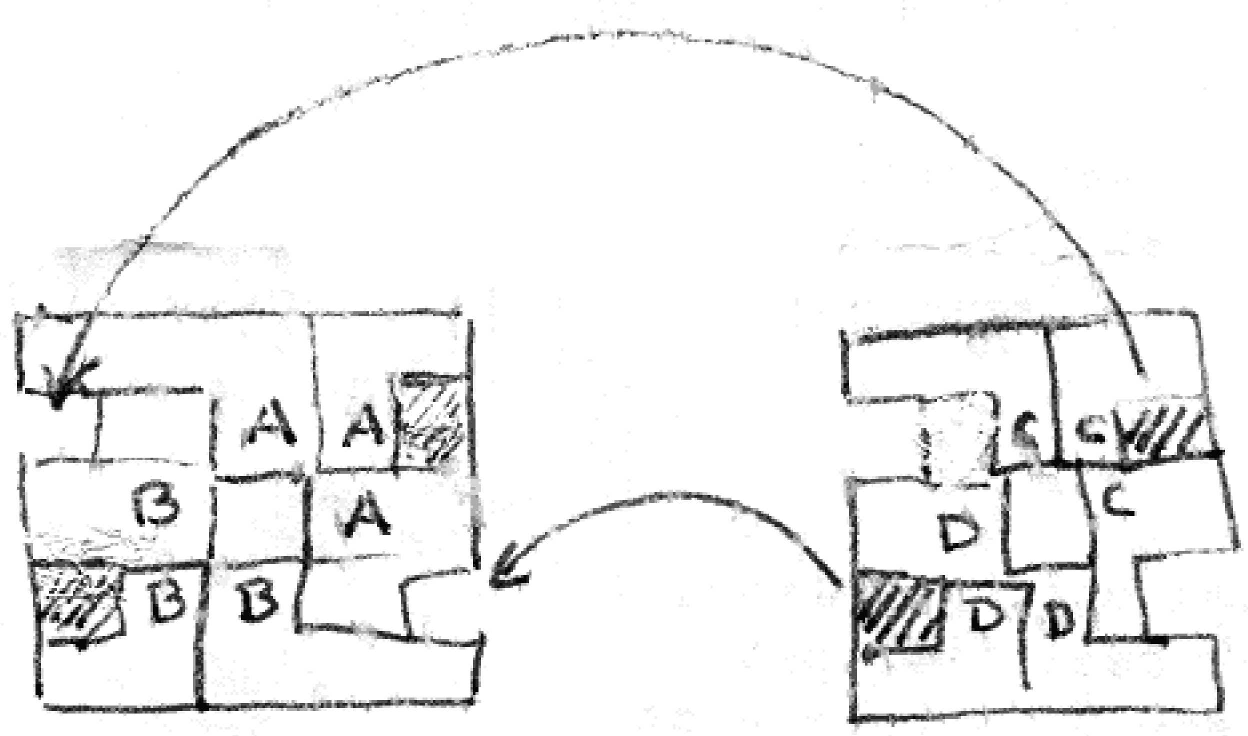
This puzzle was the first I designed for production in wood. It was designed in 1970 and produced until 1972, (see Puzzle Craft, page 83). This reedition is the first I have made since then. It is easily distinguished from the original because the external pattern on the faces is the mirror image of the original. Printed on the other side of this sheet is the original instruction sheet, which generally still applies except that it must be reversed.

One problem I had with the original version was inaccuracy of fit. This has been vastly improved in this new edition through fourteen subsequent years of woodworking experience and better techniques and equipment. Some of the joints are still fit-at-assembly, and the outside faces are sanded after assembly, so it is still true that the best fit is obtained only when the puzzle is reassembled in exactly the same way. In order to do this, the pieces are lettered as before, and the diagram below shows how they should be arranged.

This particular puzzle is made of Padauk (red), Satinwood (light), and Rosewood (dark). These are three of the most stable woods I use, so the puzzle should be less susceptible to humidity changes than the old version. Nevertheless, it will still be tight during humid conditions and looser when dry. Caution must be used in letting friends and guests handle it when it is loose, as the two halves can slide apart easily and unexpectedly, and several have been dropped and broken in this manner.

To restore finish, polish with wax. The Padauk will retain its bright color best if not stored in direct sunlight.

S.T.C.
Nov 7, 1986



#2

THE PENTABLOCK PUZZLE

The intriguing PENTABLOCK PUZZLE is based on a diabolical mathematical circumstance, the nature of which should be explained briefly, after which the object of the puzzle (but not the solutions) will be clear.

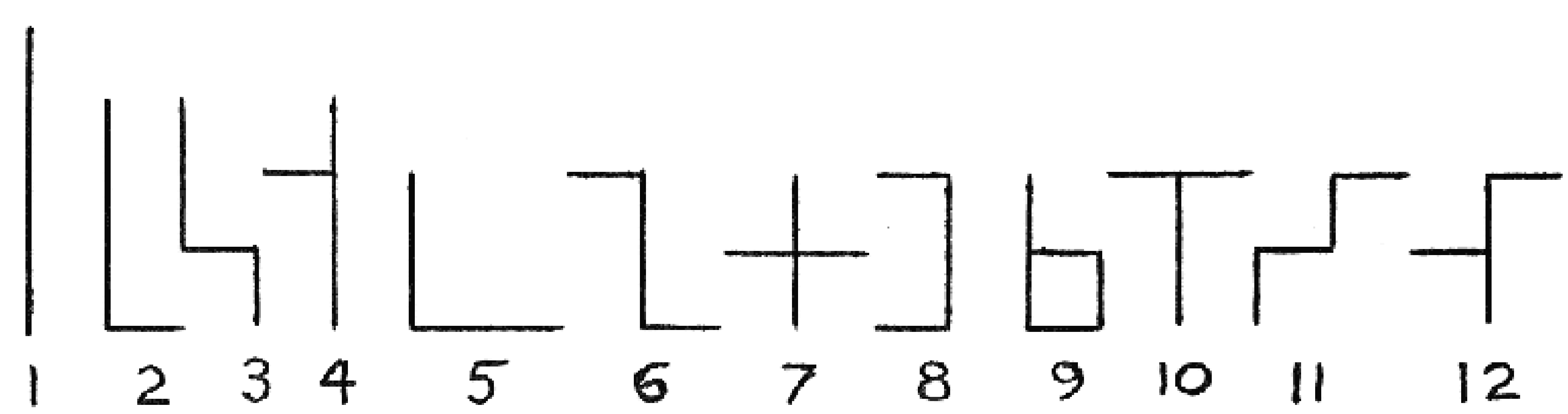
Notice, first of all, that there are twelve pieces, no two alike. But they all have one unique property in common. What is it? They comprise all the different ways in which five cubes can be joined together, face to face, in a flat configuration. (You can verify this easily by tinkering with five squares of cardboard.) Thus there are in all 60 cubic units. This is a lucky number, as 60 has an abundance of factors: 2,3,4,5,6,10,12,15,20,30. This suggests that the pieces might fit together in the following rectangular patterns: 2x30,3x20, 4x15,5x12,and 6x10. The 2x30 is impossible - try it and you will soon see why - but the others are all possible. Furthermore, there are three possible solid rectangular stacks: 3x4x5 (the box), 2x3x10, and 2x5x6. One solution of the 3x4x5 is illustrated. There are many others. Puzzle enthusiasts will surely wish to discover at least one new and original solution to the 3x4x5 which they may claim as their own, as well as solutions to each of the other configurations listed above. How many of each can you discover?

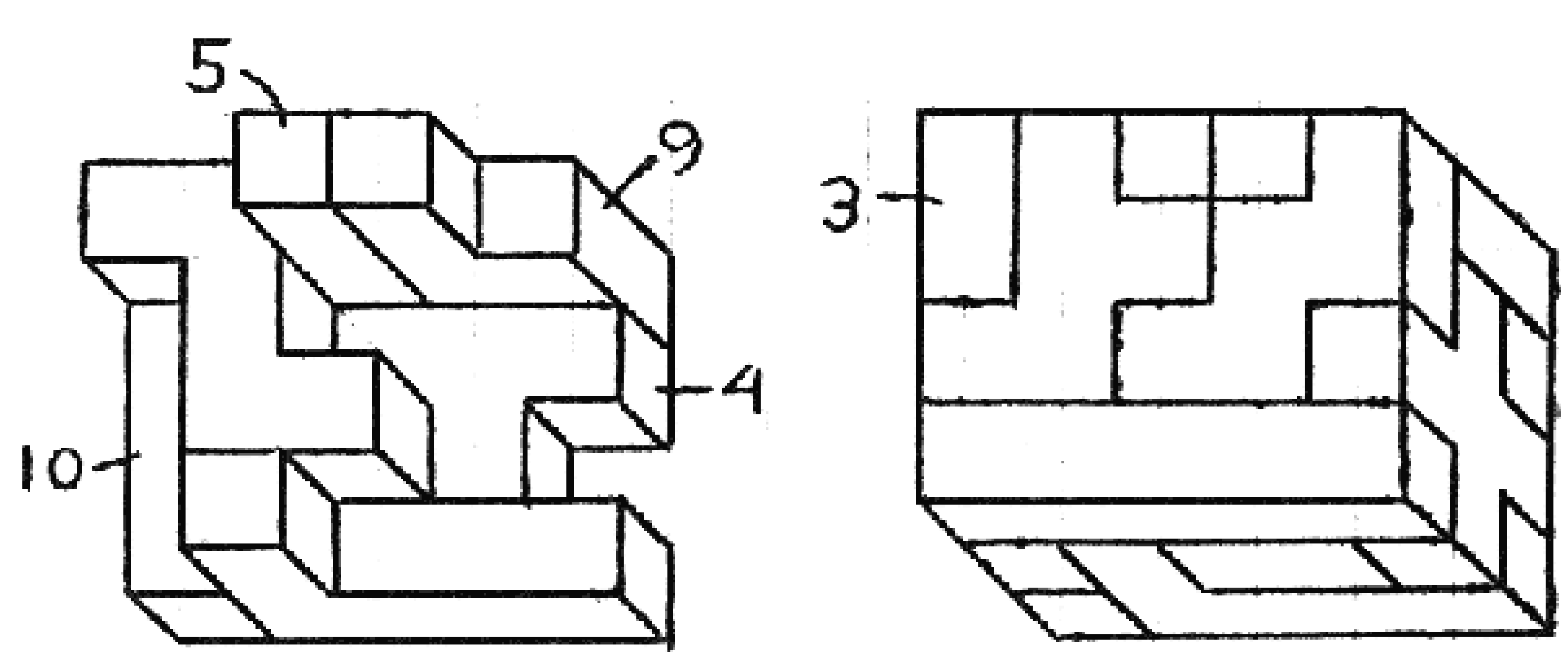
WARNING - MAY BECOME HABIT FORMING - KEEP OUT OF REACH OF FRIENDS

What other new and interesting shapes can you create? One example, Porch Steps, is illustrated. How about pyramidal forms?

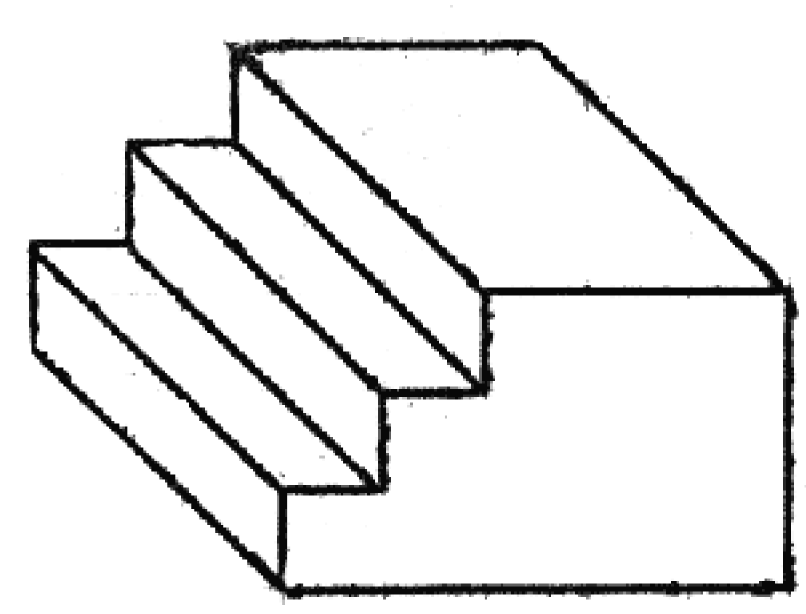
For keeping track of your various solutions, a simple schematic line diagram on graph paper is suggested. For solid solutions, it helps to number the pieces as shown.

A game which two or more can play is to place the Pentablocks inside the box until one person - the looser - is unable to fit one in. If you have two sets, you can have a race to see who can place them in the fastest. This is more fun if done blindfolded.





3x4x5



PORCH STEPS

For <Deleted>   Piece No. 2

Supplementary Instruction Sheet for the Pentacube Puzzle, 2-B

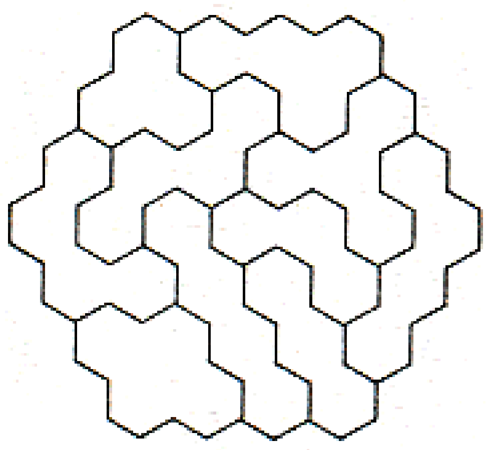
This puzzle is in the public domain and is described on page 30 of Puzzle Craft under the heading of "Solid Pentominoes." (See also page 83.) This version in fancy woods was produced around 1977, and about 20 were sold. The original instruction sheet is reproduced on the other side of this sheet. There is also a card in the bottom of the box identifying the woods.

This special reedition is with nicer woods than were available to me in the original edition. More care has been given to their placement, and the box is also improved considerably, as well as the accuracy of the pieces.

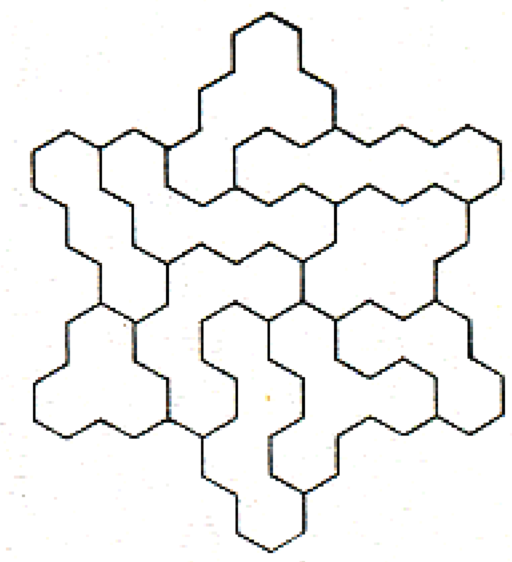
S.T.C.
Nov 11, 1986

Snowflake™

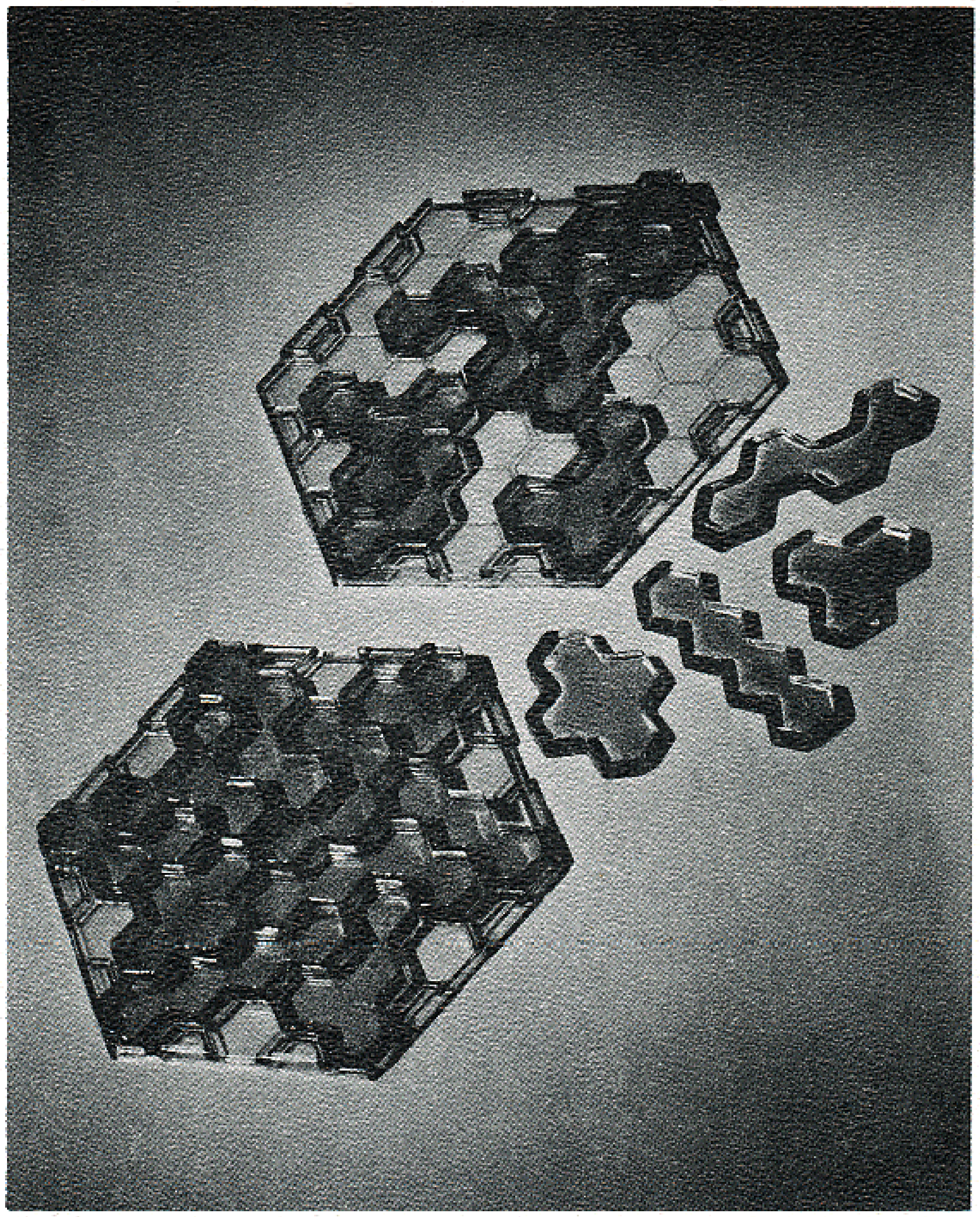
A SET OF INTRIGUING PUZZLES AND GAMES FOR ALL AGES

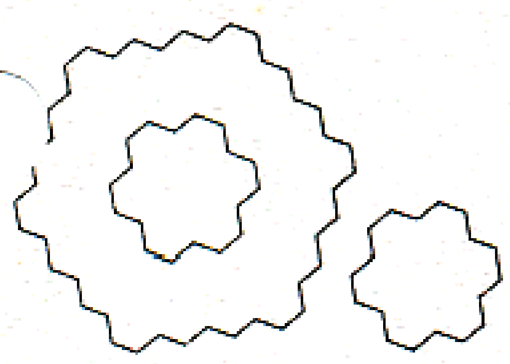


HEX

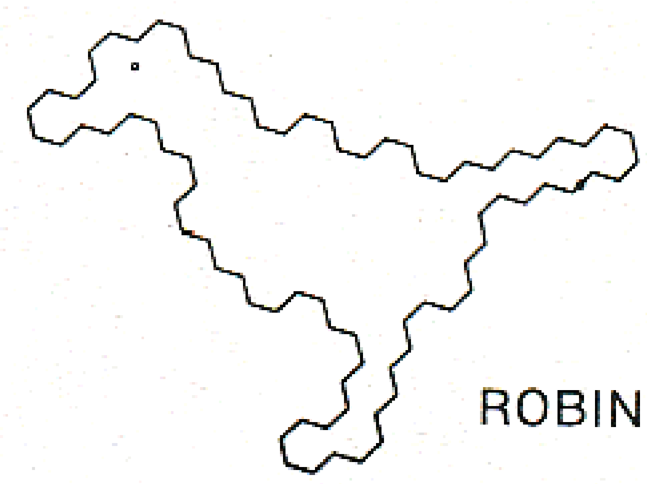


SNOWFLAKE





WREATH and SNOWBALL



ROBIN

A 6-inch hexagonal base on which the ten, ¼'' inch thick hand-cast polyester pieces fit to make over 30 hard-to-discover symmetrical figures, and an infinitely large number of please-yourself original designs. A 10-page leaflet includes game rules, over 50 puzzle challenges, and more.

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Published by Atwater-Span: made by Span Products, Inc. for

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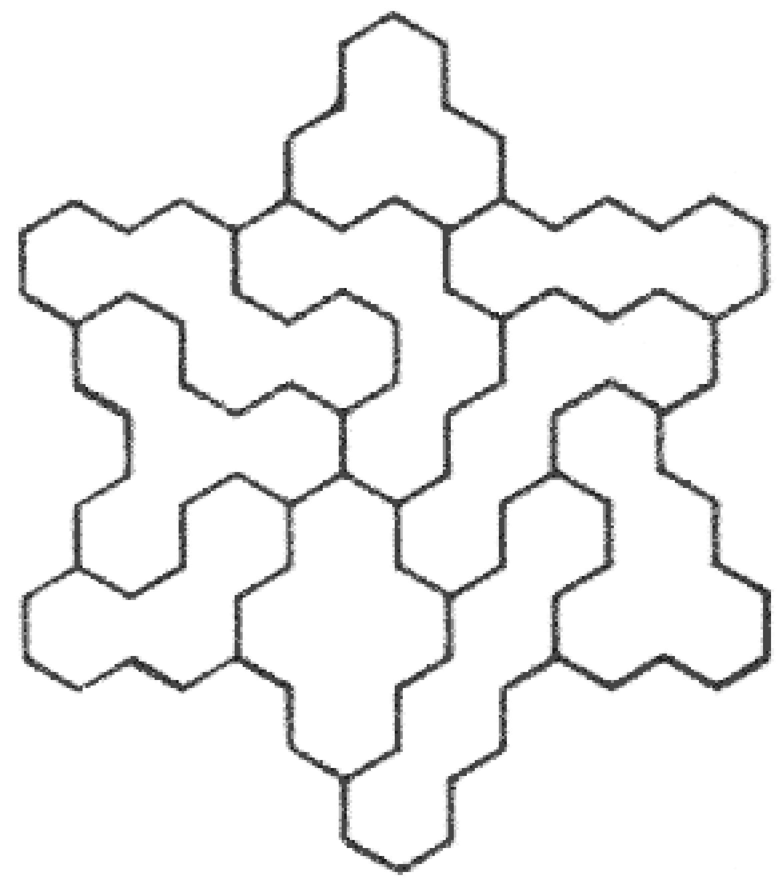
SNOWFLAKE ™

IS
AN ASSORTMENT OF INTERESTING PUZZLES AND GAMES BASED ON A MATHEMATICALLY CLOSED SET OF TEN PIECES AND A CLEVER BUT SOMETIMES FRUSTRATING BASE



SNOWFLAKE PATTERN

PLUS
A STUDY IN GEOMETRIC DESIGN AND SYMMETRY
AND
AN OPEN WINDOW FOR CREATIVE AND IMAGINATIVE MINDS

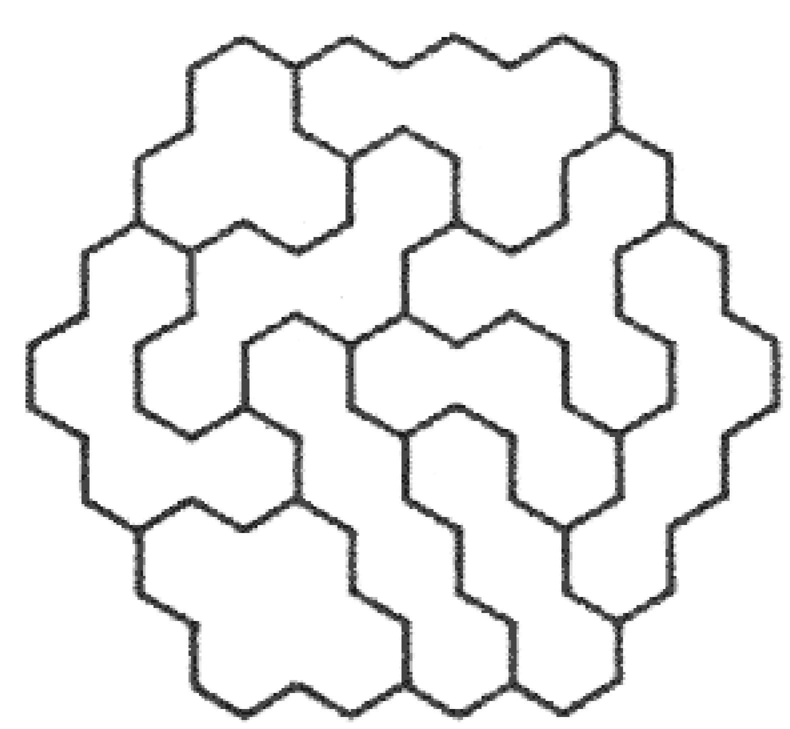
SNOWFLAKE PUZZLE FIGURES:

Start by removing the pieces from the Base. Note that the set contains three small pieces and seven larger ones, all different. These are, in fact, all the ways in which three or four hexagons may be joined together edge-wise. So, a mathematically "closed" set.

WARM-UP EXERCISES - Place all ten pieces on the Base. This may require a bit of shifting, but is quite easy. There are millions of ways. Note there are always 6 empty spaces, since the Base contains 43 hexagonal units, and the pieces are made up of 37 units.

Now, move the pieces around, and see what sorts of interesting patterns can be made as the positions of the 6 empty spaces are changed. The possibilities are practically limitless. Note, too, that the empty spaces can be arranged to form the shapes of the SNOWFLAKE pieces.

THE HEX PATTERN - Leaving the six outside corner spaces empty produces the HEX pattern, easiest and most obvious of the symmetrical SNOWFLAKE Puzzle Figures. There are hundreds of solutions to HEX; here is one:



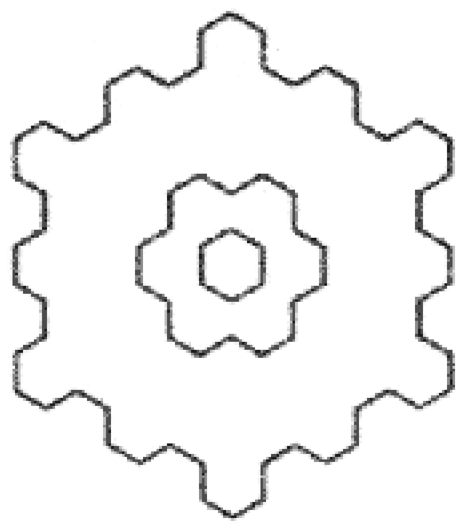
HEX PATTERN

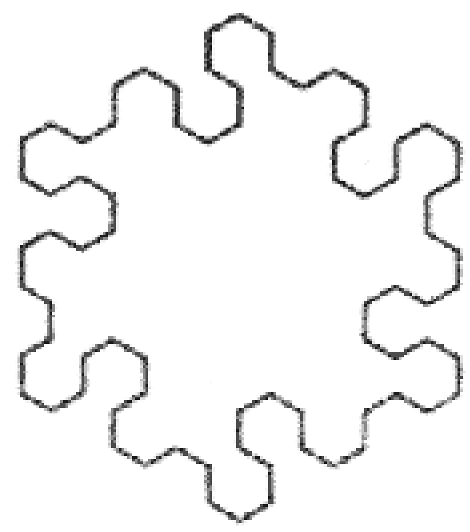
Puzzle Set 1 - Find at least one new HEX solution. Then, how many more can you discover? Try for ten.

THE SNOWFLAKE PATTERN If the 6 outside edge spaces on the Base are left vacant, the result is the beautiful SNOWFLAKE pattern. This is more difficult than the HEX pattern, but there are many solutions. One is shown on the cover.

Puzzle Set 2 - Find at least two new SNOWFLAKE pattern solutions. Memorize one and impress friends by doing it blindfolded.

OTHER HEXAGONAL SYMMETRIES - The HEX and SNOWFLAKE patterns both have hexagonal symmetry, meaning they have the same shape when rotated one-sixth of a circle. Four other patterns having this property are shown below. All four have been proven impossible. A is obviously impossible, because of the isolated center unit. If you try solving the other three, perhaps you can prove that some of them are impossible. D is the most difficult to prove. In B, see which six pieces must be used in the corner spaces. What problems then arise?


A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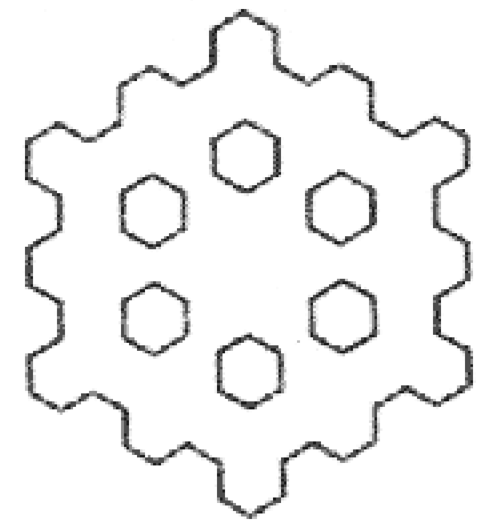
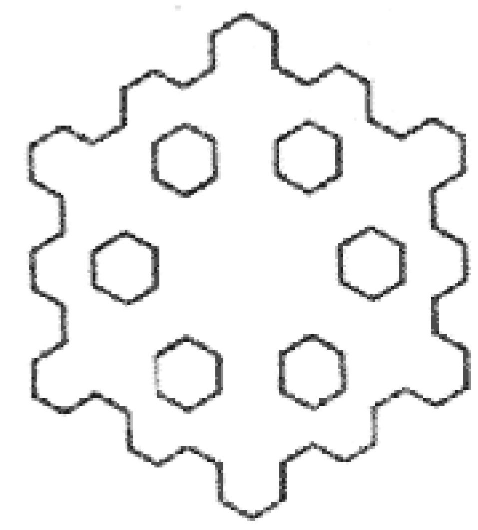
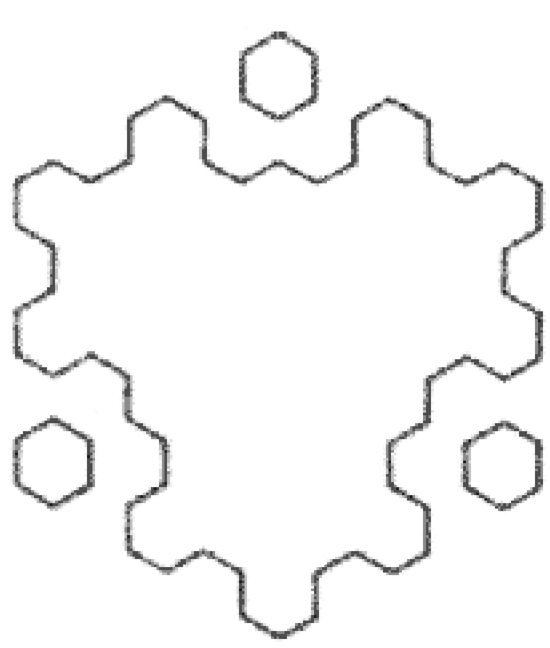
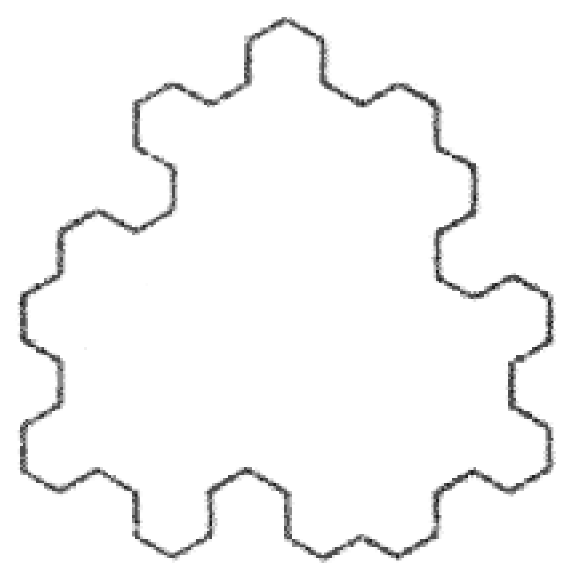

C

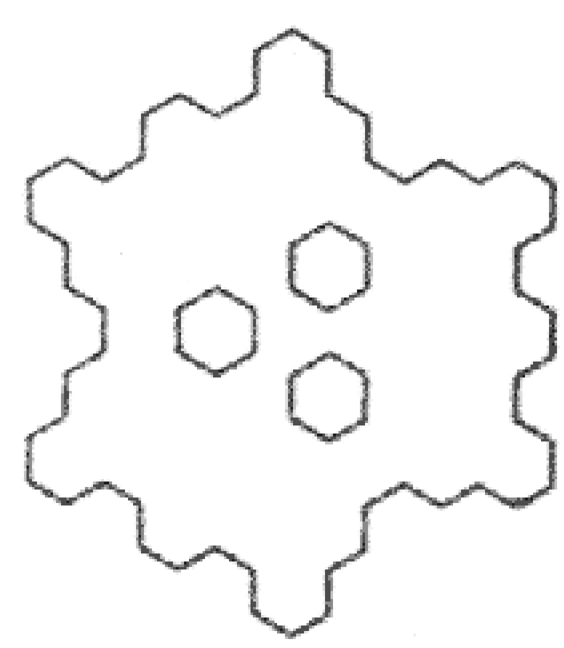

D

TRIANGULAR SYMMETRIES -These have the same shape when rotated one-third of a circle. There are many such patterns which might fit on the base, but not all of them are possible to construct. The first of the 4 below is obviously not possible.

Puzzles 3-5 - Find at least one solution for each of the three numbered triangular patterns shown below. (How many others can you find?)


Impossible


3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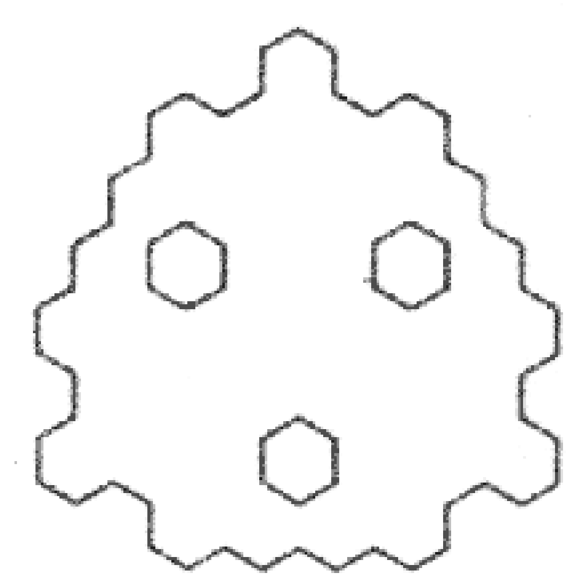
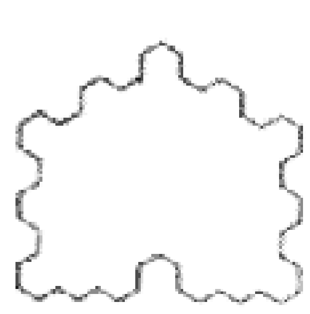
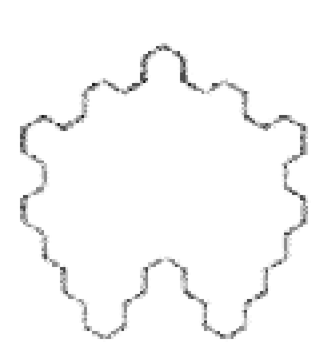

5

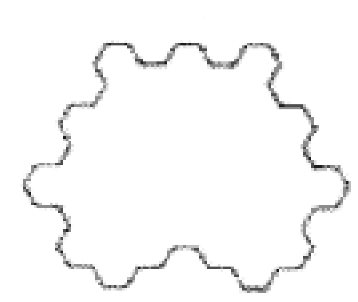
BILATERAL SYMMETRY - A pattern with bilateral or reflexive symmetry has the same shape when viewed in a mirror. All but two of the patterns shown in preceding sections have this property. All but three of the SNOWFLAKE pieces are reflexive. Which aren't?

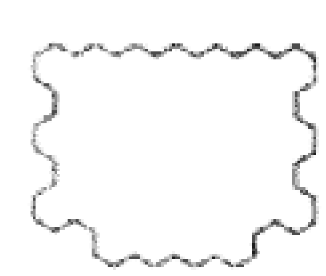
Challenge: Many hundreds of patterns are possible having bilateral symmetry. See how many interesting ones you can discover. Think up imaginative names for them.

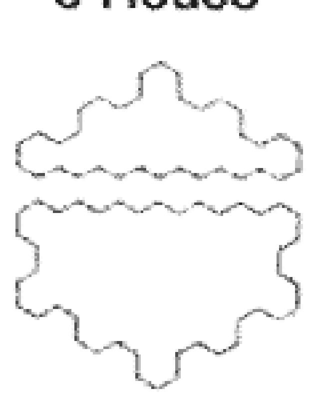
Puzzles 6-13 - Find at least one solution for each of the reflexive patterns shown below.

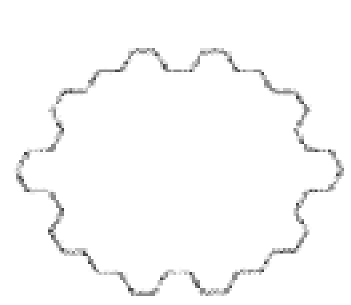

6 House

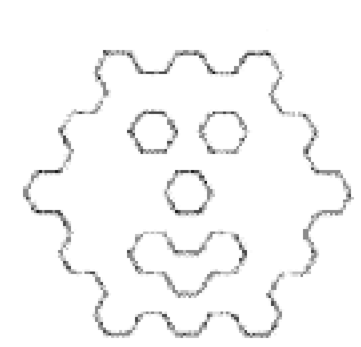

7 Igloo

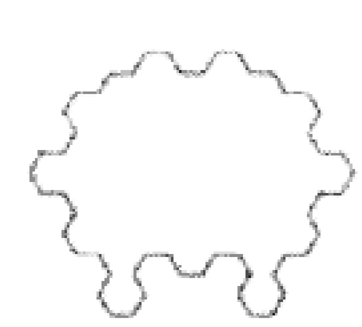

8 Sunrise


9 Kettle


10 Acorn

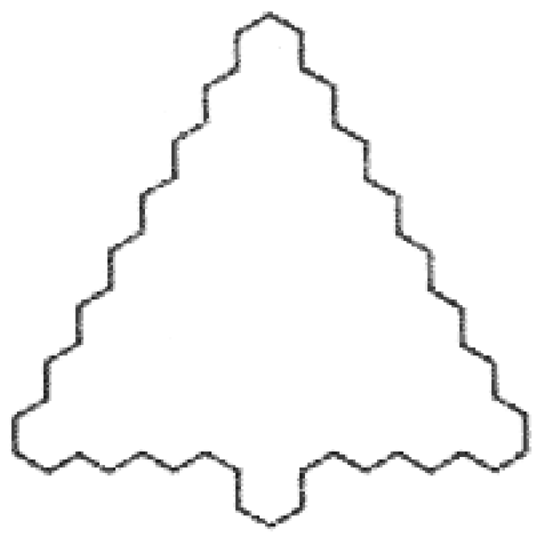

11 Egg


12 Smile

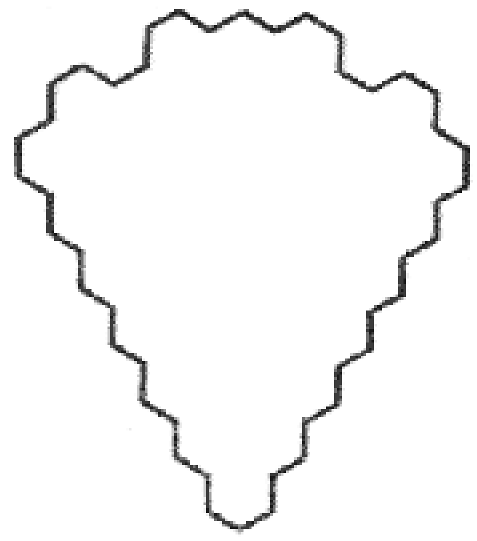

13 Fat Pig

PATTERNS WITHOUT THE BASE

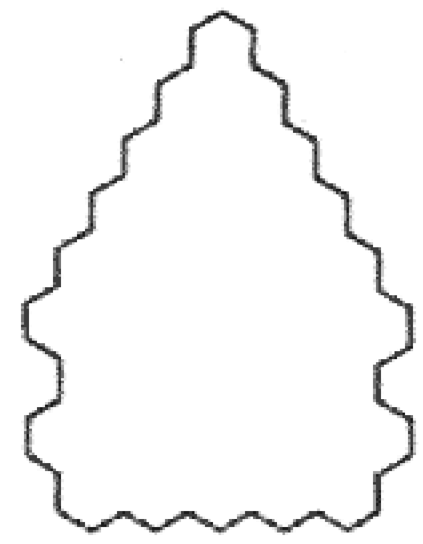
Puzzles 14-25 - Do not use the Base for the symmetrical patterns shown below.



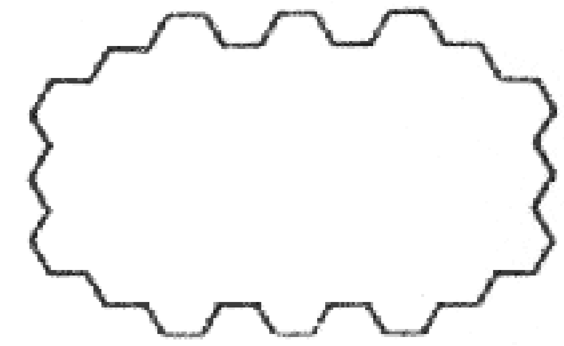
14 Xmas Tree



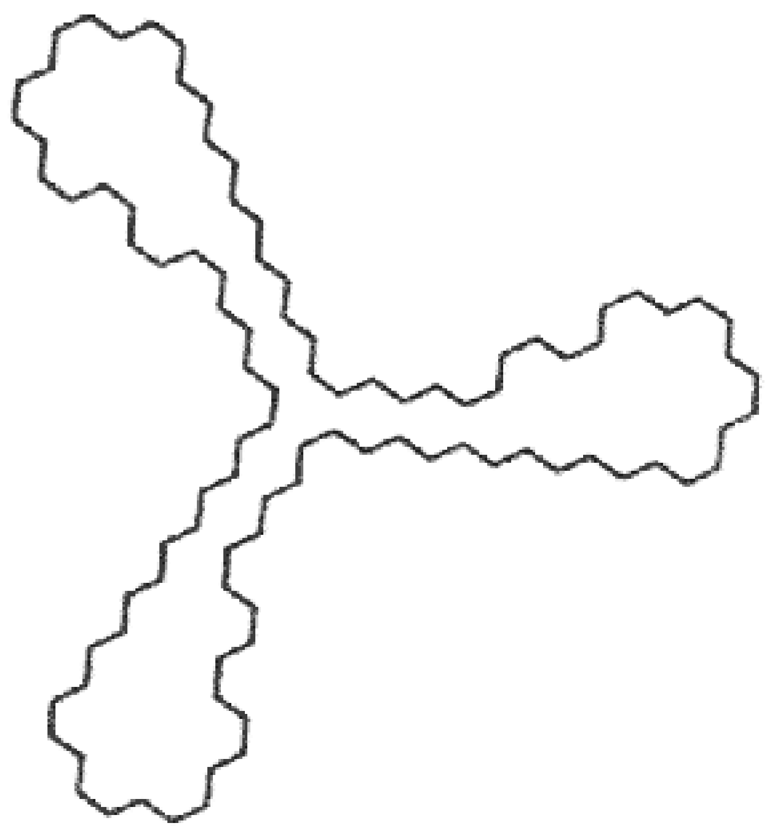
15 Top



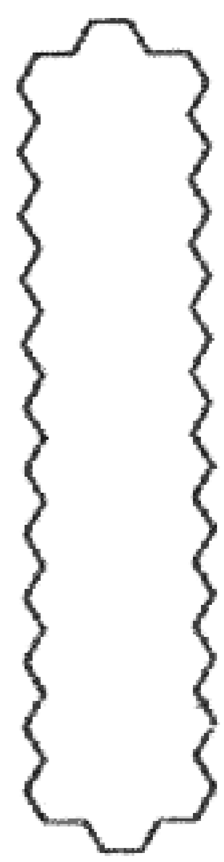
16 Church



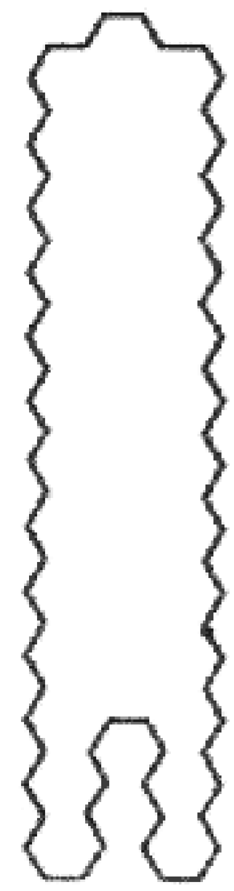
17 Watermelon



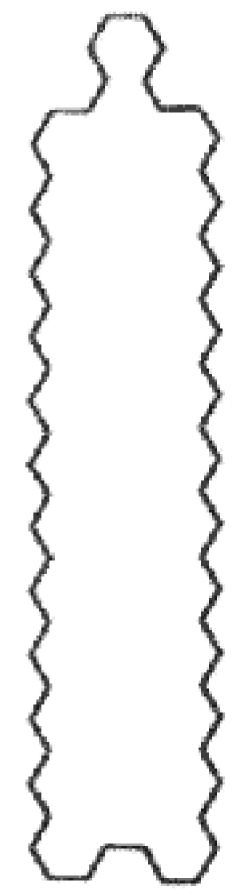
18 Propeller



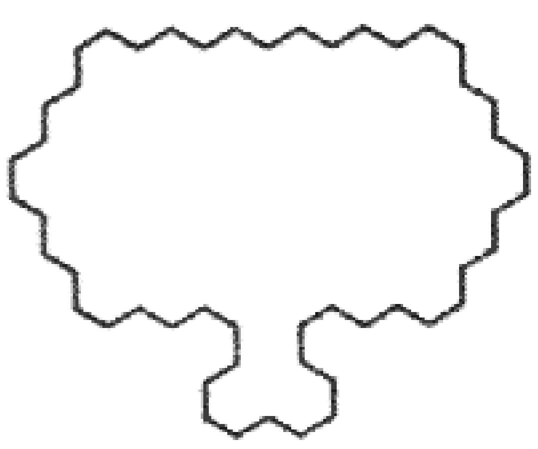
19 Tower



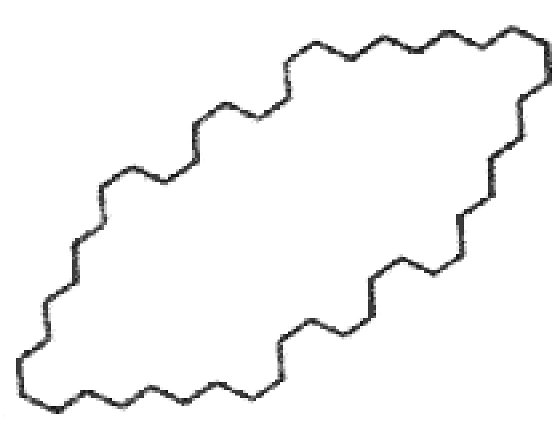
20 Rocket



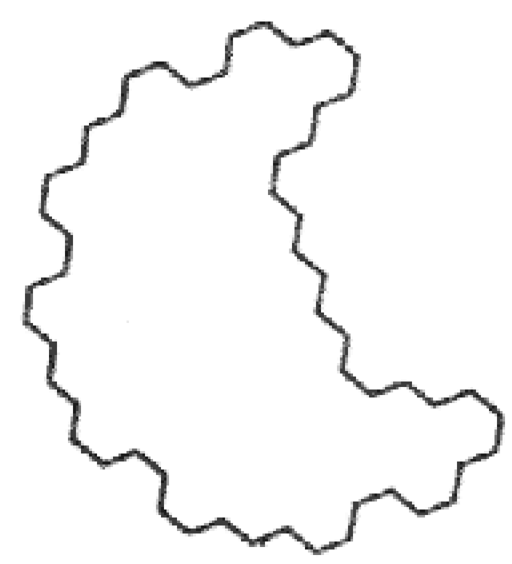
21 Candle



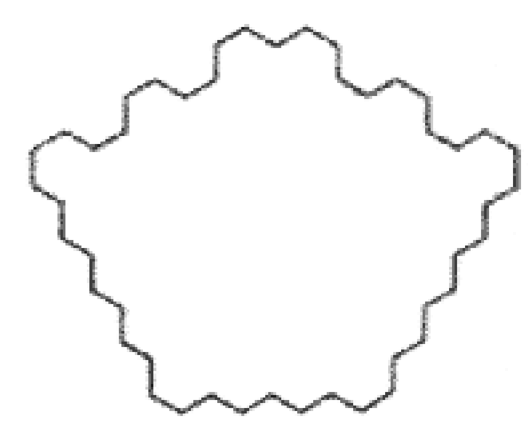
22 Shade Tree



23 U.F.O.?



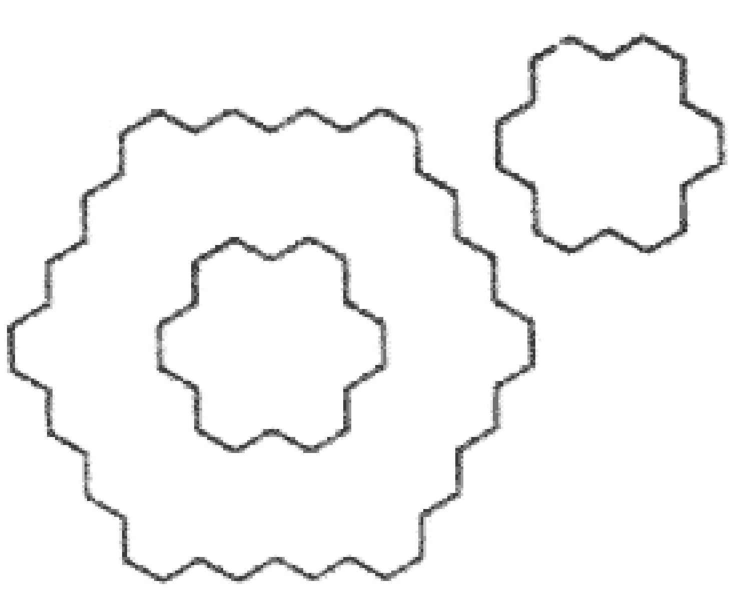
24 Moon



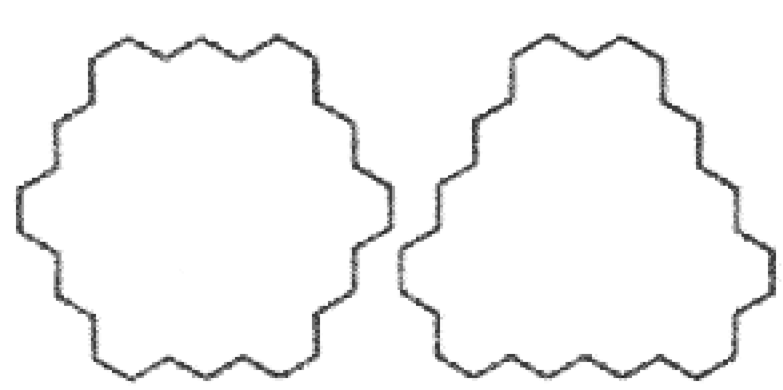
25 Basket of Fruit

DOUBLE PATTERNS - One set of pieces makes both figures.

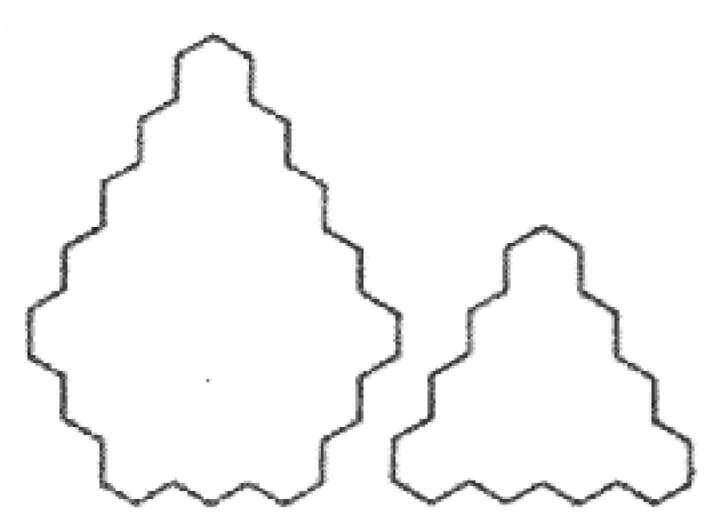
Puzzles 26-28 - Solve these three Double Patterns.



26 Wreath and Snowball

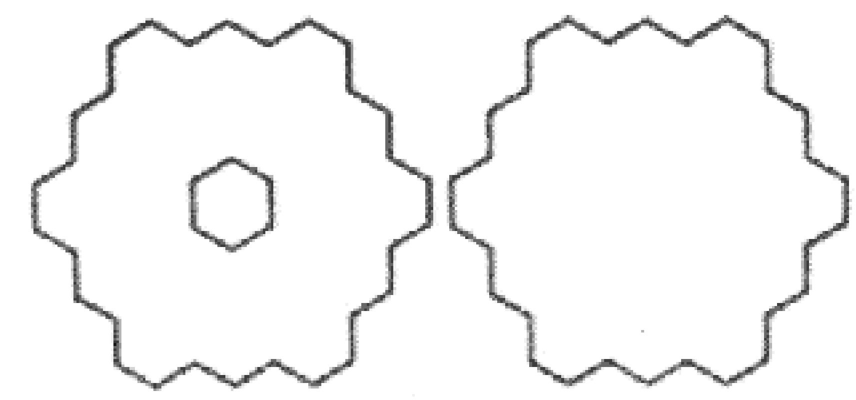


27 Hexagon and Triangle



28 Spruce Trees

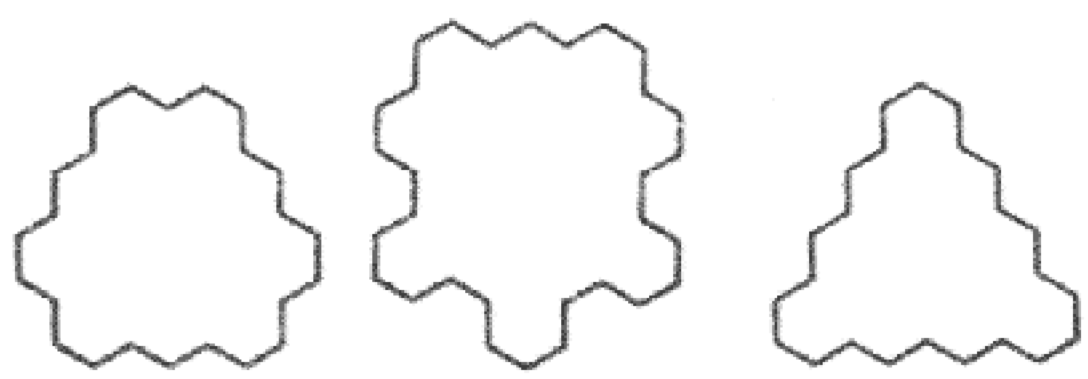
Challenge: The appealing double pattern, DONUT and POPCORN BALL shown at right, has not been proven impossible, but has foiled all attempts at solution. Can it be done? (Probably not.)



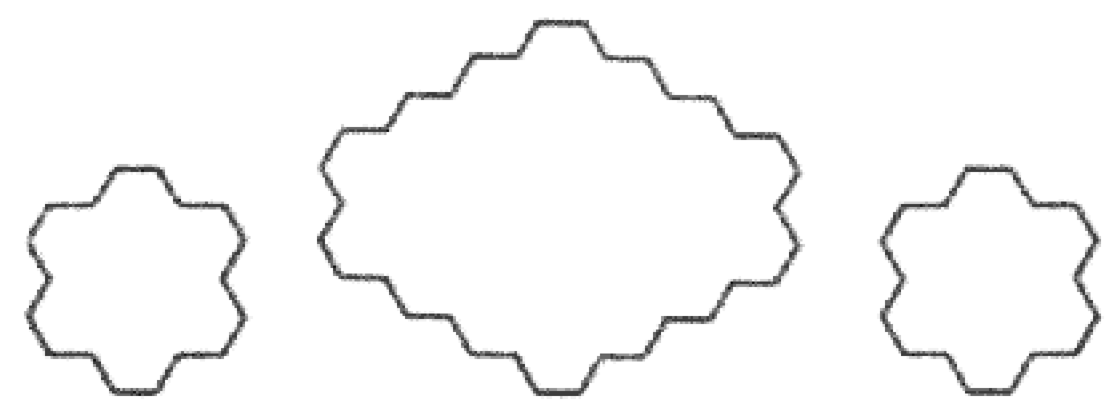
Donut and Popcorn Ball

TRIPLE PATTERNS - One set of pieces makes all three figures.

Puzzles 29-30 - Solve these Triple Patterns.



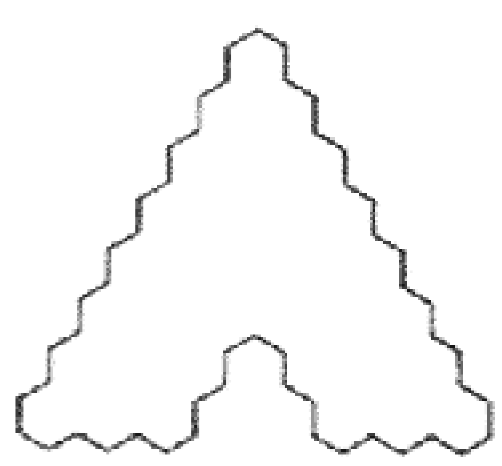
29 Shrubs



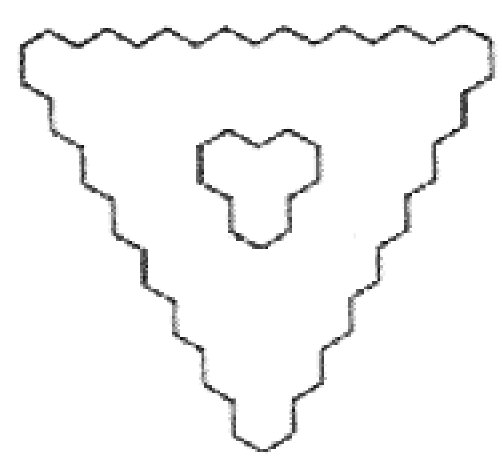
30 Baseball, Football & Tennis Ball

PATTERNS WITH PIECES OMITTED - (Which ones?)

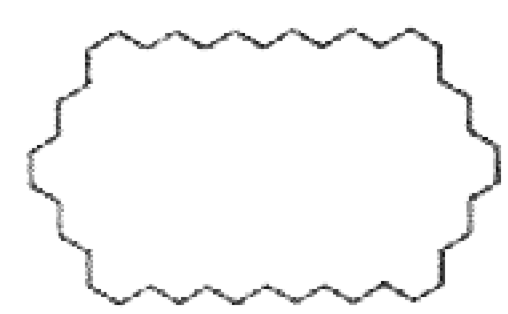
Puzzles 31-36 -Solve each of the problems shown below by omitting one or more pieces. Which piece do you omit to make OPEN TRIANGLE? Don't leap to a conclusion.



31 Tepee

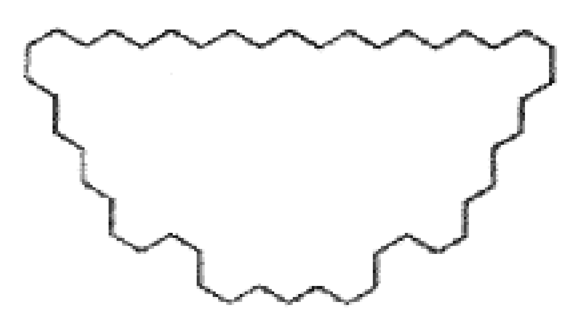


32 Open Triangle

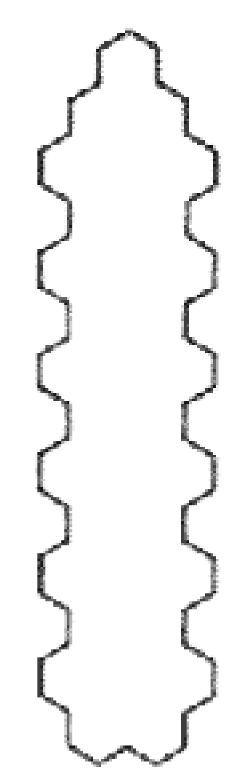


33 Muff

34 Rolling Pin



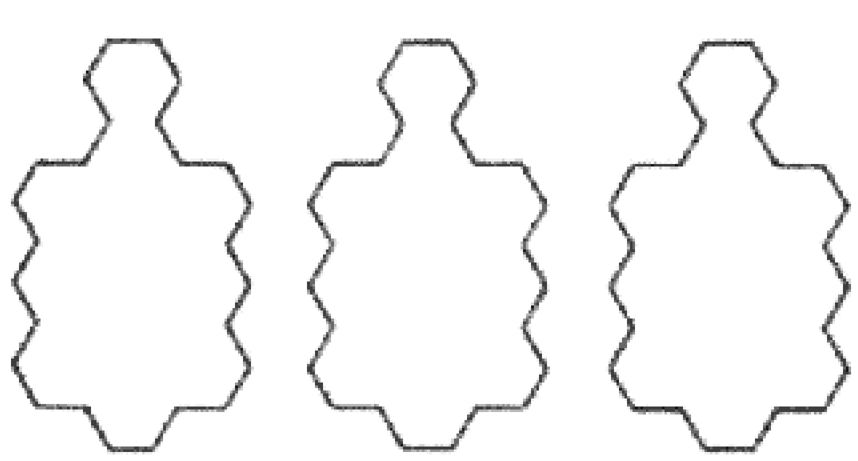
35 Bowl



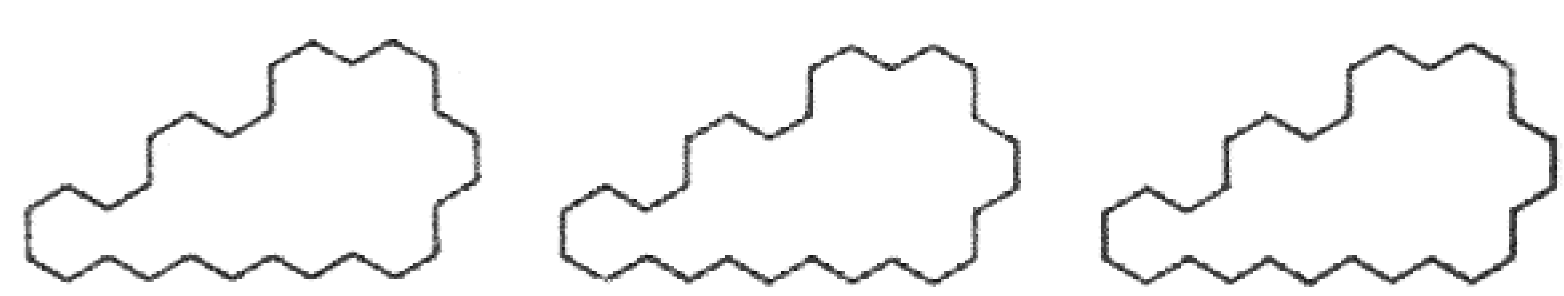
36 Ear of Corn

IDENTICAL DOUBLE AND TRIPLE PATTERNS - It is impossible to make identical Double or Triple Patterns using all the pieces, because the total number of hex units, 37, is not divisible by 2 or 3. By omitting one or more pieces, however, some are possible.

Puzzles 37-38 - Solve these two Identical Triple Patterns.



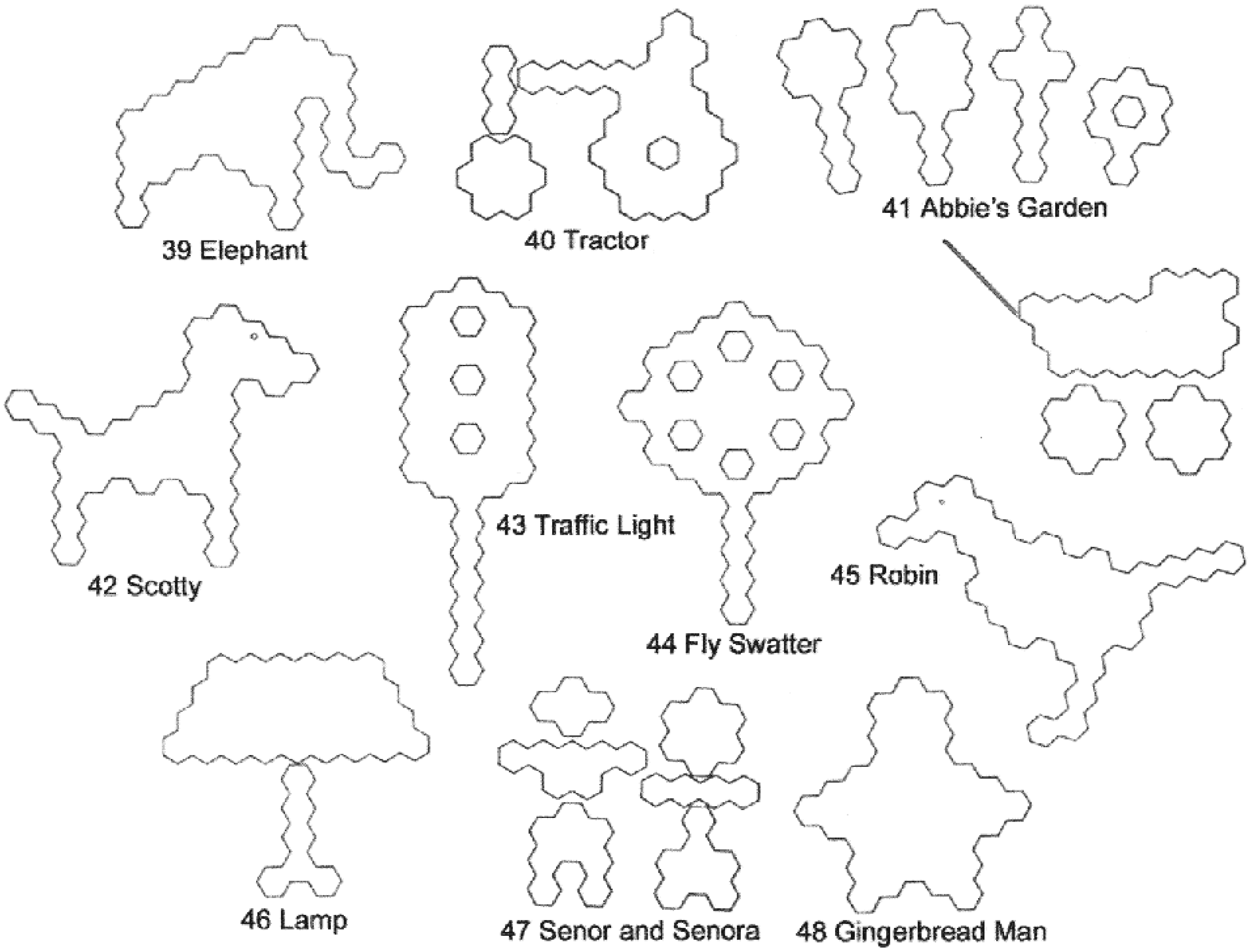
37 Three Bottles



38 Three Snails

NOTE: Problem 38 - With the THREE SNAILS solved, look back at PROPELLER, No.17.

DESIGNS - Shown below are but a few of the myriad pictorial figures which can be made with this set. Detailed directions are not needed. Turn your imagination loose; see what new and original designs you can discover.



SNOWFLAKE GAMES

SNOWFALL - a Practice Game - Two players take turns placing pieces on the Base. The last player who can do so is the winner. This seemingly simple pastime allows use of considerable strategy.

GLACIER - A Challenging Game for Two or More Players.

Standard Rules for Two Players:

1. Either player starts by placing a piece on the Base. Thereafter, each player in turn has the choice of placing another piece on the Base, or moving a piece already on the Base to a different location.

2. BUT, no piece may be moved back into a location it has been in before. A violation of this rule, detected by opponent, is a THAW and the move is not allowed.

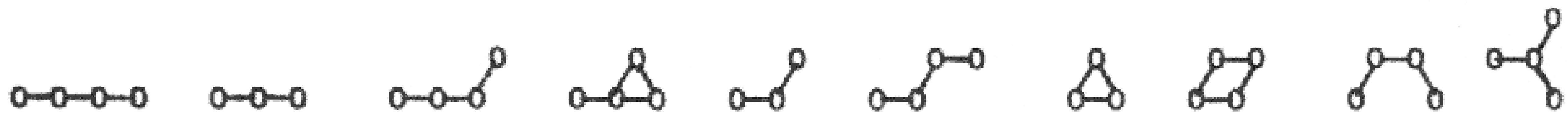
3. Any piece handled MUST be played. Violation of this rule is also a THAW. Three THAWS and you lose.

4. All empty spaces on the Base must remain connected to each other. No piece may be played which will separate the empty space into two or more disconnected areas. (Beginners may omit this rule for a simpler game).

5. Winner is last player who can make a legal move.

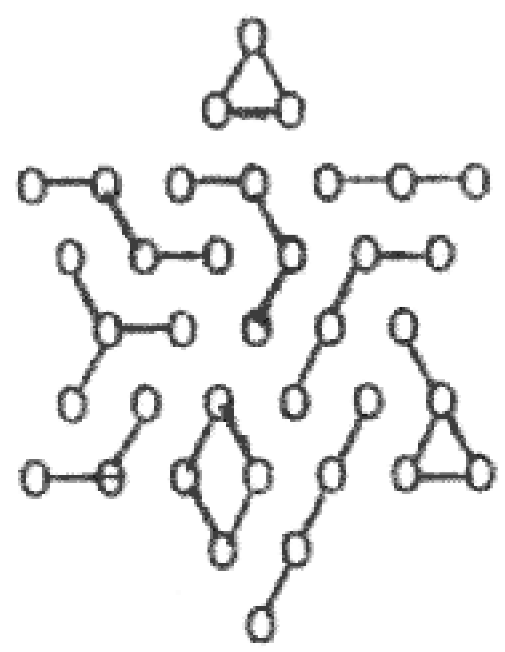
Despite the deceptively simple rules for GLACIER, this game has some interesting subtleties worth noting. The starting player has no discernible advantage or disadvantage. If both players play cautiously, neither one is likely to force an ending. Generally, it is more advantageous to place a piece rather than move one. Conversely, one should try to prevent his opponent from placing the last few pieces on the Base, especially the last one, which is nearly always lethal. But the exceptions to these strategic hints are what lead to frustrating and surprising endings. It is easy to defeat yourself by your own clever strategy.

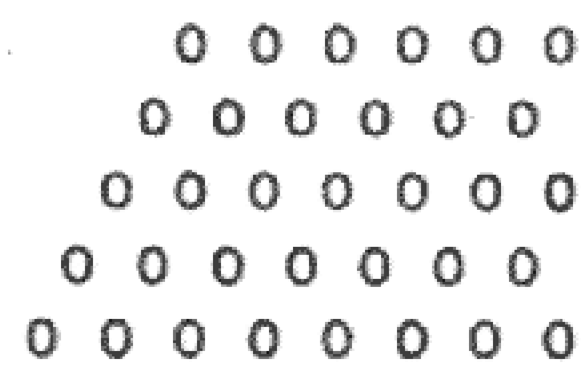
SNOWFLAKE DIAGRAMS - Ardent puzzle enthusiasts may wish to keep some record of their efforts and discoveries, including solutions (1 or more per PUZZLE Figure). A line-diagram method (below) is suggested. Each piece is represented by lines connecting centers of hexagons. The pieces are also numbered for convenience, such as when referring to an omitted piece.



1 2 3 4 5 6 7 8 9 10

A WORKSHEET master-pattern may be made on a typewriter, as below, and copied. Draw in base outlines with a ruler.

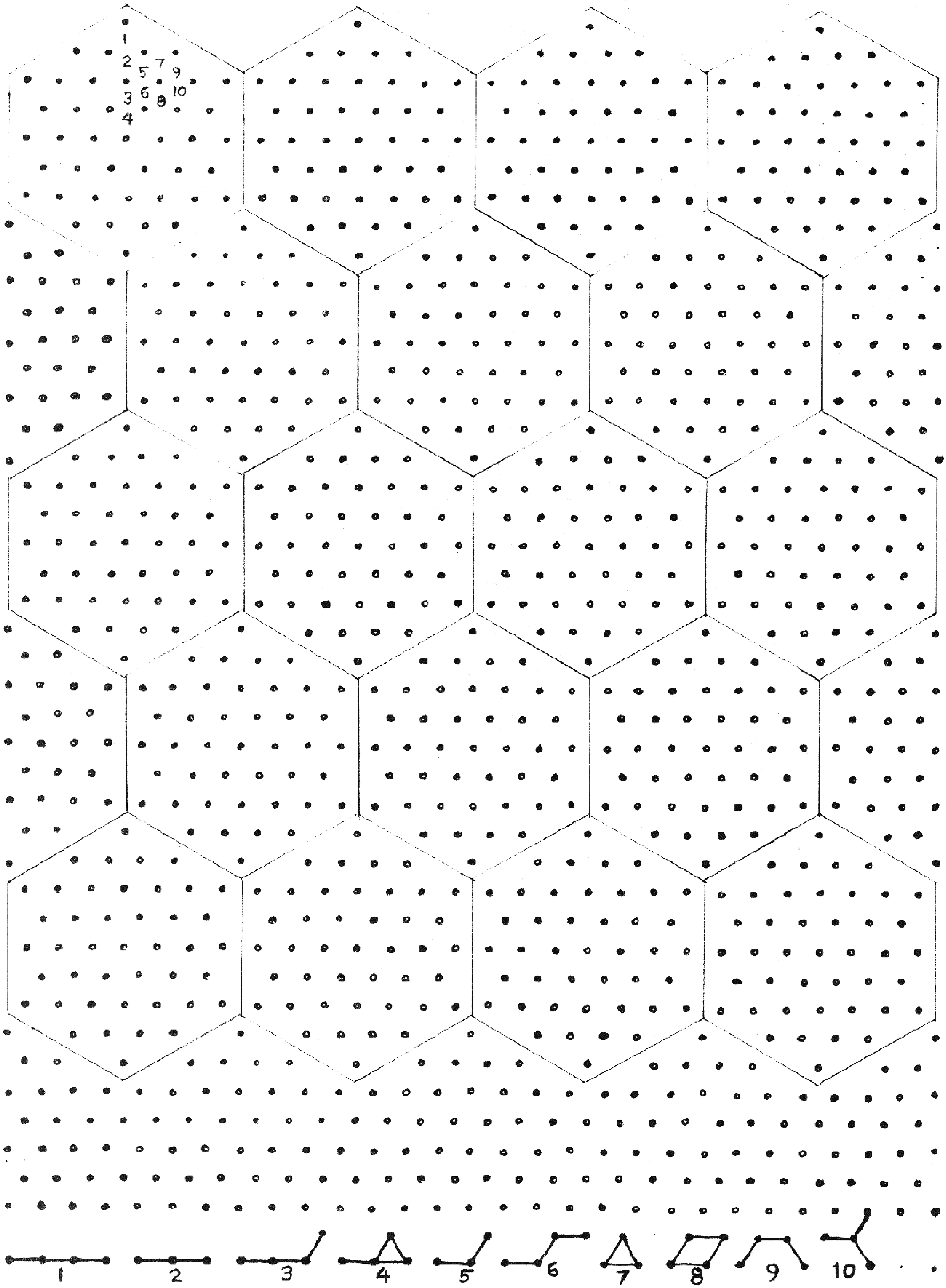




To replace lost SNOWFLAKE Pieces, send a sketch of the pieces, with 50¢: and your name and address, to Span Products, Inc., Paterson, New Jersey 07509. Indicate color of your set, please.

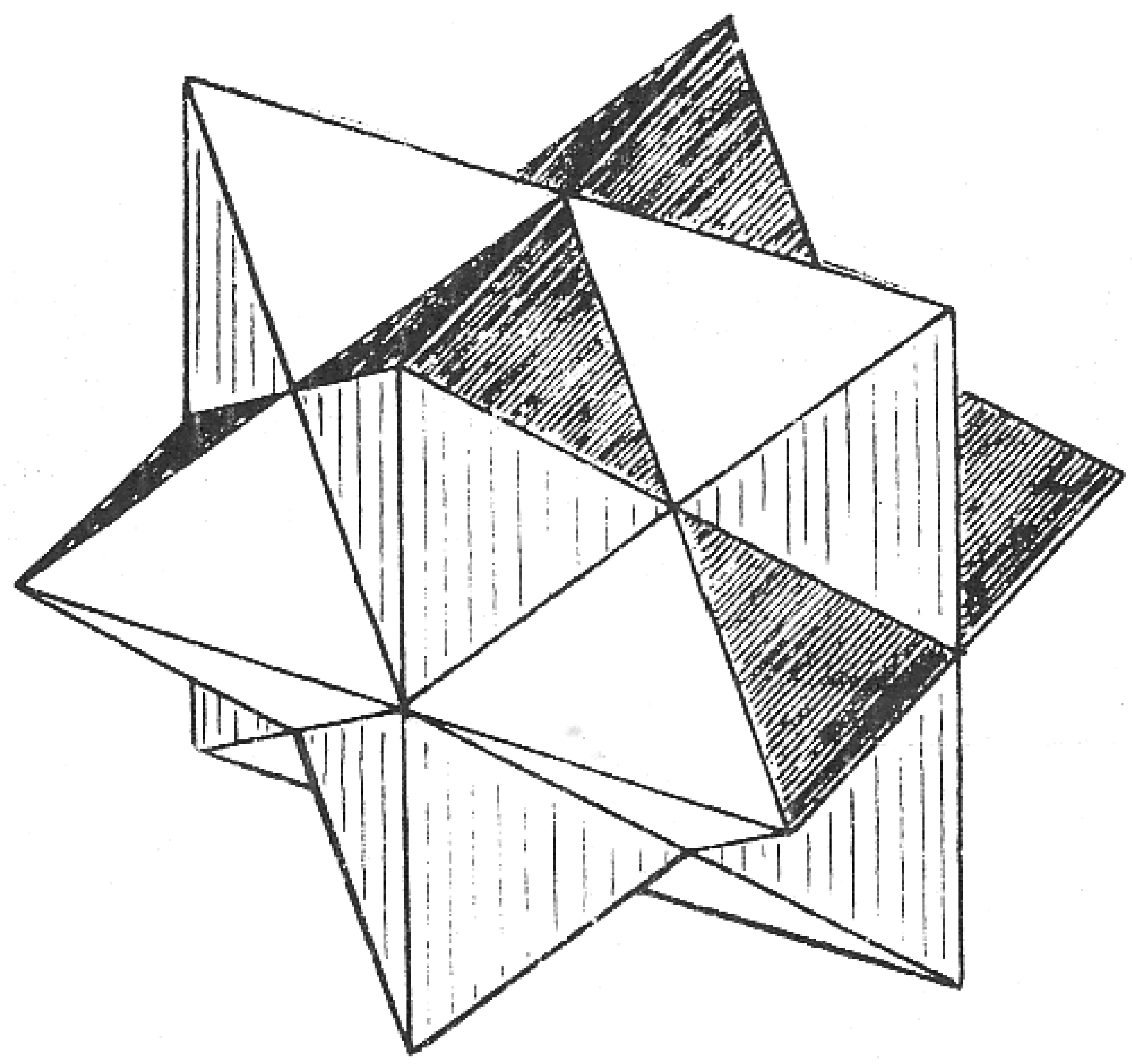
Published by Atwater-Span; made by Span Products Inc.

SNOWFLAKE PUZZLE WORKSHEET



No. 1. SIRIUS

The STAR Puzzle



STEWART T. COFFIN

Puzzles

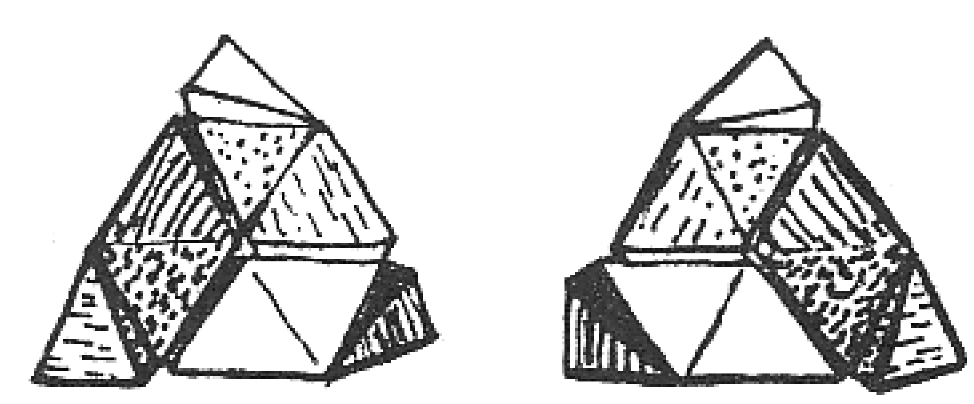
OLD SUDBURY ROAD
LINCOLN, MASS. 01773

Directions Before disassembling the STAR Puzzle, note the symmetrical pattern made by the three different kinds of wood, creating the illusion of intersecting each other along three mutually perpendicular axes. This is one of the preferred (symmetrical) solutions to the puzzle.

Now disassemble the puzzle. This is most easily done by gently wiggling and pulling on any opposing pair of pieces. Note that all of the pieces are identical in shape, hence there can be no "key" piece in this puzzle. In terms of wood patterns, there are three kinds of pieces, two of each kind.

If you are the type who prefers to work out puzzle solutions without detailed step-by-step instructions (God bless you!), then fold this sheet under at the bottom of this paragraph, and refer to the bottom portion only as a last resort. Assemble the puzzle again, first without regard for wood patterns. After this has been mastered, assemble in the preferred solution described and illustrated above. There is also a second symmetrical solution in which the eight faces on each of the six sides of the puzzle are all the same kind of wood. What other interesting patterns can you make with the pieces? If the pieces become worn and slippery, and too easy to take apart, the puzzle can be made tighter again by applying thin coats of soft wax to the inside mating surfaces of the notches.

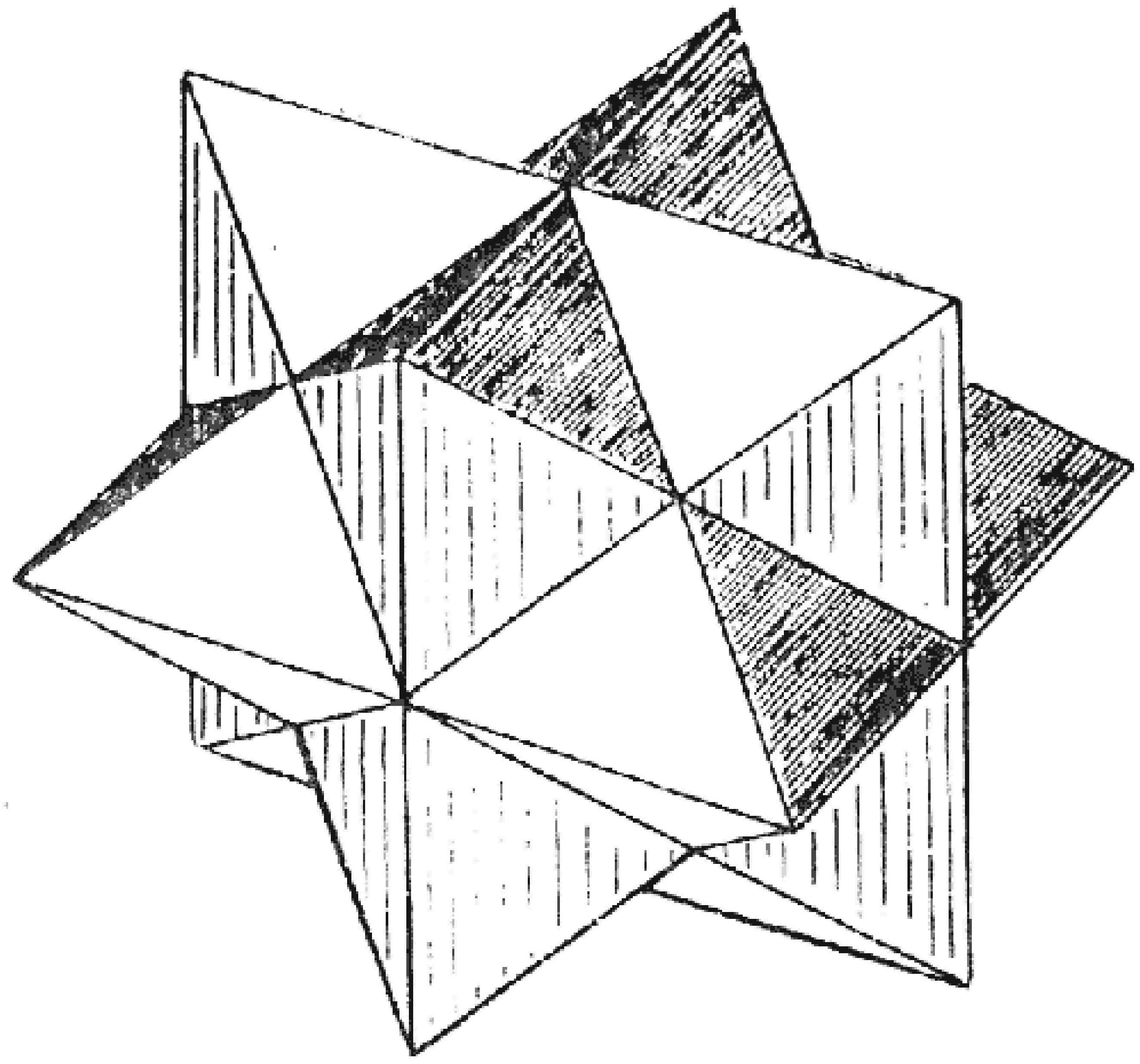
The puzzle must first be sub-assembled into two groups of three, as shown at right: The two sub-assemblies are similar but not identical - one is the mirror image of the other. Hold one in each hand, and very carefully mate the two halves. No force is required. If they do not slide together, it is because they are not aligned perfectly. Keep trying. It takes practice and patience.



#4

SIRIUS

The STAR Puzzle



STEWART T. COFFIN
Puzzles
OLD SUDBURY ROAD
LINCOLN, MASS. 01773

DIRECTIONS:

Before disassembling this puzzle, note the symmetrical pattern made by the three different kinds of wood, creating the illusion of intersecting each other along three mutually perpendicular axes. This is one of the preferred (symmetrical) solutions to the puzzle.

Now disassemble the puzzle. This is most easily done by gently wiggling and pulling on any opposing pair of pieces. Note that all of the pieces are identical in shape, hence thre can be no "key" piece in this puzzle. In terms of wood patterns, there are three kinds of pieces, two of each kind.

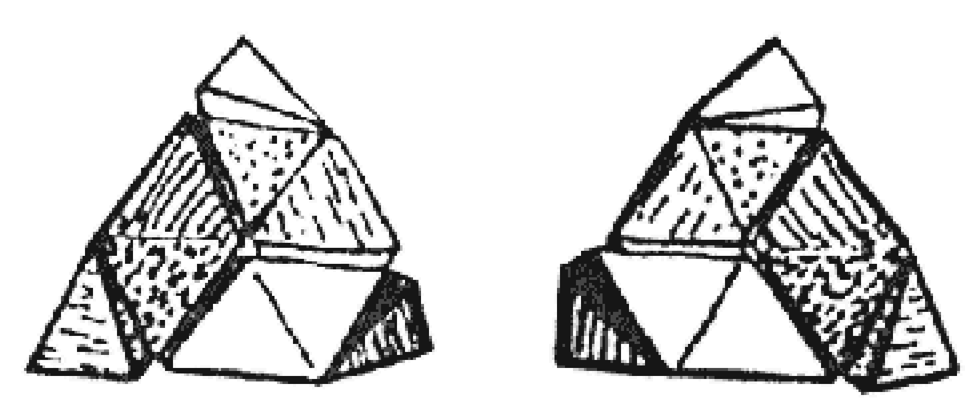
If you are (hopefully) the type who prefers to work out puzzle solutions without detailed step-by-step instructions, then fold the bottom paragraph on this sheet under, and refer to it only as a last resort.

Assemble the puzzle again, first without regard for wood patterns. After this has been mastered, assemble in the preferred solution described and illustrated above. There is also a second symmetrical solution in which the eight faces on each of the six sides of the puzzle are all the same kind of wood. What other interesting patterns can you make? Incidentally, the shape of this geometrical solid is known as a rhombic dodecahedron, stellated to its first symmetrical stage. There are two more stellated forms of this solid, both of which are available in the AP-ART series of geometrical puzzles.

Note: All woods tend to expand with moisture and shrink with dryness, mostly across the grain rather than lengthwise. The inevitable result is that this puzzle will be tighter under humid conditions, and looser when dry. One piece will be found to contain two tiny silicone rubber cushions to take up this slack. If a looser fit is desired, any of the inside mating surfaces may be sanded a few thousandths to achieve this. To make tighter, apply clear lacquer to these surfaces. To restore outside surfaces, wax and buff.

LAST RESORT:

The puzzle must first be subassembled into two groups of three, as shown at right. The two subassemblies are similar but not identical - one is the mirror image of the other. Hold one in each hand, and very carefully mate the two halves. No force is required. If they do not slide together, it is because they are not aligned perfectly. Keep trying. It takes patience and practice.



#5

THE SPIDER-SLIDER PUZZLE

What is it? The SPIDER-SLIDER is a six-piece, symmetrical, interlocking, three-dimensional, non-orthogonal geometric structure, making it a most unusual and unique puzzle. The term "symmetrical" here means that all the pieces are identical in shape and equivalent in position; that is, it would be impossible to distinguish one from any other in the assembly but for the colors. Non-orthogonal means essentially not rectangular or perpendicular in form.

The name SPIDER refers, of course, to the shape of the parts. SLIDER has to do with the way it is normally taken apart by rational adults. (Originally we started calling it the "Spider-Spinner", which gives a clue as to one acceptable alternate method of disassembly.)

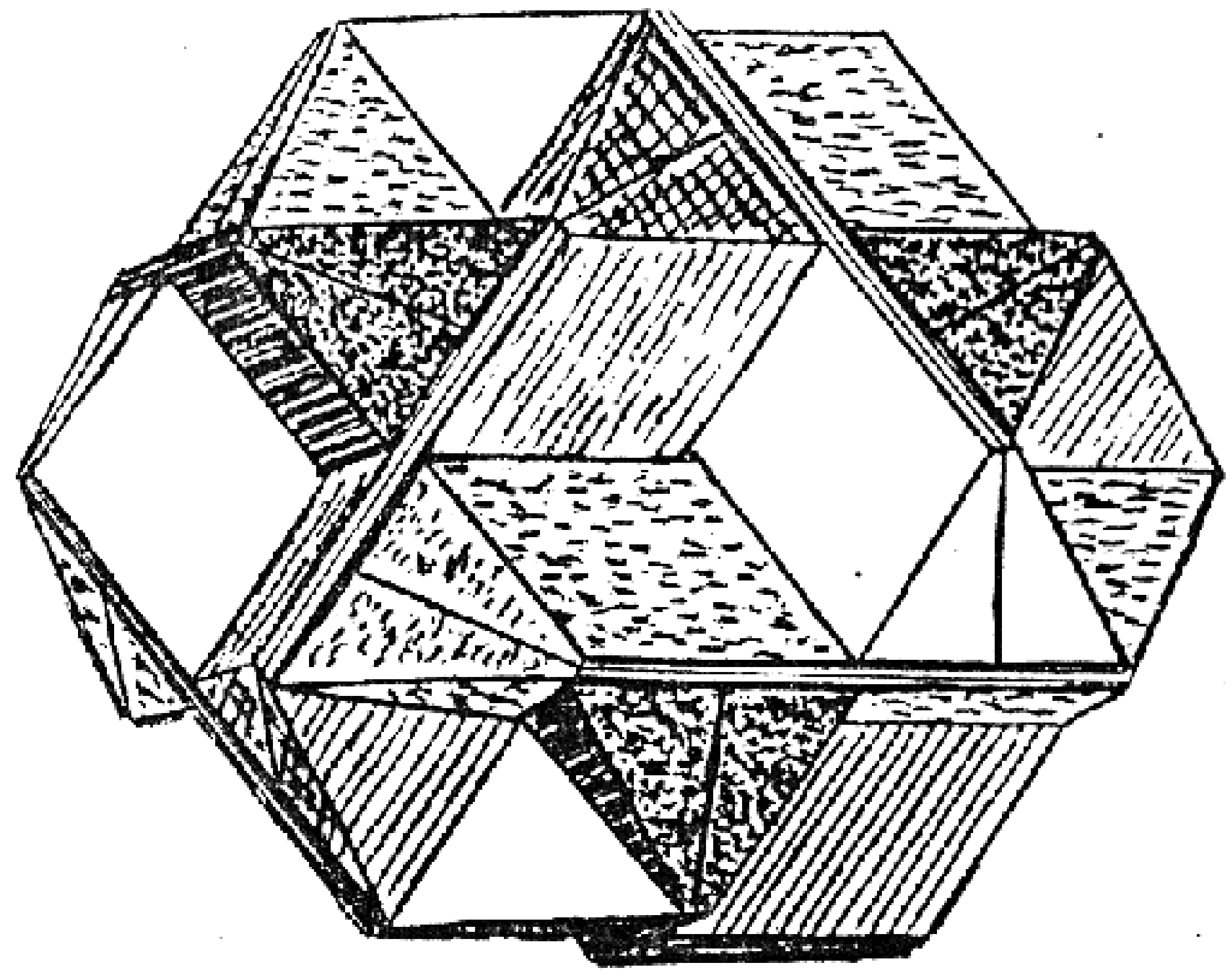
Disassembly Before taking it apart, note the color arrangement. The puzzle appears to consist of twenty-four triangular prisms grouped in parallel pairs, and, as supplied, with all pairs matched in color. This is one of the preferred solutions. Note also the absolute three-dimensional symmetry of color as well as shape. After you have discovered the sliding action which separates the puzzle into two identical halves, notice that this motion can occur independently on any of four axes, one associated with each color. (The most dramatic way to disassemble is to spin it easily in your hands or over a soft rug, in which case motion occurs simultaneously along all four axes, with startling results.)

Assembly Reverse of disassembly procedure.

Color Problems The pieces are colored not so much to make them pretty, but rather to introduce some intriguing color problems. First, note that no two pieces are colored alike. They represent, in fact, all possible permutations of the four colors. As already pointed out, the puzzle as received had matched pairs of colors. Their are two distinctly different solutions which achieve this, known as the Parallel Solution and the Ring Solution. There is a third solution, known as the Triplet Solution, in which each of the eight three-sided indentations has matched colored faces. Finally, can you assemble it so that no two like-colored pieces touch each other? There is one symmetrical and one non-symmetrical solution to this. After you have mastered all four of the symmetrical solutions, you may discover an amazingly simple key which relates all of them with one simple operation. Incidentally, without taking it apart, what is the shape of the hollow interior?

Note: This ad hoc instruction sheet has been prepared especially for a four-color painted basswood SPIDER-SLIDER, of which only about twenty have been produced. Manufacture has been discontinued because of difficulties in fabrication. Hopefully, if the demand is sufficient it may someday be produced by a different and more efficient process. In the meantime, hold onto yours. They may become collector's items.

STEWART T. COFFIN
Puzzles
OLD SUDBURY ROAD
LINCOLN, MASS. 01773



5

SCORPIUS

The SPIDER-SLIDER Puzzle

What is it? The SPIDER-SLIDER is a six-piece, symmetrical, interlocking, three-dimensional puzzle having the geometrical form of a non-orthogonal polyhedral solid. SPIDER refers to the shape of the pieces, and SLIDER is derived from the way it is normally taken apart by rational persons. Non-orthogonal means essentially not rectangular or perpendicular in form.

The SPIDER-SLIDER is actually several puzzles in one, as well as a lesson in the intriguing properties of geometrical solids, and an example of craftsmanship. The fine cabinet woods used in the construction come literally from the four corners of the World.

Disassembly This is easy. Manipulate the puzzle gently until you discover the sliding action which separates it into two identical halves. The individual pieces then come apart readily.

Alternate method of disassembly: Spin the puzzle in your hands or over a soft rug. This will cause the sliding action to occur simultaneously along all four geometrical axes of the puzzle, with startling results.

Assembly To assemble, simply follow reverse of disassembly procedure, (first method, that is, not the alternate method!).

Note: Excessive force is unnecessary, either to disassemble or assemble. If the halves do not slide together easily, it is simply because the pieces are not aligned. An ounce of patience is worth a pound of force.

Pattern Problems After the assembly technique has been mastered, you are ready to discover the truly fascinating aspects of this puzzle. Notice that the puzzle is made up of twenty-four pieces of wood in four different kinds, six of each kind. When assembled as illustrated above, the adjacent pairs of pieces are matched. This is known as the Parallel Solution. There is a second distinctly different solution, the Ring Solution, in which the adjacent pairs are again matched. In the third symmetrical pattern, known as the Triplet Solution, each of the eight three-sided indentations has matched pieces. The puzzle may also be assembled such that no two like pieces touch each other, and there is one symmetrical and one semi-symmetrical solution to this. Finally, discover a simple operation which transforms one symmetrical solution into another.

For further study: What other interesting patterns can you discover? What is the shape of the hollow interior? Identify the different woods, and the countries from which they come.

For Tom Rodgers: Piece No. 5

Supplementary Instructions for 1986 reedition of The Scorpius Puzzle.

The Scorpius (Spider-Slider) was one of the first of my AP-ART puzzles, so-called. It was designed in 1970, and produced from 1970 through 1974. The original instruction sheet is shown on the other side of this sheet. See also Puzzle Craft, pages 51 and 84.

This 1986 reedition is made using a new and more accurate gluing jig and better woodworking techniques in general. An accurate fit is very important with this puzzle but not easy to achieve. The improvement is quite evident, not only visually, but if you are as familiar with it as I am, you can feel the difference and can most certainly hear the difference when it closes with a hollow sound instead of a clack.

This edition also uses more choice woods than the old version. This was the first puzzle I made which required four contrasting woods, and I would use almost any four that did not look alike. The woods in this model are Tulipwood, Osage Orange, Luzon Acle, and Rosewood. The Acle (brown) is probably the rarest wood I have used in my puzzle work. It came to me in a round-about way from liquidation of the old Irving & Casson Furniture Company in Cambridge, Mass., via industrialist Peter Boshco shortly before he died. He told me that Mr. Irving or Mr. Casson, I forgot which, used to travel all over the world picking up rare woods as a sort of hobby. I in turn sent most of it to a collector of rare woods in Louisiana, but kept a couple boards.

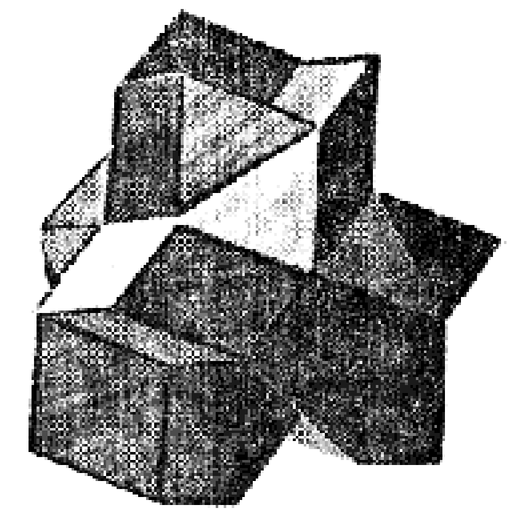
This model also features doweled joints, never used before on this puzzle. This is one of three made in this set.

The bright yellow color of the Osage Orange will fade with age, but will keep best if not stored in bright sunlight or fluorescent light.

S. T. C.
Nov 25, 1986

#6

The FOUR CORNERS Puzzle



STEWART T. COFFIN
Puzzles
OLD SUDBURY ROAD
LINCOLN, MASS. 01773

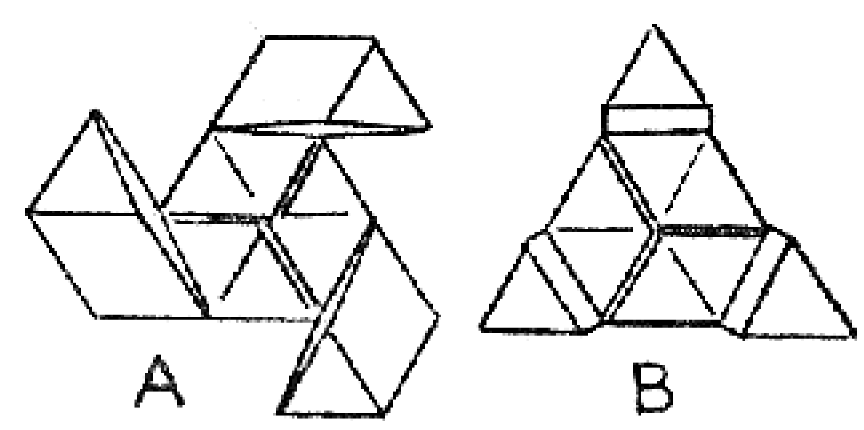
Introduction The FOUR CORNERS Puzzle has a geometric form which might be described loosely as tetrahedral, or more precisely as a semi-stellated rhombic dodecahedron. It is made up of six identically shaped pieces, each of which is composed of three segments of dissimilar woods.

This puzzle has the unique peculiarity that, although it is made up of identically shaped pieces, symmetrically situated with respect to each other, there is an intermediate stage in assembly and disassembly consisting of two totally dissimilar halves.

The center sections of the pieces are alike. The four woods used in the apexes come principally from North America, Central or South America, Asia, and Africa respectively - literally the four corners of the world. How many of them can you identify?

Disassembly A little random poking and pulling should soon reveal the sliding motion that separates the puzzle into two dissimilar halves. This can occur along any one of four identical axes of the puzzle. Study how the two halves are made up, and you will be well on the way toward mastering the mechanics of the puzzle.

Assembly Opposite of disassembly. Refer to the drawings at right: Assemble the A-half first and set it aside. Then assemble the B-half differently, hold one half in each hand, and carefully mate the two halves. Bear in mind that the square apexes must all come together at the center of the puzzle.



A B

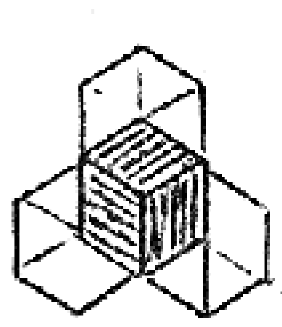
Pattern Problems After the mechanics of the puzzle have been mastered, one is ready to explore the equally fascinating and more challenging problems of symmetrical wood patterns.

The puzzle comes assembled with each of the four corners one kind of wood. This is perhaps the easiest of the symmetrical assembly patterns to do, and is called the Four Corners Solution.

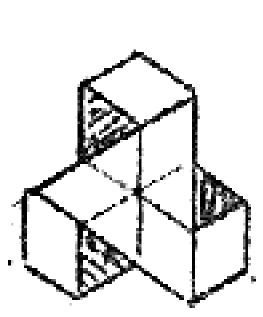
In the second symmetrical pattern, each of the triangular-shaped designs on each of the puzzle faces are matched woods. This is the Triangle Solution (see illustration below).

In the Star Solution, each of the star-like designs on the four faces of the puzzle are matched; and in the Spiral Solution, the three outer corners, when viewed from directly above, are matched.

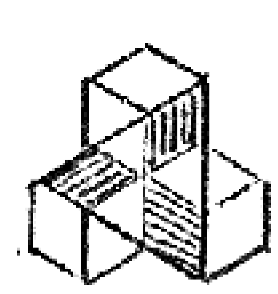
For the advanced student of polyhedralogy: be able to solve each of these pattern problems systematically, and discover a simple transform relating the Four Corners and Triangle Solutions, likewise the Star and Spiral Solutions.



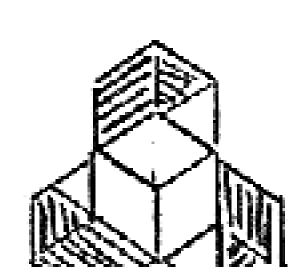
Four Corners



Triangle

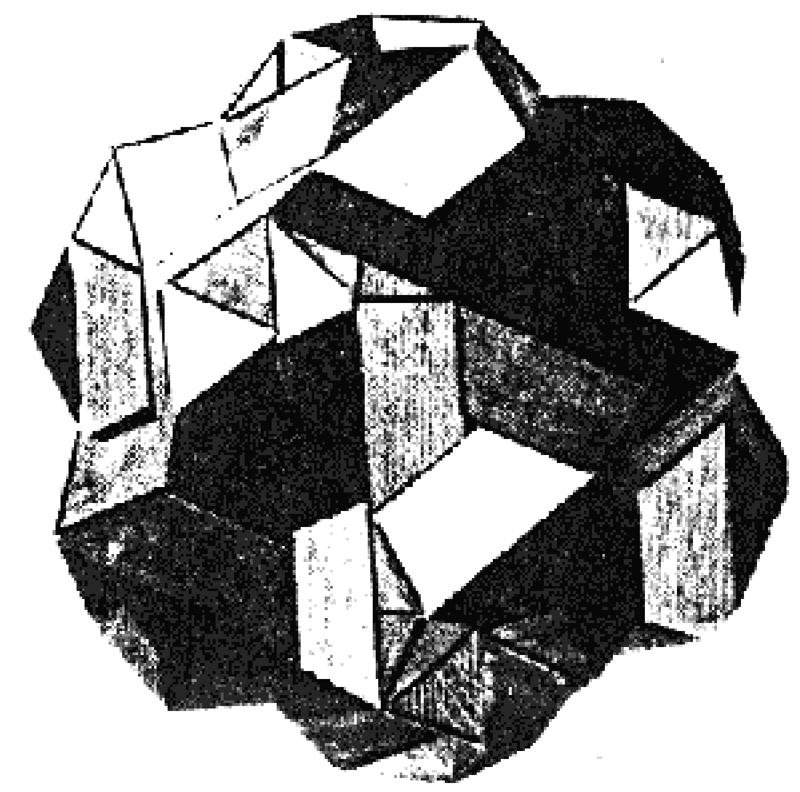


Star



Spiral

Stewart T. Coffin
Puzzles
Old Sudbury Road
Lincoln, Mass. 01773



JUPITER

The Super Spider-Slider

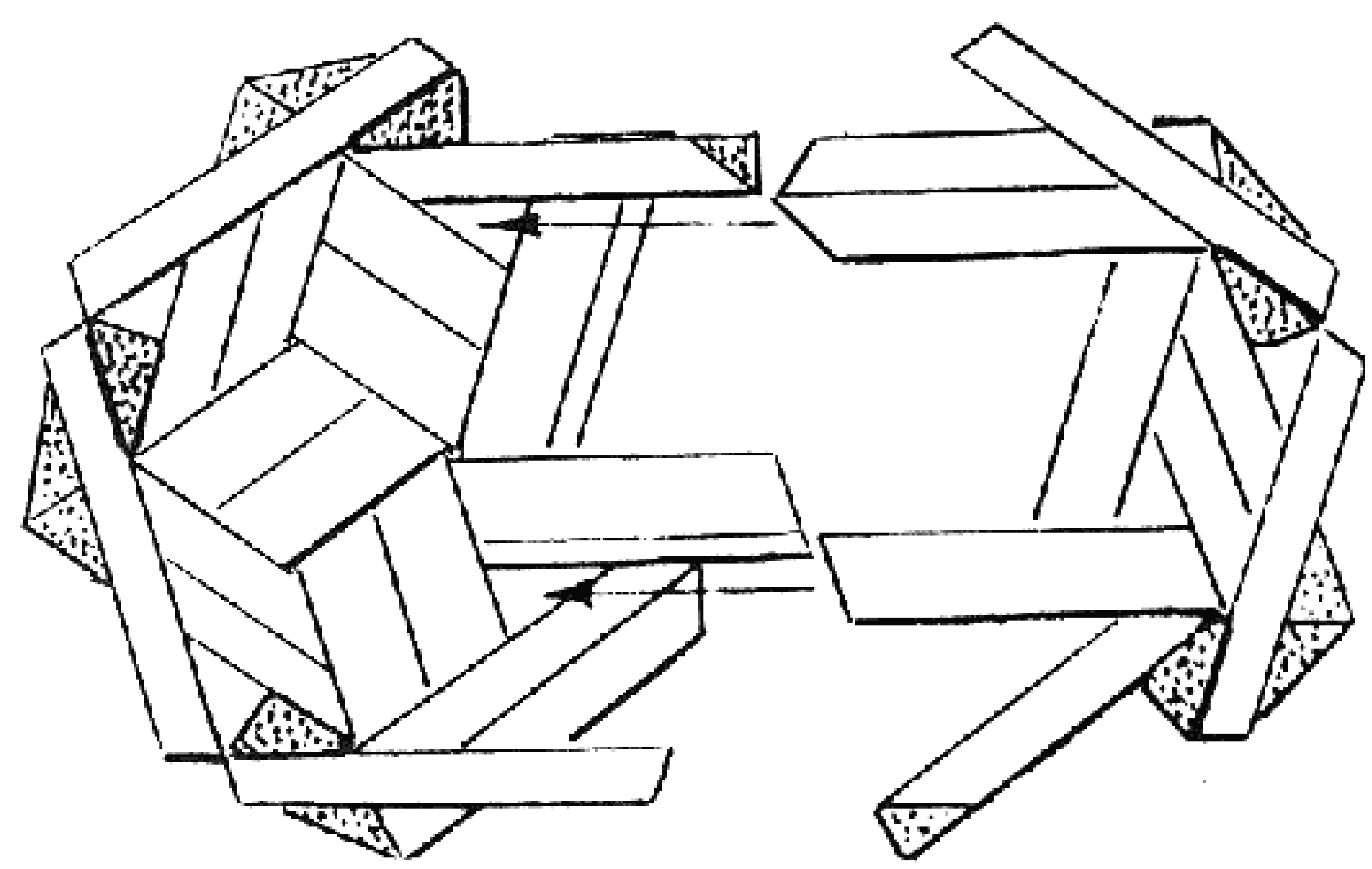
__Introduction__ To put it baldly, JUPITER is a twelve-piece symmetrical polyhedral interlocking puzzle having the internal geometric structure of a triacontahedron, which is a semi-regular solid with thirty rhombic faces. JUPITER is made up of twelve identically shaped pieces, one piece centered at each of the twelve pentagonal indentations, which are oriented as are the faces of a dodecahedron. Note that sixty individual pieces of wood of six different types - ten of each type - are used, five in each spider-shaped puzzle piece. Puzzle devotees familiar with SCORPIUS will perceive that JUPITER is merely a more intricate form of same, resulting from increasing the number of spider arms from four to five.

__Symmetry__ Despite its apparent complexity, JUPITER is surprisingly easy to assemble because of its absolute symmetry. A symmetrical assembly is, in this context, one in which all parts are identical in shape and situated congruently with respect to each other. In other words, if all the pieces were of identical material and color, it would be quite impossible to distinguish one from any other in the assembly.

__Disassembly__ This is easy. Manipulate the puzzle gently until you discover the sliding motion which separates it into two identical halves. This motion can take place independently or concurrently along any of the six geometrical axes of the structure. The individual pieces then come apart readily.

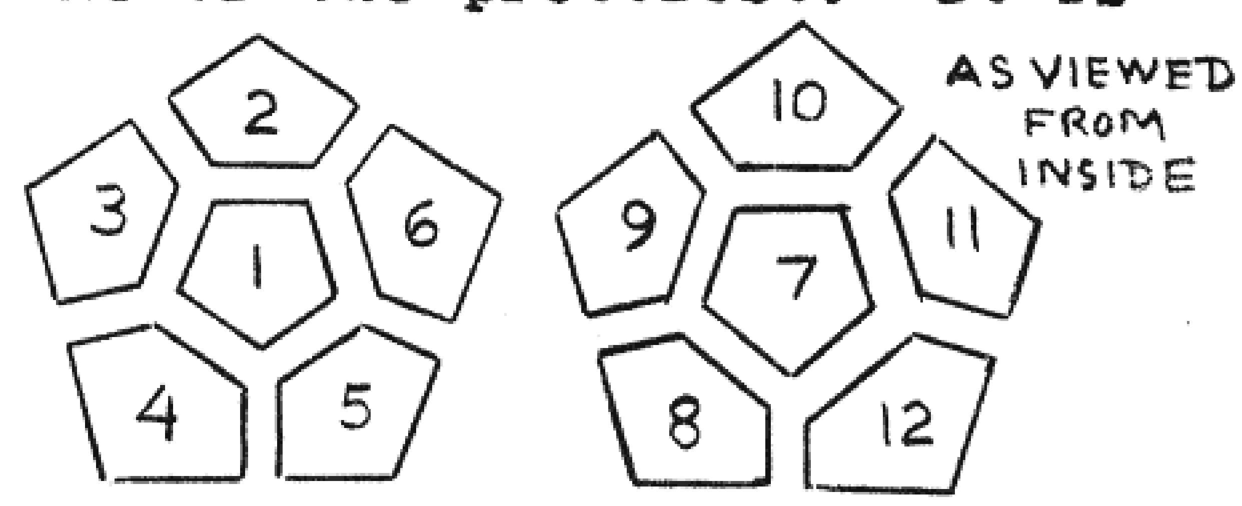
__Assembly__ Select any piece for a base, and holding it in your hand, arms pointed upward (the spider's arms, not yours), arrange five more of the pieces around it, sliding them gently into position to form a sort of hemispherical nest. The last two pieces must __first__ be pre-assembled and slid into place as a unit. This is the only tricky step, and may take a little practice. Form the other half the same way, and then mate the two halves. It will be necessary to rotate the assembly and systematically disengage the tips of the arms at several points before it slides completely together.

Need we point out that excessive force is unnecessary, and its unrestrained use, here as elsewhere, can lead only to the ruination of many beautiful things.



Symmetrical Arrangements While the structural concept of the puzzle may in itself prove fascinating, the various pattern problems which result from symmetrical arrangement of the dissimilar woods are all the more so. There are five such patterns.

In the first of these, as illustrated, all adjacent pairs of arms are matched, and furthermore all like pairs are mutually parallel. This is the easiest pattern to do, and one of the prettiest. It is known as the Parallel Solution.



To make it easier, the pieces are numbered, and the two halves are assembled as shown at right: Note that in the completed assembly, the two base pieces - 1 and 7 - will be opposite each other, likewise 2 opposite 8, 3 opposite 9, etc.

There is a second pattern, known as the Equatorial Solution, in which all adjacent pairs are again matched, but are not mutually parallel. The other three symmetrical patterns are known as the Large Double Ring, Small Double Ring, and Pinwheel solutions. Ardent puzzle enthusiasts who have mastered SCORPIUS should have little difficulty solving these, and discovering a remarkably simple transformation which relates all of them.

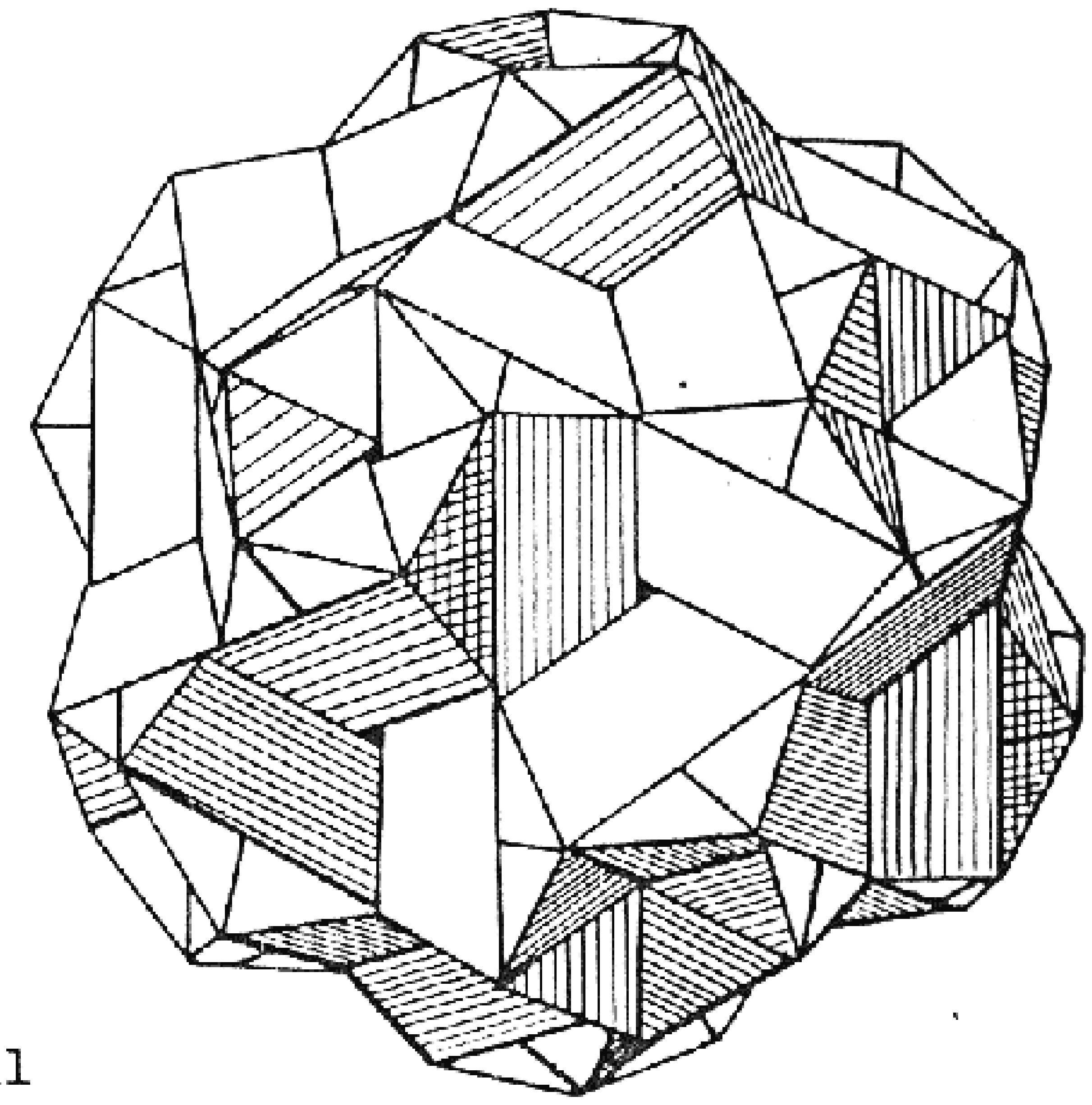
(For our purposes, it will suffice if we define a symmetrical "multi-color" pattern as one in which the individual pieces within any particular color group are situated congruently with respect to each other.)

Final Comment The considerable design and tooling effort which went into the creation of the JUPITER puzzle was prompted, in part, by the enthusiastic response to SCORPIUS by AP-ART zealots. As pointed out, JUPITER is simply the result of a quantitative extension of the SCORPIUS geometry. It is natural to ask if this geometric evolution might be continued, producing an even more intricate successor to JUPITER. The answer is a definite no. It has been proven mathematically that the sixty-piece triacontahedral geometry of JUPITER represents the absolute upper limit of symmetrical (as defined) polyhedral construction, in this world at least. Thus, this puzzle might be said to embody, in the true sense of the word, the Ultimate in polyhedral puzzle design.

#7

The JUPITER Puzzle

U. S. Patent D-232571 (1974)



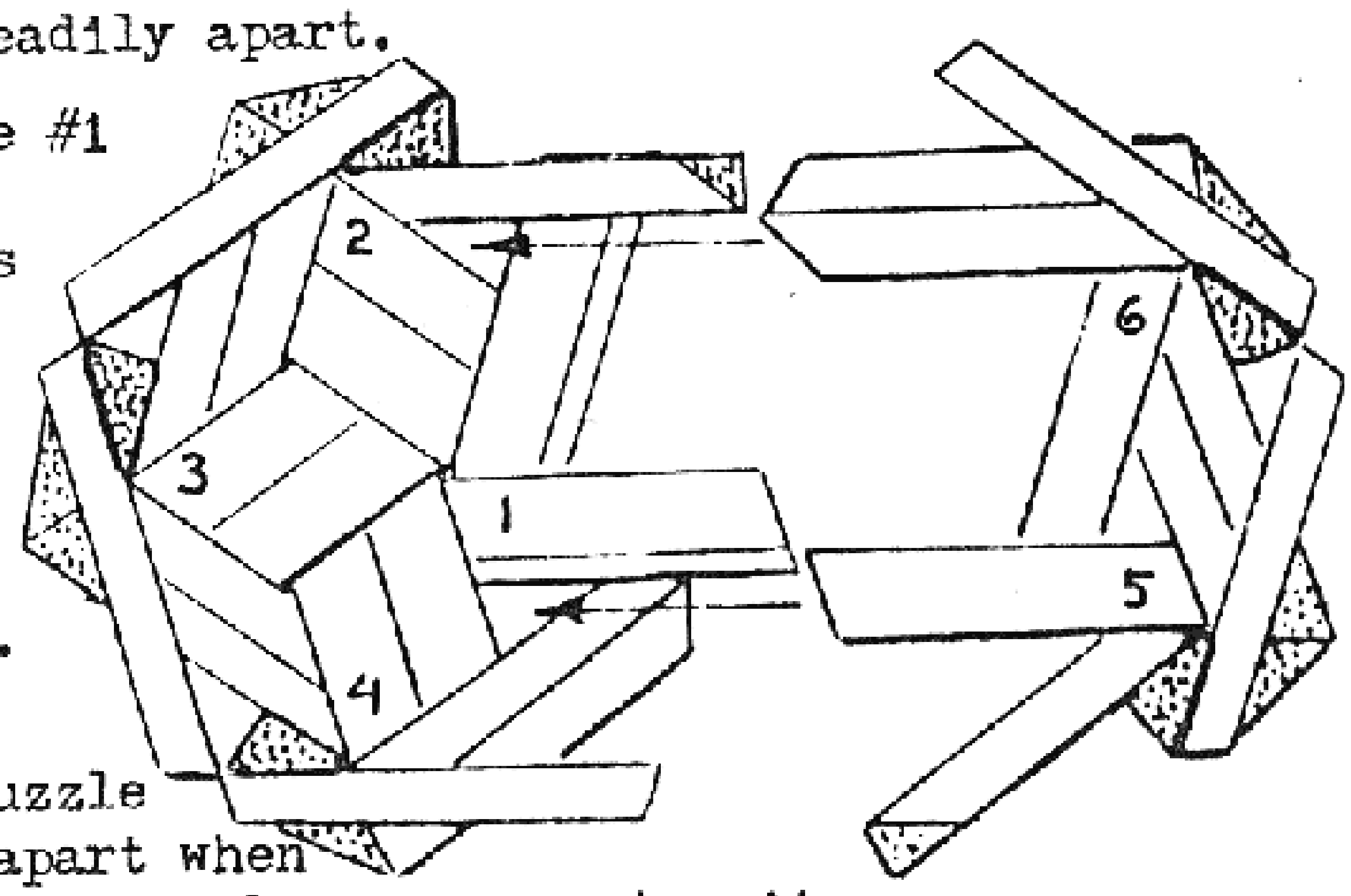
The JUPITER puzzle consists of sixty triangular sticks joined in fives to make twelve symmetrically and identically shaped puzzle pieces, which fit together to form an interlocking assembly enclosing a hollow center having the shape of a triacontahedron (thirty rhombic faces).

Six contrasting woods are used in the construction. When assembled correctly, all like woods are matched in pairs, and all like pairs are mutually parallel. There is a second solution with color symmetry in which all like woods are again matched in pairs, but the matched pairs are not mutually parallel. There are also three other less obvious symmetrical color arrangements which you can amuse yourself by trying to discover. When you are finished playing, always leave the puzzle correctly assembled to prevent warping. To preserve the bright colors of the woods, do not store in direct sunlight.

Coffin's First Rule of successful puzzle design states that a puzzle should look simple and be simple in concept, yet be surprisingly difficult. Coffin's Last Rule, however, states that all rules may be ignored. JUPITER bears this out, for it looks hopelessly complicated but is surprisingly easy.

To disassemble, separate it into two halves along any one of its six sliding axes. With practice, you will be able to do this easily by a squeezing action with thumb and forefinger of each hand on the ends of opposing stick pairs. The individual pieces then come readily apart.

To assemble one half, start with piece #1 and then arrange pieces #2 - #6 around it counterclockwise. The only tricky step is to first subassemble the last two pieces, #5 and #6, and insert them as a pair (see drawing at right). The other half is assembled the same way, with piece #7 in the center and #8 - #12 arranged clockwise around it. Then mate the two halves.



Many JUPITER owners have made the surprising discovery that even when the puzzle is pressed tightly together, it will fly apart when tossed into the air. If you don't believe it, make sure you try it over a very soft rug!

JUPITER was designed in 1971 and produced from 1971-1977. This improved 1985 reedition is being made with my most choice woods while the supply lasts, with doweled joints. For more information on JUPITER and other puzzles of this sort, including care and repair, please refer to my book Puzzle Craft.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 June 1985

No. 7

Jupiter

This AP-ART Design No. 7, **Jupiter,** is one of five made in a special edition for sale at IPP-20. Some of my last remaining stock of exotic tropical hardwoods went into these, for example this is the last of my Tulipwood, Ziricote, and Blue Maho, probably never to be replaced. The names of the woods are marked inside.

In order to preserve the brilliant colors of these fancy woods, it is recommended that you not place the Jupiter in strong UV light such as sunlight or fluorescent light for very long.

Since all 12 of the Jupiter puzzle pieces are mechanically identical, they can be assembled in any order. However, they fit best one way only, and that is with all like woods mutually parallel, as supplied and as illustrated in my various publications.

In order to prevent the pieces from warping over time, especially with seasonal changes in humidity, it is recommended that the Jupiter not be left for a long time disassembled. For best fit, keep it assembled in the parallel color arrangement as mentioned above.

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810 July 2000

No. 7-X

Jupiter

Special Edition

This is a one-of-a-kind variation of the familiar AP-ART Design No. 7, **Jupiter.** It uses twelve dissimilar woods instead of the usual six, and instead of being permutated in the usual way each puzzle piece is of one kind of wood. Since only five sticks of each kind of wood are used instead of the usual ten, this allows the use of the very last of some of my vanishing supply of rare and exotic woods. All of these woods are identified by labels on the inside.

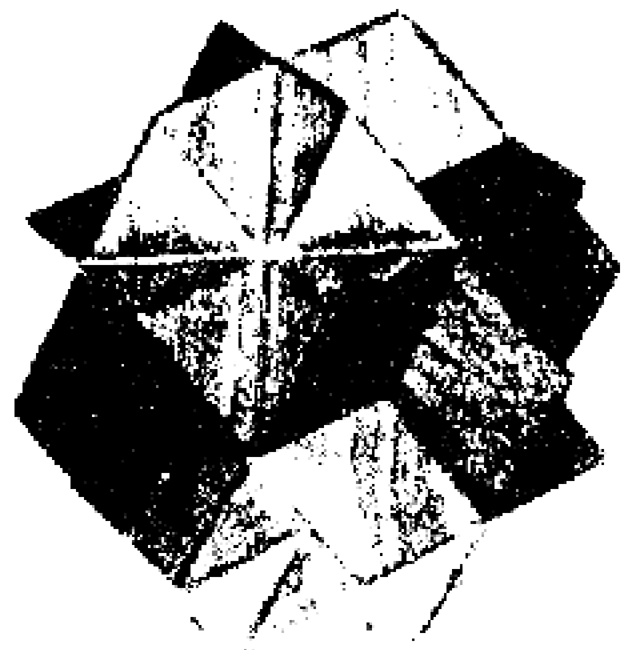
In order to preserve the brilliant colors of these fancy woods, it is recommended that you not place the Jupiter in strong UV light such as sunlight or fluorescent light for very long.

Since all 12 of the Jupiter puzzle pieces are mechanically identical, they can be assembled in any order. However, they fit best one way only. Normally that would be with all like woods mutually parallel. But since that is not possible with this version, the recommended solution is marked with letters on the inside.

In order to prevent the pieces from warping over time, especially with seasonal changes in humidity, it is recommended that the Jupiter not be left for a long time disassembled. For best fit, keep it assembled in the marked arrangement as mentioned above.

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810 July 2000

The NOVA Puzzle



STEWART T. COFFIN
Puzzles
OLD SUDBURY ROAD
LINCOLN, MASS. 01773

Before disassembling, note the symmetrical arrangement of the different woods. Each of the eight three-sided indentations should show the three different kinds of wood. This is the preferred solution to the puzzle. There are two versions of it which appear at first glance to be identical, but are not.

To disassemble, grasp any opposing pair of pieces (after very careful visual inspection to determine what constitutes a piece), then wiggle and pull apart. There are four different axes along which the assembly will slide apart. If the two opposite pieces are carefully separated directly apart, one can observe the interesting phenomenon of the puzzle expanding in all directions simultaneously, hence the name. (A nova is a star which suddenly becomes much brighter.)

We do not give detailed assembly directions with this puzzle. It is fairly simple, as puzzles go. The relative orientation of the pieces in the assembly is fairly obvious, and so the only real problem is getting them all in place, especially that last one. Like most of our AP-ART puzzle designs, all the pieces are identical in shape, so there clearly cannot be any "key piece". Anyone with six hands might try assembling in a manner exactly opposite to the catastrophic explosion which undoubtedly resulted from the experiment suggested above - that is, bringing all six pieces together simultaneously. However, like most human endeavors, there are hard ways and easy ways. In the easy way, only one right hand and one left hand are required, and if that isn't enough of a hint, we don't know what is.

Geometrically, the assembled puzzle has the shape of a stellated rhombic dodecahedron. There are actually several solids which answer to this description, of which this particular form is the most fully stellated, and also certainly one of the most beautiful.

Note: All woods tend to expand with moisture and shrink with dryness. Furthermore, this is non-uniform, with most of the movement occurring across the grain rather than lengthwise. The inevitable result is that this puzzle will be tighter under humid conditions (summer), and looser when dry (winter), despite the fact that the woods have been specially selected to minimize this tendency. One of the pieces is equipped with a unique silicone rubber cushion to take up the slack. If, in spite of all this, it is found that the puzzle cannot be assembled or disassembled without using excessive force, it should return to normal with a decrease in humidity.

Instructions for the Four Color Version of the Second Stellation Puzzle, No. 8-B

This symmetrical dissection of the second stellation of the rhombic dodecahedron appeared on my 1972 brochure under the name of NOVA. It is described in Puzzle Craft on page 84. About 100 were made and sold from 1972 to 1974. Some were in three dissimilar woods, two pieces of each kind, assembled in color symmetry with like pieces opposite. Most were made in solid Zebrawood. They were so easy to assemble that I never really considered them assembly puzzles. Back then I was calling my line "AP-ART - the Sculptural Art that Comes Apart."

The idea of making a four-color version with color symmetry problems occurred to me back then, and I believe I did make one crude model, but I don't know what became of it. I had nearly forgotten until the idea surfaced again in the course of organizing material for my new book. One reason I did not make it before was that the old NOVA puzzle had solid blocks in the ends of each piece with notches sawn into them. I did not develop the technique of accurately joining two separate blocks together until later.

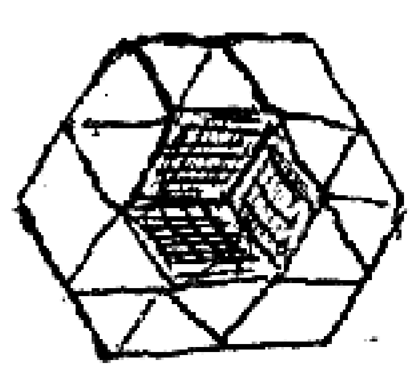
Assembling this puzzle is very easy. It goes together in two mirror-image halves. The problem is to assemble it with color symmetry. There are five different color symmetry solutions possible. Three of these have a mirror-image pair of solutions, so a total of eight possible ways.

The easiest and most obvious way is with each of the eight hexagonal dimples one solid color. A second and more difficult way is with four triangles of solid color appearing. The third and most interesting is with four rings of color circling around the outside and intersecting each other. The other two are not as obvious, and are not as easily described.

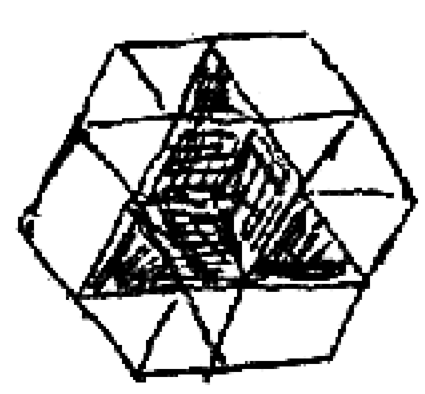
The recently developed spring loaded pin is used in this puzzle to take up the slack in dry conditions and prevent the puzzle from falling apart.

Stewart T. Coffin

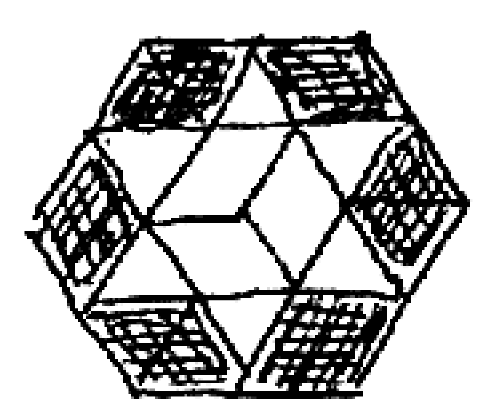
Dec. 14, 1986



1 - DIMPLES



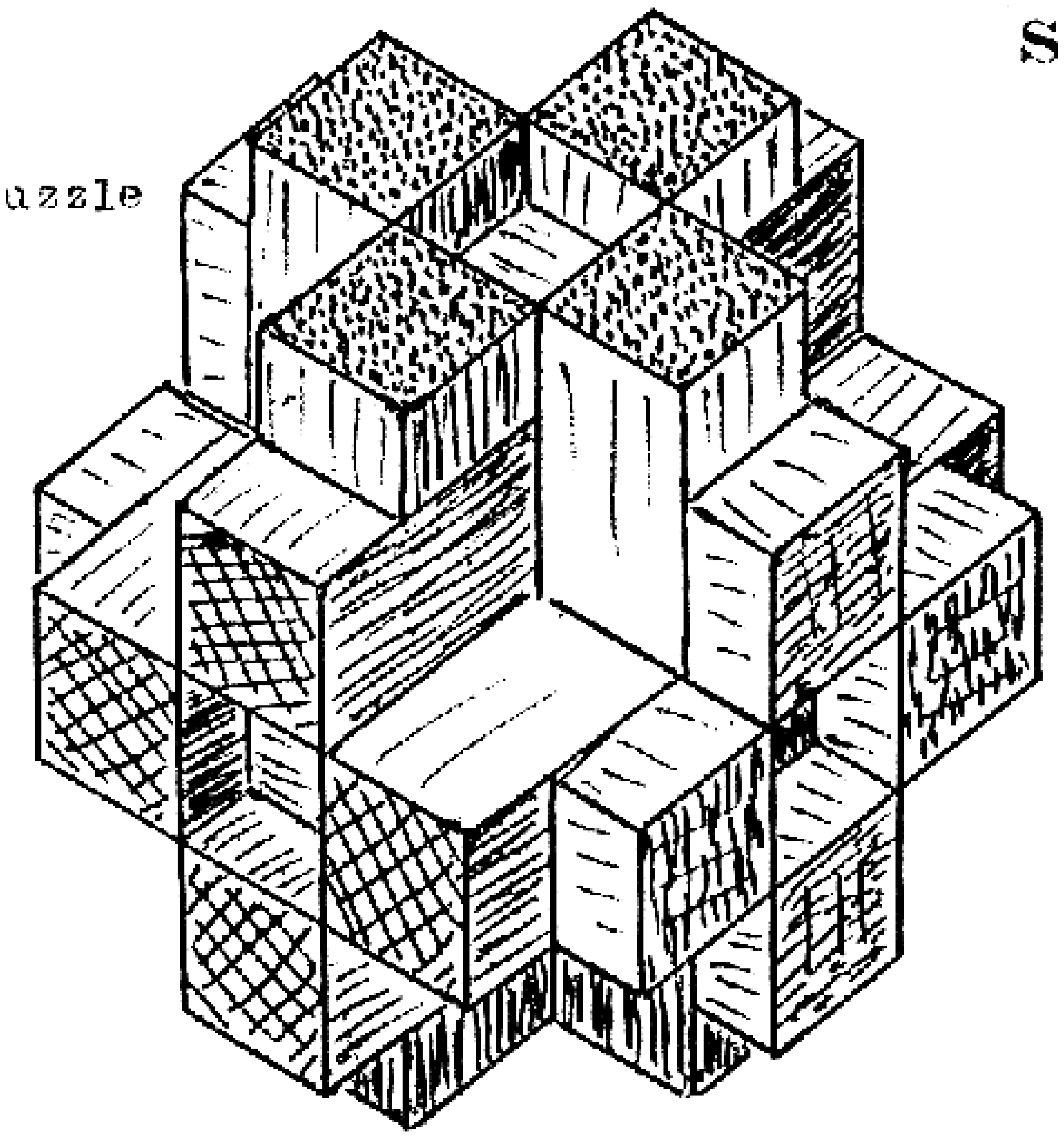
2 - TRIANGLES



3 - RINGS

#9

The SQUARE KNOT Puzzle



STEWART T. COFFIN
Puzzles
OLD SUDBURY ROAD
LINCOLN, MASS. 01773

Of the countless familiar "Burr" (notched square stick) puzzles, this one is by far the most clever and unusual. All twelve pieces are, surprisingly, identical in shape, hence no "key" piece. The final step of assembly is the sliding together of two identical (or nearly identical) halves, which should come as no great surprise to AP-ART puzzle fans. Most unusual is the fact that multiple solutions exist, of varying degrees of difficulty. As assembled for shipment, the puzzle can slide apart along one axis only. There is a second and more difficult solution in which the puzzle can be slid apart along any one of the three axes independently. This is known as the symmetrical solution, and there is only one way to do it. We have not as yet determined how many variations of the first solution exist, or if a solution is possible in which two axes slide but not the third. How about it?

This puzzle is made in various exotic hardwoods, sometimes all one kind of wood and sometimes three contrasting kinds, depending on which seems to suit the particular woods best. With three contrasting woods, there is the added challenge of arranging these woods symmetrically. There are two distinctly different symmetrical arrangements. In one, as illustrated above, all like woods are parallel. In the other, as shipped, three squares of different woods appear to intersect each other, hence the name.

In order to prevent the puzzle from disintegrating prematurely or unexpectedly, a shim has been inserted between two pieces. Remove it to disassemble. Note: all woods tend to expand non-uniformly with moisture, mostly across the grain rather than lengthwise. The inevitable result is that this puzzle may seem too tight or too loose during extremes of humidity, but should return to normal after a while. It can be made tighter by lacquering the pieces, or looser by sanding.

This puzzle is not an original AP-ART design. It is described in U.S. patent #430,502 dated 1890, which credits its invention to William Altekruse. A small plastic version was on the market for many years. This wooden version is slightly different in that the end sections of the pieces are made slightly longer - more than half the thickness of the piece - thus making the puzzle slightly more difficult to assemble.

Supplementary Instructions for the new version of the Square Knot Puzzle, No. 9.

The Square Knot puzzle appeared on my 1974 and 1975 brochures. About 40 were made and sold at that time. It is described in Puzzle Craft on pages 36 and 85. See also 14-Piece Square Knot on page 93 and patent information on page 7. The design was patented in 1890 by William Altekruse, U. S. patent 430502, and is now in the public domain.

This puzzle has many interesting variations, and new ones are coming to light all the time. First there was the 14-piece version, then larger versions with 24, 36, or 38 pieces, and so on. There is the Frantix version with pins and holes.

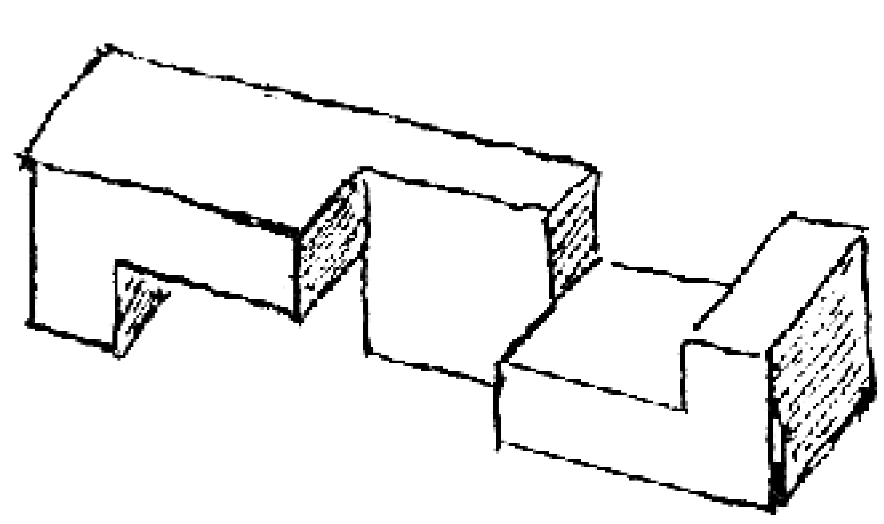
In the original version of the puzzle, all of the pieces are identical and symmetrical. Over the years, I have tinkered with other versions of notching without much success. This version being supplied herewith uses a new type of piece which I don't believe ever occurred to me to try until a few days ago. I call it a "reverse" piece, because the two end notches face in opposite directions. This piece comes in a reflexive pair, which I call "right-handed" and "left-handed" pieces.

This set contains 14 standard pieces, 5 left-handed pieces, and one right-handed piece. The 14 standard pieces allow you to construct either the 12-piece traditional version of the puzzle or the interesting 14-piece variation. For added challenge and amusement, you may substitute reverse pieces for standard pieces. The 12-piece solution can be done with ten standard pieces and two reverse pieces, or eight standard pieces and four reverse pieces. In these versions, it does not matter very much if the reverse pieces are all left-handed or a mixture of right- and left-handed, as all combinations are possible and none more difficult than another.

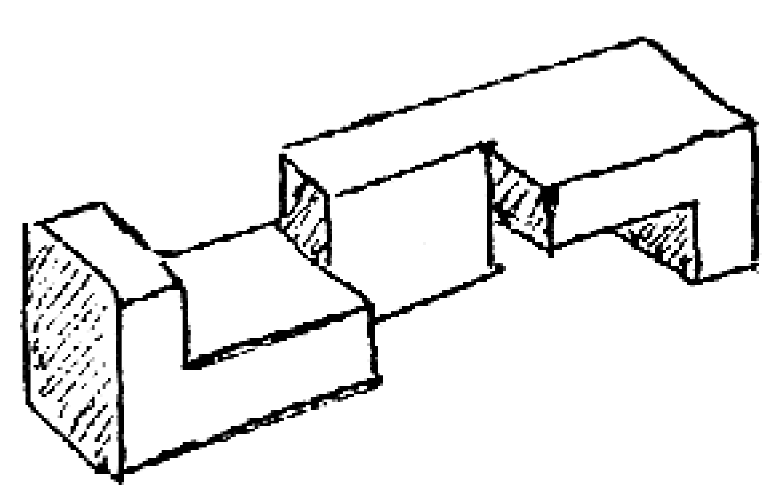
The 14-piece version may be constructed with 12 standard and two reverse, 10 standard and four reverse, or 8 standard and six reverse. In the version with six reverse pieces, the only combination which is impossible is with six identical reverse pieces. In the other combinations, it may at first appear to be possible only if the pieces are not longer than four times their width. However, it is possible with longer pieces also.

Stewart Coffin

December 30, 1986



LEFT-HANDED



RIGHT-HANDED

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

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More house-cleaning.

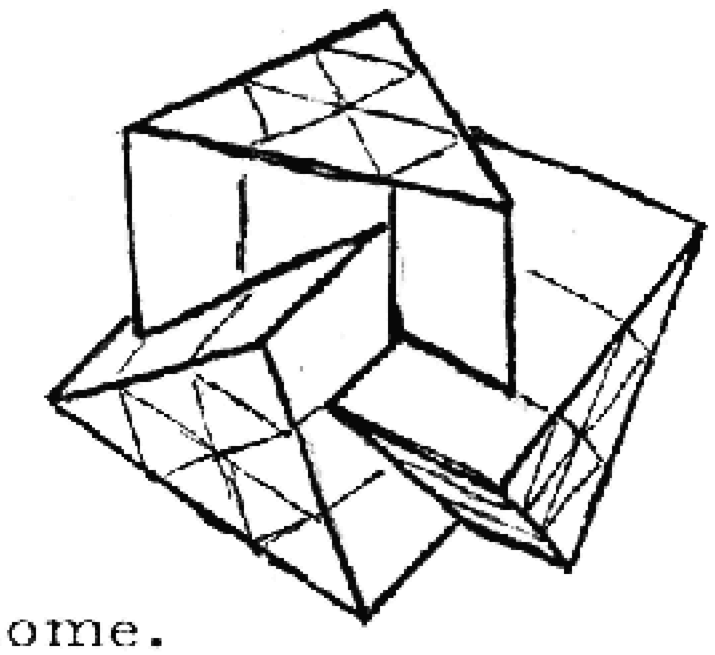
This <u>Double Hex Prism</u> puzzle is a more complicated variation of my Hexagonal Prism Puzzle, likewise with six dissimilar pieces, only one solution, and one sliding axis. This puzzle is mentioned and illustrated in my new book. I believe this rough model in Birch is the only one ever made. It was probably made around 1972. The pieces have been marked in pencil for easy assembly. Erase these marks if you wish.

S.T.C.

Oct 26, 1989

#12

The TRIANGULAR PRISM Puzzle



The Triangular Prism puzzle was designed in 1973, and produced in very limited number the following two years. The problem at that time was the accuracy of the saw cuts necessary for it to go together properly. That problem has now been overcome. Three precise sawing jigs and two gluing jigs are used in its fabrication.

The Triangular Prism is one of a family of three designs, the other two being the Hexagonal Prism, made by simply omitting the twelve edge blocks, and the Four Star (General), made by adding twelve more edge blocks in a Star of David configuration. Of the three forms, I think the triangular is the most pleasing geometrically.

Starting with the hexagonal prism structure, the method of attaching the final twelve edge blocks gives rise to two distinctly different designs. The compact version, which this one is, is illustrated correctly above. The other or elongate version, of which only a few were ever produced, has pieces which are quite different from this one and assembles into a shape which is the mirror image of the one shown here (shown, inadvertently, on my 1980 brochure).

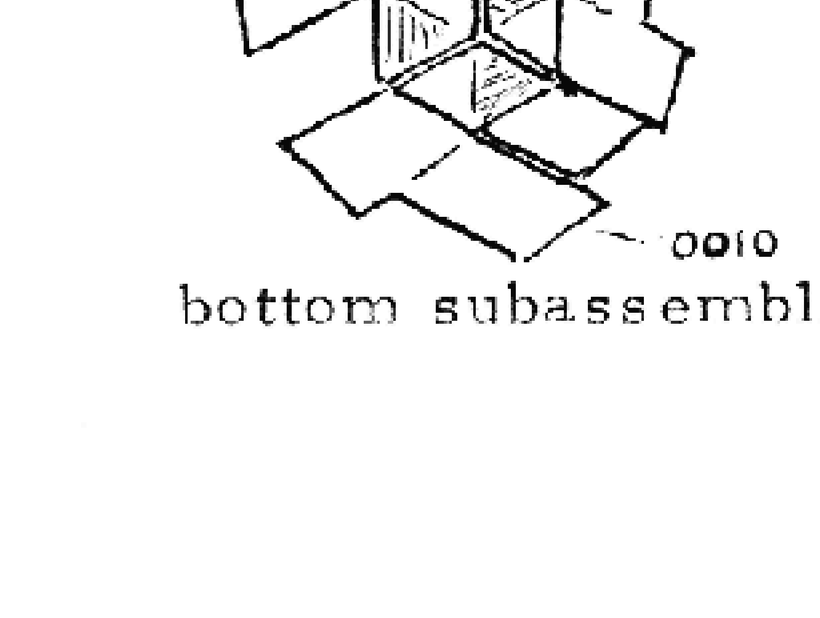
Disassembly: The first step of disassembly is to separate the puzzle into two halves. Since this can be rather difficult, especially if the puzzle is tight due to humid conditions, the axis is marked by a tiny pencil dot near the center of the top face. If you squeeze with four fingers in exactly the right places, the top three pieces lift off. The six pieces then come readily apart.

Assembly: Examine the pieces and note the following - They are all dissimilar and non-symmetrical. They all consist basically of a center block to which are directly and symmetrically attached a pair of end blocks and a pair of longer back blocks. In addition, twelve smaller blocks are scattered throughout, which are responsible for the dissymmetries. Note that they have four possible locations in each piece, at either end, or either side of center. If their presence or absence in each location is represented by 1 or 0, then the six pieces may be represented as:

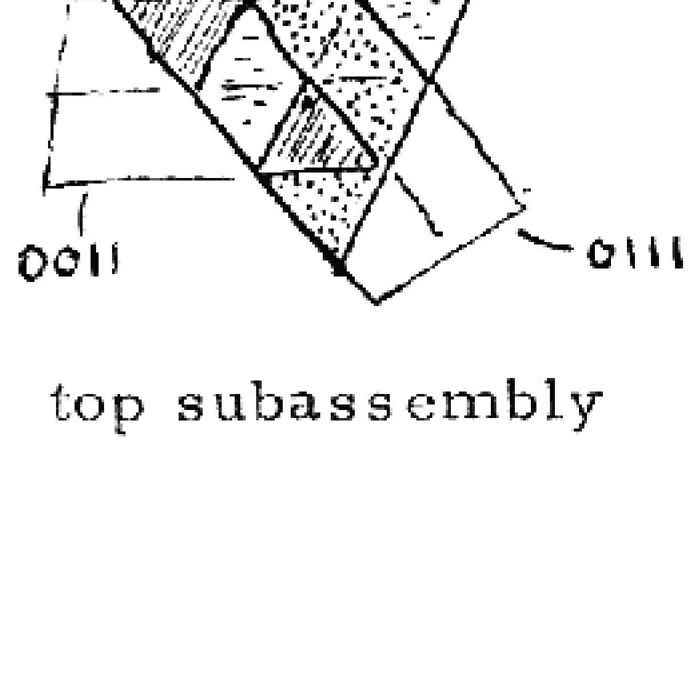
0001 0010 0011 0101 0111 1011

These are all the possible non-symmetrical permutations, which by strange coincidence just happen to go together one way and only one way to form an interesting puzzle of medium difficulty.

At this point, most puzzle enthusiasts will wish to solve the puzzle on their own by judicious trial and error (mostly the latter). Explicit assembly directions are shown below.



bottom subassembly



top subassembly

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

March 2, 1987

For <Deleted> Pieces Nos. 12, 13, 14.

This box contains a complete set of the three Prism Family Puzzles - the Hexagonal Prism Puzzle, the Triangular Prism Puzzle, and Four Star.

They are all made from the same plank of wood, the species of which is unknown. I have been calling it "Honduras Rosewood," and my supplier calls it "Almond." (Same wood used in Square Knot Puzzle sent earlier.)

If you compare this Triangular Prism Puzzle with the ones I used to make and sell, one of which you have, you will find that the final shape is the same but the pieces are quite different. Same applies to the Four Star. Many variations are possible, and it had been on my mind for some time to try this one. I have made a second set, identical to yours, which I plan to use for illustrating my new book. I think I like this version better than the original.

One feature of this puzzle set which has never been pointed out in the instructions is that halves of different puzzles in the set can be combined to create new and interesting shapes, although they do not always fit as accurately as with their own.

The Four Star can be quite confusing to disassemble the first time, and probably to assemble too. The way to go about it is to practice with the Hexagonal Prism first, as it is the easiest. Then proceed to the Triangular Prism until you have solved it too. Finally go on to the Four Star. This wood is fairly stable, which should reduce the tendency to be too tight when humid. I have not had enough experience with this wood to know what prolonged exposure to sunlight will do to its color.

S.T.C.

The Ring of Diamonds Puzzle

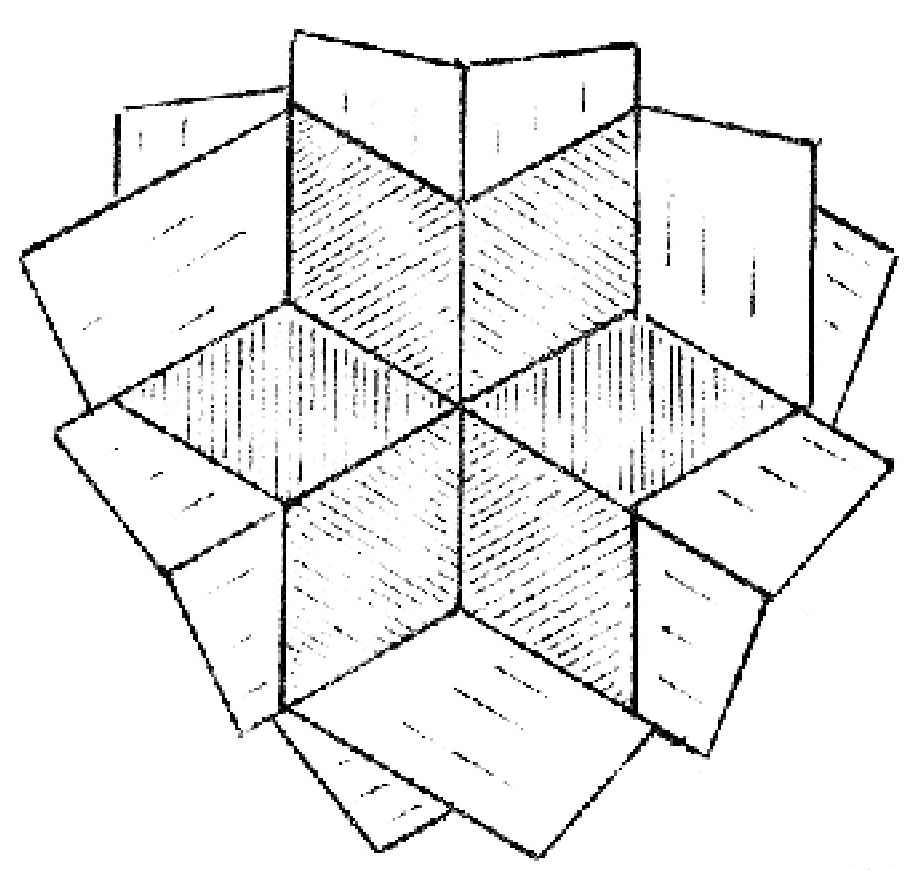
No. 13-B

This long lost puzzle design was included in the box of models and prototypes mysteriously returned to me recently by my former business agent after a lapse of more than 20 years (along with others, including the Lost & Found puzzle, No. 111). I had completely forgotten about it. I will guess that it was designed and first made in 1973, and that only the one model was made.

The six dissimilar and non-symmetrical pieces of this puzzle assemble one way only to form a puzzle having the same external shape as The General, No. 13. I prefer this design to The General because the pieces are simpler, and fewer glue joints show when assembled. Other things being equal, I will always prefer the simpler design with cleaner lines for aesthetic reasons. If it had not become lost and forgotten, I would probably have produced this version instead of The General.

The first step of disassembly can be puzzling. Like all other designs in this large family, it separates into two subassemblies of three pieces each. I usually mark the sliding axis with a small pencil dot. Assembly is a straightforward combinatorial problem, and may require a degree of patience. With blind trial & error it could take hours, but a thoughtful analytical approach can reduce that to perhaps only a few minutes, especially if you have previously solved any of the following: Hexagonal Prism, Triangular Prism, or Augmented Four Corners.

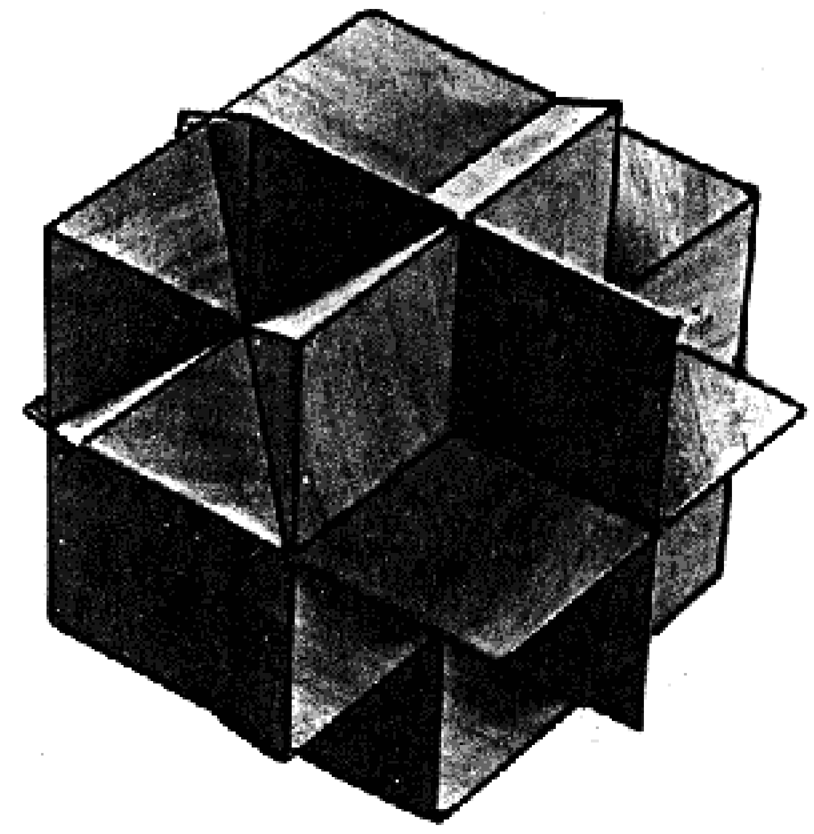
If you must have an assembly hint, here it is: Find the three pieces that each have three rhombic blocks attached at one end. Those three pieces form one of the two subassemblies. Furthermore, when correctly assembled, they form one complete flat face having the characteristic ring-of-six-diamonds shape.



Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 December 1995

Puzzle #14-A

The <u>SECOND STELLATION</u>



This puzzle consists of six dissimilar non-symmetrical pieces which assemble to form an interlocking solid having the shape of the second stellation of the rhombic dodecahedron.

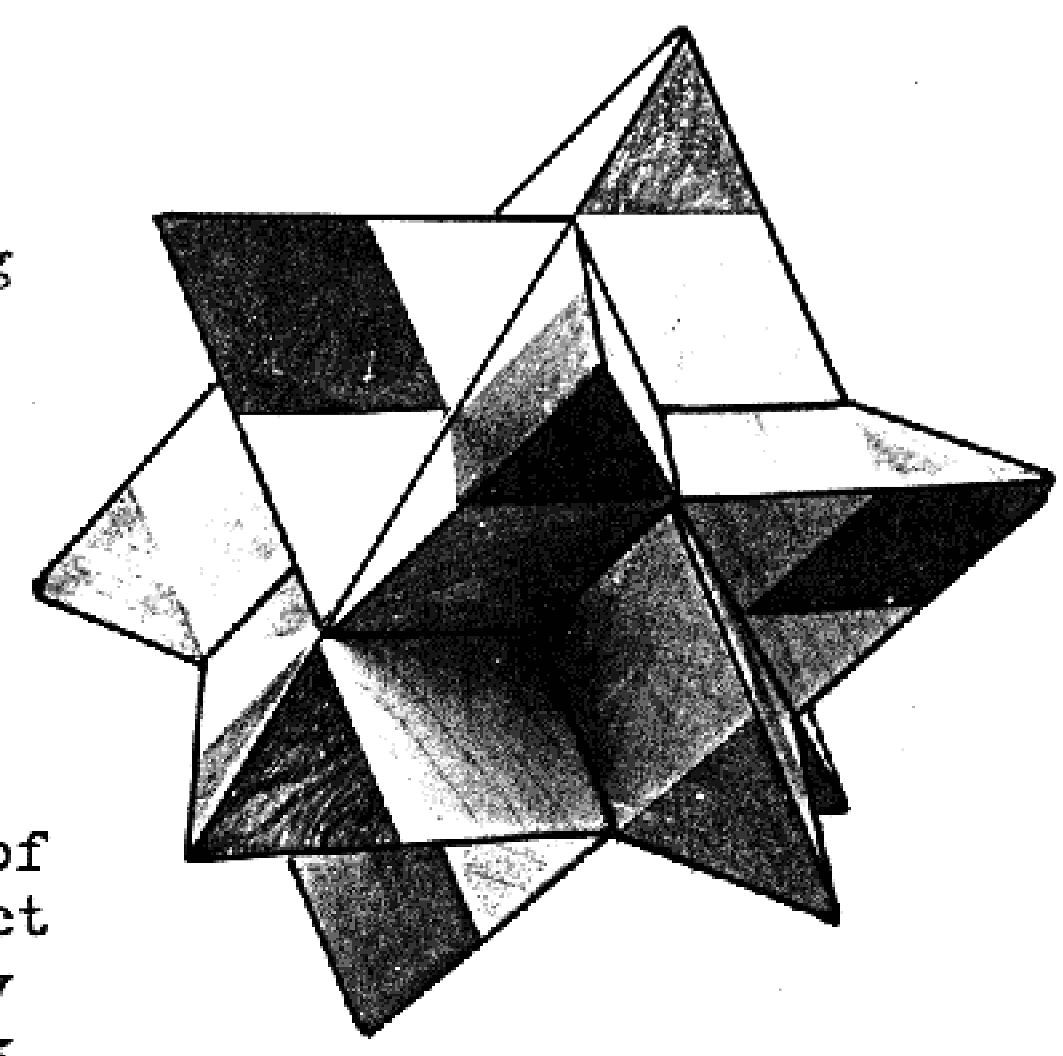
The first step of disassembly is to slide the puzzle apart into two halves, and this can be done along any one of the four sliding axes. The six pieces then come readily apart.

Examine the pieces and note the following: Each piece consists of a central block to which are directly attached a pair of identical end blocks, positioned symmetrically. Twelve more smaller blocks are required to complete the stellation. There are four possible locations for these blocks on each piece, and the six puzzle pieces represent all possible non-symmetrical permutations of attaching these blocks.

This is a straightforward combinatorial puzzle of intermediate difficulty, so explicit assembly directions are not given here. The obvious approach to solving the puzzle is to try building it up piece by piece, trial and error, until some arrangement is found without interference between the pieces. Then group the pieces in two opposite halves and mate them to complete the assembly. There are two solutions.

Puzzle #33

The <u>TWELVE POINT</u> Puzzle



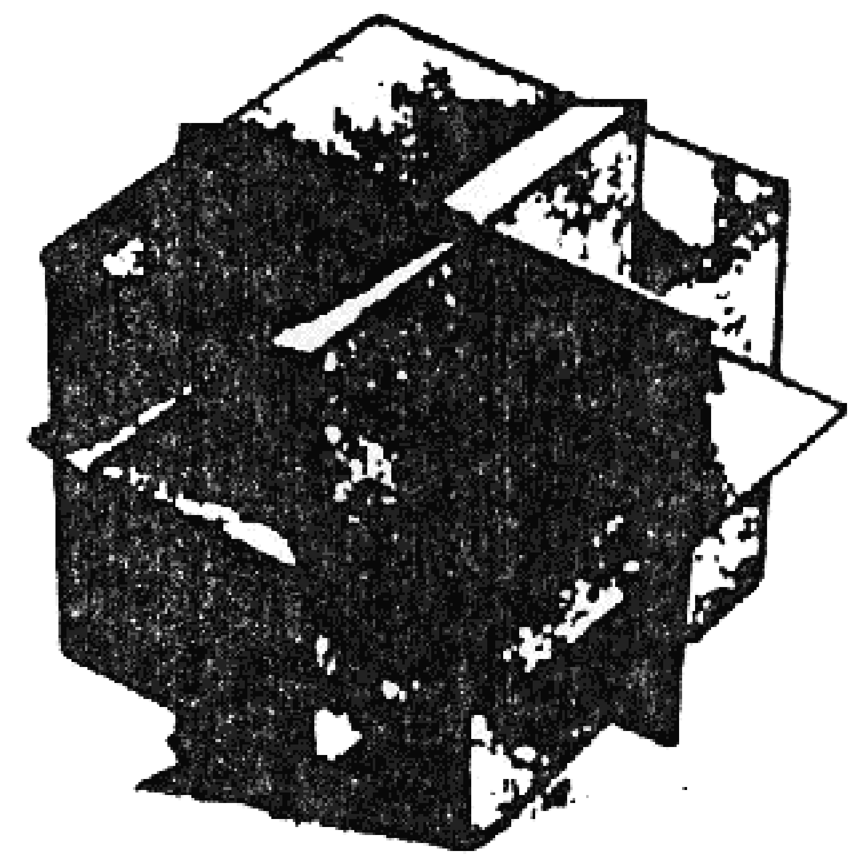
This puzzle consists of six dissimilar non-symmetrical pieces which assemble one way only to form an interlocking solid having a shape which is intermediate between the second and third stellations of the rhombic dodecahedron.

Comparison with the Second Stellation Puzzle above reveals that the Twelve Point Puzzle is made by starting with a Second Stellation Puzzle and then adding the twelve end blocks which form the points. What the addition of these blocks does to the action of the puzzle is far more important than the fact that they make an intriguing new shape. They eliminate one of the two solutions, and block three of the four sliding axes on the remaining solution, making the puzzle much more interesting.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Nov 1984

14-A

The SECOND STELLATION Puzzle



This puzzle consists of six dissimilar, non-symmetrical pieces which assemble to form an interlocking solid having the shape of the second stellation of the rhombic dodecahedron.

The first step of disassembly is to slide the puzzle apart into two halves, and this can be done along any one of the four sliding axes. The six pieces then come readily apart.

Examine the pieces and note the following: Each piece consists of a central block to which are directly attached a pair of identical end blocks, positioned symmetrically. Twelve more smaller blocks are required to complete the stellation. There are four possible locations for these blocks on each piece, and the six puzzle pieces represent all possible non-symmetrical permutations of attaching these blocks.

This is a straightforward combinatorial puzzle of intermediate difficulty, and so explicit assembly instructions are not given here. The obvious method of solving the puzzle is to try building it up piece by piece, trial and error, until some arrangement is found without interference between the pieces. Then group the pieces any convenient way into two opposite halves and mate them to complete the assembly.

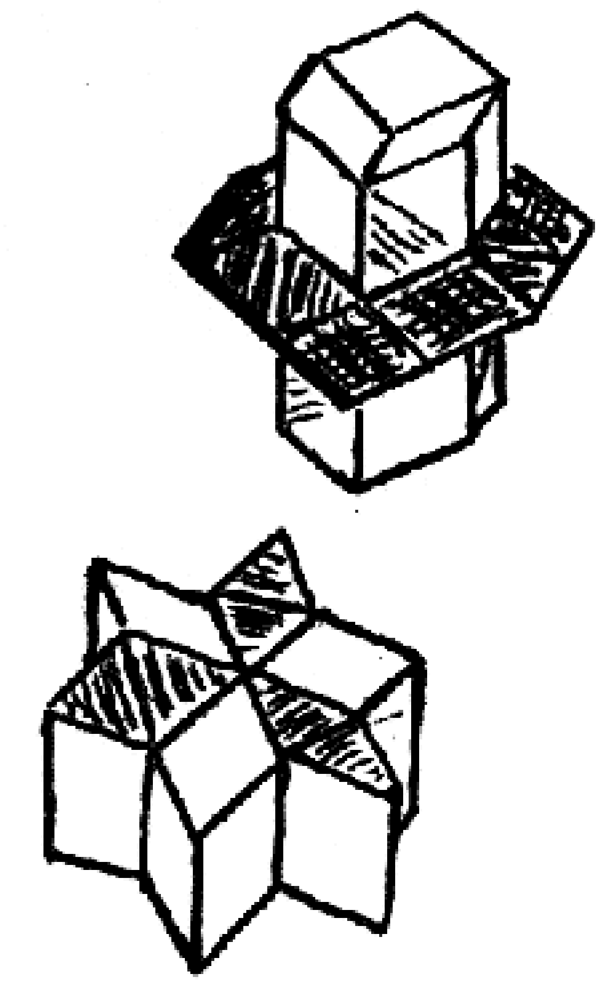
This puzzle was first produced in 1974 under the name SUPER NOVA, and was one of the first of my so-called combinatorial puzzles. (It was preceded in 1971 by the NOVA Puzzle, which had the same shape but identical pieces.) Because of the difficulties of fabrication at that time, only a few were made, and it was discontinued the following year. Improved woodworking technology now make it possible to produce the puzzle with the close tolerances which it requires.

Until recently, I had carelessly assumed that this puzzle had only one solution, but now a systematic search has revealed that two solutions exist. The existence of the second solution could quite correctly be regarded as an inherent defect in the puzzle, which is impossible to correct. That being the case, we must accept things as they are sometimes. Perhaps the second solution even makes it more interesting - see if you can discover both of them. Interestingly, in going from one solution to the other, all twelve of the matings between adjacent pieces are changed. There is, however, a simple transformation between the two solutions which you may discover.

Additional note of interest: The term "stellation" as it is used here refers to a geometrical shape generated by extending the faces of the original solid. The rhombic dodecahedron has three stellations, as well as several intermediate forms (see other side). There is a well known very simple puzzle of six identical pieces which has the shape of the first stellation, and one of my first AP-ART puzzles was a minor variation of same. I have tinkered with the third stellation from time to time, but so far without any great success worthy of this intriguing solid - a challenge for the future!

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773

TRIUMPH - The Transmutable Puzzle #15



This puzzle has the most unusual capability of being assemblable into three different symmetrical solid shapes, even though its six pieces are all identical in shape. In this respect, it is believed to be unique.

Each of the three symmetrical solutions has one axis of symmetry. The first of these shapes can be described as a hexagonal column with a hexagonal ring around its center.

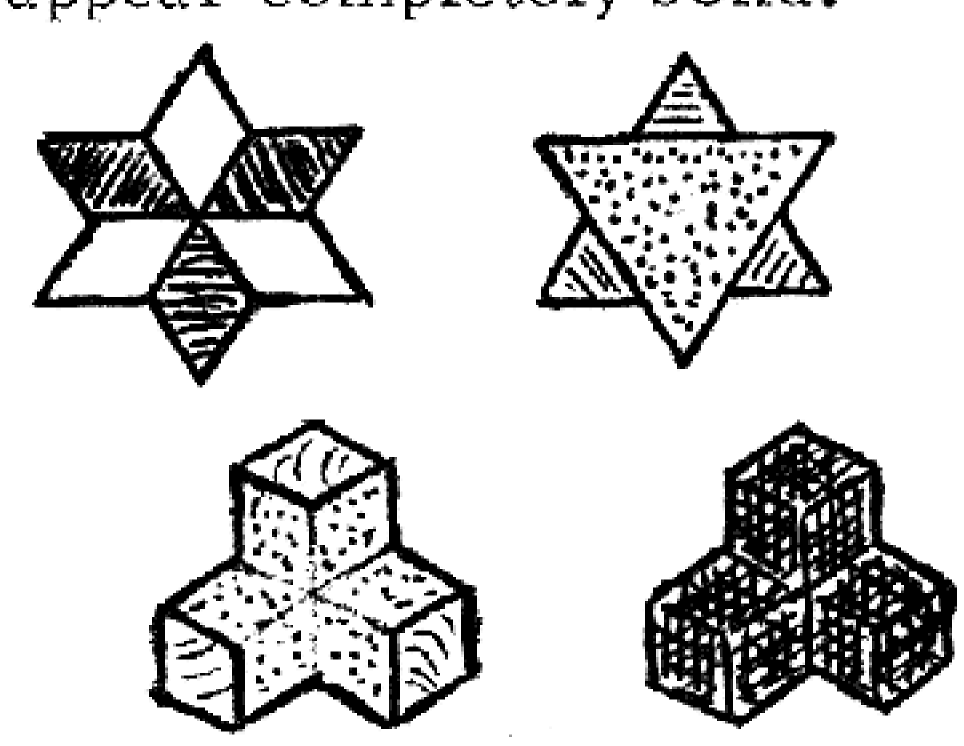
The second shape is a six-pointed Star of David column.

The third shape should be fairly obvious after you have discovered the first two, so we leave it to you to find (and name).

There are, in addition, a number of solutions having no apparent symmetry of any sort, which I have not bothered to enumerate. I offer them as an original exercise for anyone wishing to extend the frontiers of Knowledge in this particular direction.

After having mastered (?) the various geometrical shapes, we advance to the equally intriguing property of double color combinations. The puzzle is normally made in two dissimilar woods, with the central portion of all six pieces being one kind of wood, and the two ends dissimilar. Each of the symmetrical shapes described above has a pair of distinctly different patterns of color symmetry.

For example, if we refer to the two woods as "light" and "dark", in the first shape we may have a dark column surrounded by a light ring, or a light column surrounded by a dark ring. In one of them, the column will appear a completely solid color, but in the other version the ring will appear completely solid.



In one version of the Star of David solution, an alternate light and dark diamond pattern appears at both ends. In the alternate version, a triangular color pattern appears in its place.

In the third symmetrical shape, one version produces a six-pointed star in a solid color, and the alternate version is the only solution in which the assembly appears as one entirely solid color when viewed from one end.

What other interesting properties can you discover for this paradoxical puzzler?

The FUSION-CONFUSION Puzzle, No. 15-A

This is a vastly improved version of the old Triumph puzzle (1974), which consisted of six pieces identical in shape but dissimilar in coloring. In this new version, the six pieces are identical in shape <u>and</u> coloring, but two pairs of them are fused together, thus resulting in only four puzzle pieces.

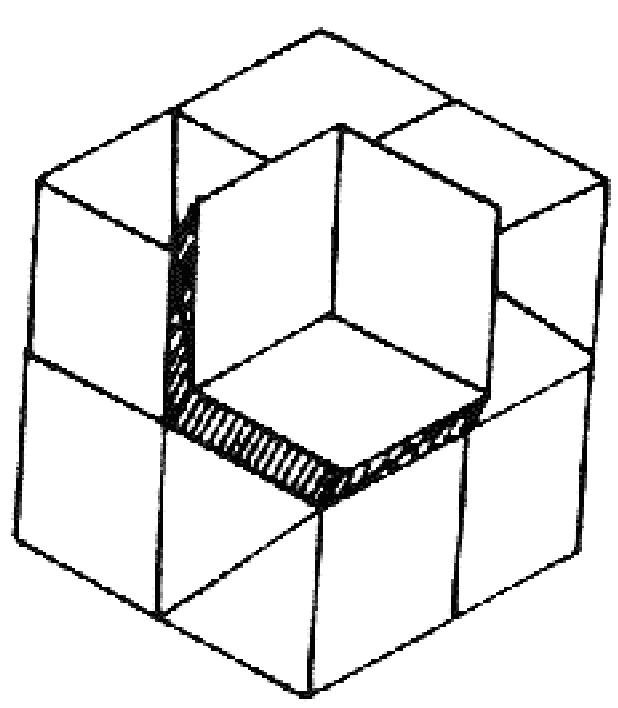
This slight modification creates the most utter confusion one can imagine. It also overcomes the tendency of the old version to fall apart when dry, as three of the four sliding axes are thus eliminated, leaving only one confusing diagonal axis of assembly.

The object of the puzzle is to assemble the four pieces to form any one of the three shapes shown below. The shape on the left could be described as a hexagonal column with a hexagonal ring around its center. The one in the center is a sort of Star of David prism. The strange shape on the right is harder to describe and is not the same top and bottom. Furthermore, it also occurs in the mirror image of the version shown, so there are really four solution shapes. All have a threefold axis of symmetry.

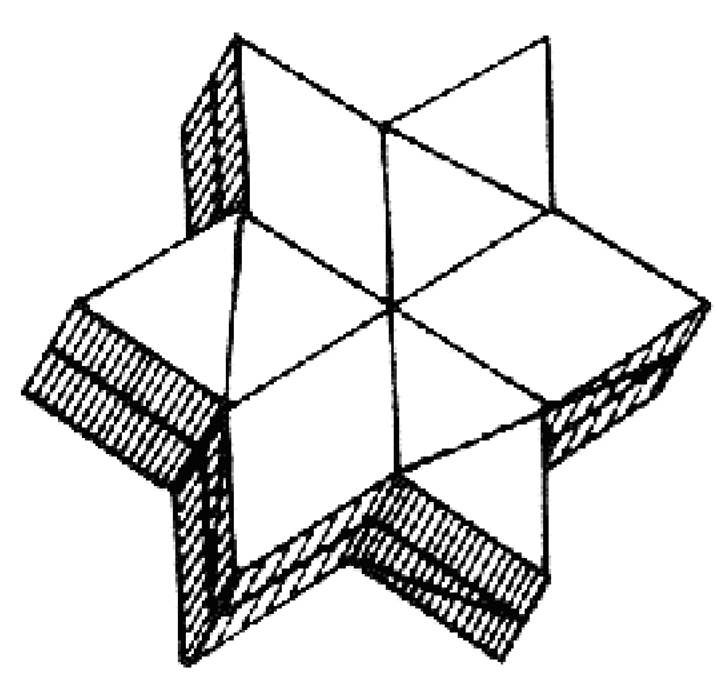
All solutions are made by mating two halves, with each half made up of one simple piece and one fused pair. There are essentially 18 different ways that the puzzle can be thus assembled. The COLUMN and STAR each have one unique solution with a confusing diagonal axis of assembly. The STRANGE shape as shown has two diagonal solutions. Its mirror image has one diagonal solution and one axial solution. The other 12 ways of assembly give rise to any one of four interesting but nondescript shapes with no symmetry.

The pieces are made up of contrasting woods in a manner such that each symmetrical solution will also automatically be enhanced by an intriguing pattern of multicolor symmetry. Furthermore, when woods with distinct growth rings are used, note that they are sawn and arranged in a manner such that symmetrical grain patterns appear in all solutions.

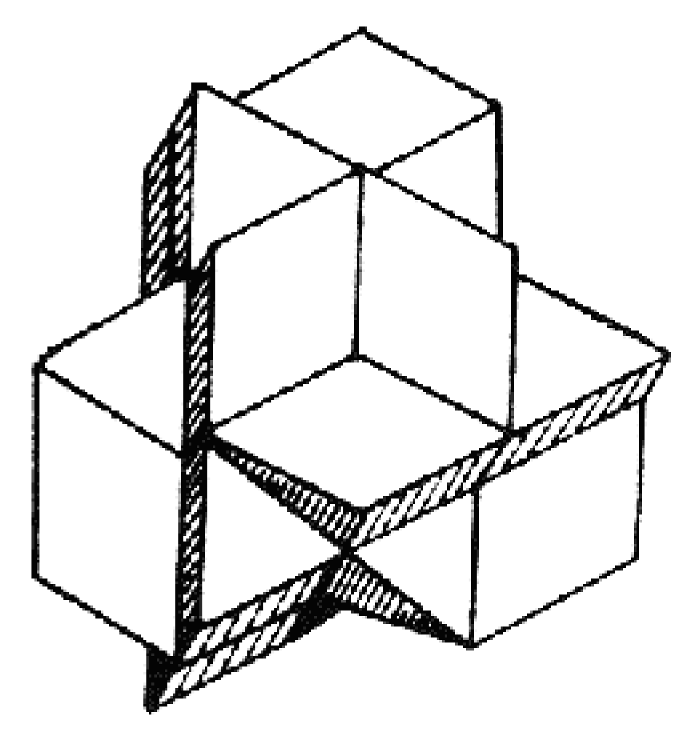
Additional exercise for the precocious puzzler: Can you figure out the peculiar logic in this particular design, and can you fathom the arcane laws of symmetry at work here? See if you can switch from one solution to another with the minimum number of moves.



COLUMN



STAR



STRANGE

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Feb 1990

For <Deleted>

TRIUMPH and COMPANION

Next in my numbering sequence is the Triumph Puzzle. This is one regular puzzle of mine which I don't have any record of you having received previously. I never made very many.

In this special re-edition for you, I have decided to have some fun. The instructions for the original Triumph Puzzle are on the other side of this sheet, and as you can see, there are three distinctly different symmetrical solutions, and six when you consider color. It is quite simple. The puzzle consists of two halves of three identical pieces each. By arranging the pieces in each half all possible ways, the six solutions are arrived at.

This Triumph Puzzle comes with a companion which is a close relative. It has a total of eight different symmetrical solutions. Now, by interchanging sets of three pieces between the two, a great many new and interesting shapes are also possible. I haven't bothered to figure out how many, and I leave that task to you.

The woods are Almond and Brazilian Rosewood.

By the way, note that in the two solutions as delivered, one sits neatly on top of the other. There are several other versions of this.

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

For <Deleted> Dislocated Jupiter

The Dislocated Jupiter Puzzle was designed around 1974. It is described in Puzzle Craft on pages 52 and 86. Only about 10 were made and sold, 1974-1976. They were all in one kind of wood.

This completely new version of the Dislocated Jupiter has six dissimilar woods. It has a superficial resemblance to the Jupiter Puzzle you obtained in 1985. Closer inspection will reveal that it is assembled in the so-called "ring" solution, in which each type of wood is matched in pairs, and the five similar pairs of each wood form a zigzag ring around the outside. (It is also possible to assemble the Jupiter Puzzle this way, but it is normally assembled in the easier and more obvious "parallel" solution.

The next dissimilarity will be discovered when you start to disassemble it, since it has two sliding axes, Jupiter has five, and Saturn has only one.

The third property which makes it unique is that all 12 pieces are identical in shape but non-symmetrical.

The matching of colors in assembly makes for an interesting but not terribly difficult puzzle. Trial and error should eventually produce the correct arrangement, with all like woods matched in pairs. There is only one way. The trick will be discovering the correct order of assembly.

The woods are: Zebrawood, Tarara, Breadnut, Honduras Rosewood, Sumac, and Blue Mahoe. This is very nearly the last of my Blue Mahoe, a rare wood. All joints are doweled. To maintain best fit and prevent warping, store the puzzle properly assembled.

Considering the geometry, workmanship and accuracy, unusual solution, and contrasting exotic woods, I believe this is the most sophisticated puzzle I have made. I plan to make one more like it for my own collection.

S. Coffin
March 25, 1987

STEWART T. COFFIN

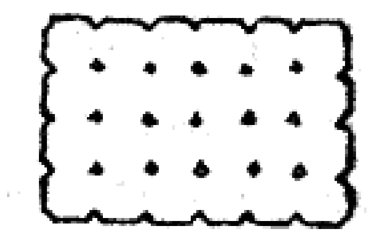
Puzzles

OLD SUDBURY RD.   RFD 1   LINCOLN, MASS. 01773

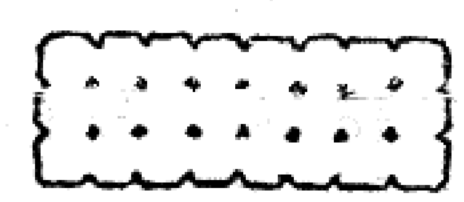
Wonder Block Set No. 1 - ABBIE'S PUZZLE

Problem #1 Dump the six pieces out of the box and fit them back in again. There are at least eight distinctly different ways of doing this, one of which is symmetrical. How many of them can you discover?

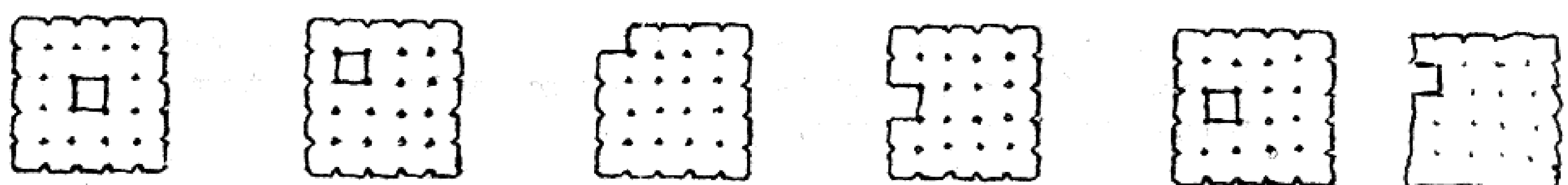
Problem #2 Arrange the pieces in a 4x6 rectangle. Four solutions are known.



Problem #3 Arrange the pieces in a 3x8 rectangle. There are at least six ways to do this.



Problem #4 Arrange the pieces in a 5x5 square with a hole in the center, (Fig. A below). There is believed to be only one solution to this, so it is somewhat more difficult than the other problems. Now try it with the hole in other locations (B, C, D). No solution has yet been found for the form in E or F - can you find one, or prove it impossible?



A   B   C   D   E ?   F ?

Comments: Twenty-four cubic blocks may be arranged in any one of the following six rectangular shapes: 1x1x24, 1x2x12, 1x3x8, 1x4x6, 2x2x6, and 2x3x4. The first of these is obviously impossible with this set, and the second can also be easily eliminated. The 3rd, 4th, and 6th we have already done (hopefully). This leaves the 5th - can it be done?

More Problems By omitting one or more pieces from this set, all of the following rectangular solids are possible: 1x2x4, 2x2x3, 1x3x4, 1x4x4, and 1x4x5. Are there any others? The puzzle world waits for someone to list all of the possible rectangular solutions to this puzzle, and prove all the others impossible.

Those who have mastered this puzzle might wish to move on to the more challenging Set No. 2 - PYRACUBE, which is based on a non-cubic and decidedly more confusing type of lattice structure.

For <Deleted> Abbie's Waffle

This puzzle is mentioned on page 86 of Puzzle Craft. It was designed by my daughter around 1970. It was demonstrated by her on the National Public Television program "Zoom" in December 1973. I believe she made and sold a few made of wood scraps.

This is the first one I have made for sale that I have any record of. (I expect my children made and sold them at craft shows around 1975, hence no records.)

Here is just one more example of a simple puzzle that I evidently had considered too simple to be worthwhile making. Having taken considerable pains to make this one well crafted for you, I have been playing with it, as have my family, visitors and friends. We all seem to be getting quite a bit of pleasure from it. I have now learned that it is a big mistake to dismiss puzzles simply because they seem too simple. This is actually quite a nice little puzzle to play with. It is one that you can leave out for friends and visitors to play with, as it is quite rugged and unbreakable, and simple enough so as to not be intimidating to those who are not really into puzzles. Abbie and I hope that you get many hours of enjoyment from it. The original instructions sheet with minor revisions is on the reverse side. You might find ways that it could be improved.

The pieces are Purpleheart. The box is Peroba Rosa and Mahogany plywood. (Peroba Rosa is notable for taking an extremely smooth finish with little work.)

S. T. C.
March 28, 1987

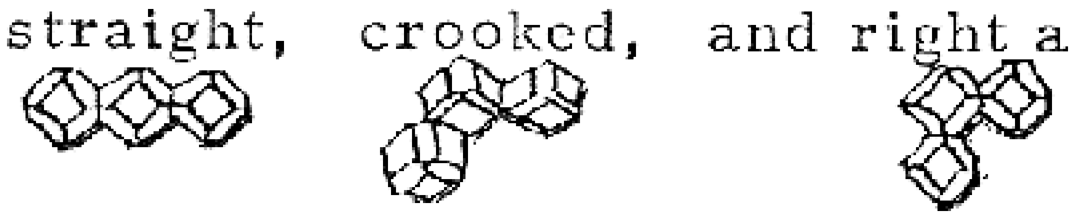
STEWART T. COFFIN

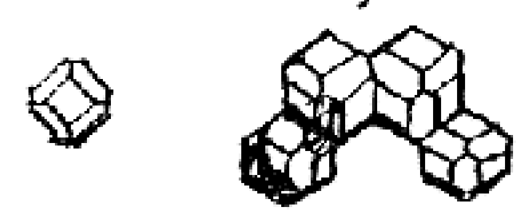
Puzzles

#19 OLD SUDBURY RD. RFD I LINCOLN, MASS. 01773

Wonder Block Set No. 2 - PYRACUBE

This unusual puzzle consists of five simple pieces which pack neatly into a cubic box, and do a number of other confusing things. Start by dumping the pieces out and examining them. Note that the pieces consist of 14 identical blocks fastened together in different ways - one single block, one quadruple piece, and three triple pieces. We will identify the triple pieces as: straight, crooked, and right angle.





Problem #1 For a starter, fit the pieces back into the cubic box. How many distinctly different solutions can you discover? There are at least four.

Problem #2 Now, set the single block aside, and fit the other four pieces into the box in a totally symmetrical cubic configuration. The extra space has disappeared. Where did it go? Only one solution believed possible. (As a last resort, solutions for the various problems are illustrated on the back of this sheet. Only the assembled shapes are shown, not the location of each piece. But first try to do all of the problems without looking at these.)

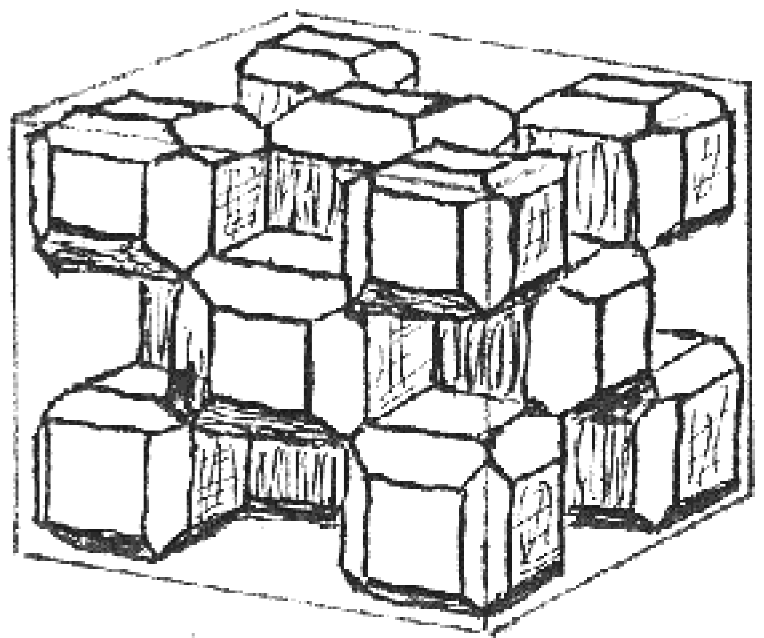
Problem #3 Using all five pieces, make a pyramid with square base. (It should be understood that the terms "pyramid", "cubic", etc., as used here, describe the general aspect of the figure being constructed, rather than its exact shape in the strictest sense, as the faces obviously cannot be plane surfaces. You might say that we are describing the shape of the container into which they would tightly fit.) Three solutions have been found for this problem.

Problem #4 Using all five pieces, make a pyramid having a rectangular base. A difficult exercise - only one solution is known.

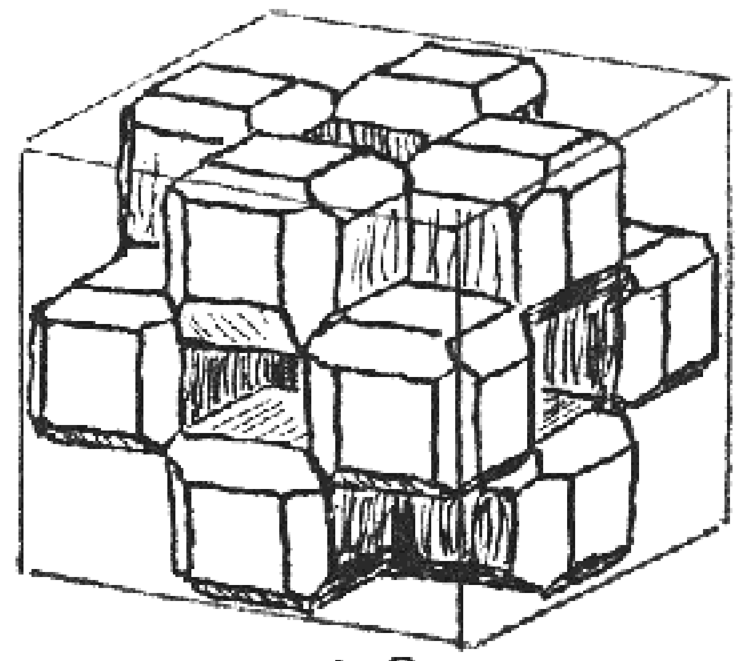
Problem #5 Omit one piece and make a triangular pyramid (regular tetrahedron). This is probably the most difficult one. First, you must know which piece to omit. However, this can be done using logic. (Hint: think of the individual blocks as cannonballs. How would they be stacked, and how many would be required?) There is only one solution. Note that this pyramid fits neatly inside the cubic box!

What other interesting shapes can you discover? A few are illustrated.

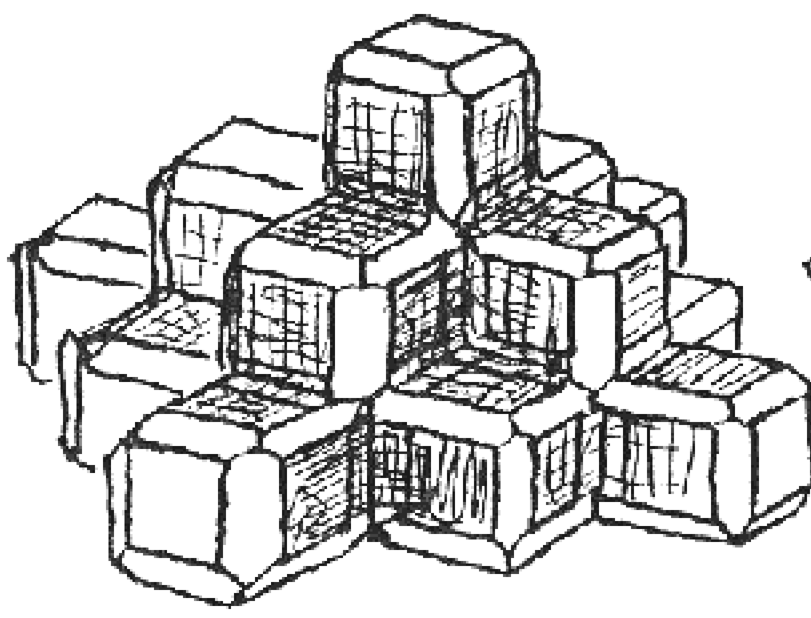
SOLUTIONS

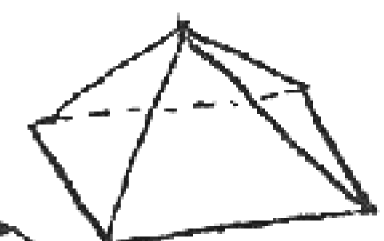


#1

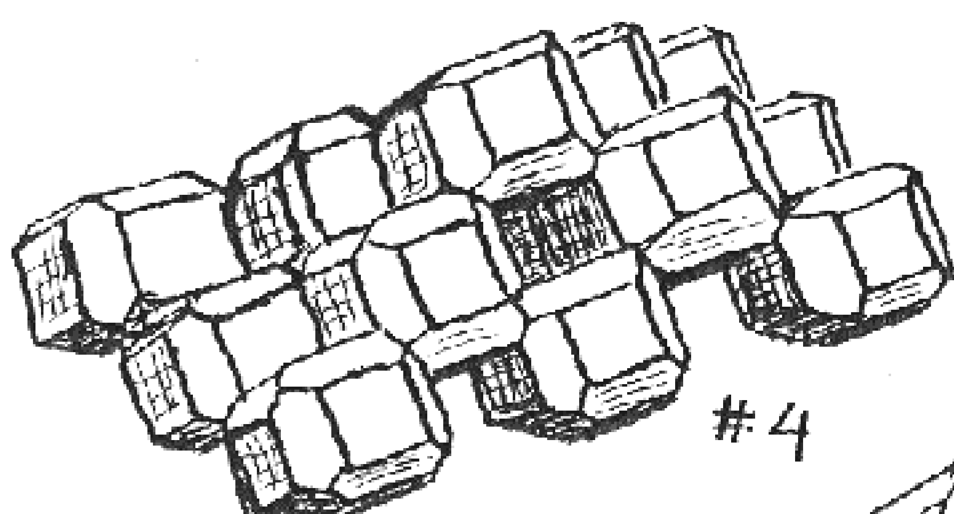


#2

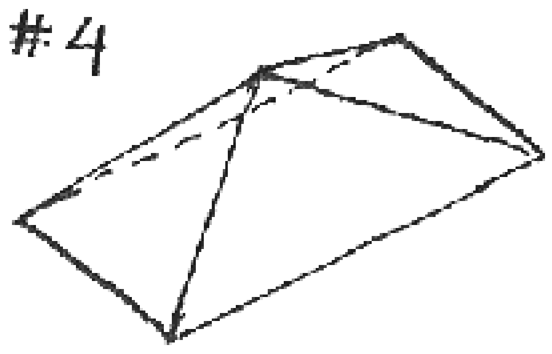


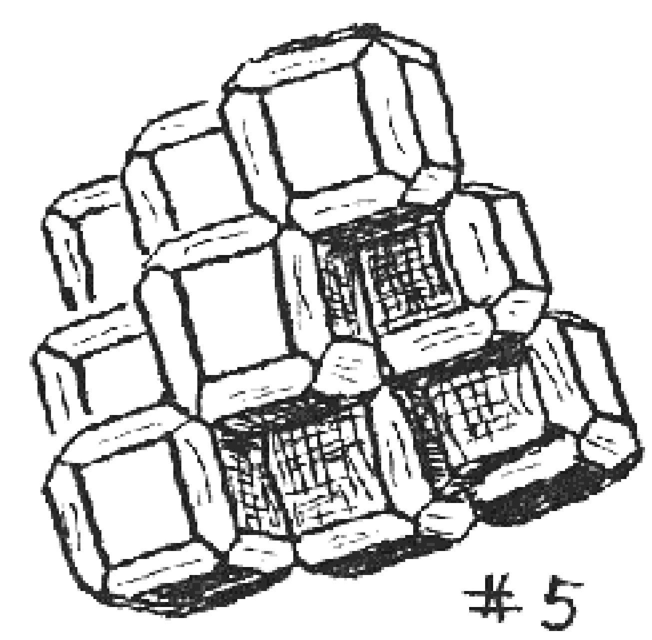


#3

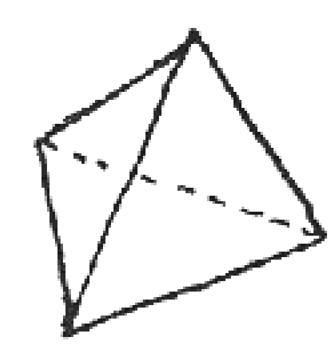


#4

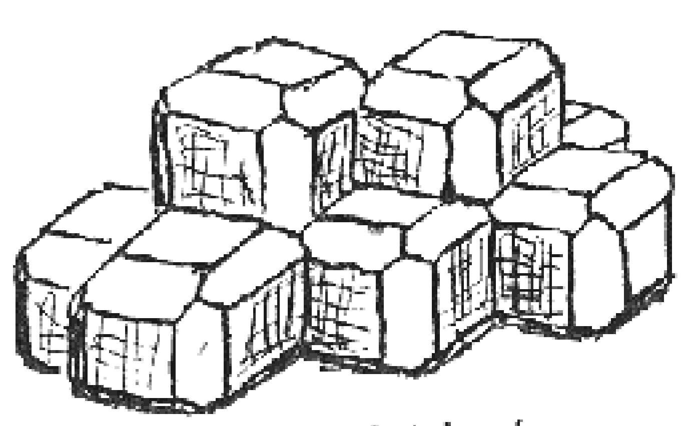




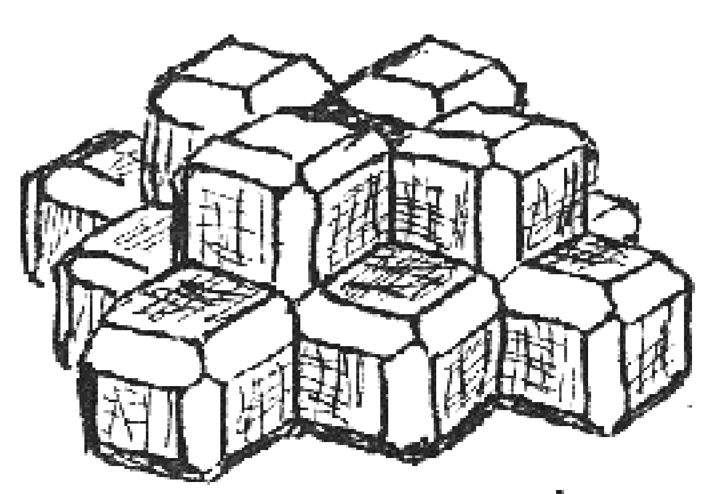
#5



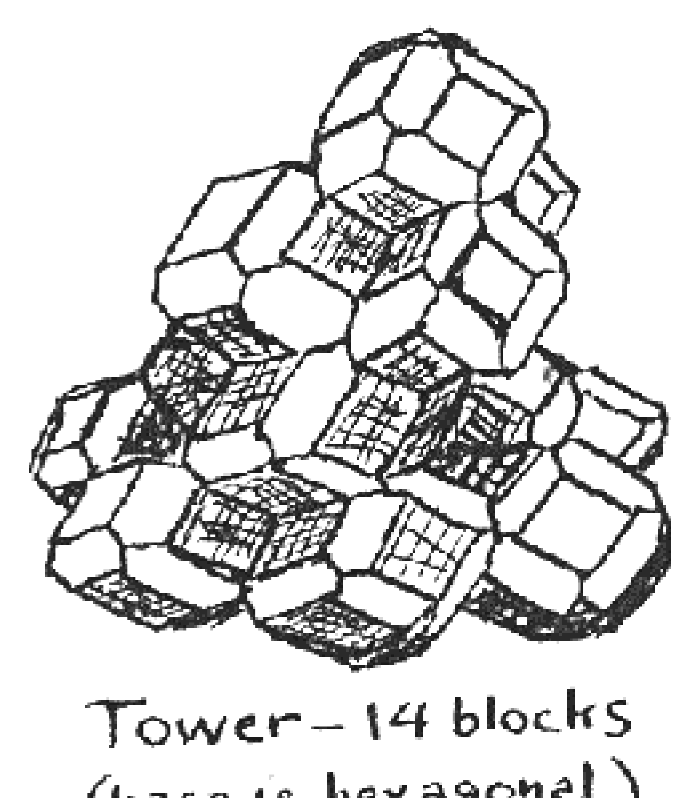
Other Figures:



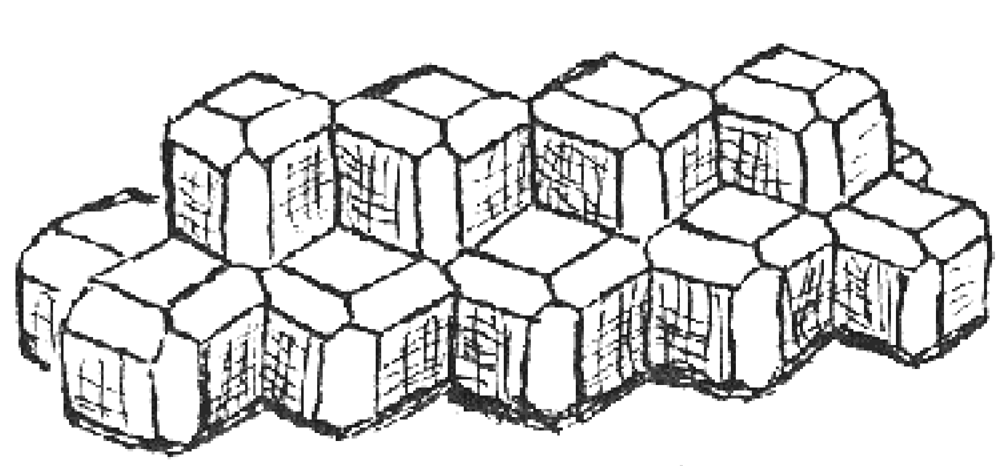
Bug – 8 blocks



Volcano – 13 blocks
(see #3 above)



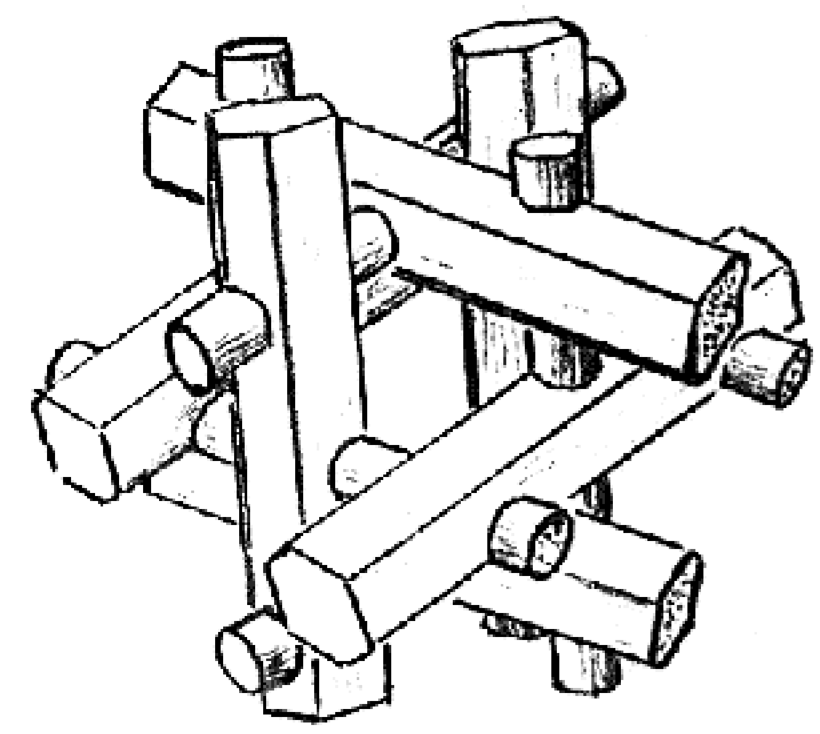
Tower – 14 blocks
(base is hexagonal)



Ridge – 14 blocks

#21

The CUCKOO NEST Puzzle



Observations

While the Nest is still assembled, note the following: It consists of six hexagonal bars and six round dowels. The bars are arranged in three pairs, the two in each pair being parallel. The dowels are arranged similarly. Each dowel passes through three bars, and three dowels pass through each bar. The structure has a hexagonal shape and symmetry. Note that the faces of adjacent bars all rest flat against each other.

Disassembly

Locate the dowel which is free to slide, and remove it. The other pieces now slide out one by one.

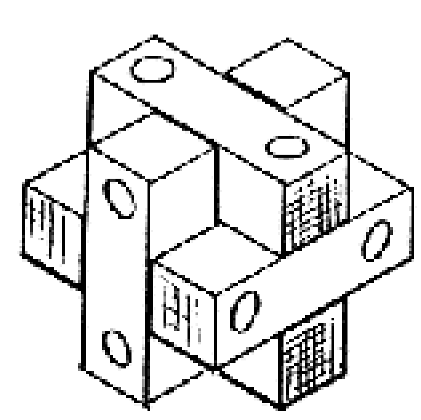
More Observations

Examine the pieces. There is one plain dowel, one hexagonal bar, and five compound pieces. Two of the compound pieces are twins; the other three are all different.

Assembly

This is a classic combinatorial puzzle in that the seven pieces must all be assembled in exactly the correct order and orientation. There are actually two solutions, but quite a number of ways which do not lead to a solution. Keep trying, and eventually you will succeed (as long as you do not keep making the same mistakes over and over again).

Stumped? For a practice exercise, try our much simpler Pin-Hole Puzzle. It looks altogether different, but is based on the same principle.



Pin-Hole Puzzle

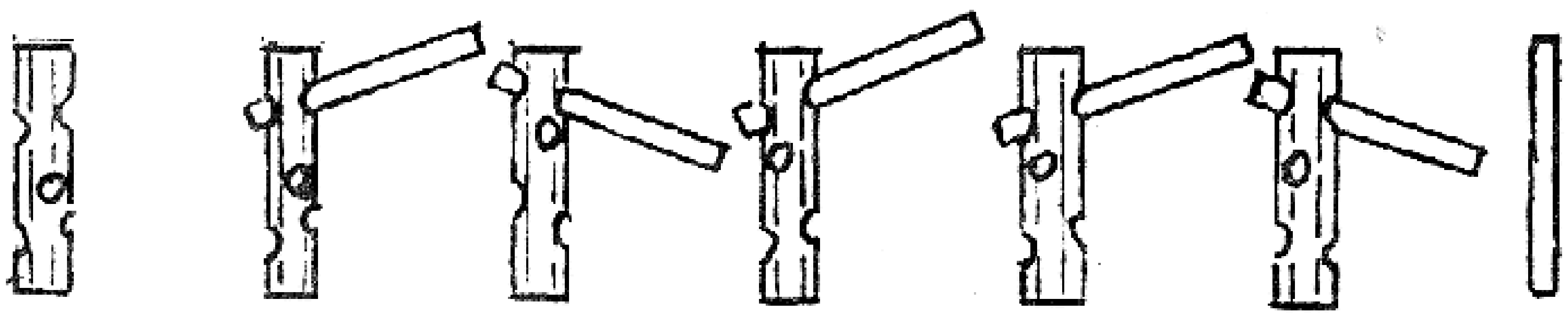
Stewart T. Coffin, Old Sudbury Road, Lincoln, MA 01773 (617)259-8348

Assembly directions for the Cuckoo Nest puzzle

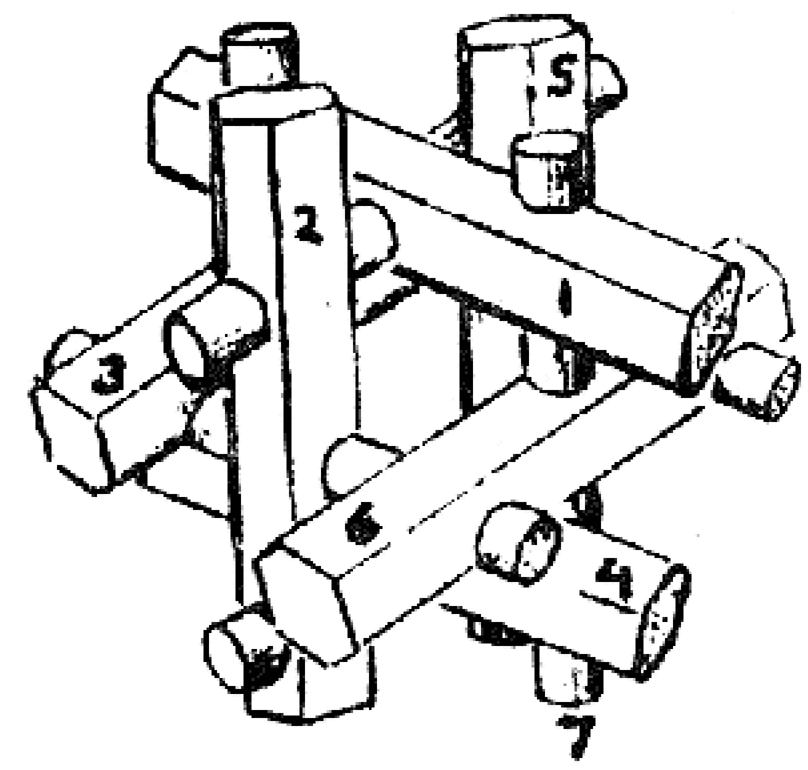
In my continuing project of publishing assembly directions for old puzzle designs, here are such for the No. 21 Cuckoo Nest. About 100 of these puzzles were made and sold, 1977-1983, without explicit instructions. Assembly directions were published in Puzzle Craft (1985), page 49, from which they are reproduced below:

Cuckoo Nest Puzzle

There is an interesting variation of the Locked Nest which I made for a while and called the Cuckoo Nest. It uses only six sticks and six dowels, but most persons will find it more confusing than the Locked Nest.



1 2 3 4 5 6 7



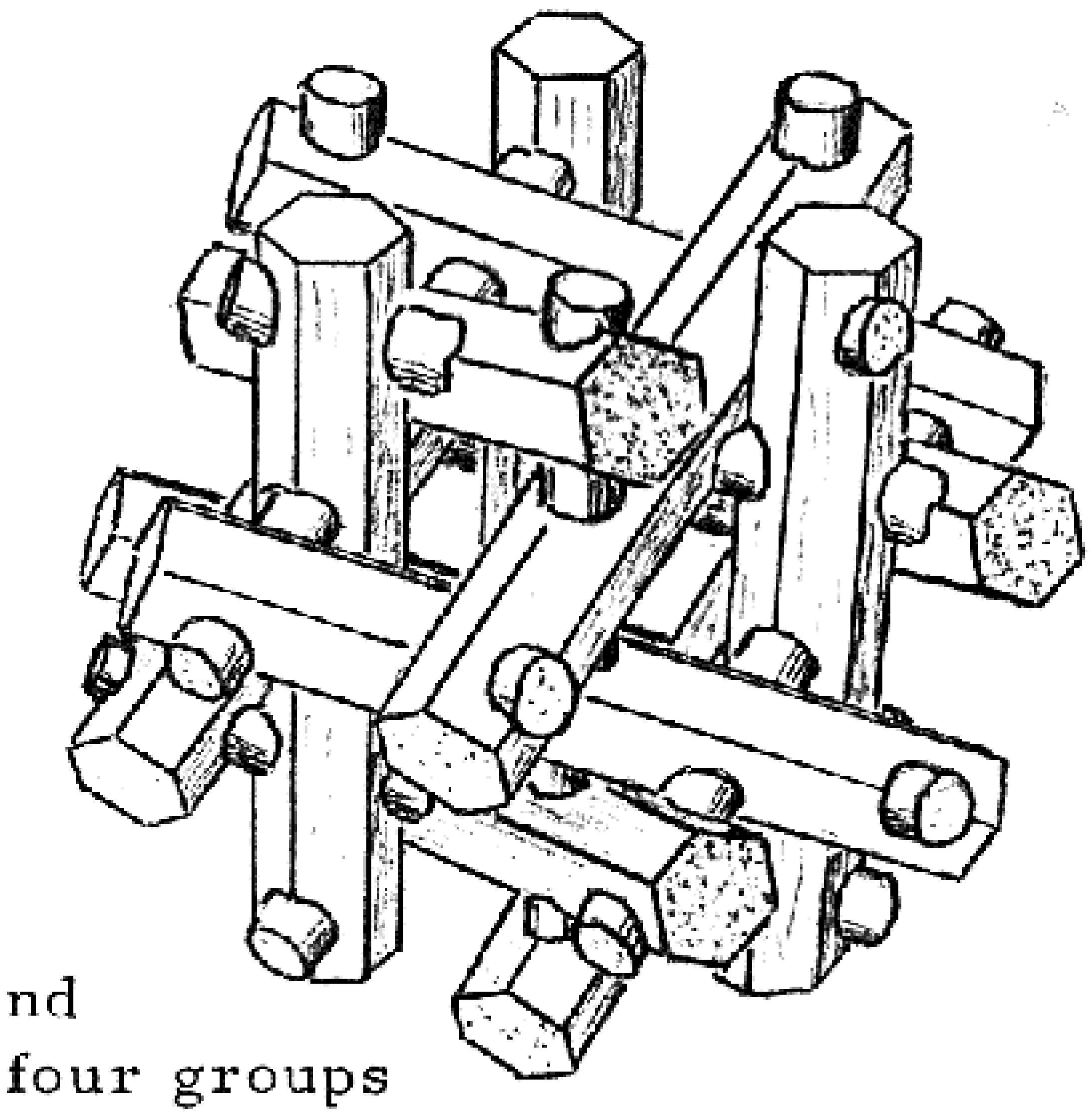
Assemble in the order numbered. 4 and 5 are alike. There is a second solution.

S.T.C.
Nov 1990

#22

The LOCKED NEST Puzzle

(Also known as "The Monster")



Observations

While the Nest is still assembled, note the following: It consists of twelve hexagonal bars and twelve round dowels. The bars are arranged in four groups of three, the three in each group being situated in a triangle and mutually parallel. The dowels are arranged similarly. Each dowel passes through five bars, and five dowels pass through each bar. The structure is entirely symmetrical. One other useful feature to note is that the faces of adjacent bars all rest flat against each other.

Disassembly

Locate the seven dowels which are free to slide, and remove them. The Nest now comes apart easily (almost too easily).

More Observations

Lay all the pieces out. Note that there are seven plain dowels, seven hexagonal bars, and five compound pieces which we shall call elbows. All the bars are identical and symmetrical.

Assembly

This can tend to be slightly confusing, especially if you did not note just how it came apart. Over the possible objection of a few puzzle purists, we offer several helpful hints:

The first hurdle is to become familiar with the basic geometry of the structure. This is best done by setting aside the elbows, and fitting just the bars and dowels together to match a portion of the illustration. Good! Now remove the dowels one by one, and try to work the elbows in. If you can find a place for all of them, you have it solved! One left over? That's still pretty good. (Experienced puzzlers know that a cardinal rule of geometrical puzzles is to assemble the largest or most complex pieces first. This puzzle demonstrates a startling exception to that rule.)

A good practice exercise for this puzzle is to master its little sister, the Cuckoo Nest Puzzle, and a good warm-up for both of them is the simpler Pin-Hole Puzzle.

For the Advanced Puzzler

With the puzzle disassembled, join a dowel and bar together to make another elbow, using a wedge of paper in the joint and perhaps a spot of glue, so you have six dowels, six bars, and six elbows. Now assemble. If you don't believe it can be done, send a self-addressed stamped envelope.

#22

SOLUTION TO THE SIX-ELBOW VERSION OF THE LOCKED NEST PUZZLE

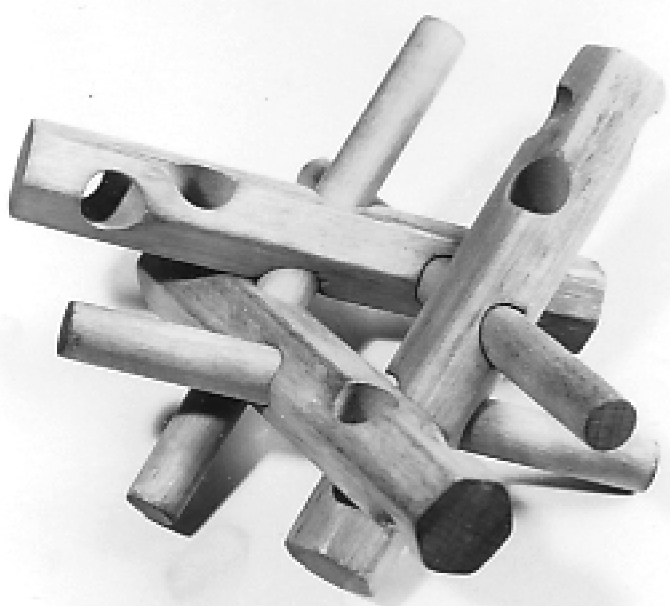


Fig. 1

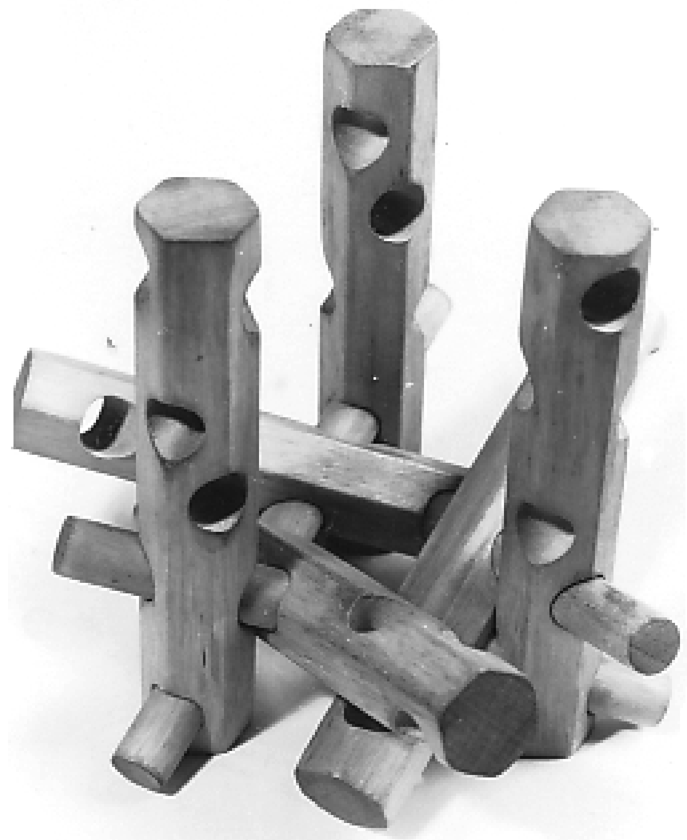


Fig. 2

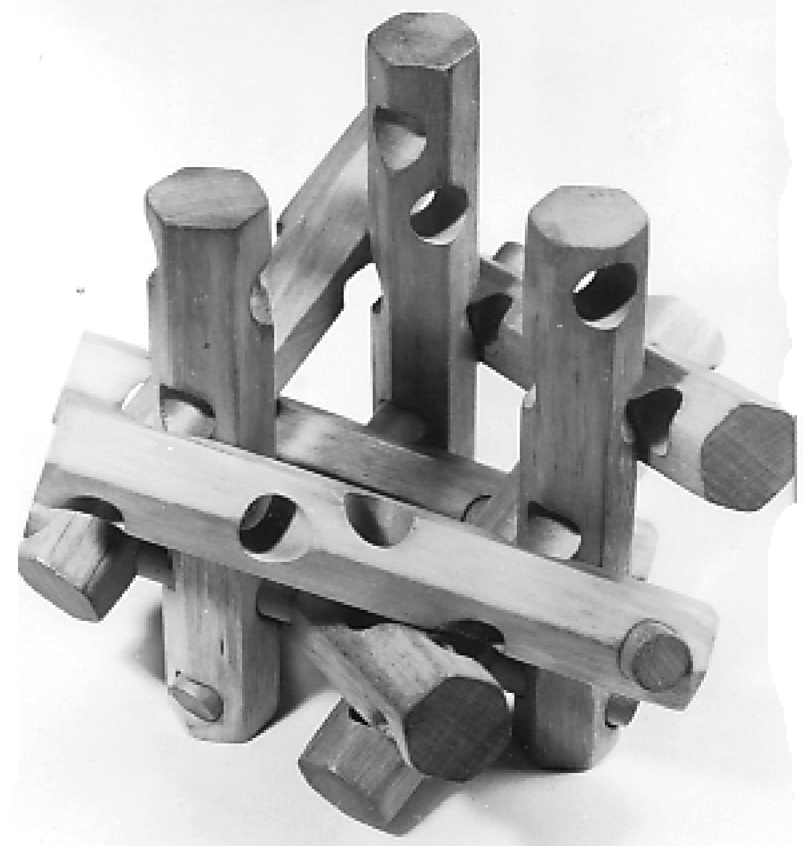


Fig. 3

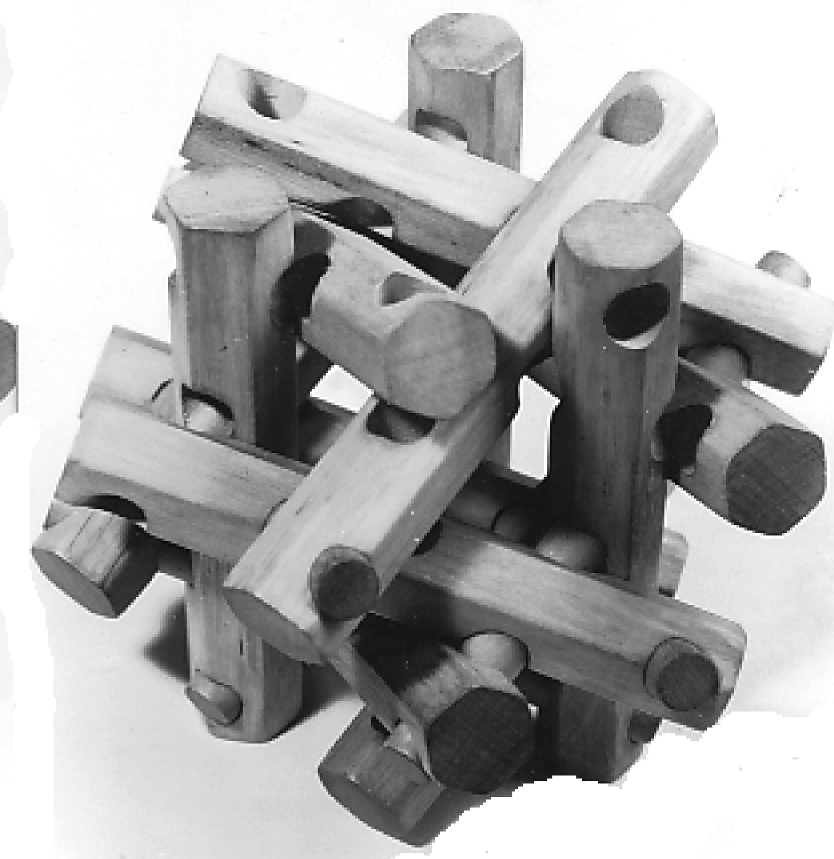


Fig. 4

Parts used: six bars, six dowels, and six elbows.

1. Assemble three bars and three dowels in a symmetrical triangular configuration as shown in Fig. 1. This triangular symmetry is maintained at each stage of assembly.

2. By sliding the dowels back and forth, install the three remaining bars vertically, using their bottom two holes, as shown in Fig. 2.

3. Now take one of the elbow pieces, and use it to displace one of the dowels in the assembly by poking through in the direction indicated by the arrows in Fig. 2. Displace the other two dowels with elbow pieces the same way. It should now appear as in Fig. 3.

4. Now the tricky step. Insert one of the remaining elbow pieces into one of the three sets of four holes which should be in alignment along the sides, but keep the bar end loose and free to rotate. Insert the two remaining elbow pieces the same way. Now, in one coordinated motion, let all three elbow pieces rotate downward on top of each other, as shown in Fig. 4.

5. Insert the six dowels.

Note: No other solutions have been discovered, and it appears doubtful that there are any. There are many solutions to the standard version of the puzzle with five elbow pieces. The above directions immediately suggest two of them. How many others are there?

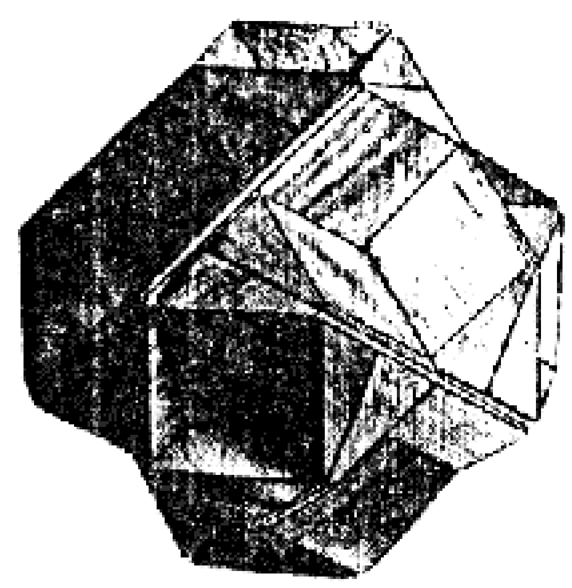
Stewart T. Coffin, Old Sudbury Road, Lincoln, Mass. 01773

#23

Instructions for the SCRAMBLED SCORPIUS

Refer to the instructions for the SATURN Puzzle on the opposite side of this sheet. The SCRAMBLED SCORPIUS is based on exactly the same principle, and was in fact one of the links in the chain of development of the SATURN Puzzle. Since it has only half the number of pieces, and is therefore relatively easier to solve, we will omit the assembly directions. It is simply a matter of trying different combinations until the correct one is found.

From a designer's point of view, this puzzle is extremely interesting in one respect. The six pieces represent all the possible non-symmetrical permutations of the original SCORPIUS piece. By an extraordinary stroke of luck, they have one and only one solution, and essentially only one order of assembly. I do not see how there can be any further improvement in this particular line of development.



U. S. Patent
D-230,288

Repair Instructions for Both Puzzles

If a joint becomes broken, the only correct way to repair it is to reglue it with the puzzle tightly assembled, using the puzzle itself as a jig. This is exactly the way I would do it here, so there is no point in sending it here. Only if several joints are broken at once is it necessary to use special jigs for repairs.

Use any strong wood glue, such as Titebond, Elmer's Professional, epoxy, or plastic resin. Use wax or small pieces of waxed paper to prevent the glue from spreading and sticking to adjacent pieces; otherwise you will have a new puzzle on your hands.

Stewart T. Coffin, Old Sudbury Road, Lincoln, MA 01773

Jan 1978

The EGYPTIAN Puzzle
No. 23-A

This puzzle is a new variation on one of my old favorites, the Scrambled Scorpius. It is larger than the old S.S. and just fits snugly inside its five-inch cubic box. It is constructed of sticks of trapezoidal rather than triangular cross-section, giving it a geometrical shape somewhat different from that of the old S.S. In completely retooling the jigs for this puzzle, tolerances were held to a few thousandths of an inch for an especially precise fit.

One feature of this puzzle is that it comes with a coded solution. The EGYPTIAN could be considered a combinatorial puzzle of sorts. Usually I do not include solutions with straightforward combinatorial puzzles, but this one is anything but straightforward! To discover the solution, all you have to do is remember the name "EGYPTIAN," be able to spell it, and match the letters marked inside. (My object in choosing a name for this puzzle was to find a familiar, classical-sounding word that almost anyone could spell, and with eight letters, all different. If you think that there ought to be many such words, try to find another!)

A second special feature of this puzzle is that all joints are double-glued. Furthermore, I am using only woods that form a strong glue joint. It should be practically unbreakable. I am presently using some choice boards of red oak. In another departure from my standard, I am using a hand-rubbed Danish oil finish rather than the usual lacquer, as it especially enhances the beauty and warmth of oak and gives a nice feel when handled.

(Incidentally, this puzzle was partly responsible for a revival of my puzzle production. I had been giving my three daughters a new puzzle each Christmas, and my inventory of such puzzles finally ran out. Having gone to all the trouble of tooling up, I began producing a few extra ones for distribution.)

The object was to come up with an improved variation of the baffling S.S. that could be left out for friends and guests to play with without a care about eventual reassembly, and also one that could withstand rough handling. You can let almost anyone play with this one, but just keep it away from the dog!

To disassemble, look for the two black dots on opposite sides at the base of triangular indentations which identify the axis of separation. The puzzle slides apart into two identical halves, which then come readily apart into the six dissimilar puzzle pieces.

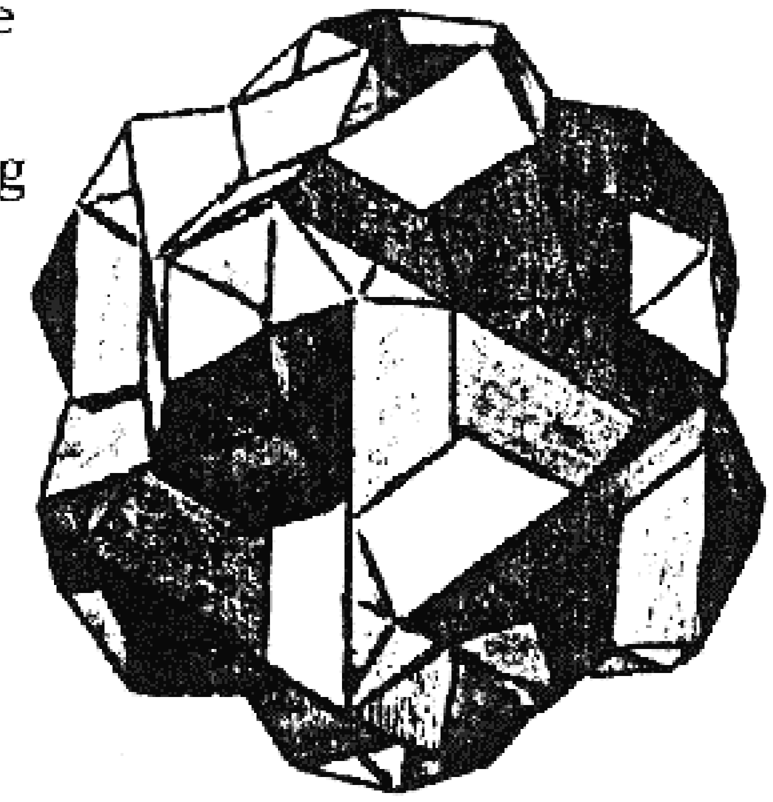
To assemble, match the letters E-G and Y-P to form one half, then letters T-I and A-N to form the other half, and mate the two halves.

Stewart Coffin, 79 Old Sudbury Road, Lincoln, MA 01773
December 1993
(revised February 1995)

#24

U.S. Patent D-232,571

Instructions for the SATURN Puzzle

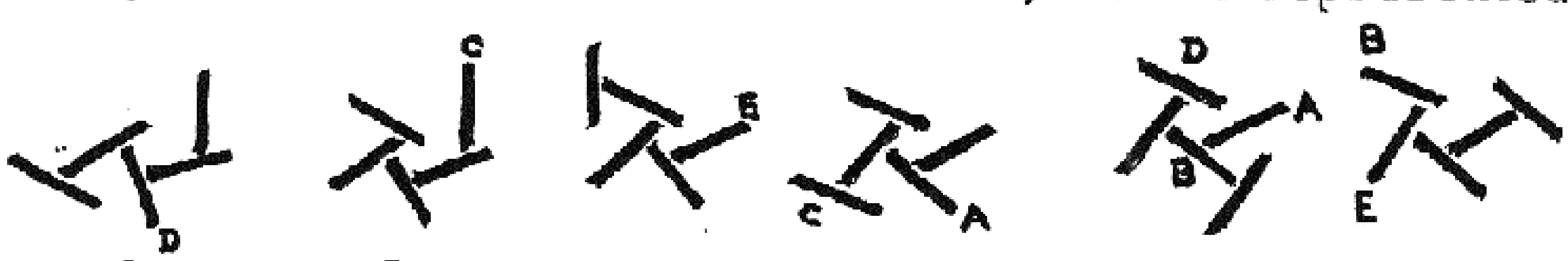


While the puzzle is still together, observe the following (or if it is already apart, refer to the illustration). It is made up of sixty identical sticks, of 36-54-90 degree triangular cross-section. They are arranged as thirty pairs and enclose a hollow center which has the shape of a triacontahedron, each pair forming one rhombic face. The entire structure has apparent polyhedral symmetry, which is to say that it has no top or bottom, front or back, all parts being equivalent.

The first step of disassembly is to separate the puzzle into two identical halves. The way to do this is not by prying with a knife blade, which will surely ruin it, but rather by squeezing with thumb and forefinger of both hands on nearly opposite parallel pairs until the right combination is discovered to make it slide apart. Practically no force is required. To make this easier, the axis of the puzzle is marked by two pencil dots on opposite sides, at the base of the pentagonal depressions. The six individual pieces in each half then come readily apart.

Note that the six pieces in each half are all different, and that both halves are made up of identical sets of pieces. The pieces are numbered 1 - 6, and the pieces in one half are further identified by the suffix A. (If the numbers are not legible, the pieces can be identified by the diagrams below).

The pieces, as viewed from the inside, can be represented thus:



To assemble, mate the two arms marked A above, then B, and so on, forming one half. Make the other half the same way, and mate the two halves. There are other solutions - how many can you discover?

For your incidental information and to answer a frequently asked question, this puzzle design was not the result of a sudden inspiration (very few inventions are), but rather a long chain of development. There are basically only three ways to arrange sticks symmetrically in space. One of them is the orthogonal arrangement of three mutually perpendicular pairs of rectangular sticks around a cubic center, such as the very familiar "burr" family of puzzles. A second way is twelve equilateral triangular sticks around a rhombic dodecahedron, represented by my SCORPIUS family of puzzles and their many variations. The SATURN puzzle of course represents the third way. The original version, called JUPITER, consisted of twelve identical symmetrical pieces. The second version, called the DISLOCATED JUPITER, had twelve identical pieces like piece #2 above. In this new version, SATURN, we introduce the added novelty of dissimilar pieces, making the puzzle rather more challenging. (I have another version with twelve dissimilar pieces and only one solution, which I do not plan to make, as it would be hopelessly difficult without directions.)

Stewart Coffin
29 Brookfield Road
Andover MA 01810-1601

1978

24-X

Special Jupiter-Saturn

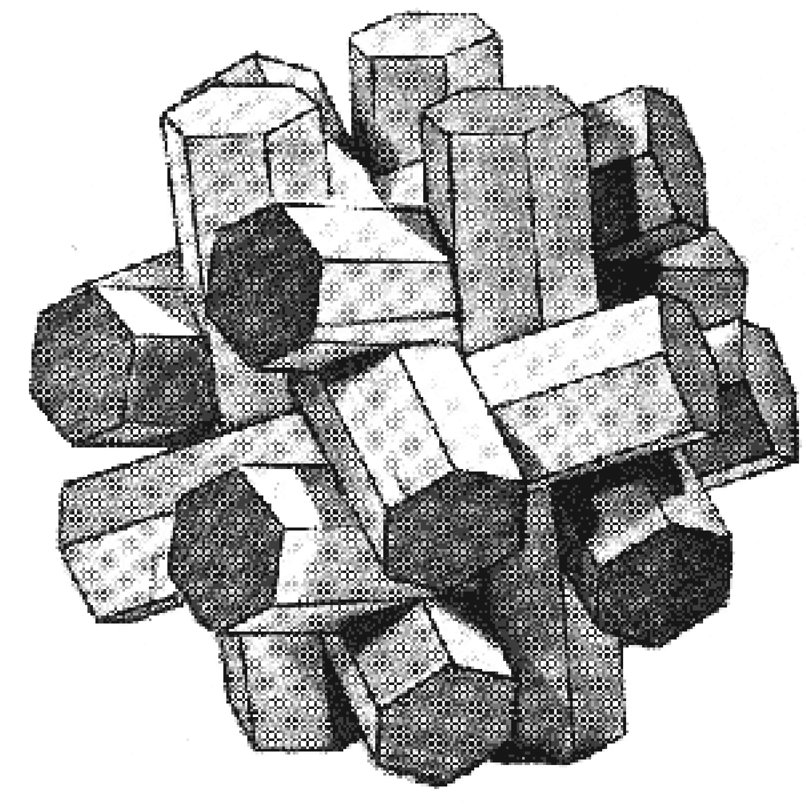
This one-of-a-kind Jupiter-like model was discovered while cleaning out long-forgotten remnants in my workshop recently. I have refinished it a bit and am now offering it for sale at IPP-20, more as an interesting sculpture than a puzzle.

It is made of Honduras mahogany. Ten of the pieces are the standard Jupiter shape. The 11th piece has one arm subtracted, which is added to the 12th piece. This determines how these two pieces must be arranged. The other pieces may be assembled randomly. However, it will fit best if assembled one particular way, as indicated by letters on the inside.

I believe that this model was made around 1978, and was used as a gluing jig when making the first No. 24 Saturn. Mahogany was used for its stability. Then it was no longer needed and was stashed away.

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810 July 2000

INSTRUCTIONS FOR THE HEXSTICKS PUZZLE U.S. Patent 3,721,448



The HEXSTICKS Puzzle is an interlocking assembly of twelve notched hexagonal rods, and has polyhedral symmetry. The hollow center has the shape of a rhombic dodecahedron. The rods are arranged in four groups of three, the three being mutually parallel. Seven of the rods have two notches, and are called Standard pieces. Two of the rods have only one notch, and are called Simple pieces. The three remaining rods have a third notch, and are called Odd pieces. The different possible locations of the Odd pieces in the assembled puzzle give rise to three distinctly different solutions.

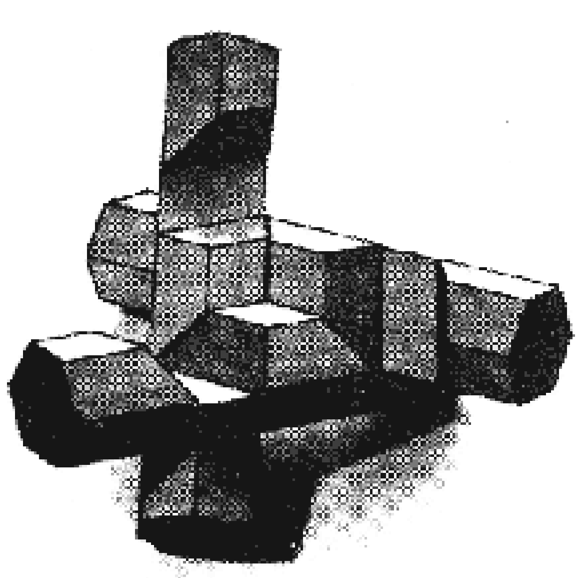
In the First Solution, the three Odd pieces are grouped together in a triangle. They go in last and come out first. This is the easiest solution, and probably the way it is assembled when you get it. To disassemble it, you will have to look closely to discover the extra notches of the three Odd pieces, and then lift them out as a unit.

In the Second Solution, there is a "key" piece which slides in last, and comes out first. Many persons assume that there has to be a key piece in puzzles of this sort, but this is not necessarily so. If you cannot locate the sliding key piece, then the puzzle is not assembled in the Second Solution.

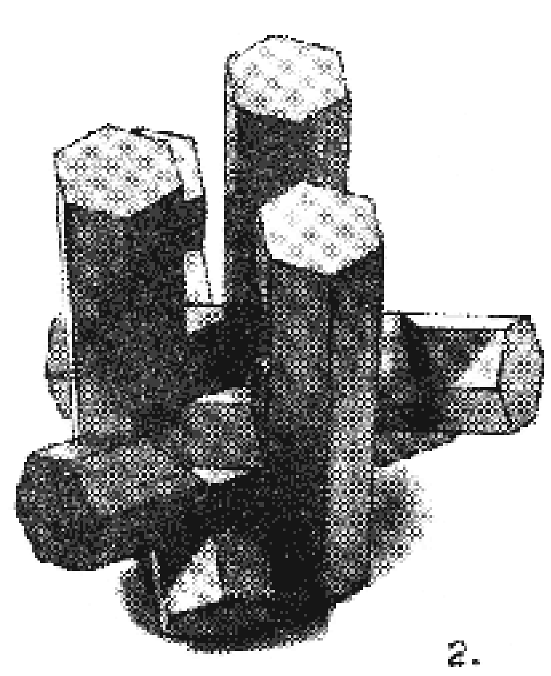
There is a Third Solution which is more difficult than the first two. In order that you may enjoy the challenge of discovering it entirely on your own, no further hints are given here.

Directions for the First Solution:

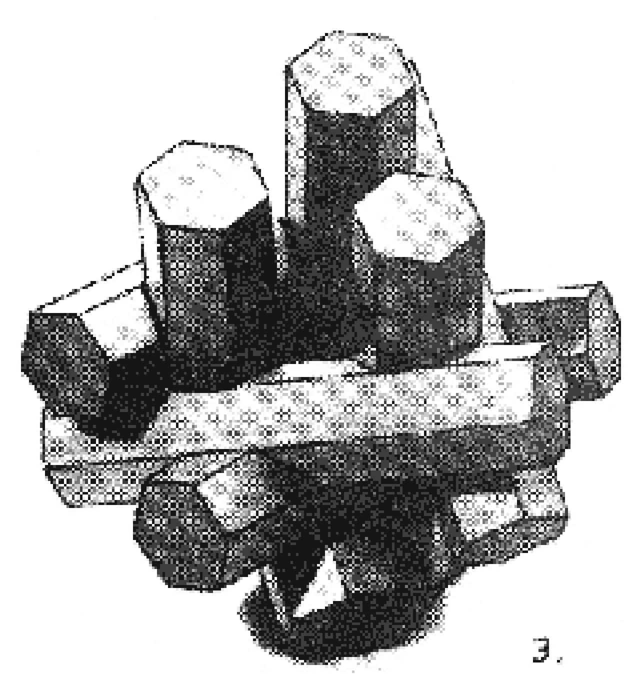
1. Arrange three Standard pieces in a triangular nest (Figure 1), and place them on a flat but not slippery surface.
2. Stand the two Simple pieces and one Standard piece vertically around the outside (Figure 2). This will raise the triangular nest up slightly.
3. Insert the three remaining Standard pieces in the three notches around the outside (Figure 3). Raise the first two to insert the third.
4. Group the three Odd pieces in a triangular nest similar to the first step, but with the odd notches all facing outward (Figure 4). Insert them into the top, completing the assembly.



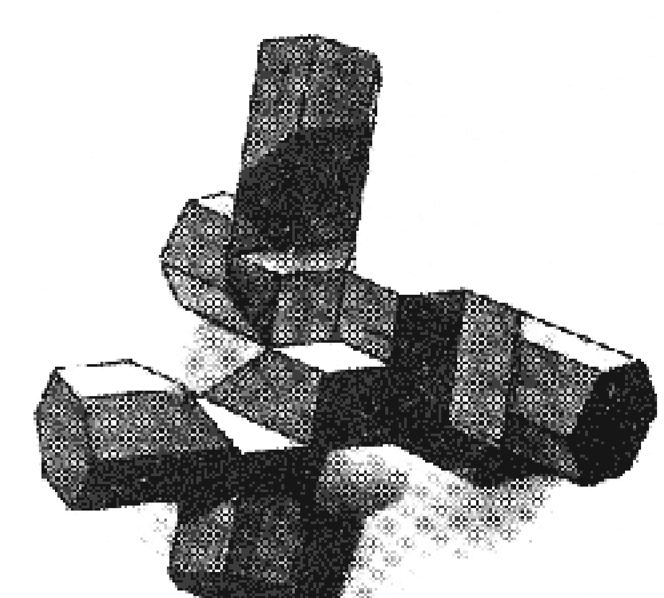
1.



2.



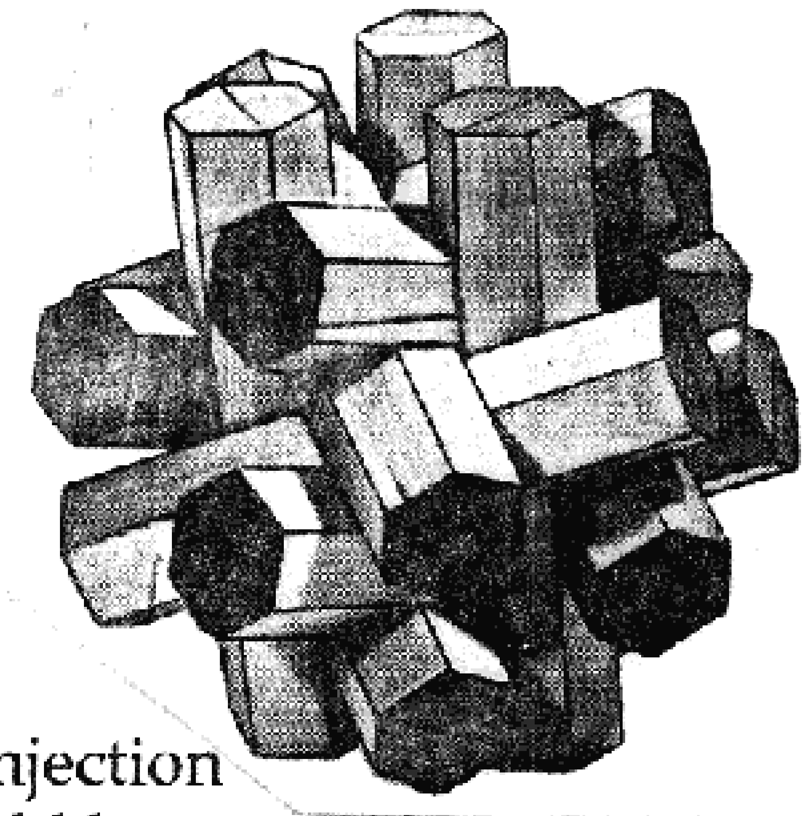
3.



4.

Stewart T. Coffin, Old Sudbury Road, Lincoln, Mass. 01773

The GIANT HECTIX Puzzle, No. 25-B



The Hectix Puzzle was one of my earliest efforts in polyhedral puzzle design, dating from 1968. In 1970, it was licensed to 3M Company for manufacture in injection molded styrene. About 100,000 were produced and sold between 1971 and 1979. I patented the design in 1973, U. S. patent number 3721448. (Later I discovered that Bill Cutler had independently come up with a similar design a few years earlier.) The plastic Hectix used nine "standard" pieces with two notches and three "odd" pieces with a third notch. It had three solutions.

In 1979, I began making a wooden version in 3/4-inch birch, which I called Hexsticks, No. 25-A. It had the usual three "odd" pieces, but it differed from the plastic Hectix in having only seven "standard" pieces plus two "simple" pieces having only one notch. It had the same three solutions.

In this 1993 edition, I have gone back to the original design with nine "standard" pieces and three "odd" pieces. The size has been exactly doubled. In order to make the notches accurately in this size, the sawn hardwood pieces are laminated.

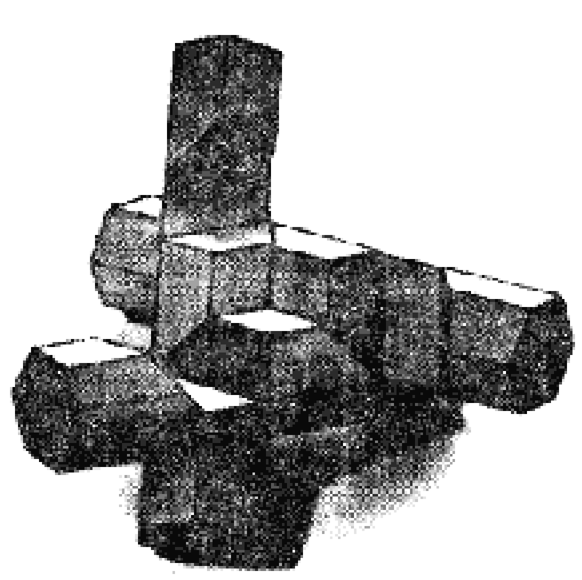
One solution, the easiest, is shown below. The other two more difficult solutions are left for you to discover.

1. Arrange three standard pieces in a triangular nest and place them on a flat but not slippery surface.

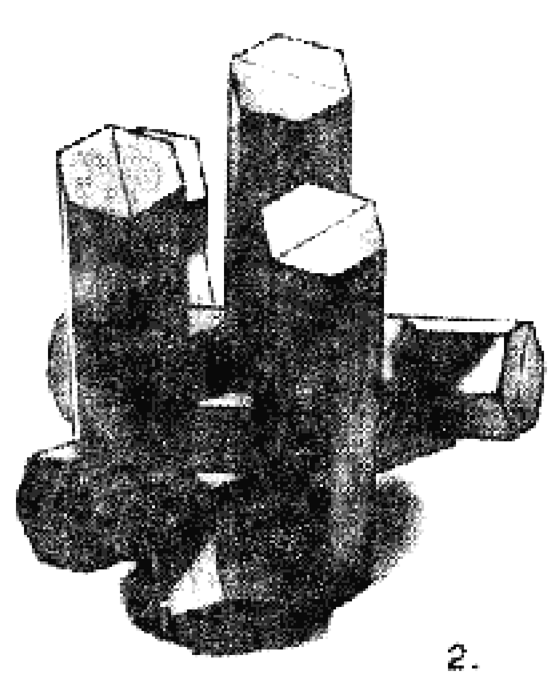
2. Stand three standard pieces vertically around the outside.

3. Insert the three remaining standard pieces in the three notches around the outside. Raise the first two to insert the third, as they must fall into place as a unit.

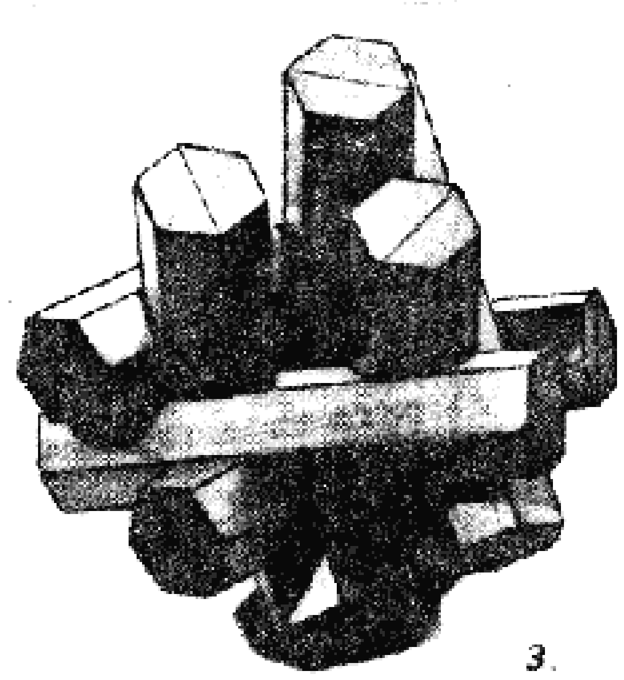
4. Arrange the three odd pieces in another triangular nest with the odd notches facing outward, and insert in the top to complete the assembly.



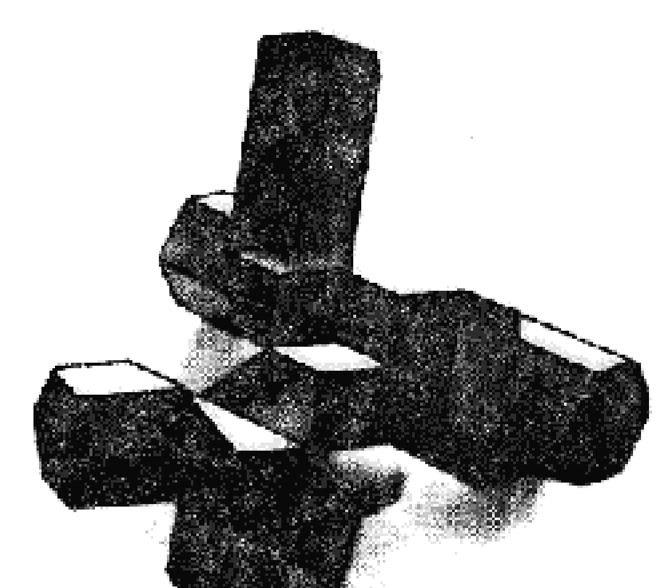
1.



2.



3.



4.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Dec. 1993

AP-ART
The sculptural art that comes apart

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773
617-259-8348

Four-Color Hexsticks
No. 25-C

I have long maintained that most if not all of what is considered to be aesthetics is really functionality in disguise, rooted ultimately in some practical purpose, perhaps in the distant past with the connections long since lost and forgotten. To put it another way, art and science are surely just two sides of the same coin, and neither can exist apart from the other. I try to adhere to that design philosophy in all of my AP-ART puzzle creations.

Some of my early puzzles, such as Four Corners, and Jupiter, were mechanically simple multicolored polyhedra, achieved with exotic woods in bright, contrasting colors, with the object of the puzzle being to assemble in one or more ways having some sort of color symmetry. Lately, the trend has been more towards mechanical complexities using plain woods. One does not use multiple colors in AP-ART unless they serve some practical purpose. They are never intended to be just decorative. In the fancy versions of the Pentacube and Cornucopia, the ten or twelve contrasting woods made the individual pieces stand out when assembled. In the Rosebud puzzle, the contrasting exotic woods with symmetrical grain patterns served to dramatize the novel mechanical action. In others, such as the Fusion-Confusion, they serve to accentuate the intriguing symmetry.

My first successful puzzle design and first to be sold (just 25 years ago) was the Hectix puzzle. It was intended to be molded in styrene in four contrasting colors - red, yellow, green, blue - in order to accentuate the interesting geometrical arrangement of the sticks in four groups of mutually parallel triplets. I licensed it to 3M with that understanding. Alas, they perversely made it every way but that. Most were plain white. Some were an ugly vomit brown. The clear acrylic ones weren't bad, but only a very few of those were made, and at double the price. Ugliest of all by far were their red, white, and blue ones (their bicentennial edition!) arranged randomly, a supreme example of the misuse of color. So far as I know, until now the only ones ever made in the four colors as originally conceived were about half a dozen that I cast in epoxy as prototypes. I think I may still have one of them somewhere.

Here then, at last, is the original four-color version, but this time in contrasting fancy woods, very accurately made, and a good bit larger as well. Some of these woods are hard to find, and some are altogether no longer on the market. But I laid in a good supply years ago, and I am now gradually using it up in limited special editions such as this one.

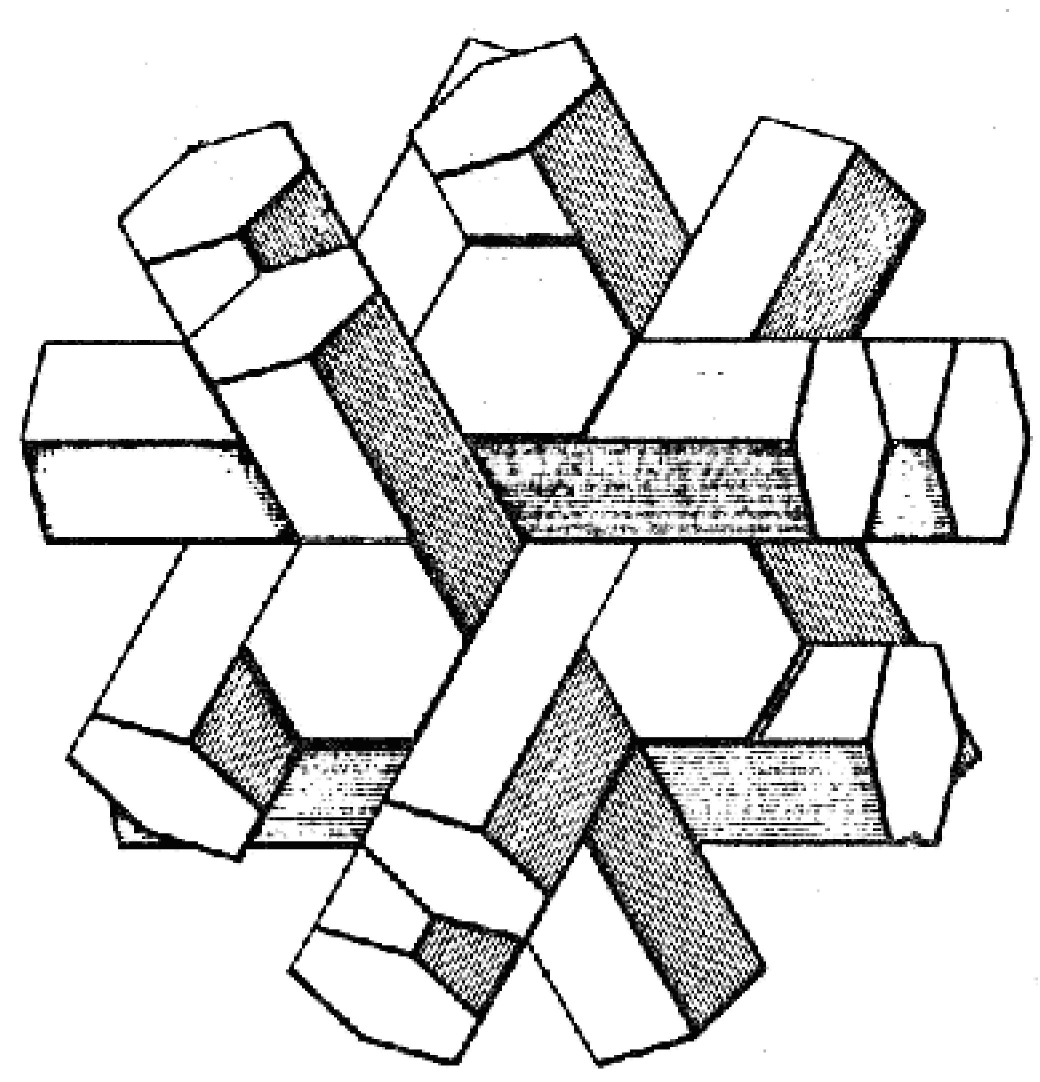
The first object is of course to master one or more of the distinct mechanical solutions to this puzzle, of which there are three. The most obvious, probably already familiar to everyone receiving this edition, is with the three odd pieces dropping in last. There is a second more difficult solution which is a variation on this. There is also a third solution that is quite different and involves a sliding key piece.

A further object is to assemble the puzzle with some sort of color symmetry. The most obvious, and in my opinion the most attractive, is for all mutually parallel triplets of sticks to be the same color. Another way of defining it is that no like colored pieces touch each other. This solution is illustrated on the cover of my book, *The Puzzling World of Polyhedral Dissections.* With the three odd pieces being all the same color, this precludes the simple first solution and forces one to investigate the alternate solutions.

A second interesting arrangement is with no like colored pieces being mutually parallel. This requires a mechanical solution different from the one above and produces an attractive pattern of color symmetry.

Perhaps you can discover further recreations with the multicolored pieces of this special edition of Hexsticks.

S.T.C.
March 1995



Instructions for the FOUR-PIECE PYRAMID Puzzle

This puzzle is based on the space-filling property of the rhombic dodecahedron. The problem in designing it was to come up with four puzzle pieces of five blocks each, all dissimilar, and interlocking. Interestingly, the one design I discovered which satisfies both of these requirements appears to be unique. Furthermore, it has the added appeal of having only one possible order of assembly - just one more example of a fortunate accident of nature which the puzzle designer occasionally stumbles upon.

To disassemble, examine closely for glue joints until you find Piece No. 4 (Fig. 1), and pull it straight out. The other pieces come apart more easily.

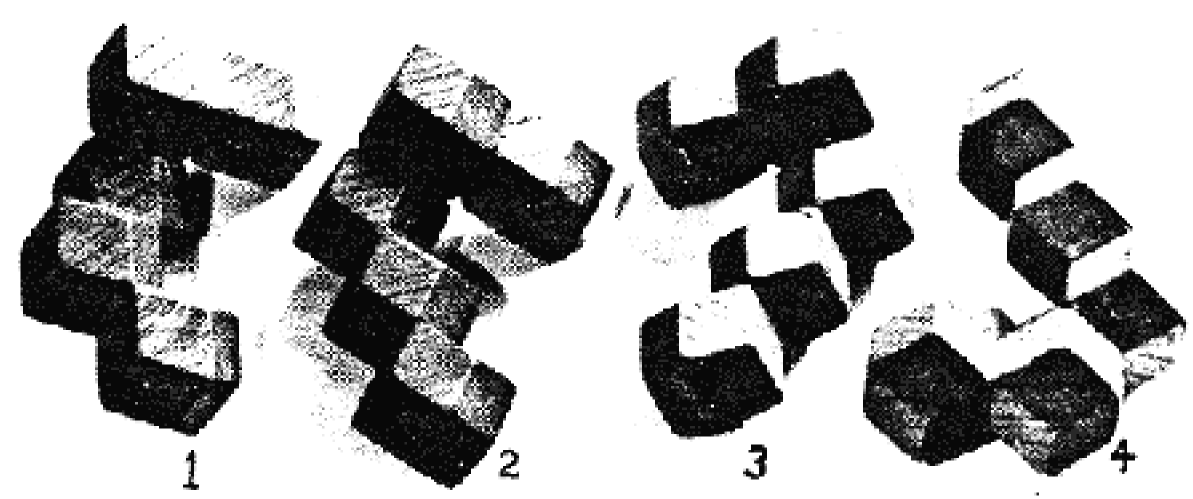


Fig. 1

Note that Piece No. 2 and Piece No. 3 have reflexive symmetry. Piece No. 4 is the only "flat" piece.

To assemble, fit Piece No. 1 inside Piece No. 2 (Fig. 2).

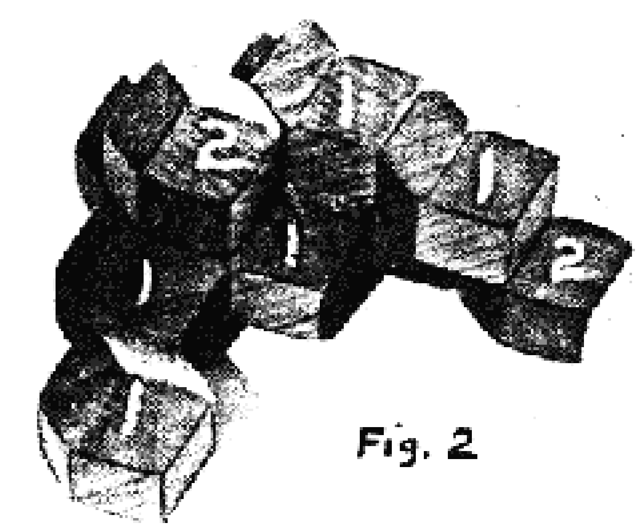


Fig. 2

Piece No. 3 then clamps over the top of the assembly (Fig. 3).

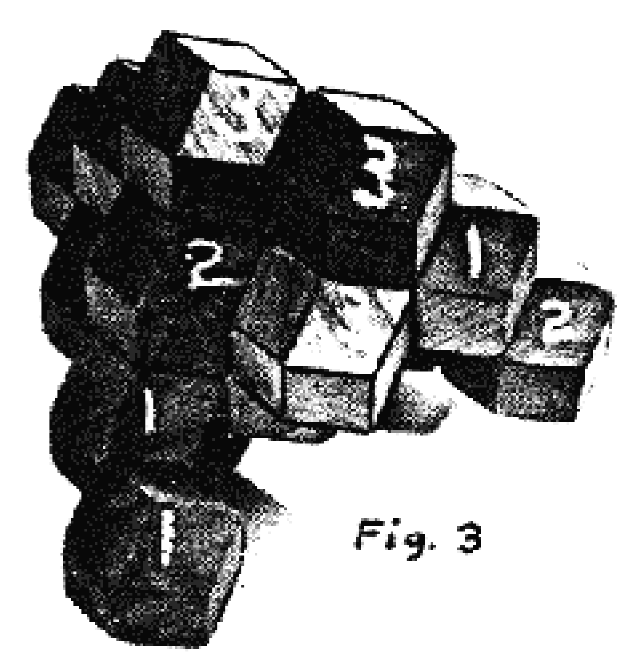


Fig. 3

Finally, Piece No. 4 fits into the remaining space (Fig. 4), completing the assembly.

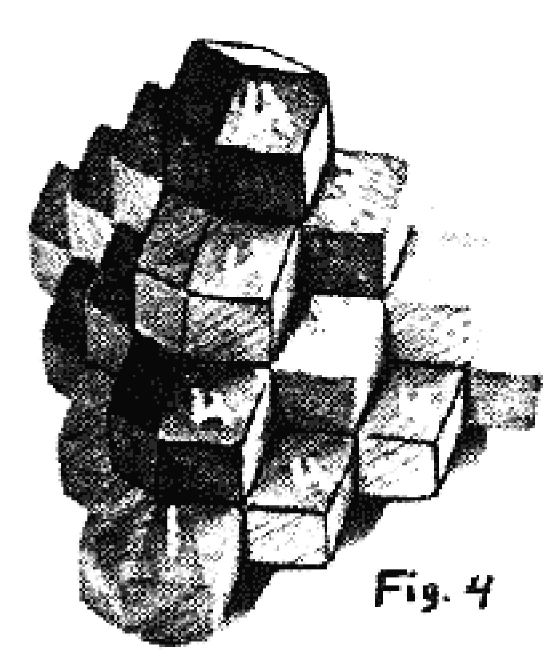


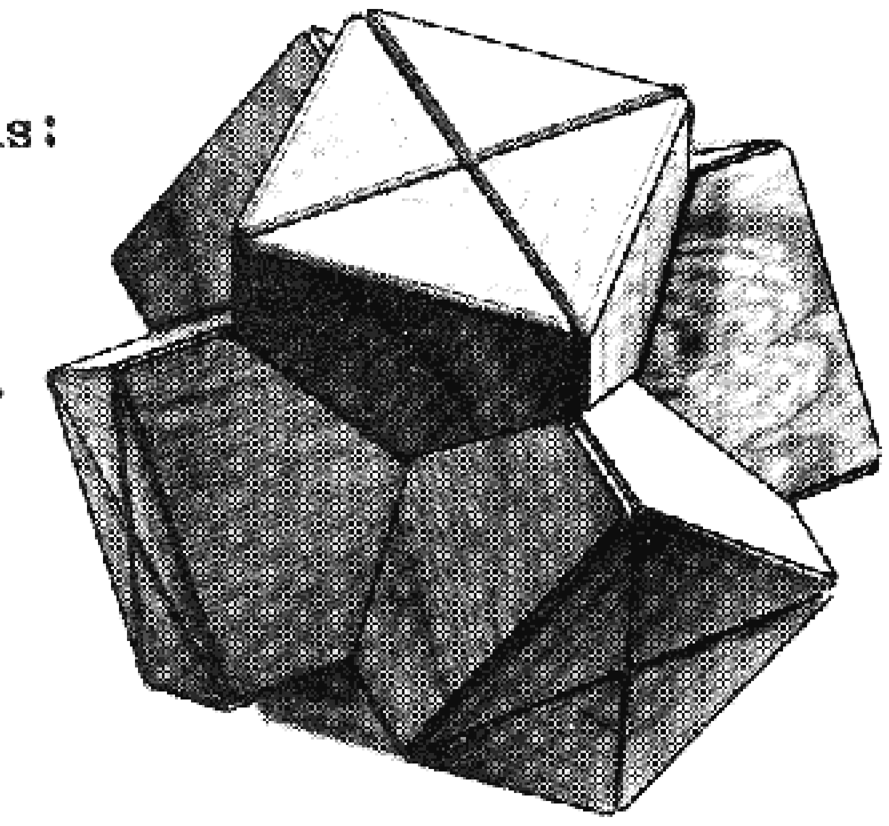
Fig. 4

The individual blocks of this puzzle are made by starting with one-inch square stock and making eight diagonal saw cuts, using a special jig. Can you figure out how it is done?

To repair a broken piece, glue the broken joint with the puzzle tightly assembled, using rubber bands. Use epoxy or plastic resin (urea) glue. Use wax or bits of aluminum foil to prevent adjacent pieces from sticking.

Stewart T. Coffin
Old Sudbury Road
Lincoln, Mass. 01773

THE THREE PAIRS PUZZLE



Before disassembling puzzle, read these instructions:

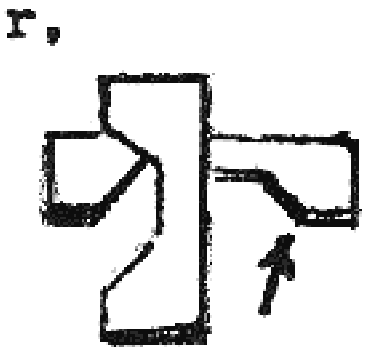
If you like unusual and challenging puzzles, then I think you will appreciate this one. HOWEVER, in order to get the maximum enjoyment from it, you should either have ordered it unassembled, or ask some disinterested party to disassemble it for you.

Break this seal for disassembly directions:

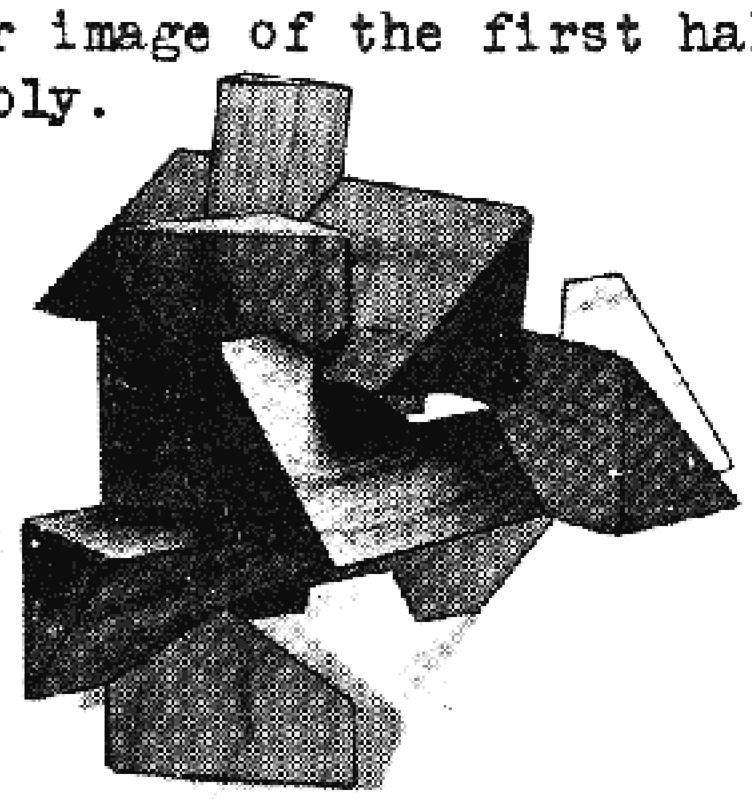
To disassemble, grasp two opposite pairs of pieces, and gently pull and wiggle until you discover the combination that separates it diagonally into two halves. Then wiggle the pieces apart until you discover the strange action that separates each half into three pieces.

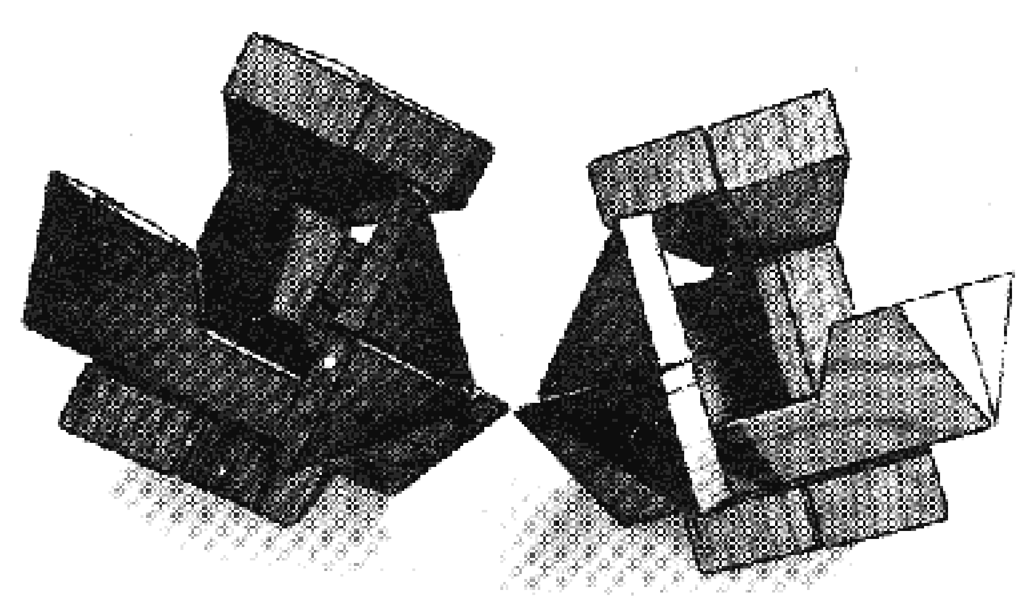
Break this second seal for assembly directions:

Lay all the pieces flat side down. Take the three which look like this (right), hold them loosely at exactly right angles to each other, as shown below, so that the three corners (indicated by arrow) just engage each other. Then slide them together.



The other half goes together the same way, except that it is a mirror image of the first half. Mate the two halves to complete the assembly.





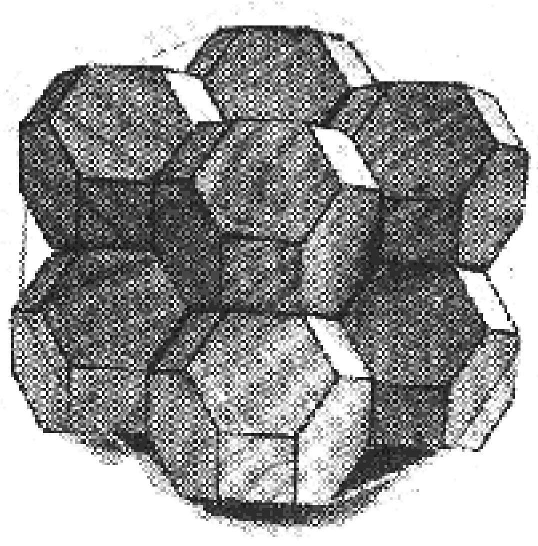
I stumbled upon this unusual mechanical action quite by accident a few years ago, by first gluing the sub-pieces together and then seeing if they would come apart. Production of the puzzle was held up until I could devise methods for sawing out the pieces accurately, which is necessary for it to work properly. Four separate sawing jigs and one gluing jig are used.

Stewart T. Coffin, Old Sudbury Road, Lincoln, Mass. 01773

The Truncated Octahedra Puzzle

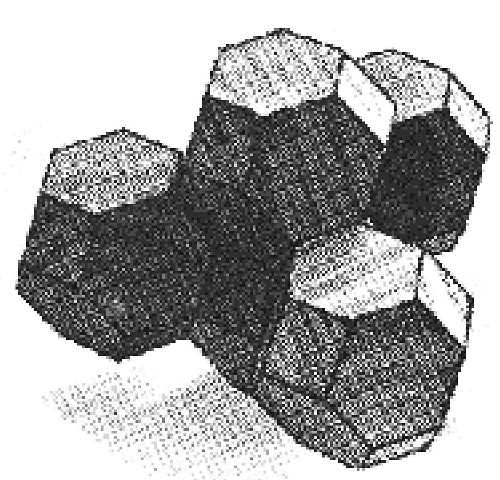
Stewart T. Coffin
RFD 1, Old Sudbury Road
Lincoln, MA 01773

Here are two more problems with triangular symmetry—both of them balance on one block. HEXAGON is the only threefold figure that is also symmetrical top and bottom. Alas, it falls apart without the rubber band.

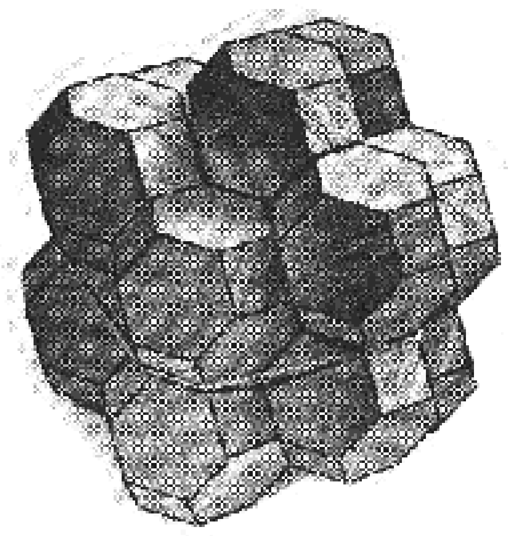


Problem No. 17
HEXAGON (U.F.O.?)
(8 blocks)

Problem No. 18
PROPELLOR
(5 blocks)

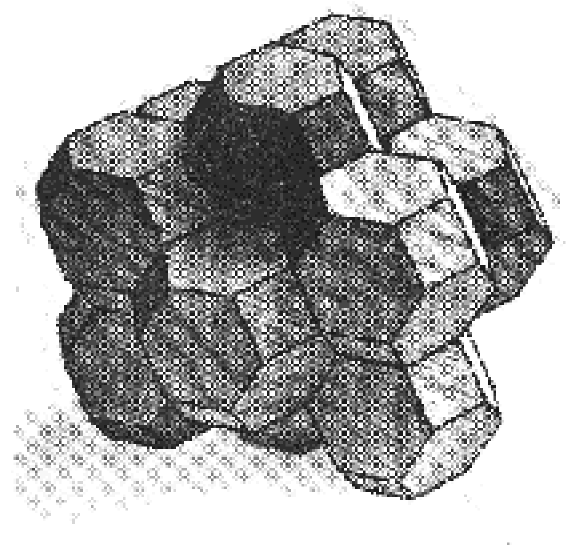


These problems have threefold symmetry, and are apt to be more confusing than the others. HEX PILE is the only one which uses all the pieces. Are any others possible?



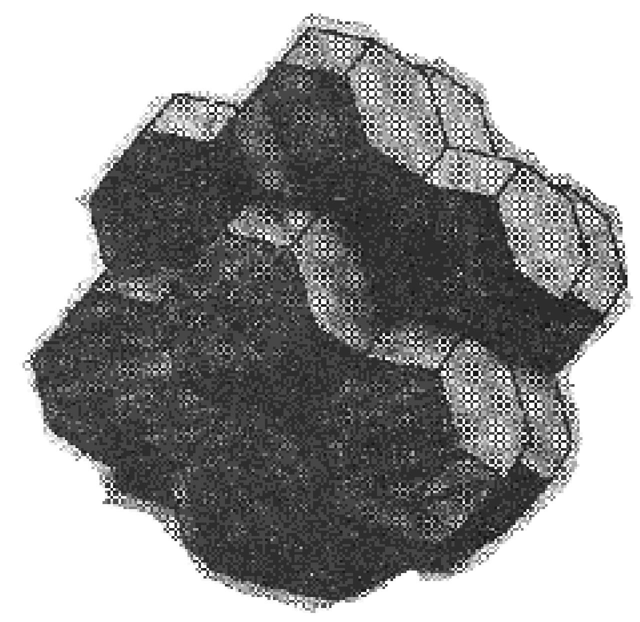
Problem No. 13
HEX PILE
(14 blocks, note rubber band holding it together)

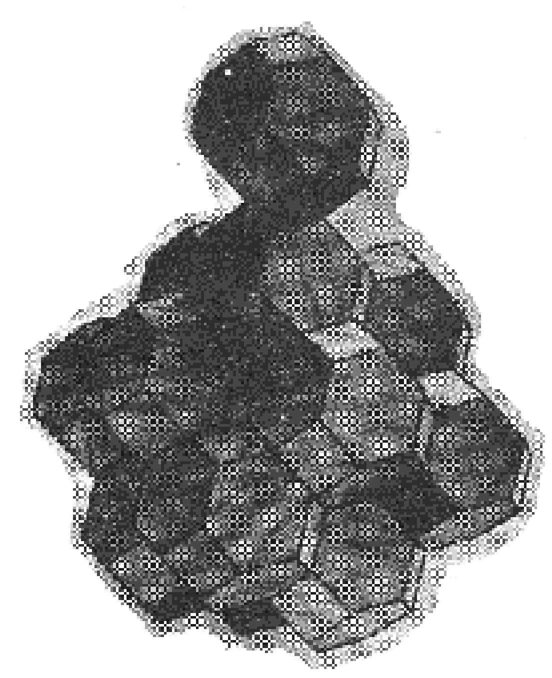
Problem No. 14
HEX DOME
(11 blocks)



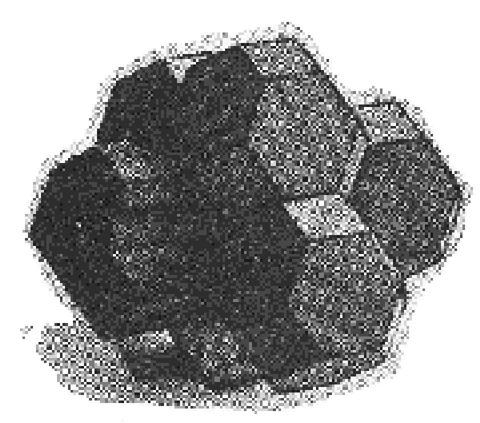
Problems No's. 3 and 4 also use all the pieces and have a vertical fourfold axis of symmetry, (i. e. same shape when rotated 90 degrees). Are any other such figures possible?

Problem No. 3
DOME

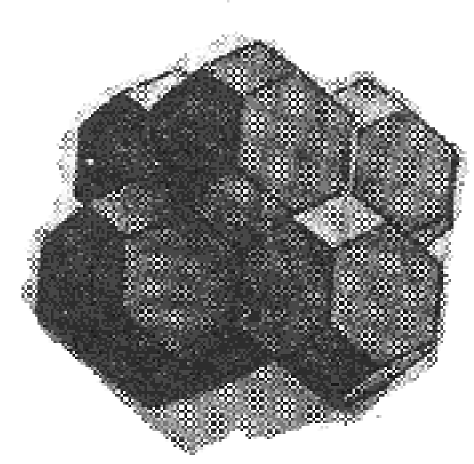




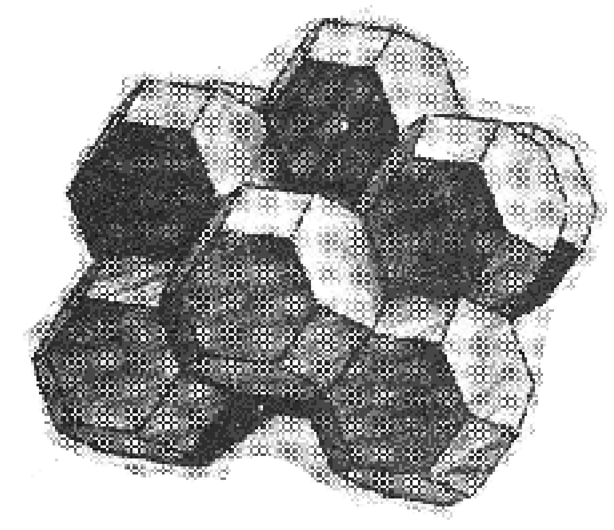
Problem No. 4
FLASK



Problem No. 6
JACKSTRAW
(6 blocks)



Problem No. 7
SMALL SQUARE PYRAMID
(5 blocks)

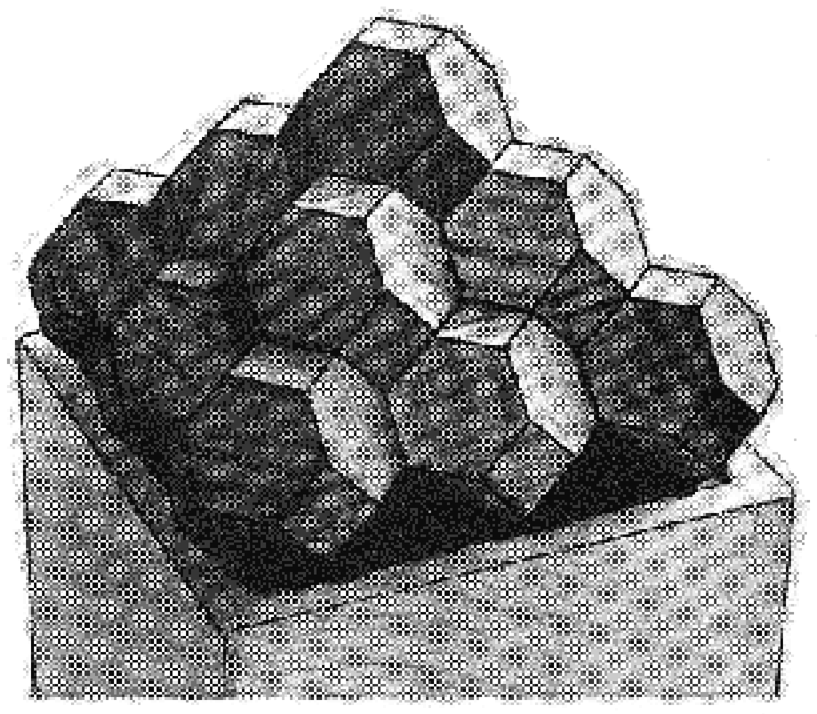


Problem No. 8
PLATFORM
(9 blocks)

Problem No. 1 is to dump the pieces out of the box and then fit them back in again a different way. There are eleven possible ways. Note that the five pieces are made up of fourteen blocks (truncated octahedra) joined together different ways.

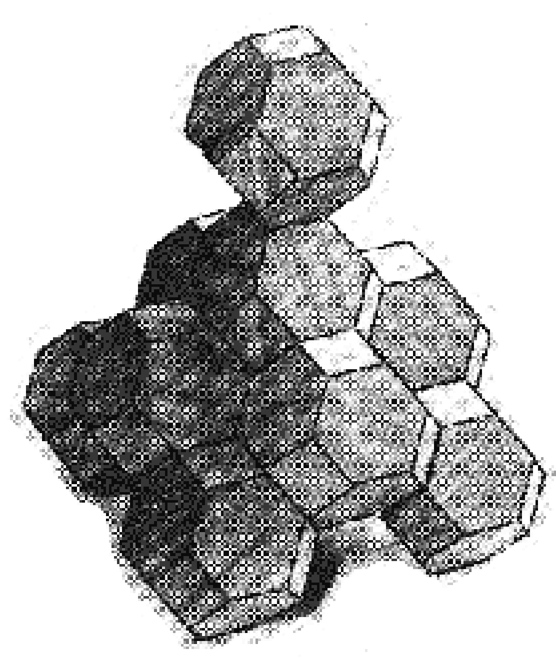
Problem No. 2 is to make a square pyramid using all five pieces. The box turned upside down serves as a base.

Problem No. 2
SQUARE PYRAMID



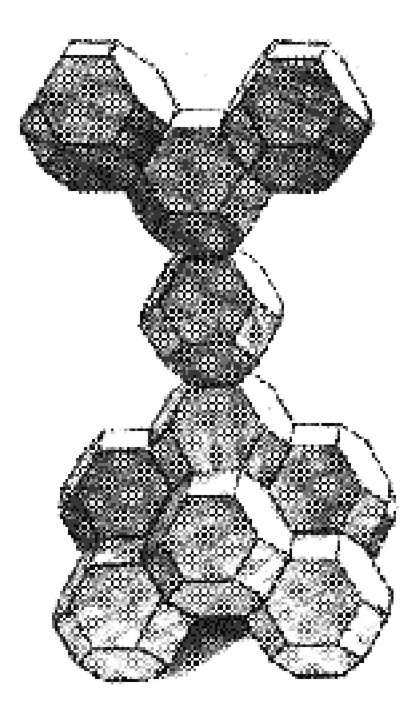
The problems on these two pages also have fourfold symmetry, but do not use all the pieces. Some are known to have only one solution, others have more than one, and some have not yet been analysed that thoroughly. How many solutions can you discover?

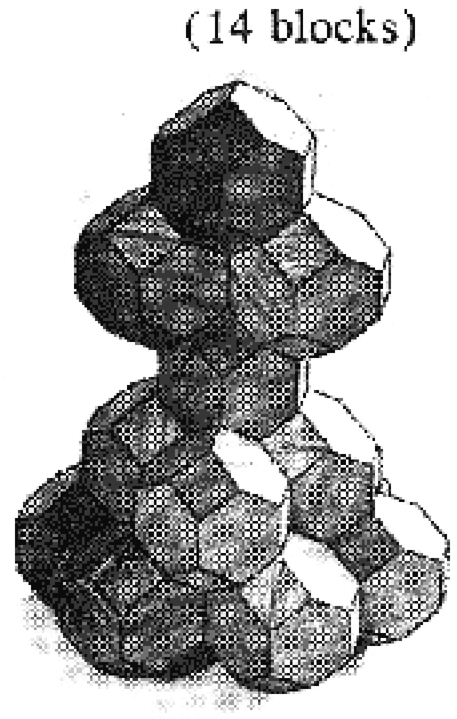
Problem No. 5
EIFFEL TOWER
(11 blocks)



The problems on these two pages have bilateral symmetry, meaning they are the same front and back (or left and right).

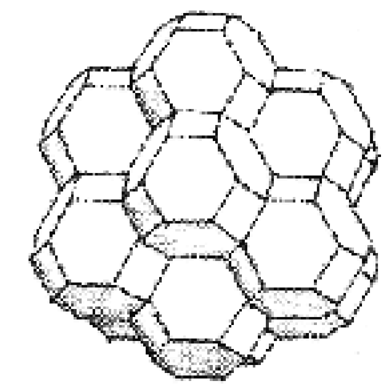
Problem No. 9
WINDMILL (?)
(14 blocks)





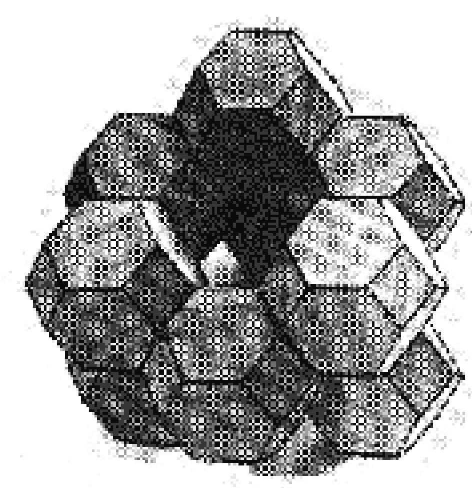
Problem No. 10
CHURCH STEEPLE
(14 blocks)

Problem No. 19: Imagine a figure having a hollow center the shape of a truncated octahedron, surrounded by fourteen blocks, one for each face. Prove that this is impossible to construct with this set of pieces.



After you have solved all nineteen problems, maybe you can invent some of your own. We have limited the problems to those having some simple sort of symmetry because they are easiest to visualize. What other types can you discover?

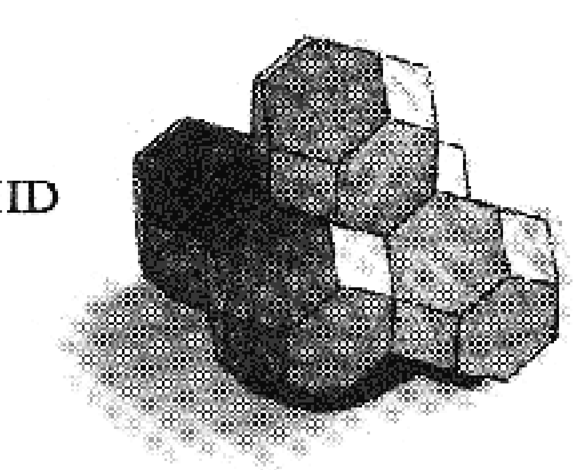
Problem No. 15
HEX TOWER
(12 blocks)

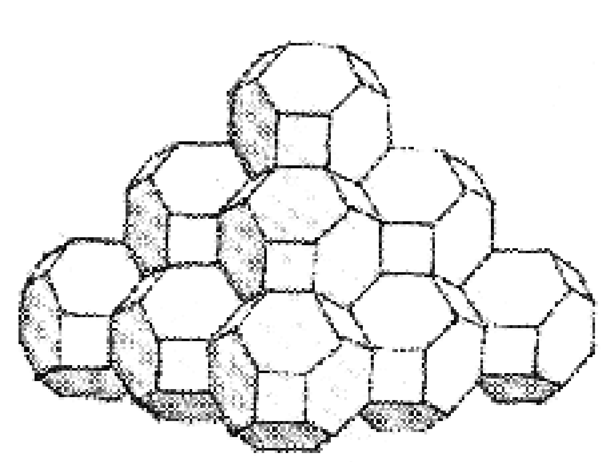


Problem No. 16
HEX NUT
(9 blocks)

Note: All four of these figures rest on a three-block base.

Problem No. 11
SMALL RHOMBIC PYRAMID
(5 blocks)





Problem No. 12
LARGE RHOMBIC PYRAMID
(14 blocks)

Note: No solution has been found so far for the LARGE RHOMBIC PYRAMID. Can you either find a solution, or prove it impossible?

29

The HALF-HOUR Puzzle

Probably nearly everyone who has ever tinkered with the design of 3-D puzzles has at some time or other contemplated the classic 3x3x3 dissection of the cube. Steinhaus, in his "Mathematical Snapshots," shows a 6-piece, 2-solution version. And of course everyone is familiar with the 7-piece, 240-solution "Soma."

One of the fundamental mistakes of puzzle designers is our tendency to make things too complicated. One of my first commercial puzzles was the 12-piece 5x5x5 Cube puzzle. It is now superseded by the new and improved 7-piece 4x4x4 Convolution (over). The logical next step was to see what might be done with the 3x3x3 that had not been published already.

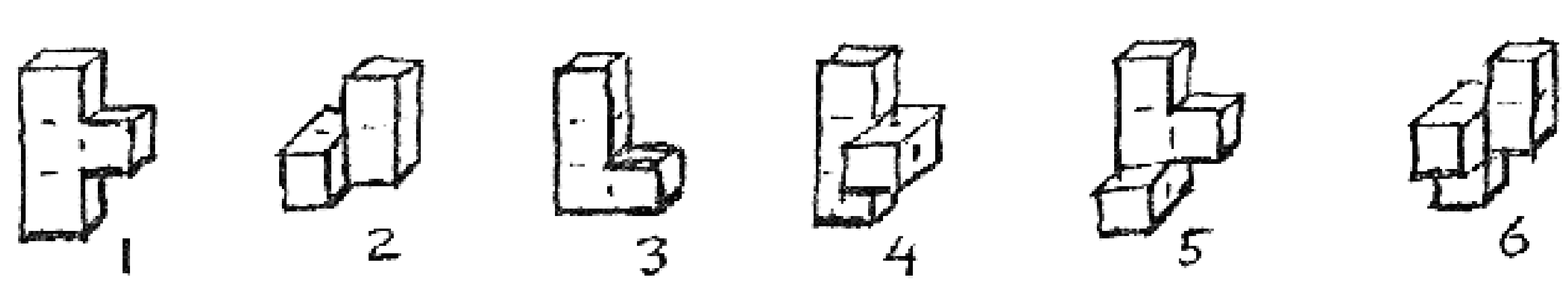
The obvious objection to this type of puzzle among serious puzzle enthusiasts is that they are too easy. The goal here was to see if this objection could be overcome. This led to an investigation of what constitutes difficulty, the conclusion of which can be stated as follows:

Coffin's Criterion of Difficulty - "The difficulty of a combinatorial puzzle varies directly with the number of combinatorial possibilities, and inversely with the number of solutions."

For a given design, the number of distinctly different solutions is a precisely defined number, and only a great deal of time and patience (or a computer) are necessary to determine it. The number of "combinatorial possibilities" is not so easily nailed down, but it can be presumed to vary exponentially with the number of pieces, but diminished by any axes of symmetry present in the pieces. One measure of it might be the number of operations required by a computer to completely examine the puzzle for solutions. Another might be the time required by a person to do it manually, which in this case after much practice was about 30 minutes.

The optimum number of pieces was found to be six. With five, the number of combinations is drastically reduced, and with seven the symmetries and number of solutions get out of hand. It was arbitrarily decided that there would be three 4-block pieces and three 5-block. Consequently, it was unavoidable that two pieces have an axis of symmetry. Many hours of trial and error finally yielded this combination with one and only one solution, which I here submit as being an optimum design.

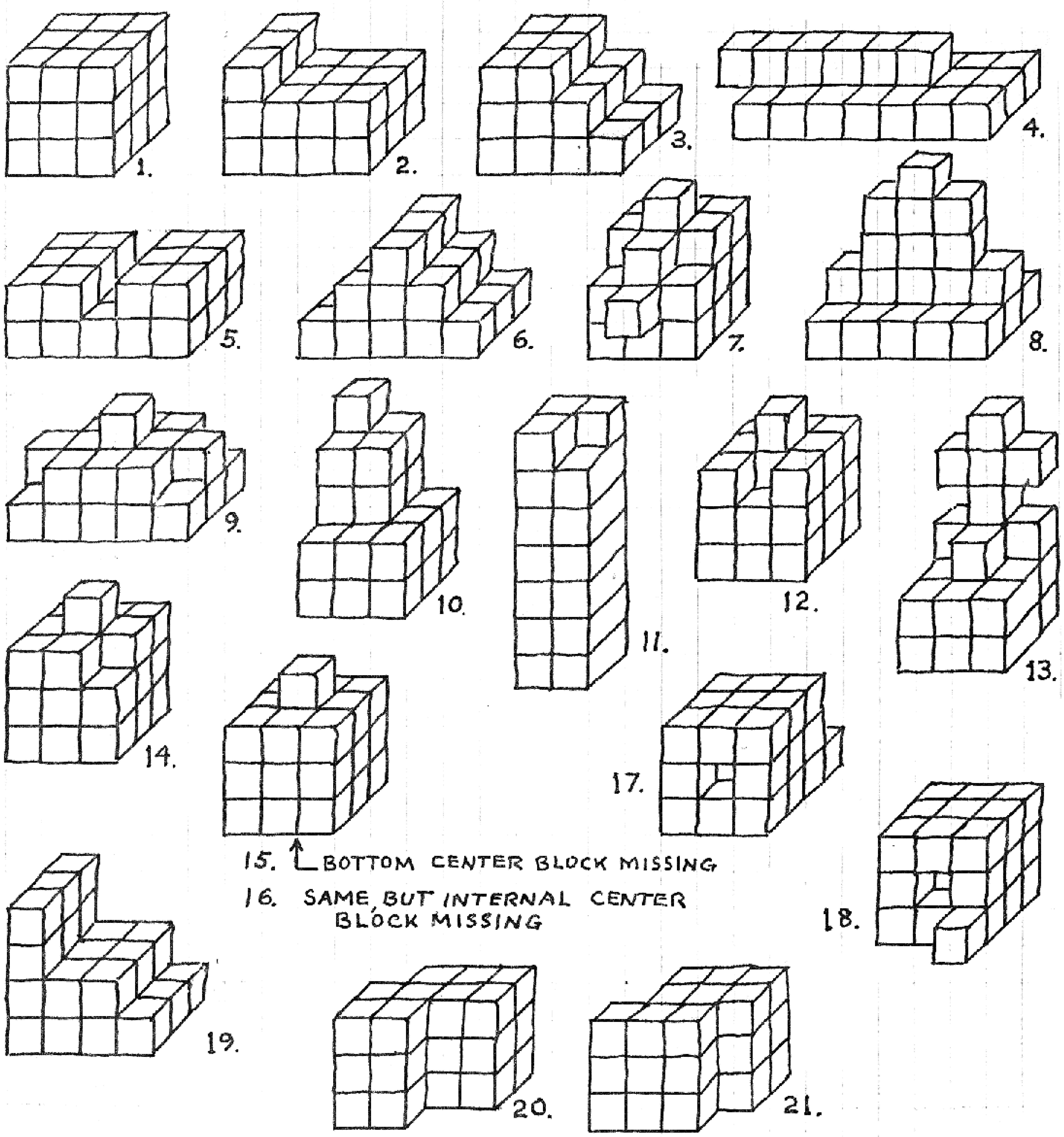
One possible objection to this design is that it makes only the cube solution, whereas the familiar 7-piece "Soma" has numerous symmetrical and animated puzzle problems published for it. Actually, I believe this set of pieces is also capable of forming many such shapes, but they are much more difficult, and so far I have discovered only a few. Rather than illustrate them here, I encourage persons to send in interesting solutions they have discovered, preferably with at least one plane of symmetry. A selection of the best ones might then be published later on a separate sheet.



Stewart T. Coffin
Old Sudbury Road
Lincoln, MA 01773

Feb 1980

#29

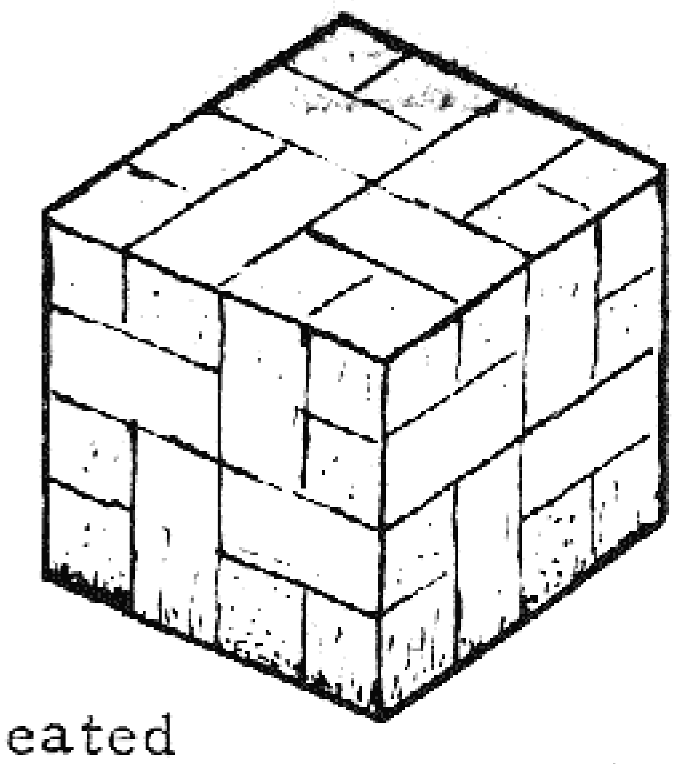


These are but a few of the many geometrical constructions which are known to be possible with the six HALF-HOUR Puzzle pieces. Most of these were discovered by Hans Havermann of Toronto.

David Barge has found many additional symmetrical solutions, which number in the hundreds and fill several pages. For more information on these, write to him at: Bldg 911A, B.N.L., Upton, L.I., NY 11973, and include $1 for printing and postage.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln MA 01773

#30



The CONVOLUTION Puzzle

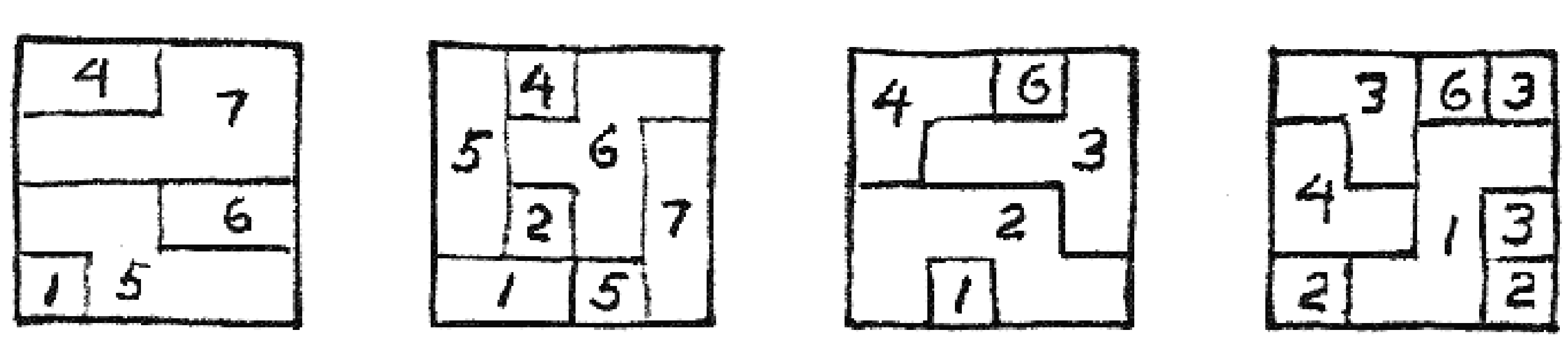
(Please read before disassembling)

This 7-piece dissection of the 4x4x4 cube was created to replace the old 12-piece Cube puzzle, which was discontinued years ago. The convolute symmetry of the faces has been retained, but this new design satisfies Coffin's Rules for combinatorial puzzles, which are: all pieces dissimilar, none have axes of symmetry, and only one solution exists. It also has only one possible order of assembly, making it what I call "serially interlocking."

I believe this is only the second puzzle I have produced which is described as "very difficult," (the other being the old Super Nova). Persons who disassemble the puzzle and note the order of the pieces should have no difficulty reassembling it. For the serious puzzle enthusiast, therefore, I suggest they have someone else disassemble it and scramble the pieces. It is often difficult for the designer to accurately judge the difficulty of his own creations, but I would guess that with a methodical approach, this one ought to be a good evening's work. Please let me know - I could be way off! Solution is included below, just in case —

Coffin's Optimization Rule for the design of such puzzles requires that the maximum possible number of pieces be used, and I don't know if this is satisfied here or not. I have discovered a totally interlocking design using eight 8-block pieces, but without the symmetrical face pattern. Can both conditions be satisfied? Also note that I assume only one solution exists, but have not proven it. There are many intriguing puzzle design problems of this sort awaiting someone with unlimited time and patience to solve them.

The systematic searching for puzzle solutions by computer has become a popular pastime recently, and there have been several papers on the subject. Now that the programming of such problems has become routine, these computer wizards might well turn their talents to the more useful and challenging task of designing fantastic puzzles. For example, puzzles which satisfy all or nearly all of the previously mentioned rules, and which have the added fascination of assembly into different symmetrical forms, are extremely difficult to design. Imagine, for instance, a puzzle similar to this one, but in which by omitting one or more pieces, smaller interlocking rectangular solids could be made. Over the years, especially the past two, I have spent many hours playing with rhombic dodecahedral blocks with similar schemes in mind, and am beginning to wonder if such designs are actually impossible, or just hopelessly difficult to find. How about it?



TOP 2ND 3RD BOTTOM

S. T. C.
Feb 1980
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reprinted 1984 for "Puzzle Craft"

The OCTAHEDRAL CLUSTER Puzzle

The object of this puzzle is to assemble the four pieces into a solid cluster having octahedral form and symmetry. There is only one solution, and only one possible order of assembly. To visualize the solution, imagine one block in the center surrounded by twelve blocks - one on each face, with the remaining six blocks forming the vertices of the octahedron.

Note the similarity of this puzzle to the Four-Piece Pyramid (over). This one is probably the more confusing of the two. It is perhaps surprising that a straightforward four-piece assembly puzzle can present such difficulties. This did not come about by mere chance, but rather was the result of a systematic investigation of a category of puzzles which I refer to as "polyhedral-combinatorial-interlocking." The following are Coffin's Rules for designing puzzles of this sort:

1. A polyhedral puzzle is defined as one having apparent polyhedral symmetry when assembled, both external and internal. (For definition of polyhedral symmetry, see Puzzle Craft 6A.) Apparent, because internal planes of dissection, or glue joints, are disregarded, but pins, notches, or other spurious devices are not allowed. Such puzzles are, by definition, made up of identical sets of modular building blocks joined together different ways.
2. A perfect combinatorial puzzle is one in which -
   A. All pieces are dissimilar.
   B. No piece has any axis of symmetry.
   C. Only one solution exists.
3. A totally interlocking puzzle is one having only one possible order of assembly.

All of the above rules are easy to satisfy simply by using few pieces. The final rule is therefore -

4. The optimization rule - which is to satisfy all of the preceding rules with the maximum number of pieces possible.

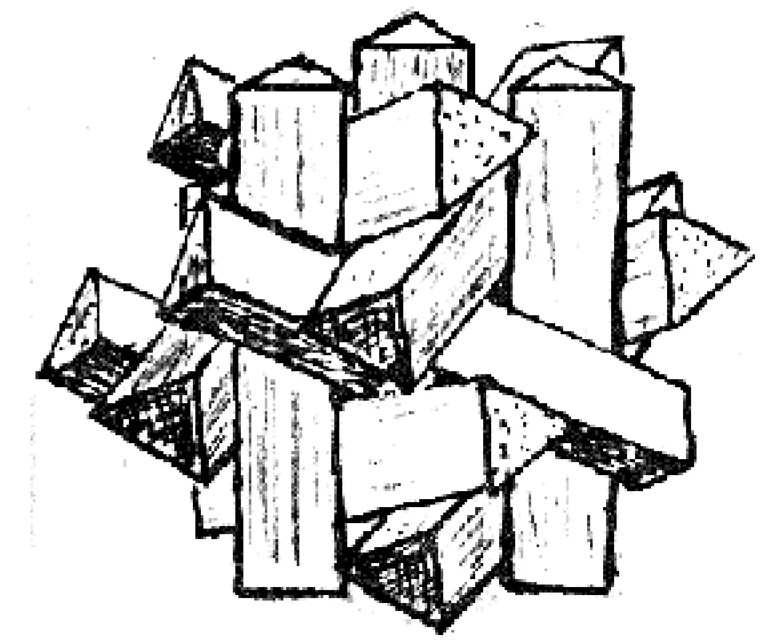
In designing the Four-Piece Pyramid, I looked into possible five-piece solutions, and became convinced that none exist, but without proof. Considering the difficulty I had finding a successful combination for the Octahedral Cluster with four pieces, I assume that five-piece solutions are impossible. If I am correct, then these two puzzle designs satisfy all of the above rules. Can you identify any other puzzles which do? (The Scrambled Scorpius, Triangular Prism, and Broken Sticks come close, but do not satisfy Rule #3 by a strict interpretation. The Convolution may, but I am not sure if it satisfies Rule #4.)

Persons who wish to experiment along these lines may purchase the individual blocks in mahogany as follows:

1 - inch rhombic dodecahedra -		35¢ each
1-1/4 - inch "	"	50¢ "
1-1/2 - " trunc. octahedra		75¢ "

#32

The BROKEN STICKS Puzzle



This puzzle might be described as consisting of six dissimilar, non-symmetrical, interlocking pieces which assemble one way only to form a solid having the appearance of twelve interlaced continuous triangular sticks arranged in four triplets in polyhedral symmetry around a rhombic dodecahedral center. After working with it for a while, perhaps you will think of other descriptive phrases.

Disassembly: This is easily accomplished by pushing on the ends of different triplets until the sliding axis is found which separates the puzzle into two halves. The six pieces then fall out.

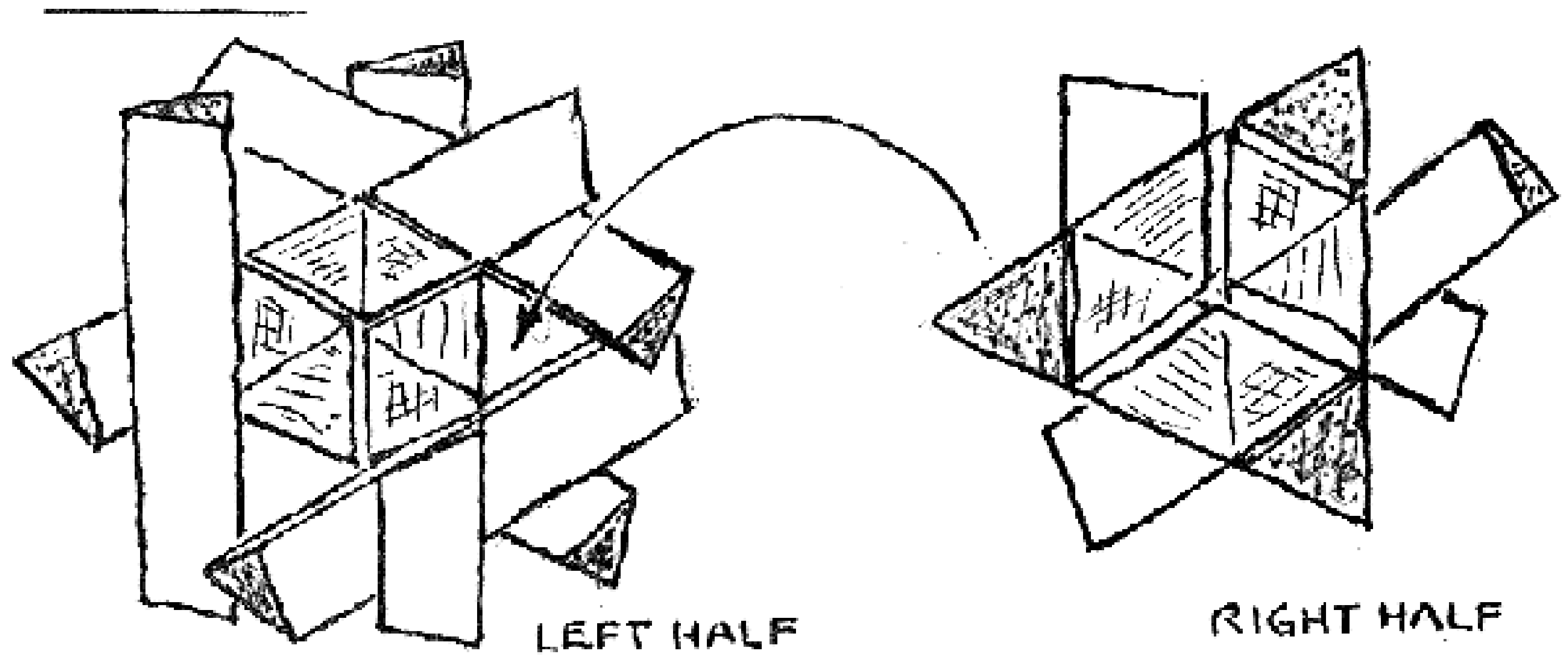
Assembly: It is always an open question whether or not explicit assembly directions should be included with puzzles of this sort. My feeling is that if step-by-step directions are followed, the main object of the puzzle is defeated; and if they are necessary, the puzzle is too hard. Be that as it may, many customers insist on directions being included, and I do now include them as seems most appropriate with most but not all of my puzzles. This particular puzzle is probably one of my more difficult ones. Besides having only one solution and one axis of assembly, it has the added confusion of many odd angles, and also requires a bit more dexterity than some of the others.

I suggest that you first attempt it without directions. If, after an hour or two, you have made no progress, unfold if you must hint no. 1 below. Unfold additional hints only if desperate.

Hint No. 1 The puzzle goes together, as it came apart, in two halves of three pieces each. However, do not worry about this yet. Build it up piece by piece until a combination is found in which there is no interference between pieces; then figure out how to assemble it. If you find an arrangement that appears to fit together but is utterly impossible to assemble, you have had the bad luck to discover the wrong one. Start all over again.

Hint No. 2 Each piece has a pyramidal vertex at its center. All six of these come together at the center of the puzzle; therefore they must come together in each subassembly. When viewed from inside, the center blocks of one subassembly appear to spiral clockwise, the other counterclockwise. One has three sticks which project vertically; the other half has none. Both subassemblies are non-symmetrical, and must be rotated until they match.

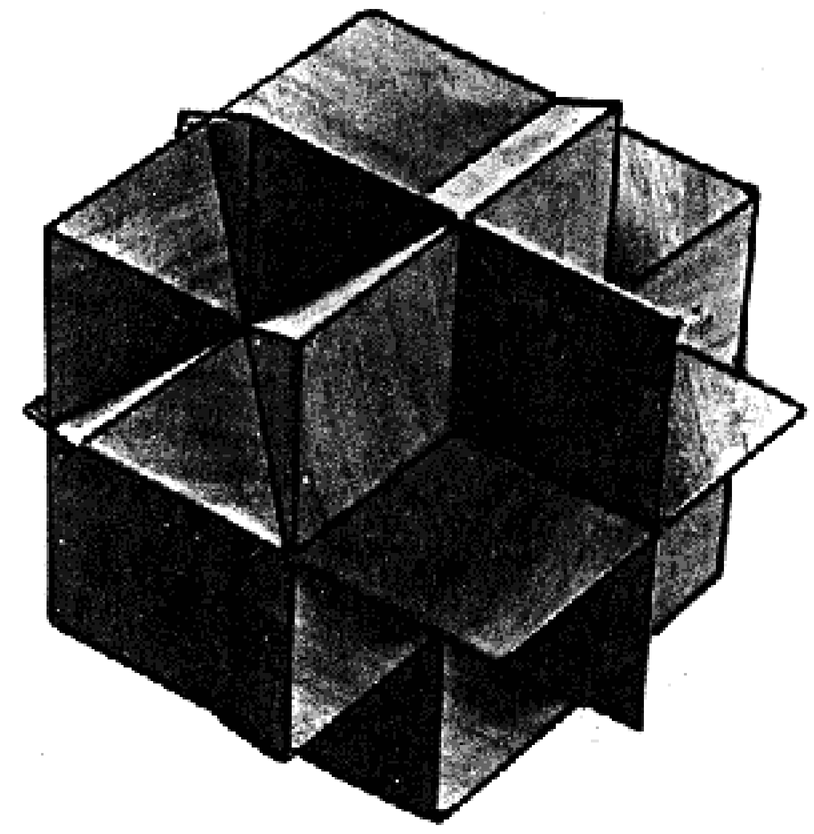
Solution



Stewart T. Coffin
Old Sudbury Road
Lincoln, MA 01773

Puzzle #14-A

The SECOND STELLATION



This puzzle consists of six dissimilar non-symmetrical pieces which assemble to form an interlocking solid having the shape of the second stellation of the rhombic dodecahedron.

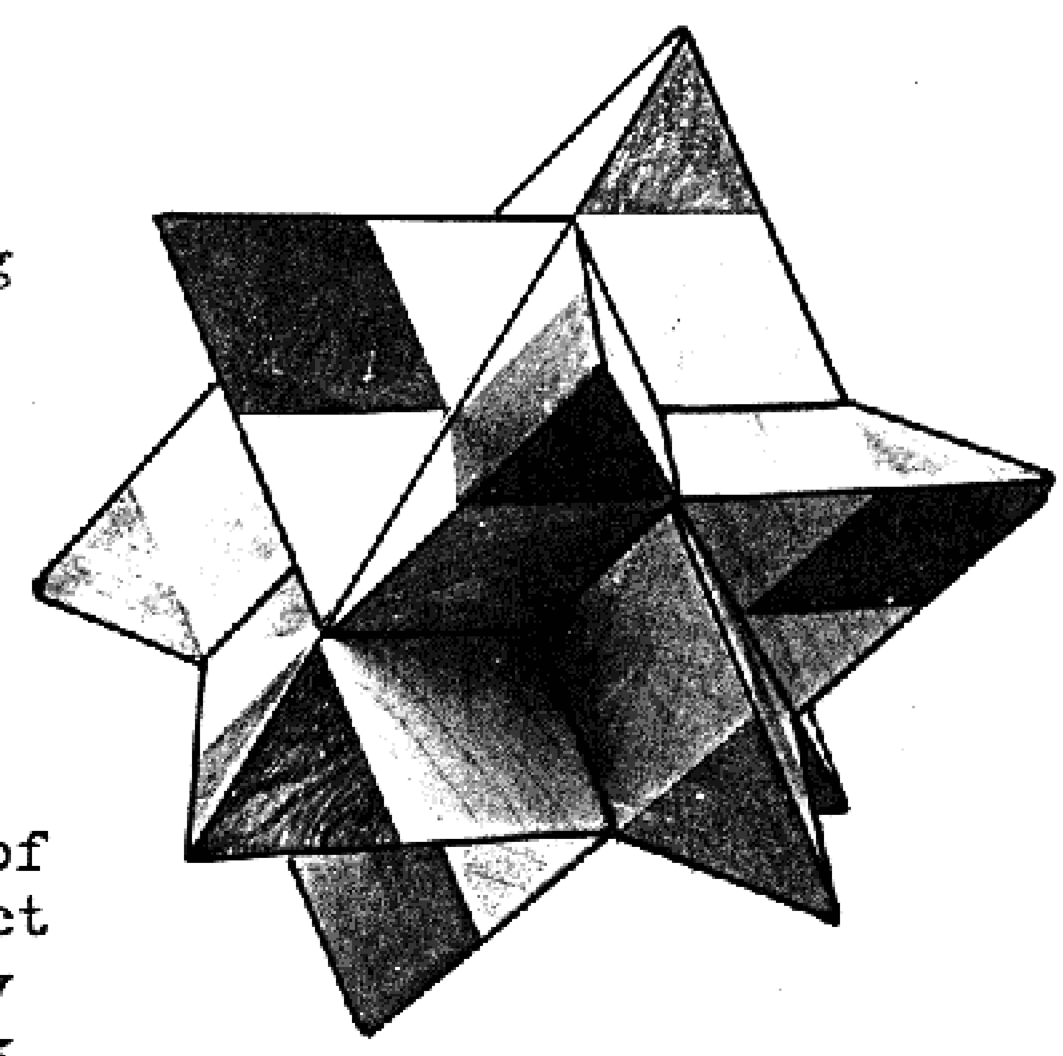
The first step of disassembly is to slide the puzzle apart into two halves, and this can be done along any one of the four sliding axes. The six pieces then come readily apart.

Examine the pieces and note the following: Each piece consists of a central block to which are directly attached a pair of identical end blocks, positioned symmetrically. Twelve more smaller blocks are required to complete the stellation. There are four possible locations for these blocks on each piece, and the six puzzle pieces represent all possible non-symmetrical permutations of attaching these blocks.

This is a straightforward combinatorial puzzle of intermediate difficulty, so explicit assembly directions are not given here. The obvious approach to solving the puzzle is to try building it up piece by piece, trial and error, until some arrangement is found without interference between the pieces. Then group the pieces in two opposite halves and mate them to complete the assembly. There are two solutions.

Puzzle #33

The TWELVE POINT Puzzle



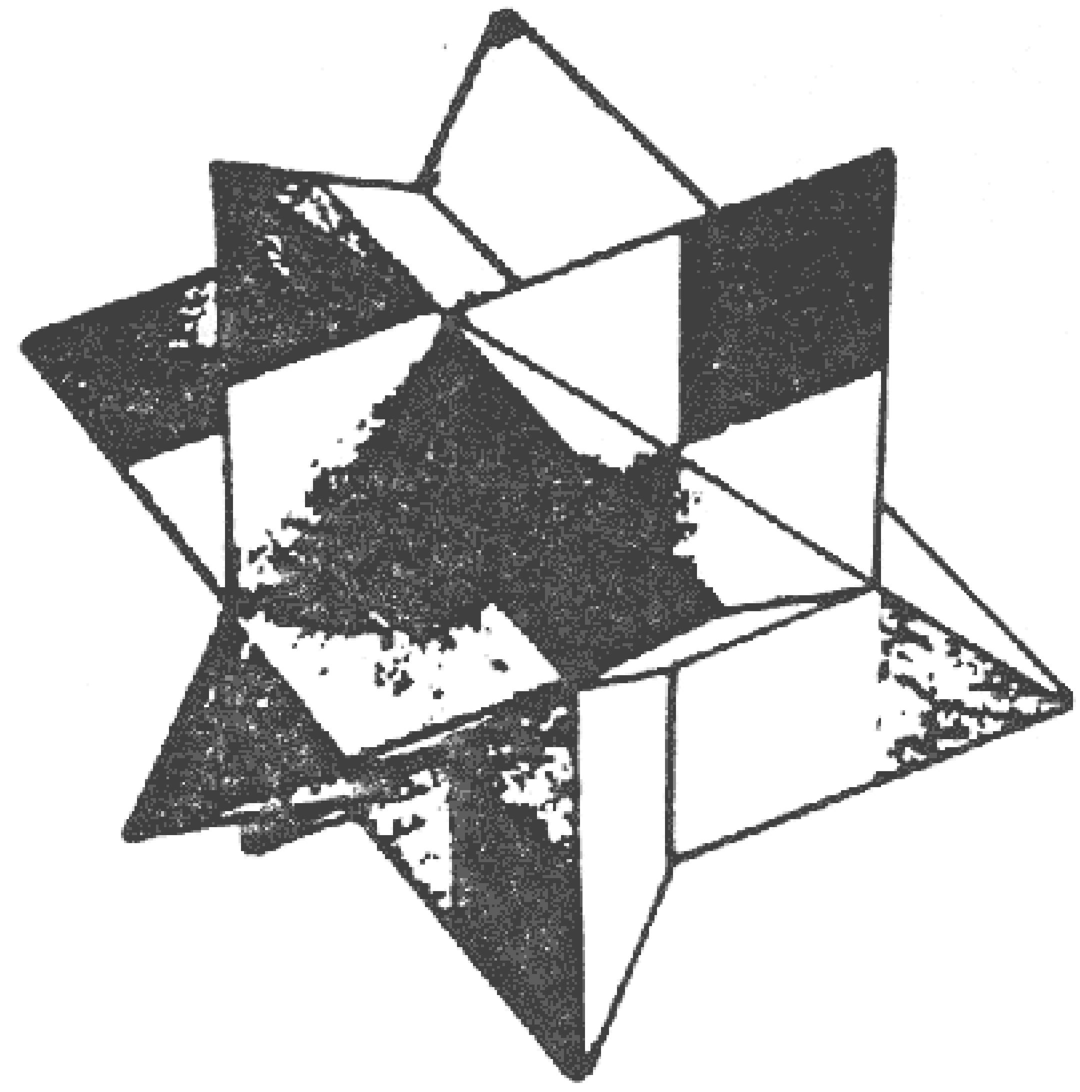
This puzzle consists of six dissimilar non-symmetrical pieces which assemble one way only to form an interlocking solid having a shape which is intermediate between the second and third stellations of the rhombic dodecahedron.

Comparison with the Second Stellation Puzzle above reveals that the Twelve Point Puzzle is made by starting with a Second Stellation Puzzle and then adding the twelve end blocks which form the points. What the addition of these blocks does to the action of the puzzle is far more important than the fact that they make an intriguing new shape. They eliminate one of the two solutions, and block three of the four sliding axes on the remaining solution, making the puzzle much more interesting.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Nov 1984

#33

The TWELVE POINT Puzzle



This puzzle consists of six dissimilar, non-symmetrical pieces which assemble one way only to form an interlocking solid having a shape which is intermediate between the second and third stellations of the rhombic dodecahedron.

The first step of disassembly is to locate by trial and error the one sliding axis by which the puzzle is separated into two halves. The six pieces then come readily apart.

Assembly is of course the opposite of disassembly. Since this is a straightforward (almost) combinatorial puzzle, and only moderate dexterity is required to assemble, explicit assembly instructions are not given here. However, here are some hints:

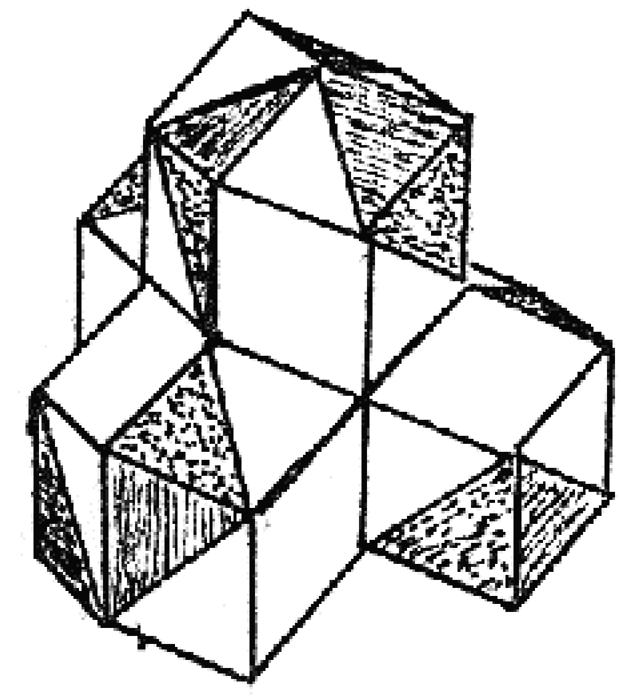
There are at least three possible ways to approach puzzles of this sort - (1) random trial and error, (2) systematic trial and error, or (3) analytical. The best approach is sometimes a combination of all three. After a bit of random trial and error, you will see that the six pieces are oriented with respect to each other rather like the six faces of a cube, in three sets of opposite pairs. With this knowledge gained, you may wish to try a systematic approach. Any piece can be chosen at random to start. Any of the five remaining pieces can be tried in an adjacent position, oriented either of two ways, making ten possibilities. For the third position, there are eight possibilities, etc. Thus, the total number of possible arrangements of the pieces is 10x8x6x4x2, or 3840. This number divided by the number of solutions (one) gives a rough index of the degree of difficulty, i.e. 3480. The BROKEN STICKS and TRIANGULAR PRISM puzzles have the same index of difficulty. The SECOND STELLATION Puzzle, because of its two solutions, has a difficulty index of 1920. When an arrangement is finally found in which all the pieces fit together without interfering with each other, all that remains is to figure out how to combine them correctly into two groups of three to form the two mating halves. This can be rather perplexing, as explained below.

Comparison of this puzzle with the SECOND STELLATION Puzzle (see other side) will show that it is identical except for the addition of the two dark end blocks on each piece. The function of these blocks is to prevent the two halves from sliding apart on certain axes. By an extraordinary stroke of luck, they eliminate all four axes on one solution of the SECOND STELLATION Puzzle, and three of the four axes on the second solution, thus leaving <u>one</u> solution with <u>one</u> sliding axis. A consequence of this is that there is <u>one</u> arrangement which is an apparent solution, but which is impossible to assemble. If you have the misfortune to stumble into it, nice try. Start over again!

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773

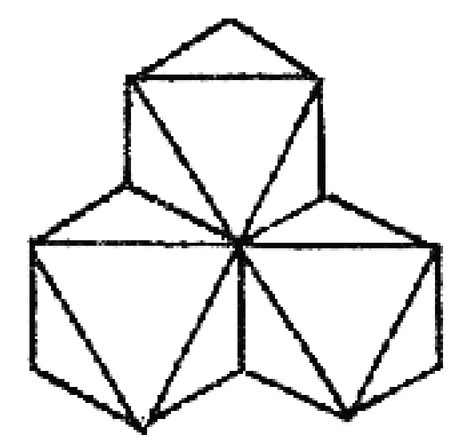
#34

Instructions for the Augmented Four Corners Puzzle

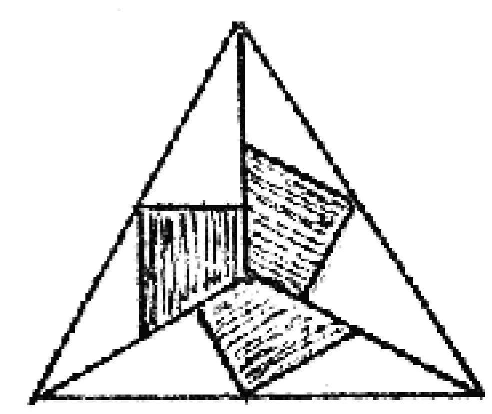


The Augmented Four Corners Puzzle consists of six dissimilar interlocking pieces which assemble one way only, with one sliding axis, to form a geometrical solid with tetrahedral symmetry.

This puzzle has a superficial resemblance to the old Four Corners Puzzle, but functionally it is much more closely related to the Hexagonal Prism Puzzle. Each puzzle piece consists of an identical symmetrical body (light colored wood), to which are attached the twelve dark blocks in such a manner as to produce every possible non-symmetrical puzzle piece. Assembly is a straightforward combinatorial problem, so I see no need to give detailed assembly directions.



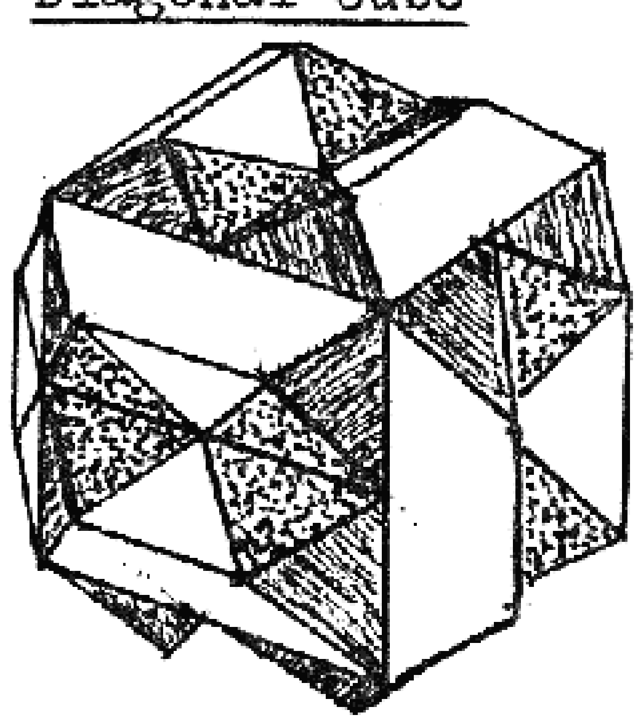
Since we have so much space left over on this sheet, some interesting variations of this puzzle will be described. In the first of these, the four "sides" of the assembled puzzle are sanded down flat until the center point of the side is reached. This minor alteration has the effect of changing all 36 rhombic faces of the original solid into 48 triangular faces.

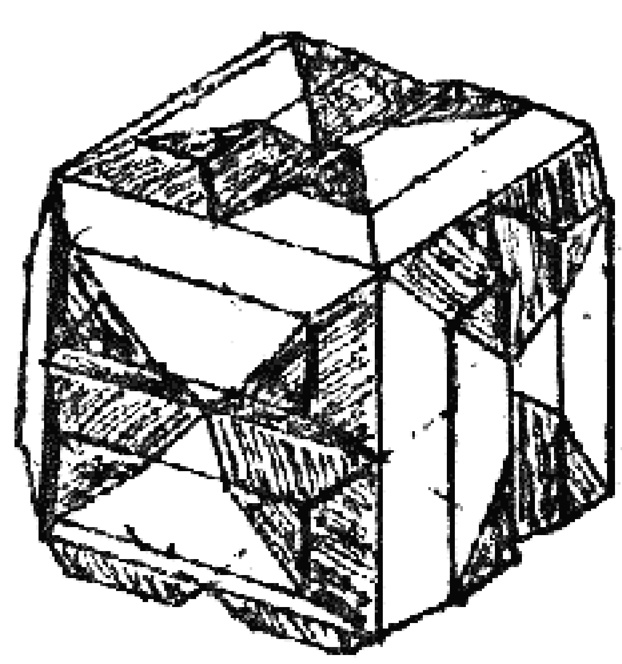


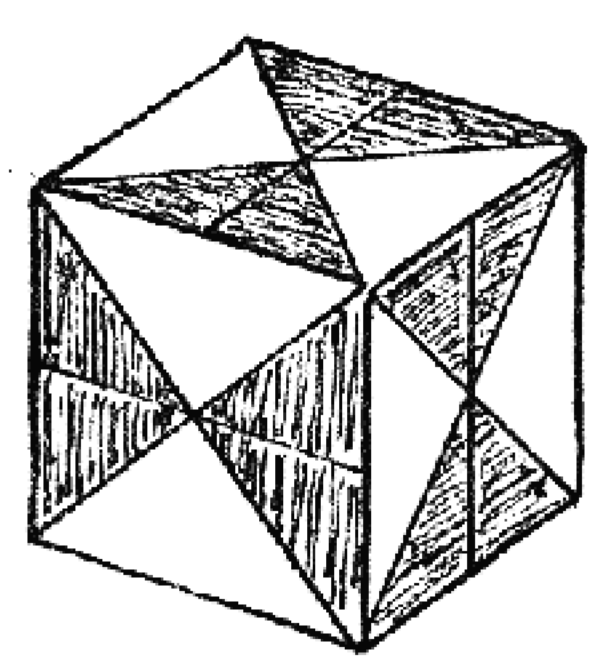
The reduction of the sides described above can be continued until the shape of the puzzle becomes that of a regular tetrahedron. By using multi-colored woods in making up the puzzle pieces, interesting patterns are made to appear on the faces. I have made only one model of each of these variations, to satisfy my curiosity. I prefer the original version.

By making the two end blocks (light colored wood) on the body of each puzzle piece twice as large, so that the body has planes of symmetry, and then adding twelve more filler blocks (dark colored), the assembled puzzle acquires cubic symmetry. The six sides of this version can then be truncated any desired amount, until eventually a perfect cube is obtained with diagonal face patterns, resulting in an intriguing dissection of the cube that is totally non-orthogonal. This is the Diagonal Cube mentioned on page 12 of Puzzle Craft II.

#58 - Diagonal Cube







Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Jan 1981

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

34X

For <Deleted>

Six-piece tetrahedron in mahogany + limba.

Experimental - only one made.

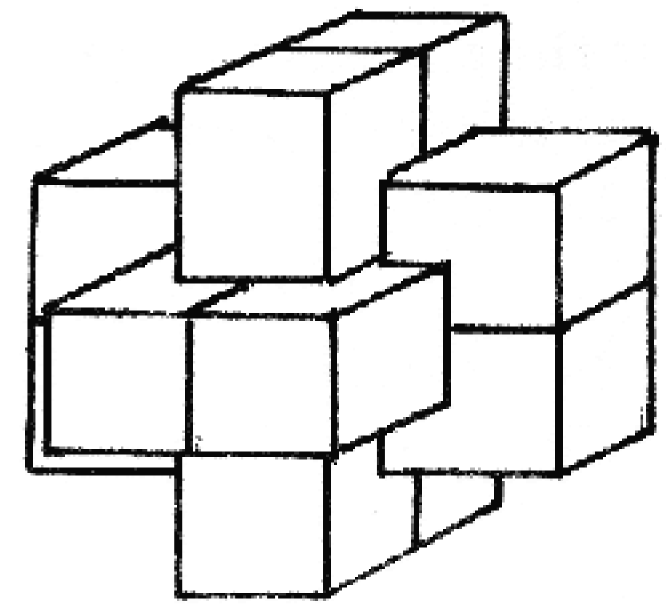
This puzzle was made by first making an Augmented Four Corners and then sanding down the four faces. I do not expect to make any more. The pieces are not very strong.

S.T.C.

Jan 2, 1990

#35 + #36

Instructions for the SIX-PIECE BURR PUZZLE, including Burr #305, Coffin's Improved Burr, and the Set of 25 Notchable Pieces



It seems reasonable to assume that most persons are already familiar with the basic six-piece burr puzzle, which over the years has probably enjoyed the greatest all-time popularity of any three-dimensional puzzle. A section in my Puzzle Craft II (1981) is devoted to it. For further reading, I recommend "The Six-Piece Burr" by William H. Cutler, which appeared in the "Journal of Recreational Mathematics, Vol. 10(4)," and is summarized in "Scientific American" Jan. 1978.

To summarize briefly, the six-piece burr consists of three pairs of symmetrically and orthogonally arranged mutually intersecting notched square sticks. All notches are made within the regions of intersection by removing descrete cubic units which measure one-half the width of the sticks. If one limits the notchings to those which can be made with simple saw cuts, without the necessity of carving out blind corners and edges, there are said to be 59 possible pieces. If one furthermore limits the design to only those which can be assembled solid, without internal voids, there are only 25 usable pieces, and these are known as the set of 25 Notchable Pieces. These may be assembled 314 different ways if duplicates and triplicates of certain pieces are available, and if the same set of pieces assembled a different way is counted as a different combination. (In order to assemble all 314 combinations, duplicates are required of pieces 4, 5, 6, 9, 10, 12, 14, 15, 16, 17, 19, 22, 23, and triplicates are required of pieces 2 and 3, for a total of 42 pieces.)

From among these 314 combinations, I have chosen one - Burr #305 - for inclusion in my 1981 catalog. Why was it chosen? To begin with, if we eliminate from this list those combinations which use symmetrical pieces (1, 2, 8, 9, 18), those which contain multiple pieces alike, and those in which the same set of pieces can be assembled more than one way, we are left with only 18 combinations. But 16 of these involve the rather common and uninteresting 4-12 or 3-10 two-piece "key." The two remaining are clearly more unusual and interesting, and since they are a reflexive pair, I arbitrarily chose the first in Cutler's listing - #305. It uses pieces 6, 12, 14, 21, 22, and 23.

Nearly everyone who has systematically investigated the six-piece burr has limited their investigations to solid assemblies. Combinations which have large amounts of hollow space tend to be easy and less interesting, with many possible solutions, and also tend to fall apart or rattle. However, there is a type of design which involves the shifting of pieces to assemble or disassemble, which in my opinion is clearly the most interesting type, and these necessarily must have at least one hollow space inside. The reason these have not been systematically studied yet is that it is exceedingly complicated to do so. Someday, someone will program a computer to do this.* In the meantime, I propose a contest to see who can come up with the cleverest design. After a few hours of tinkering, I have come up with Coffin's Improved Burr, which is included in my 1981 puzzle line. See if you can come up with a better one, and send me a sketch of it. From all those submitted, I will choose the best one and put it in next years catalog, with credit to the inventor. Rules (over):

* Note: Bill Cutler has now done this!

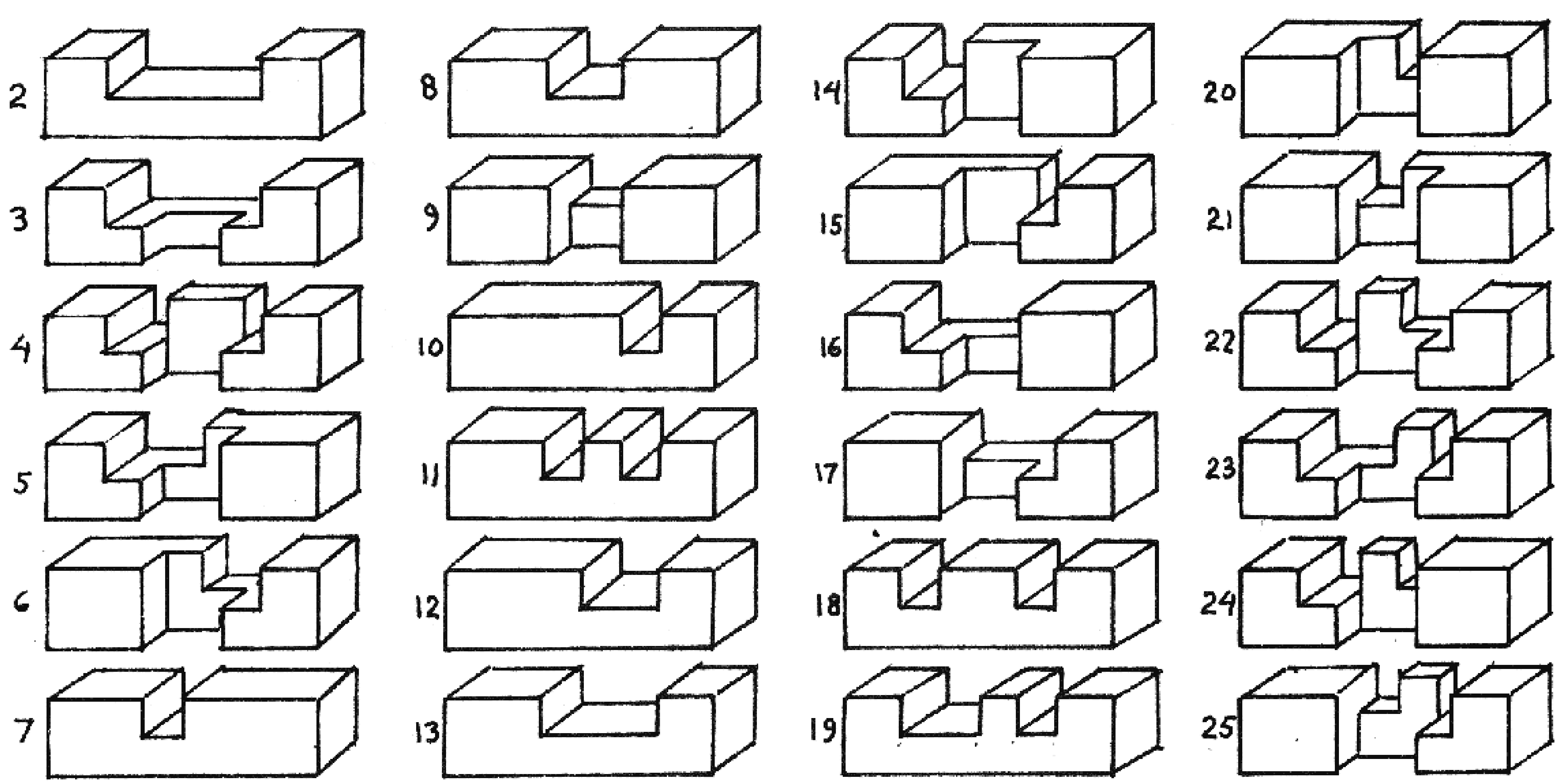
Rules and suggestions for designing better burrs:

1. Try to use the 25 notchable pieces in-so-far as possible. If you must use other pieces, try to use ones that are relatively easy to make by modifying notchable pieces (there are 369 possible pieces).
2. Do not use the same piece twice.
3. Avoid if possible using pieces having an axis of symmetry (1, 2, 8, 9, 18).
4. When you think you have discovered a clever design, systematically check every possible way to make sure it does not go together another easier way. Avoid designs with more than one solution unless all solutions are intriguing, or some purpose is served by having more than one.

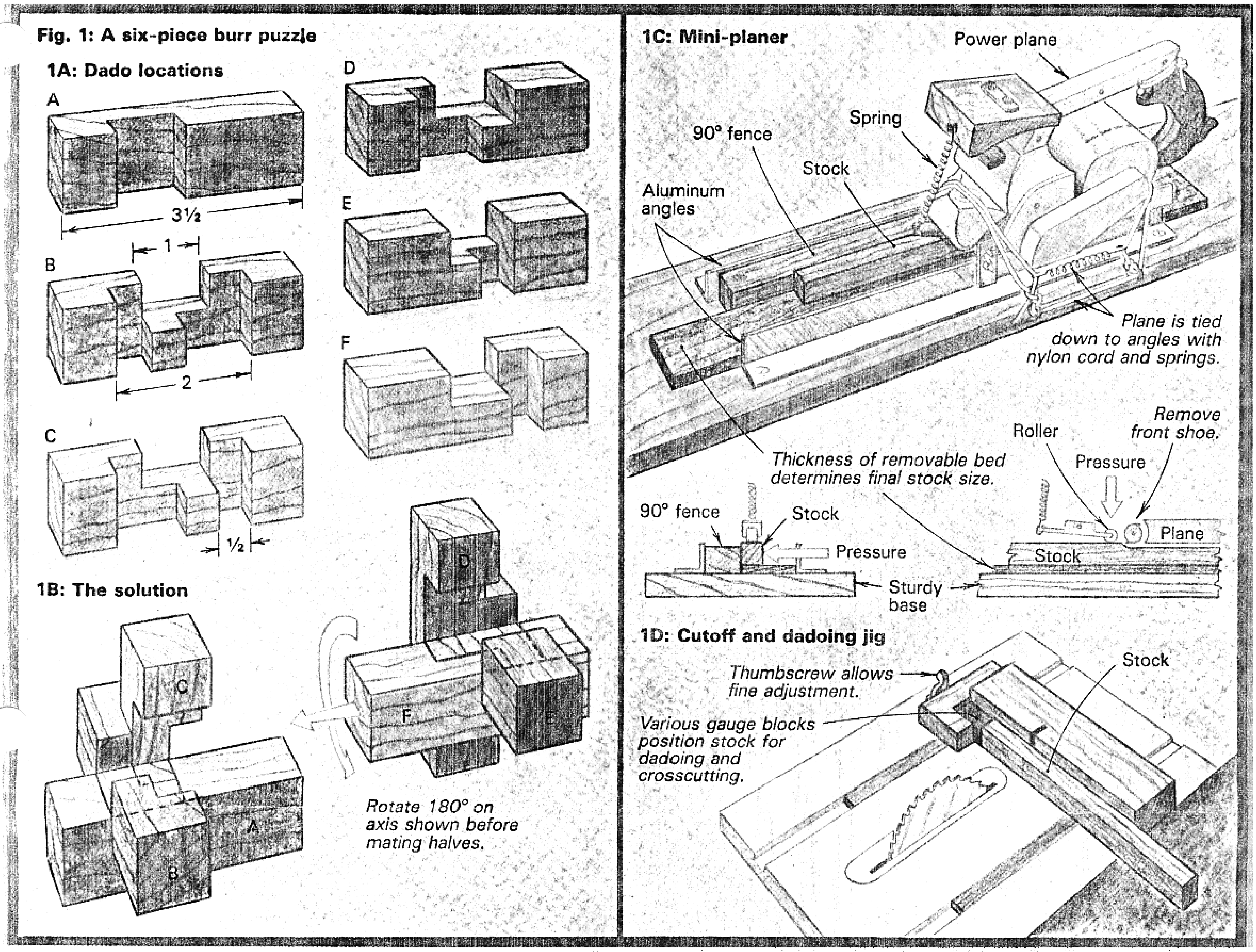
Since it takes a skilled puzzler only a few minutes to solve most common burr puzzles, and only slightly longer to analyse them for all possible solutions, the object here is to design burrs which are clever, tricky, difficult, unusual, surprising, or amusing to assemble. Since all of the solid burrs - be they the 314 notchable ones or Cutler's 119,979 in the general category - come directly apart by sliding out the key piece (or pieces), I would think they would all have to be rejected as being too simple. The alternative is to design burrs with internal voids. A burr which meets all of the criteria above, and in which one piece slides one unit to release another piece, is rather easy to design, and would not be considered a serious submission. Much better would be one in which the second piece also slides to release the third (see my Sliding Burr designs, next page.) Avoid having too many voids, because as their number increases, so also does the liklihood of other easier solutions.

Note that with solid burrs, the length of the pieces is arbitrary, and has no bearing on the puzzle. With hollow burrs, this is not the case. The end sections of my present pieces are all 3/4-inch. If they were shortened to 1/2-inch, certain solutions would be possible which are impossible with the longer pieces.

1 HAS NO NOTCHES



THE 25 NOTCHABLE PIECES



sweater we put them on ten years ago, but whether the clothing's owners are still working out the solution or not, I can't say. (I have to admit that the first time somebody tied one on me, I had to cut the cord.) For readers who find such teasers more frustrating than interesting, the solution is given at the end of this article.

Some of my puzzles have been licensed to manufacturers, but most were engineered so I could make them in limited production in my small shop. I started with only an 8-in. tablesaw and a belt sander. Later I found a thickness planer to be indispensable, but because of the small scale of the work, I made mine from a portable power plane mounted over a fixed bed, as shown in figure 1C. Eventually I added two more tablesaws—one just for ripping and one for making notches—and, finally, a bandsaw.

Among all interlocking puzzles, the six-piece burr (the center zzle on the facing page) is one of the most ancient. Many people are apt to dismiss it on sight as being too trivial, but while some variations of the burr puzzle have numerous solutions and are therefore fairly easy to solve, others such as the one shown in figure 1, which has just one solution, can be quite taxing.

When making a burr, as with most other puzzles, the woodworking is simple and straightforward, but all cuts must be extremely accurate or the puzzle will be sloppy. To check measure-

and swells with changes in humidity. Don't aim for too tight a fit on a dry winter day or the puzzle will lock solid in summer. Saws must be set up square and true and kept very sharp—a hollow-ground (no-set) plywood blade will do fine.

Domestic woods such as cherry, walnut and white oak can be used, but my preference is Honduras mahogany because it's more stable. Among the more exotic tropical woods, Brazilian rosewood is my first choice.

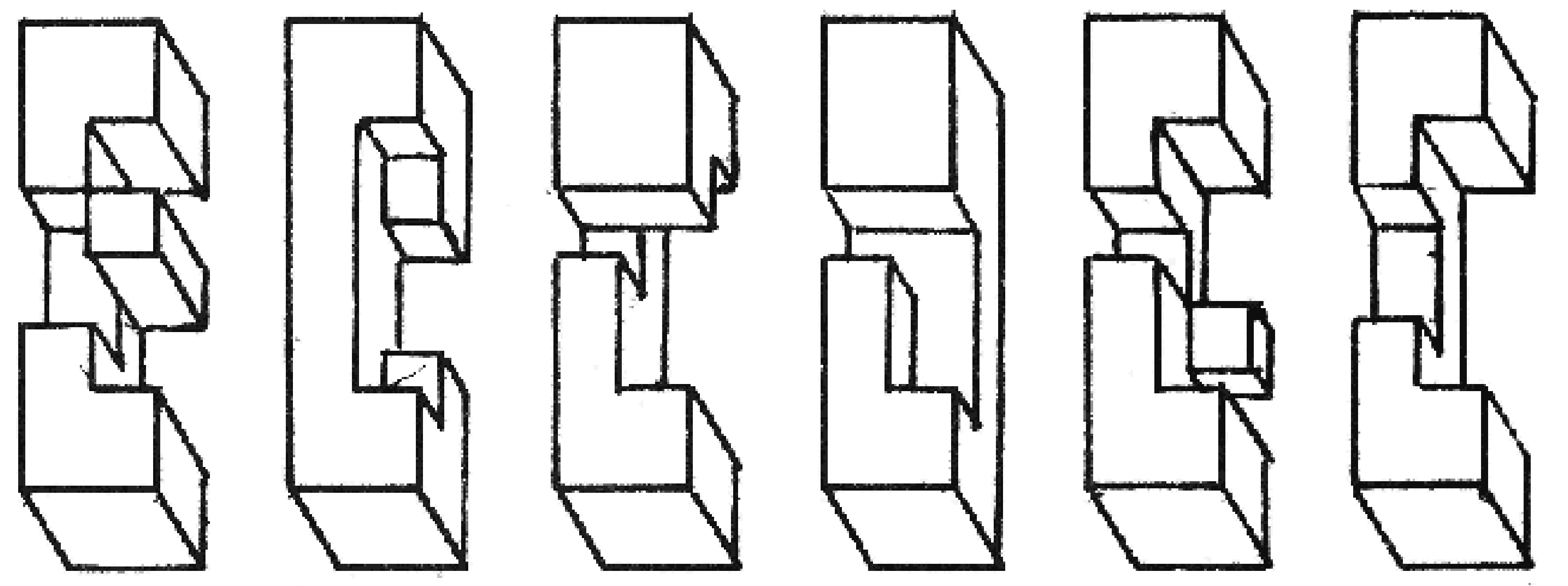
Thickness the sticks to exactly 1 in. square. I first rip the stock to $1\frac{1}{16}$ in. square. To bring the sticks down to final dimension, I set the planer to skim off the sawmarks on two adjacent faces, then reset it to final size and skim the other two.

Next I cut the sticks to their 3½-in. finished length. I never mark sizes on the stock, because that would be a time-wasting and inaccurate step when such close tolerances are required. Instead, I rely on a jig to ensure accuracy and speed. The setup shown in figure 1D holds the stick exactly square to the blade, and positions it to length by means of a removable gauge block. The same setup, with different gauge blocks, ensures that the notches are in the right place. I cut them with a dado set shimmed out with paper to 0.002 in. oversize.

When I've cut the pieces, I test the fit and give them a very light sanding to ease the corners, making the parts much more

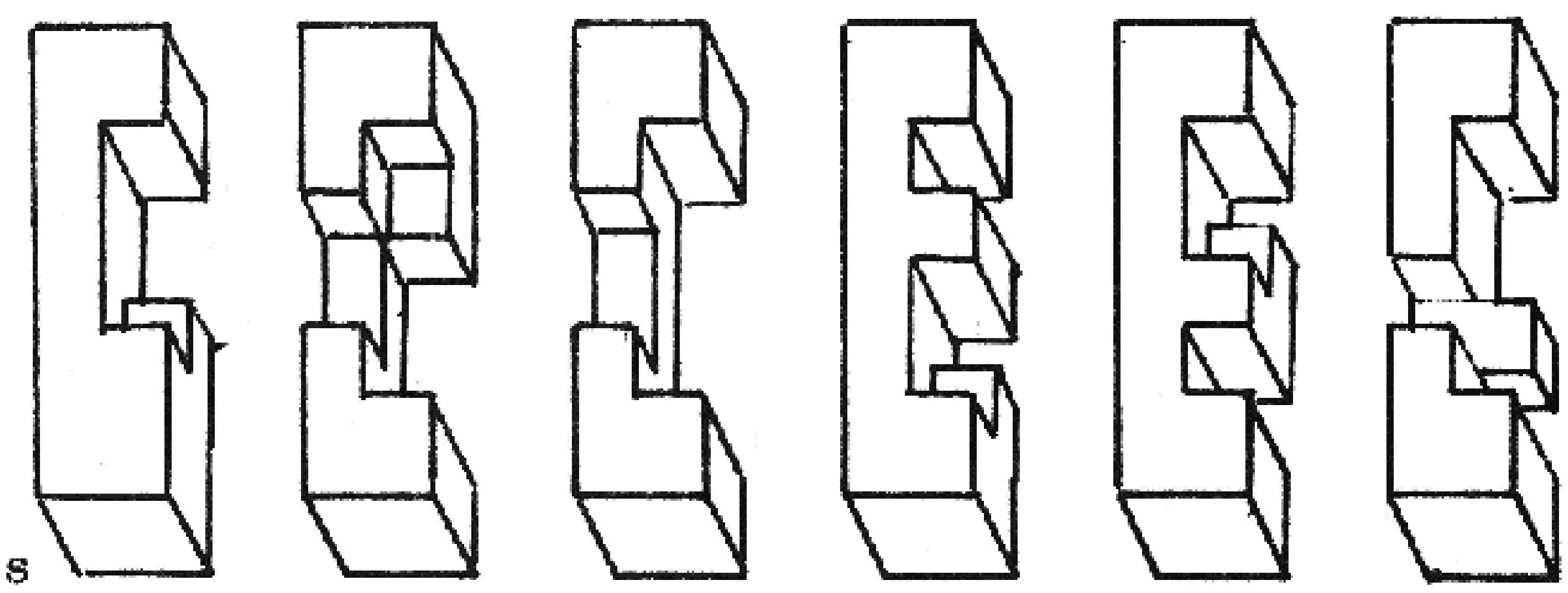
#40

Burr #1, Interrupted Slide



This is the first burr I designed. It has several interesting features. There are nine apparent solutions but only one way that it will go together, involving a complicated slide. If the end sections are shortened slightly to be one unit in length, there is a second solution which is quite perplexing, and totally unlike the first. Unfortunately, only one of the pieces is notchable, and it is fairly difficult to fabricate. There must be better ways of doing it.

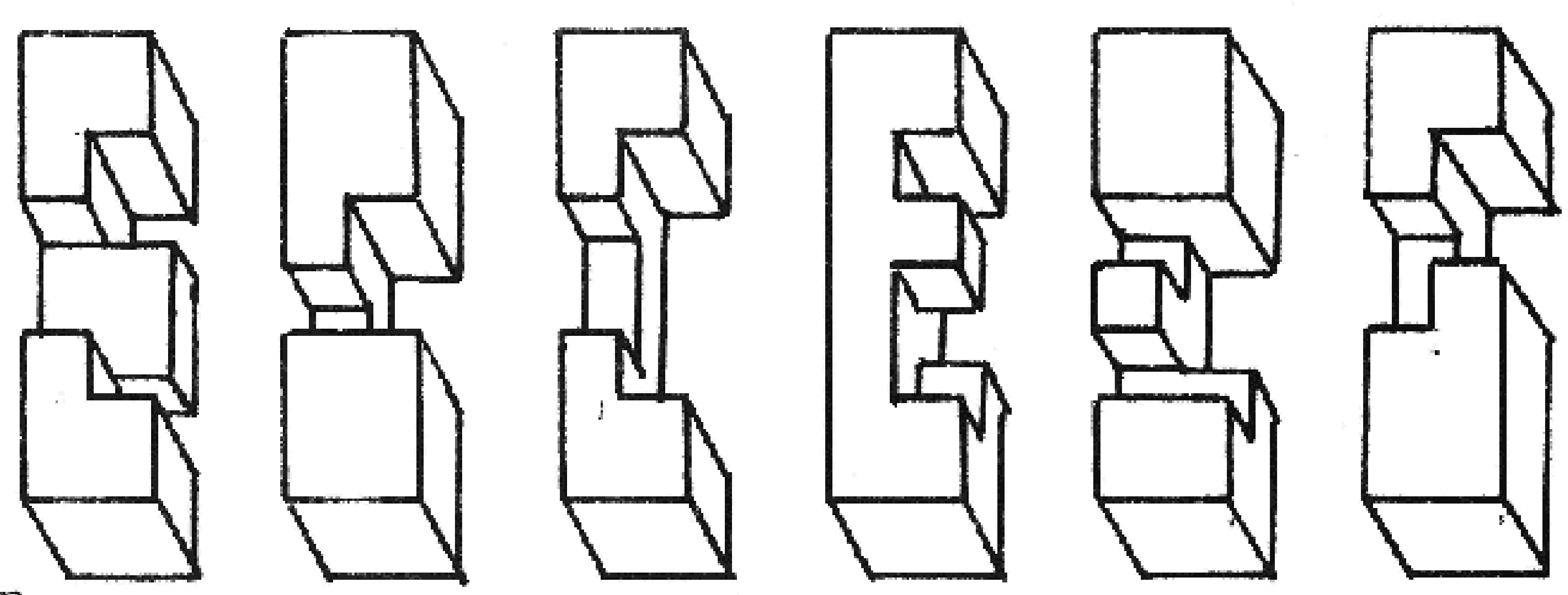
Burr #2, Triple Slide



This design has a most unusual sliding action to assemble. It has never been completely analysed, so other solutions may exist. Only two of the pieces are notchable. The piece on the right is an example of a piece which is notchable on a saw, but is not included in the set of 25 Notchable Pieces. A design which has the same sliding action, but with simpler pieces, would be a worthy contribution to the art of burr puzzle design.

36

Burr #3, Coffin's Improved



This is the one I have chosen for production in 1981. Two of the pieces are not notchable, but they are easily made from notchable ones by the addition of three cubic blocks glued on. For production, I find this easier and more precise than gouging out, but perhaps someone has a better way of doing it and could let me know. Incidentally, if you have my Set of 25 Notchable Pieces, you can make up a close approximation of this puzzle which behaves nearly the same way. This puzzle is probably less difficult than either of the two above. Surely someone can come up with an improved design for next year.

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773

Jan 1981

PUZZLE CLUB SHEET No. 1

The STAR OF DAVID Puzzle and Prospectus for Membership

The STAR OF DAVID Puzzle consists of six interlocking pieces which assemble different ways to form various geometrical figures having an axis of symmetry. This unusual characteristic was first explored a few years ago with the TRIUMPH Puzzle. In this new and much improved version, the pieces are all dissimilar, making it much more interesting. Also, movement is restricted by the uncooperative shape of three of the pieces to a single sliding axis instead of four - an axis which at times appears to go in the wrong direction. There are many puzzle designs which have as their theme the creation of order and harmony out of the apparent disarray of the constituent parts, but I do not know of any other in which symmetry emerges so surprisingly out of such utter chaos and confusion.

Observe that the assembled puzzle has the shape of a symmetrical column with Star of David cross section and end faces. The object of the puzzle is to first take it apart (easy if you press in exactly the right places, but impossible otherwise), and then determine how many other figures can also be assembled with this same type of symmetry. (While you are at it, you may if you wish list all the possible shapes, and numbers of solutions for each - I have not done so.)

For whatever help it may be, I will point out the following: Although the pieces may appear to differ from each other in a rather random and haphazard manner, they actually necessarily follow a very definite geometrical plan in every detail, and when you discover this plan, you will have practically solved the puzzle!, (or at least be well on your way.) Interestingly, every piece has to be exactly the shape that it is in order for this puzzle to function as it does, and it was no small task discovering this unique design.

By purchasing this puzzle, you have introduced yourself to our new Puzzle Club. Here is how it works: After you have mastered this puzzle (or given up), you are entitled to order the next in the series. With it, you will receive belated directions, of sorts, for the previous puzzle, and a notice for the next after that in the series. I would hope to produce new designs for this series at the rate of about four per year, until I run out of ideas. If any particular one sounds like it would not appeal to you, or the price is too high, you may skip it and still remain listed, provided you write and let me know you still wish to receive future notices. Unless you request otherwise, your name and address will be printed in the Club roster.

Next puzzle (around April 1981): Three-Piece Block Puzzle - fairly difficult, surprisingly. $15.00 plus shipping.

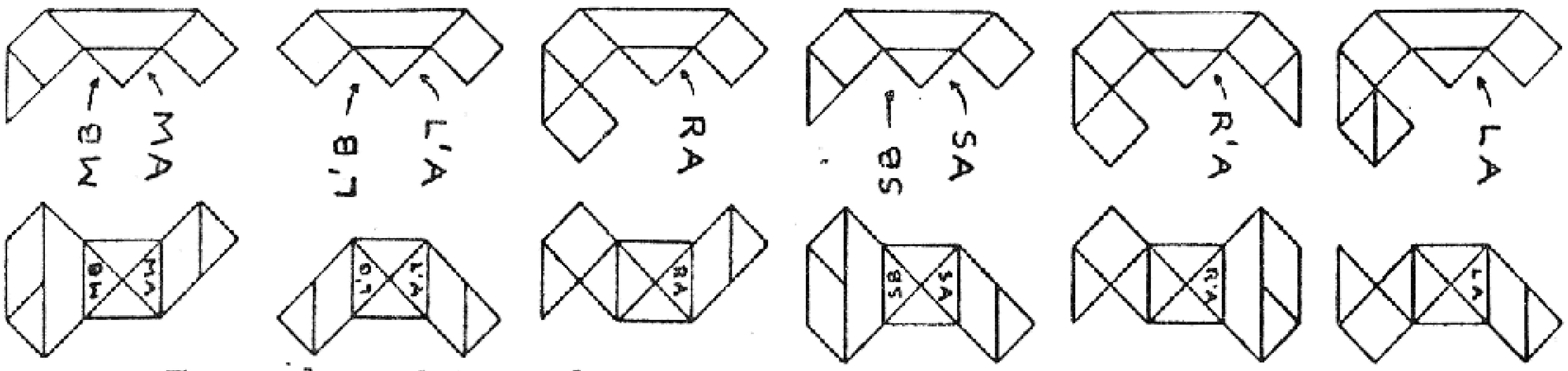
When you order, please include a note telling me if you want puzzles that are harder, easier, more expensive or less, and any other suggestions you might have. Also, how long did it take you to solve the Star of David, and how would you rate its difficulty?

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Jan 1981

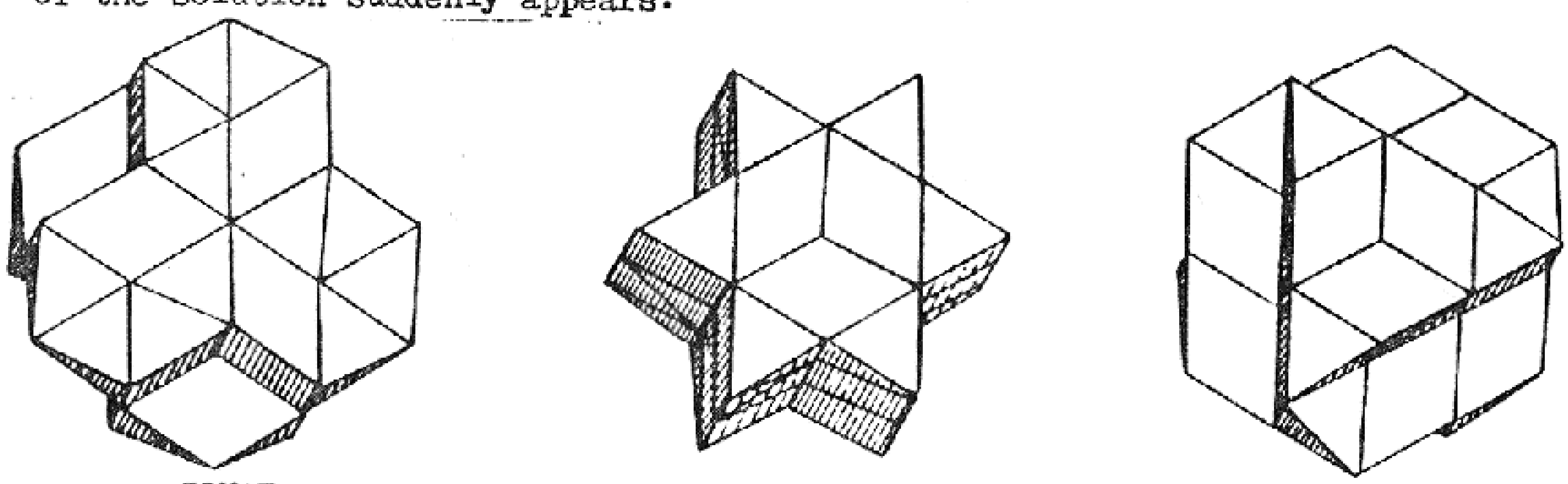
Instructions for the Star-of-David Puzzle, No. 37

In response to fervent requests, this instruction sheet has been prepared and published "post hoc" for those who received this baffling puzzle years ago and could never solve it or who never even dared try. It applies only to the original 1981 version in solid mahogany and not to the improved 1989 multicolored version.

Disassemble the puzzle and mark the pieces as shown below. (Some may already be marked.)

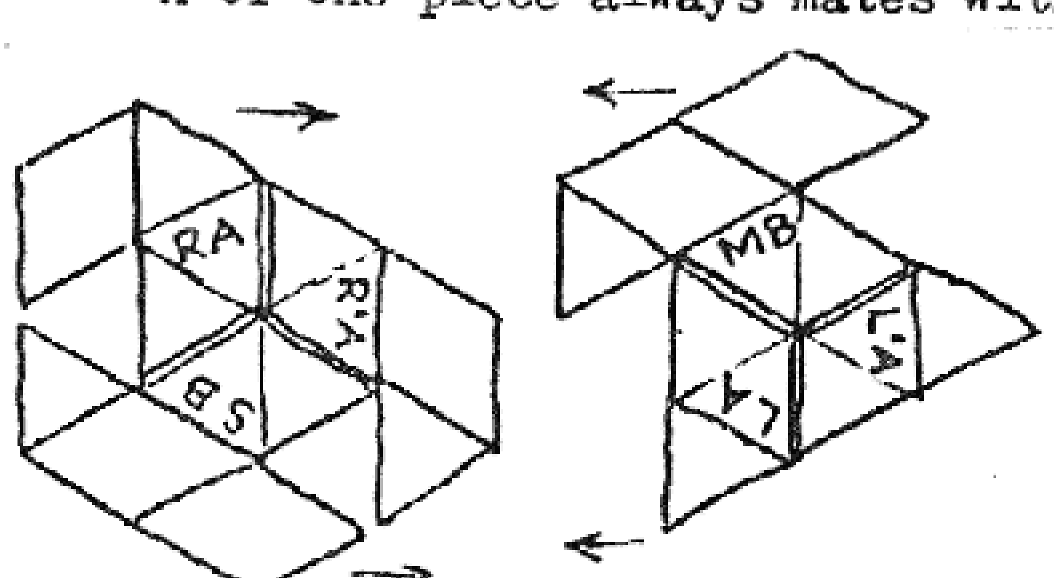


The puzzle can be assembled to form any one of the three axially symmetrical shapes shown below. (The puzzle also assembles into a solution with bilateral symmetry, not realized when the puzzle was first published.) All solutions are assembled by mating two halves of three pieces each. Many of the axes of assembly are diagonal, so that even as the two halves are being mated it still looks like a random jumble of protrusions. Then, as the two halves mate, the beautiful symmetry of the solution suddenly appears.

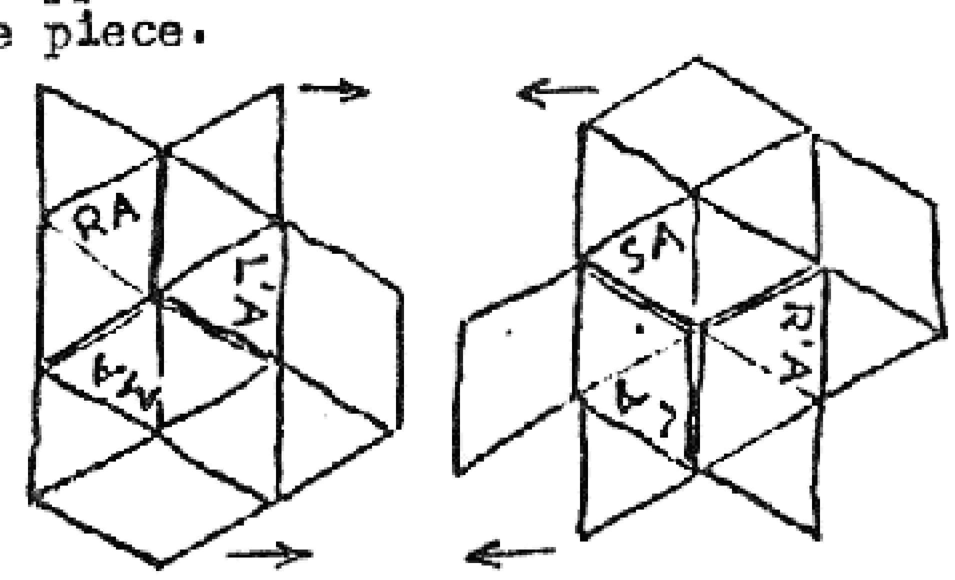


SQUAT STAR SPIRAL

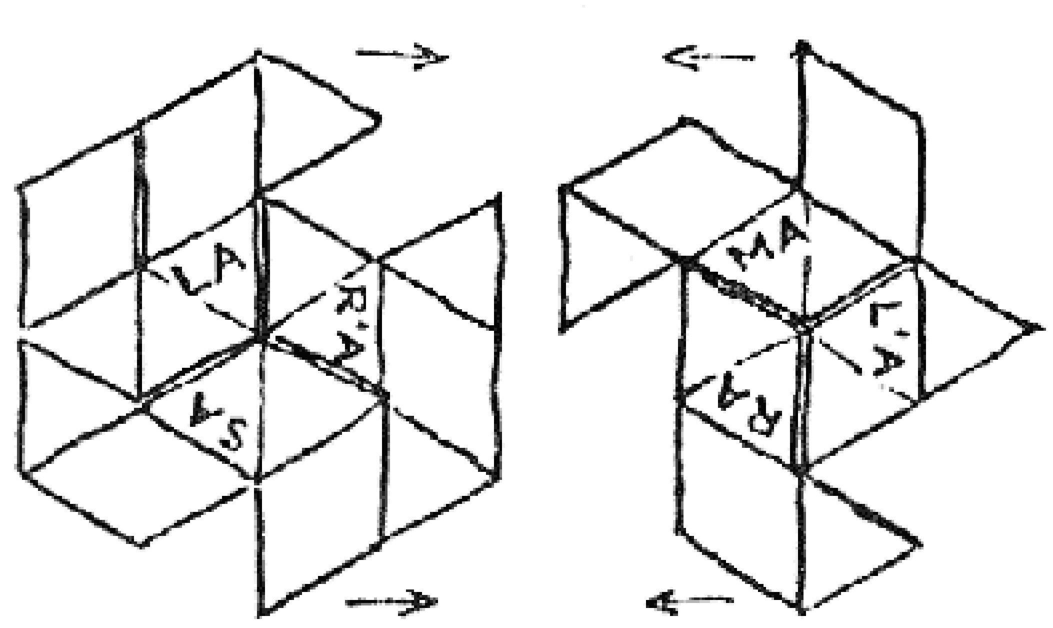
The SQUAT and the STAR each have two solutions, and the SPIRAL has four solutions. One solution for each of these is shown below, and the others are left for you to discover. Note that in the assembled puzzle, the pieces are arranged in opposite pairs, with M always opposite S, L opposite R, and L' opposite R'. Furthermore, end A of one piece always mates with end B of its opposite piece.



SQUAT

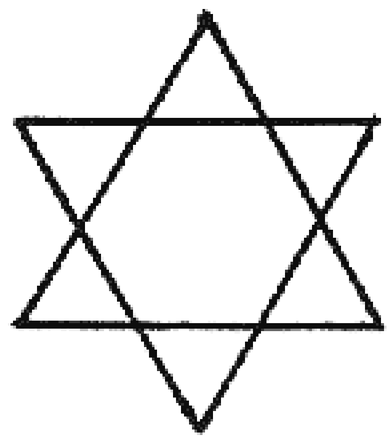


SPIRAL



STAR

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 April 1990



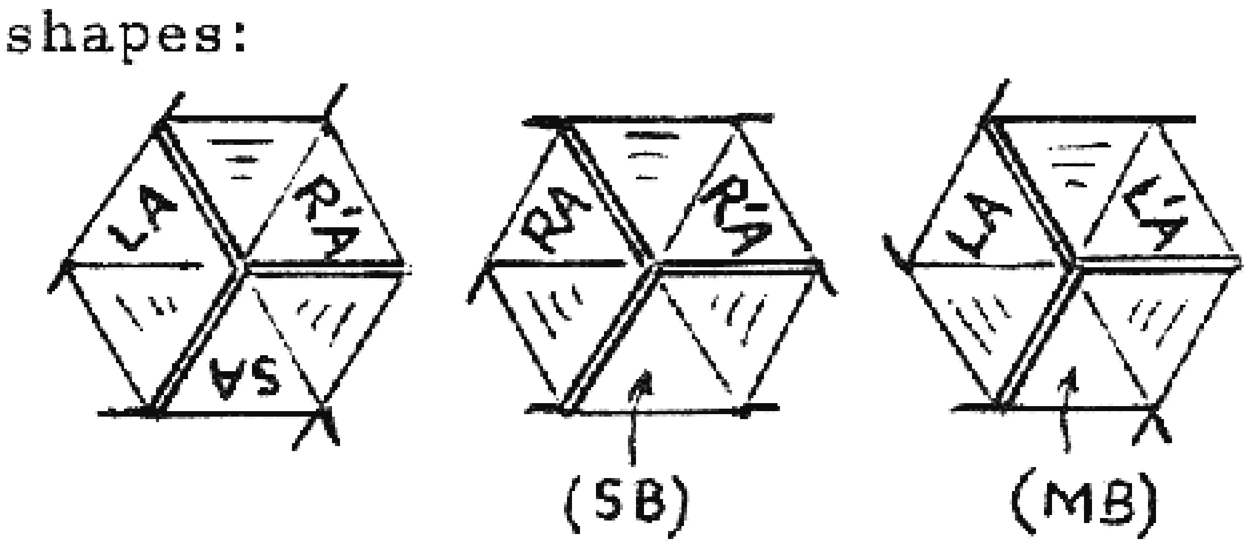
PUZZLE CLUB SHEET No. 2

This sheet is being sent to the forty or so members who have thus far purchased the Star of David Puzzle. #37

Your first assignment was to report how many symmetrical solutions you could discover for that puzzle. Of the nine of you who responded, only about half appear to have discovered the other two possible shapes, and those largely by accident. Credit for the most satisfactory answer goes to David Bruce, who reported making a systematic study of the various possible combinations.

All of the three possible symmetrical shapes are assembled by mating two halves of three pieces each. In addition to the Star of David, there is what I call the "squat" shape and the "spiral" shape. The various solutions can also be classified according to whether the two halves separate along the axis of symmetry (axial), or not along the axis of symmetry (diagonal). The Star of David solution is diagonal, the "squat" solution is axial, and the "spiral" has both a diagonal and an axial solution; so one could say there are four solutions. Finally, each of these can be assembled two slightly different ways, by interchanging the primed and unprimed pieces, thus making a total of eight distinct solutions.

The principle of this design, which evidently no one discovered, is that the pieces should always be arranged in particular opposite pairs, which are: L opposite R, L' opposite R', and M opposite S. Furthermore, one end of each piece is marked A (call the other unmarked end B), and end A mates with end B in opposite pairs. The two halves for any solution can be labeled "clockwise" and "counterclockwise," the meaning of which should become obvious as you study them. Shown schematically below are three different clockwise halves, which when mated as explained above with their corresponding counterclockwise halves, will produce the three different symmetrical shapes:



In response to my questionnaire, no one objected to the present price range ($15-$35) so that is the way we will continue. I will say, however, that it is nearly impossible to come up with new and interesting designs, hand crafted of fine wood, at the lower end of this range, our Puzzle No. 2 being a rare exception. As for the question of difficulty, evidently many of you found the Star of David quite confusing, and some of you indicated you would prefer easier puzzles, so "friends can enjoy them," or "children can do them." Well, the idea of this series was that it was to be primarily for the serious puzzler, and I don't wish to depart from that, so be prepared for more difficult puzzles in the future.

#38

The next puzzle in this series, the Three-Piece Block Puzzle, is now available - price $15.00 plus shipping. It assembles into a symmetrical shape, and since it is fairly simple, no further hints are given at this time.

Because of a large backlog of puzzle orders, plus the fact that I am still working on Puzzle Craft booklet #3, do not expect the next puzzle in this series to be ready for several months, at which time a notice will be mailed out.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 May 1981

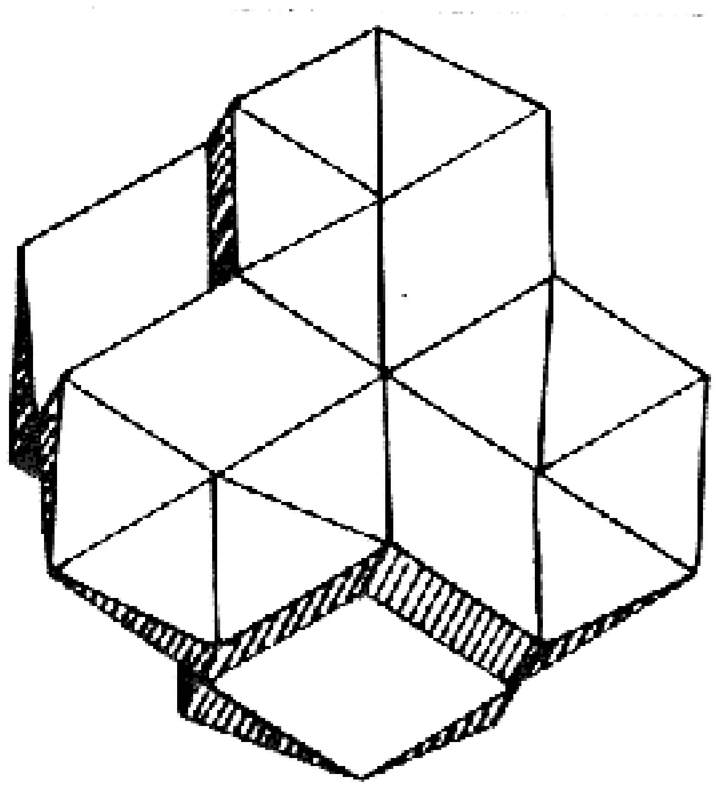
The STAR-OF-DAVID Puzzle (improved version) #37-A

These instructions apply only to the improved (1990) version of the Star-of-David Puzzle, and not to the original (1981-1983) edition. When assembled, it can be distinguished from the original version by its two contrasting woods, whereas all of the original version were in solid mahogany. The assembled solution shapes are the same for both, but the new version has pieces of simpler design that are marked differently. But believe it or not, this version is even more confusing to solve than the original version. By popular request, this version comes with explicit assembly directions (see other ~~side~~ sheet).

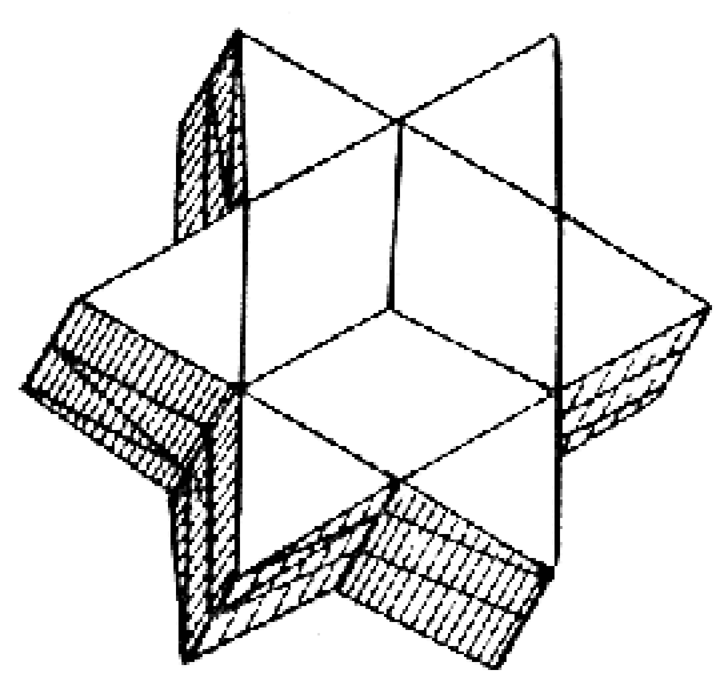
The first object, if the puzzle is assembled, is to disassemble it. This may require some random pushing and pulling in various directions to separate the two halves, since most solutions do not separate along the axis of symmetry as might be expected.

This puzzle has the most unusual property that its six interlocking pieces can be assembled into four different symmetrical shapes. Three of these intriguing polyhedral solids have a threefold axis of symmetry and are shown below. The fourth shape, not shown, has bilateral symmetry plus a twofold axis. The STAR and SQUAT have only one solution each, with a confusing diagonal axis of assembly. The SPIRAL has two solutions, one assembled axially and one diagonally. The BILATERAL shape has six solutions. There are also many ways the pieces go together to form interesting but nondescript shapes, as you will discover.

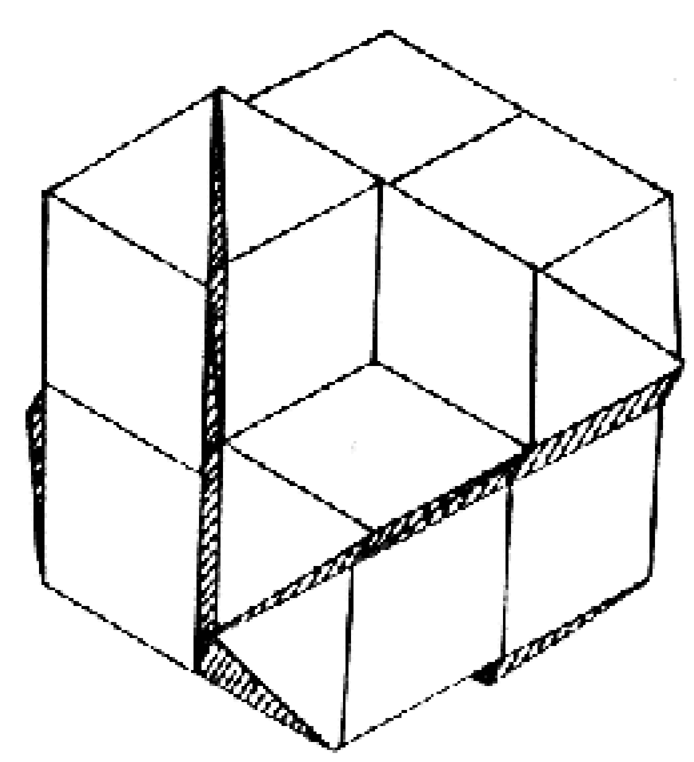
Another fascinating property of this version is that the pieces are bicolored in such a way that each symmetrical solution will also create a pattern of color symmetry, which serves to further accentuate the geometrical symmetries of these intriguing polyhedral shapes.



SQUAT



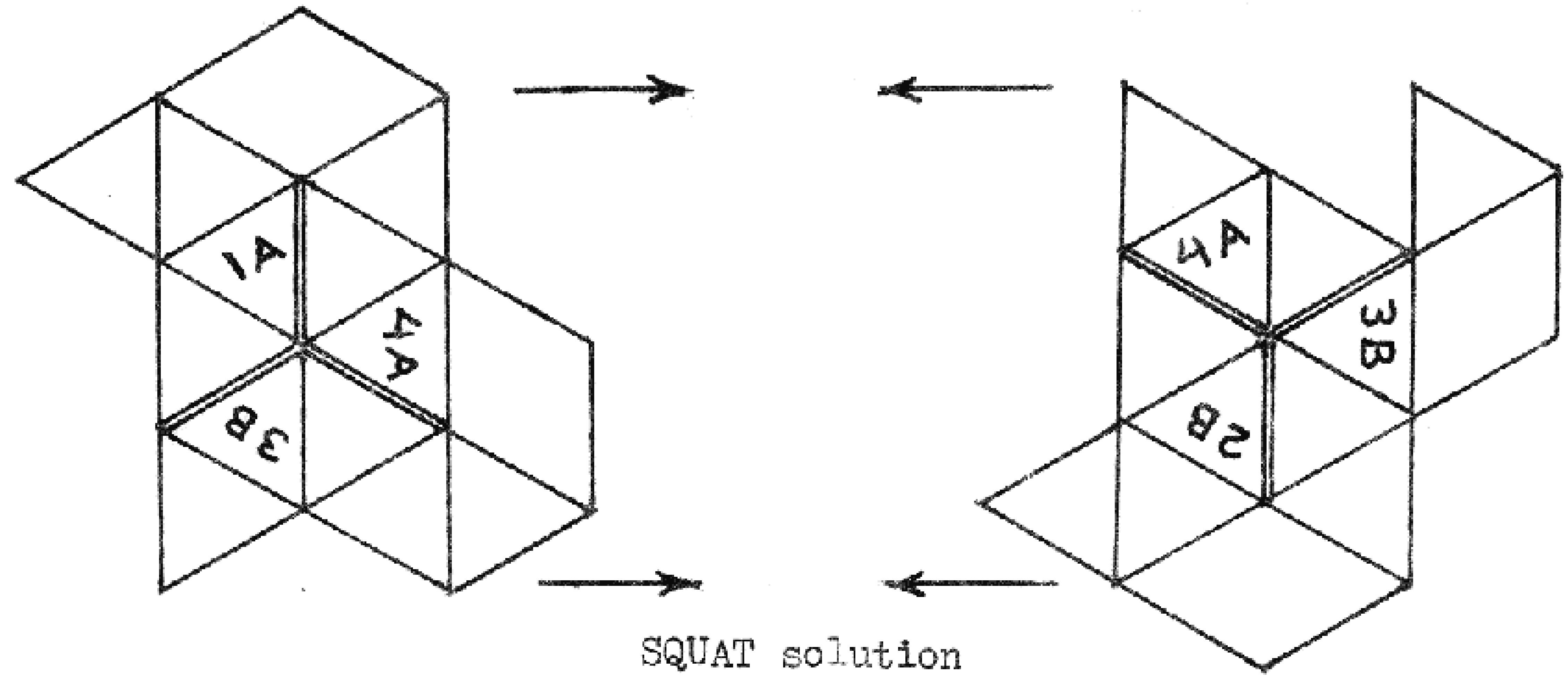
STAR



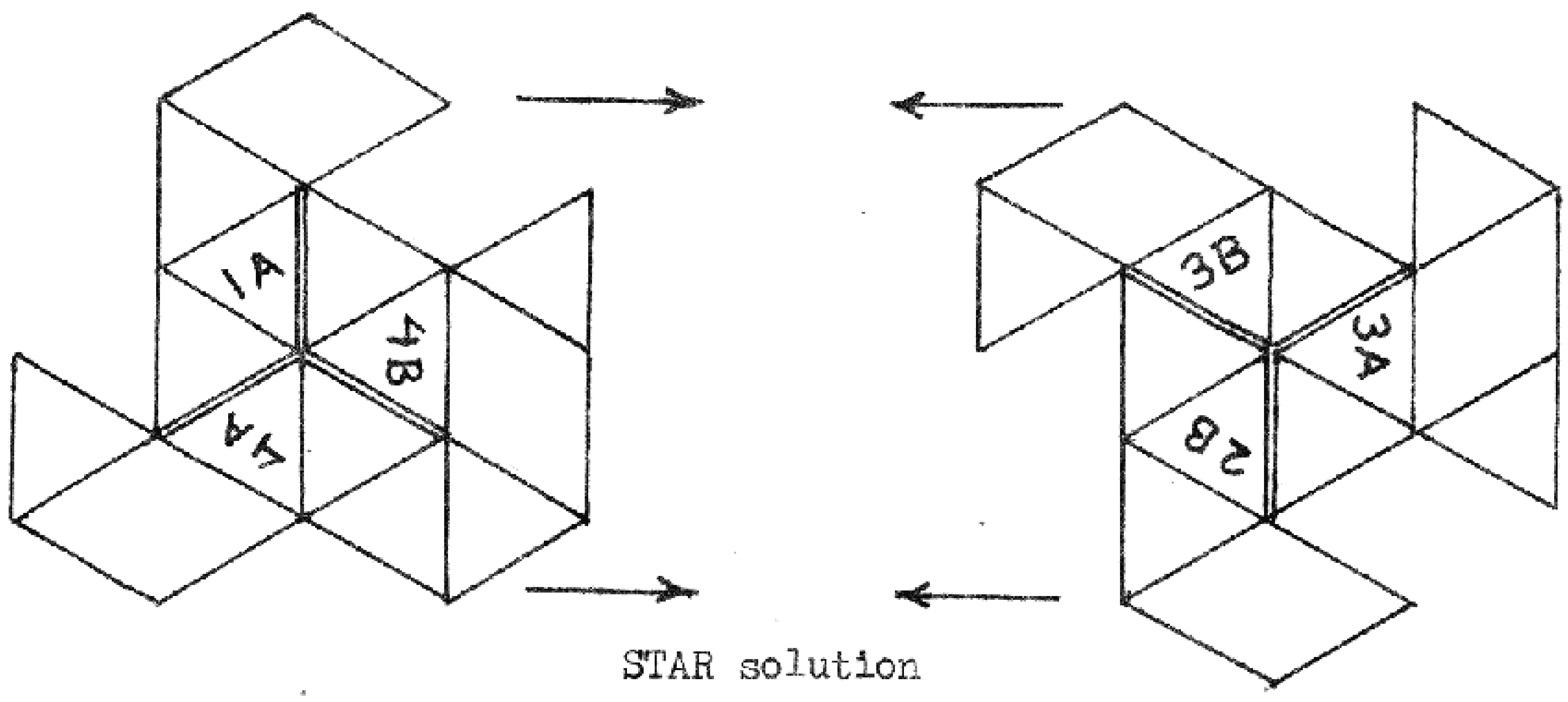
SPIRAL

The SQUAT and STAR solutions appear essentially the same shape top and bottom. The bizarre SPIRAL shape appears as its mirror image from the opposite side. In all cases, the colors are reversed top and bottom.

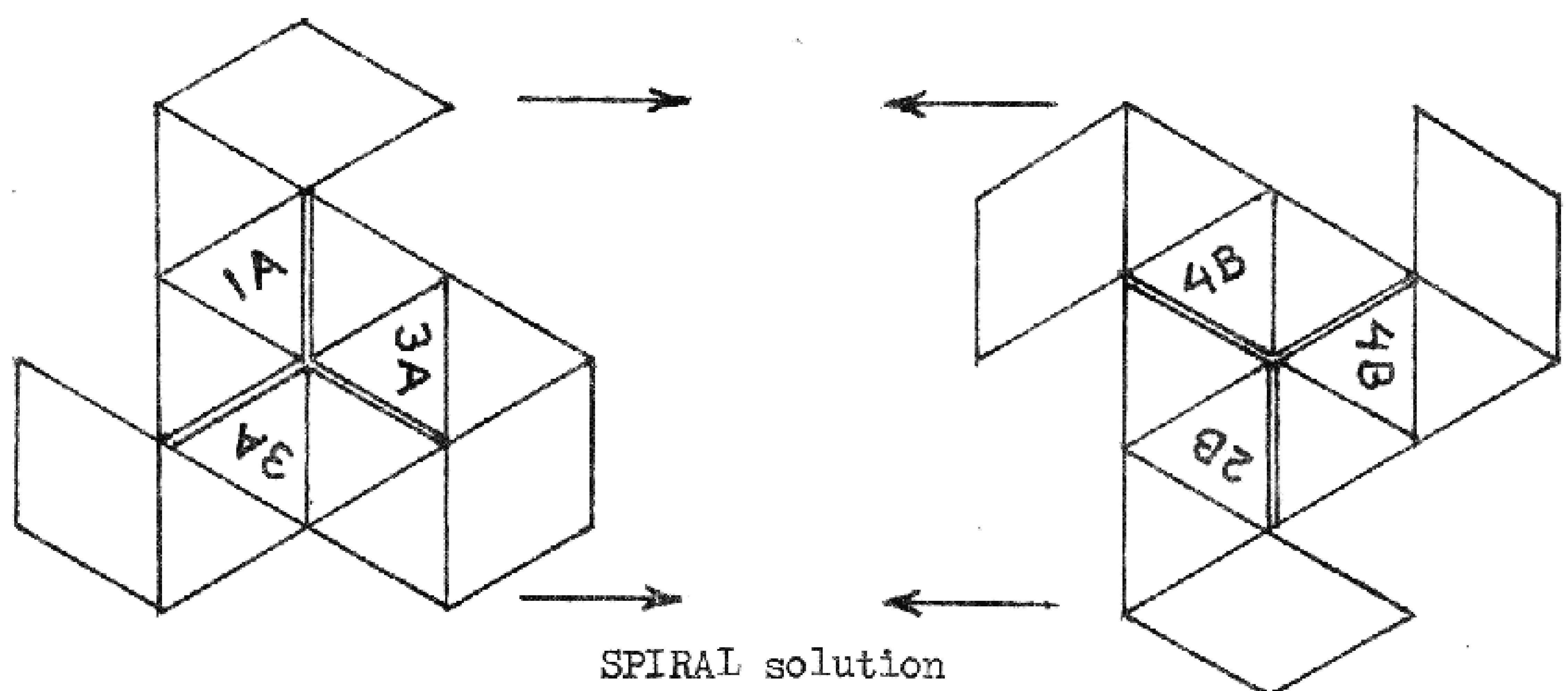
Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Feb 1990



SQUAT solution



STAR solution



SPIRAL solution
with axial assembly

The six puzzle pieces are identified by the numbers 1, 2, 3, and 4. There are two each of pieces 3 and 4. The two ends of each are marked A and B. All solutions are made by first assembling two halves of three pieces each according to the diagrams above, and then mating the two halves.

For additional recreation, try to discover the other SPIRAL solution and one or more of the BILATERAL solutions. See if you can figure out the strange principles of mechanics and symmetry upon which this design is based that make these amazing transformations possible. Find the simplest way to shift from one solution to another.

37-A, Feb 1990

#39

Puzzle Club Sheet No. 3A - General Instructions for Rosebud Puzzle

Some of you have indicated a preference for puzzles that are difficult and unusual. This one should satisfy you on both counts. It is one of the most bizarre geometric configurations I have discovered. I stumbled upon it a couple years ago. One reason I did not bring it out sooner was that I wasn't quite sure of the best way to present it. Some of you do not like to receive puzzles disassembled and without instructions, but then there are others of you who prefer them that way, so here it is.

Instructions (please follow carefully):

Examine the pieces and note that there are three identical pieces which we shall arbitrarily refer to as "left-handed" pieces, and three right-handed pieces likewise identical except that one of them has a slightly tapered hole with a pin stuck into it.

First, try assembling the six pieces into an interlocking configuration, and you will discover two such configurations, neither one very interesting.

Next, remove the pin and set it aside. Assemble the six pieces into an interlocking configuration different from the two above, and you will have discovered the intriguing pinwheel solution.

Finally, with the pin still removed, assemble the six pieces into a fourth solution different from any of the three above. After the puzzle is thus assembled, put the pin back in the hole. If you do not follow the directions exactly and do not discover this fourth solution, you have missed the whole object of the puzzle, for this is the Rosebud solution. Place three fingers of each hand in exactly the right places and make the rosebud bloom! (Now you will discover why the pin is there.) Shift the fingers slightly, and it returns to the bud! (Those of you with the rosewood-tulipwood version, note the symmetrical patterns of the grain on the tulipwood - can you see how this was achieved?)

Note:

Practically no force is required to assemble this puzzle in any of the four solutions. This advice, which applies to practically all puzzles of this sort, has not been mentioned in these sheets for quite a while, so perhaps it is worth repeating here. The cherry version of this puzzle is very strong and can probably take almost any abuse. The rosewood-tulipwood version is somewhat less strong. If you do pop a glue joint, great care must be taken in regluing it, as there is very little margin for error in the dimensions of this puzzle.

#40 Puzzle No. 4 - Advance Notice:

In accordance with our plan of alternating simple and difficult puzzles, the next puzzle to be issued in this series will be the Interrupted Slide six-piece burr puzzle. It will not be available in exotic woods, but I will try to use some uncommon wood you do not already have. The price will be $15.00 postpaid. You may place an order for it now if you wish, but it will not be available until around mid-1982. If you have not ordered it by then, you will receive a postcard reminder.

When ordering, please report on your success or lack thereof with the Rosebud puzzle, and indicate if you wish to receive detailed assembly directions for it, which by that time will have been printed.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln MA 01773 March 1982

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

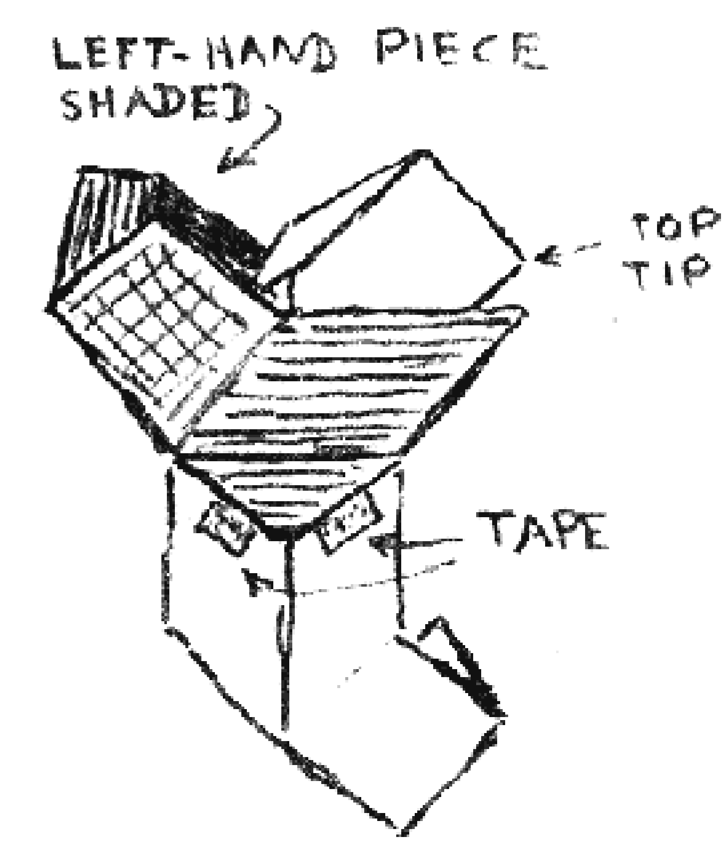
39

Instructions for Rosebud Puzzle

Examine the six individual puzzle pieces and note that there are three identical pieces which we shall arbitrarily refer to as "left-handed" pieces, and three right-handed pieces likewise identical except that one of them has a tapered hole with a pin stuck into it.

To assemble the pinwheel solution, first remove the pin and set it aside. Sub-assemble the three left-handed pieces into one sub-assembly, and the three right-handed pieces into another, and mate the two halves. The resulting solution has an axis of symmetry.

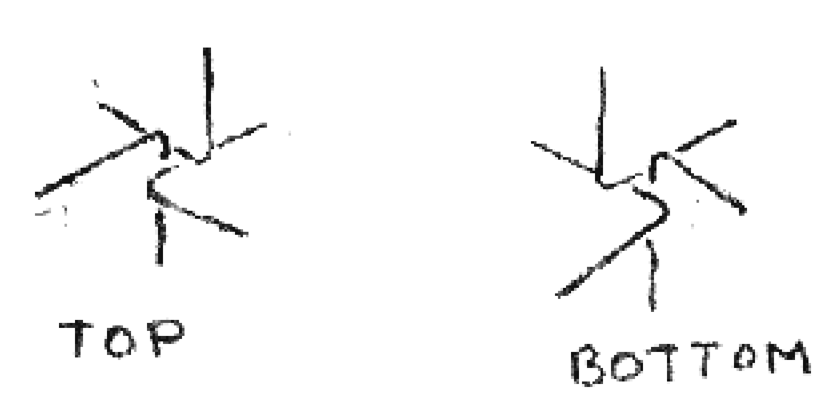
The other symmetrical solution, known as the Rosebud solution, requires the simultaneous manipulation of all six pieces. It is mentioned on page 20 of Puzzle Craft II, and is illustrated on the cover (lefthand column, fourth down). One possible way to assemble it is to put the pieces in place one-by-one, alternately right- and left-handed, and expanding it almost to the point of collapse to very carefully work the sixth piece into position. With the earlier models I made this was difficult enough, and with the more precisely fitting ones I am making now this is very difficult. A somewhat easier way is to first sub-assemble three identical right-left pairs in the expanded position using masking tape, and then bring them simultaneously together so that the tips just barely engage. Once they are properly engaged, the tape is removed and the puzzle is compressed together. At this point, the pin is inserted back in the hole, which prevents the puzzle from coming apart. Now you can play with it and discover the proper grasp with three fingers of each hand which will make it expand, and by shifting your grasp by 60 degrees, contract again.



Instructions for Use of Assembly Jig #39-A

Each puzzle is assembled and disassembled several times during fabrication. After this puzzle went into production, it soon became obvious that I needed a faster way to assemble it than the masking tape method, especially with the tighter fitting ones, so I devised an assembly jig. Some of you asked if you could obtain one, so I am now making it available ($10 plus shipping).

Assembly of the Rosebud solution using this jig is very simple. First, the Rosewood (or cherry) end of a right-handed piece is placed in cavity no. 1. Next, the Tulipwood (or mulberry) end of a left-handed piece in cavity no. 2. Continue likewise until all six pieces are in place. Adjust them slightly if necessary until the three pointed ends of the top Tulipwood (or mulberry) blocks mutually engage each other as shown, and the bottom ones do likewise in the mirror image of this configuration. Remove the jig and compress together.



S.T.C.
May 1983

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

<Deleted> ,

This is something new - just made.

It is a jig for assembling Rosebud puzzle.

Can you figure out how it works?

Haven't written instructions yet, but will send when done. It makes it ever so easy.

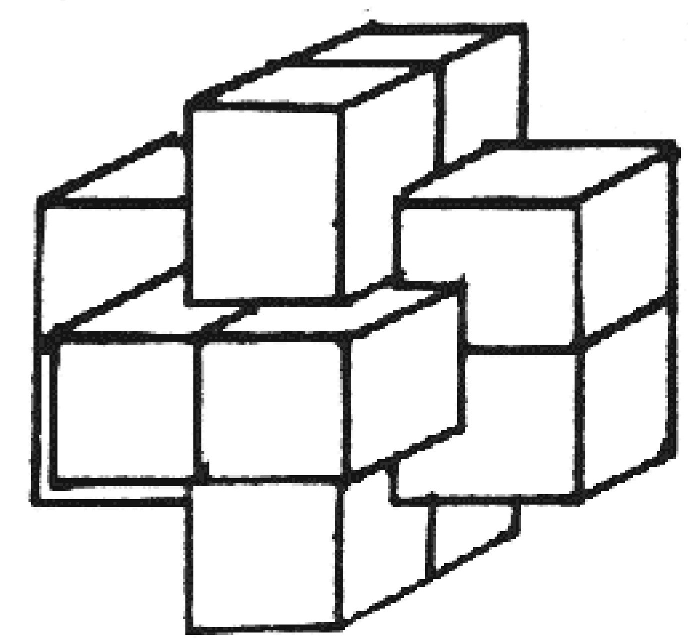
S. T. C.

This is the first one I have made — except for one I use myself.

39A

#40

Puzzle Club Puzzle No. 4 - The INTERRUPTED SLIDE



The INTERRUPTED SLIDE is a conventional six-piece burr with unnotchable pieces and internal voids. It is supplied to you unassembled, and your assignment is to find at least two totally different solutions, and tell me if any others exist. I expect that most of you will report solving it without any great difficulty; however, if this is not the case, I may drop a few hints in future bulletins.

I designed this burr around one particular interesting solution. I am in debt to Bill Cutler for showing me the second solution, from which the name of the puzzle is derived, together with a complete analysis of it. For further information on this type of puzzle, refer to my three pages of general instructions which you already have.

Earlier in this business, when my forte was making puzzles of exotic and colorful woods, I made the disconcerting discovery that many owners of them were using them as display objects and never taking them apart. I suspect that part of the reason for this was that they were then being sold over the counter at gift shop, and probably ending up in the hands of a third party. I trust that none of the seventy of you whom I presently list as Puzzle Club members would purchase one of these just to look at, but to make doubly sure, they are now all being sent to you <u>unassembled</u>, and will probably continue that way in the future.

Back about ten years ago, I was fortunate to have acquired a good supply of exotic woods for my puzzle work, some of which I still have and am now trying to use up. I had promised you an unusual wood in this puzzle, partly to make up for any possible disappointment you might have had in receiving this admittedly rather mundane and ordinary design. This puzzle is being made of Golden Bilinga, while my supply lasts. I have only one board of it - enough for 28 puzzles. It comes from Africa, and I obtained it from a wood collector in Louisiana. I have never run across it or heard of it any place else.

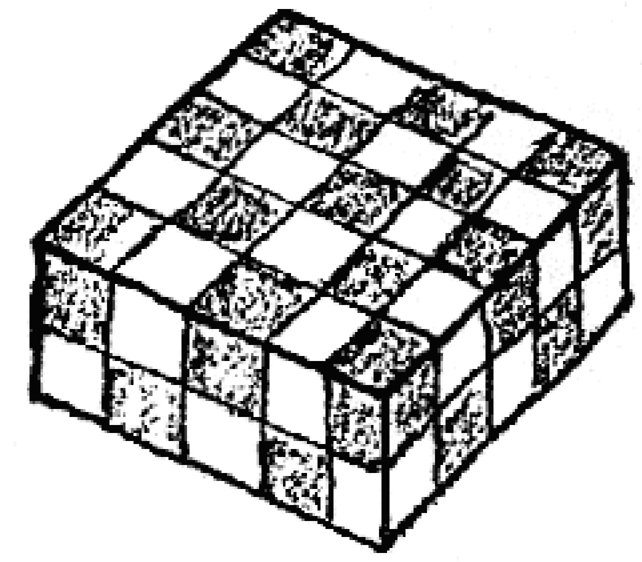
Progress Report:

1. Star-of-David Puzzle. No one solved this to my complete satisfaction. Three of you submitted what you said were exhaustive listings of all possible combinations - however, the instructions called only for <u>symmetrical</u> solutions.
2. Three-Piece Block Puzzle. Only one person has submitted a drawing showing how he assembled the pieces into the triangular pyramidal solution - Woodrow Carpenter.
3. Rosebud Puzzle. A couple of you have reported solving it, but so far, no one has told me <u>how</u> they did it. Here are some hints: The Rosebud solution is illustrated on the cover of Puzzle Craft. The puzzle is mentioned on page 20 of Puzzle Craft II as being of the "coordinate motion" type. The Rosebud solution requires the coordinate manipulation of all six pieces. If you assemble the pieces one by one, alternately right- and left-handed, in the correct way, you can assemble all but the last piece. It is then possible to very carefully expand the whole assembly and insert the sixth piece. A much easier way is to tape the pieces together in pairs - right and left - in the expanded position, and then carefully engage the pointed ends (takes practice). Will print up more explicit directions in the future if requested. No one has yet told me the purpose of the pin and hole. They are <u>not</u> there to make the puzzle harder - quite the contrary.

Don't expect a notice of the next puzzle in this series until next winter at the earliest. I am now involved in a new enterprise which has nothing to do with puzzles.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln MA 01773 July 1982

Instructions for the Unhappy Childhood Puzzle



Begin by noting the 2x5x5 checkered solution in which the puzzle arrives. Then dump the pieces out of the box and scramble them.

Before explaining the puzzle, perhaps you would like to know how come the name. I find that coming up with good names for new puzzles is the hardest part of the game, so I am always on the lookout for names. Sometimes I even reverse the process and try to design a puzzle around a name (doesn't work very well). Anyhow, at our first craft show, which was at our local DeCordova Museum in 1970, a man who had spent quite a long time at our booth staring at my large display of new and unusual polyhedral puzzle designs finally looked up at me and asked whimsically: "Did you have an unhappy childhood?" So, we picked it up, and it was always my intention to use that as the name of some special puzzle design. (The irony was that most of those early models had identical pieces, and were actually much easier than they appeared to be.)

We discussed solid checkerboard puzzles in Puzzle Craft I, page 10. I suggested that the solid pentominoes might make an interesting checkerboard problem. Evidently not many of you thought so, because only one person responded - Kathy Jones of Kadon Enterprises, who found a way to make the three solids with one set of blocks. So here is a vastly improved puzzle designed along similar lines.

The ten puzzle pieces which make up this set represent all the "preferred" ways that five cubes may be joined, i.e. excluding those which are flat, those with an axis of symmetry, and those which fit inside a 2x2x2 cube. Assembling these ten pieces to form a 2x5x5 solid is a pleasant pastime, but scarcely challenging enough to justify the title. So, we turn to the checkerboard version, and call upon the amazing talents of Mike Beeler and his equally amazing computer. First, he found that disregarding the checkering, there are 19264 solutions to the 2x5x5. There are 126 different ways that the pieces might have been checkered. One of these has no solution. Of the remaining 125, there is one and only one way of checkering the pieces which results in one and only one perfectly checkered 2x5x5 solution, which is of course the one we have chosen. Thus this puzzle design is doubly unique. While puzzle discoveries such as this are admittedly of trivial significance in the overall affairs of mankind, it is interesting to contemplate the fact that they have awaited discovery since the beginning of time, and in the case of this one - application of computer techniques. What others await discovery?

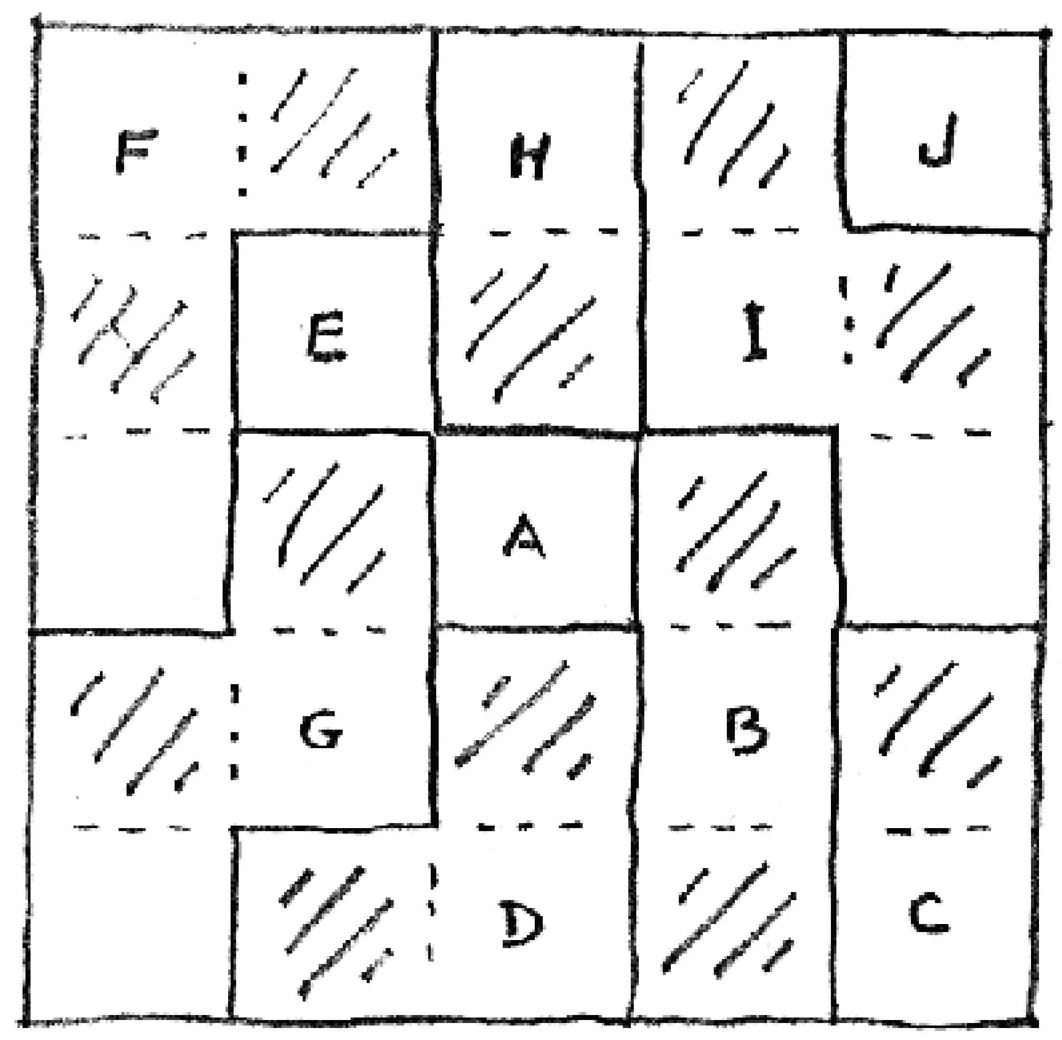
Summary of Problems	Number of Solutions
2x5x5 random color pattern	19264
2x3x5 checkered (fairly easy)	15
2x4x5 checkered (harder)	5
2x5x5 checkered (the Ultimate)	1

Note: In the smaller assemblies above, omit any pieces you wish. In the 2x4x5, if the two pieces having a plane of symmetry are omitted only one solution exists (hard).

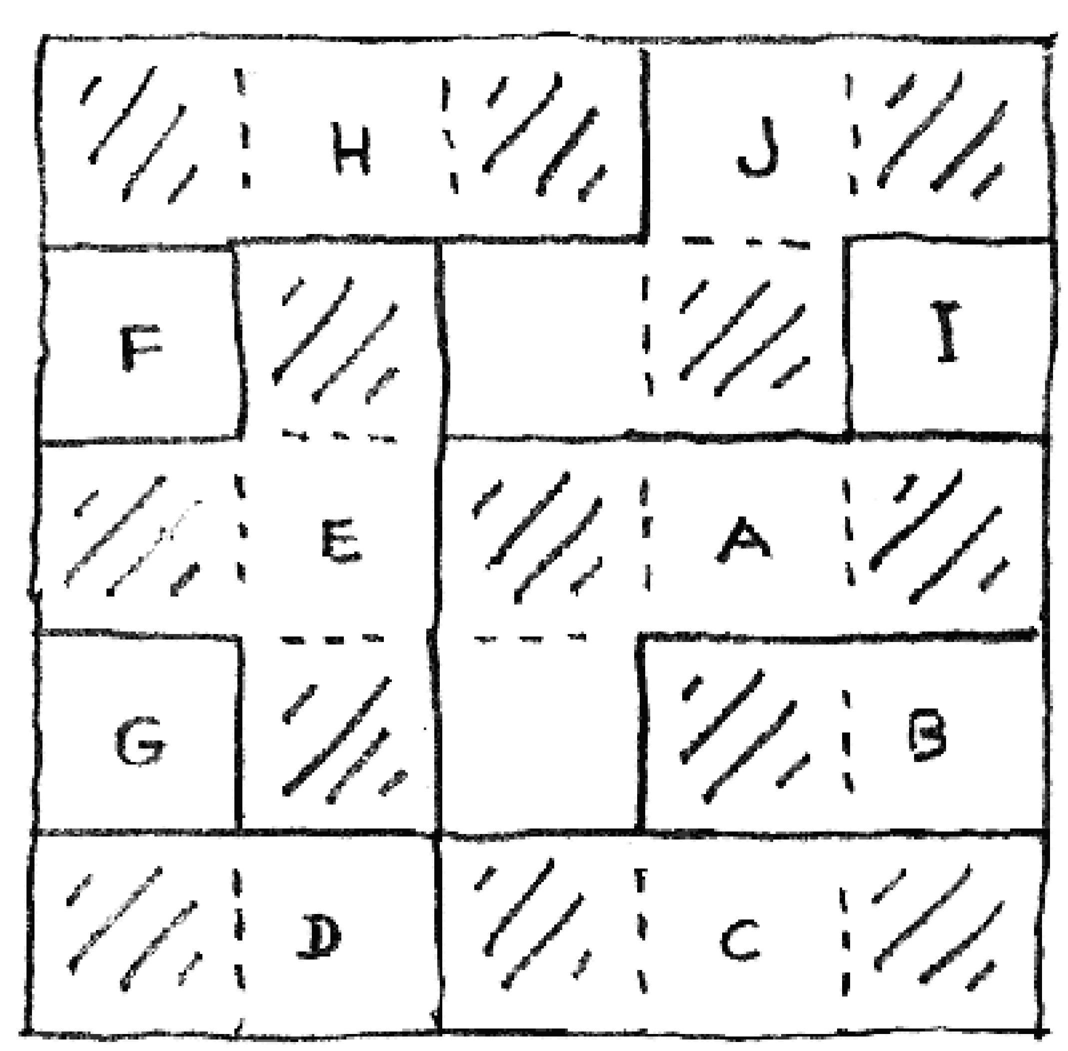
Stewart T. Coffin, 79 Old Sudbury Road, Lincoln MA 01773 March 1983

SOLUTION TO NO. 41, UNHAPPY CHILDHOOD

(UNIQUE)



TOP LAYER



BOTTOM LAYER

STC
DEC. 2000

STEWART T. COFFIN
Puzzles
OLD SUDBURY ROAD
LINCOLN, MASS. 01773

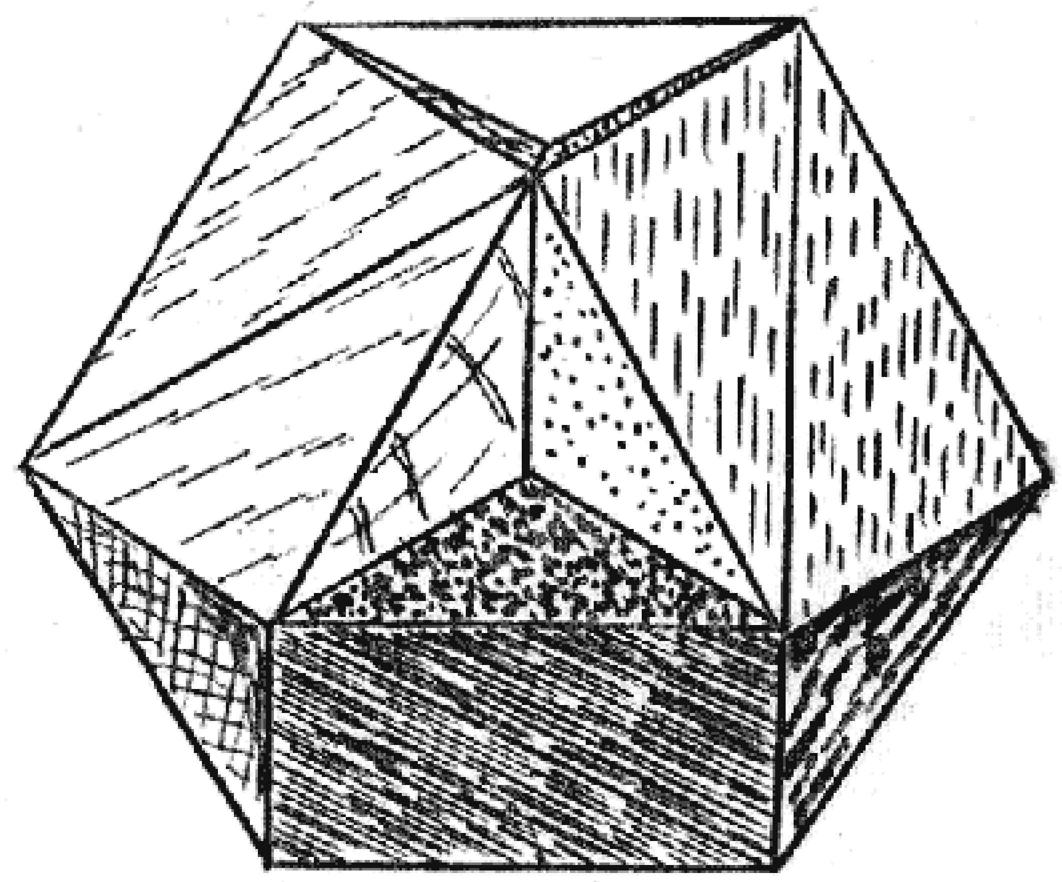
$5.00
(1971 price!)

#42

The

SEVEN WOODS

Puzzle

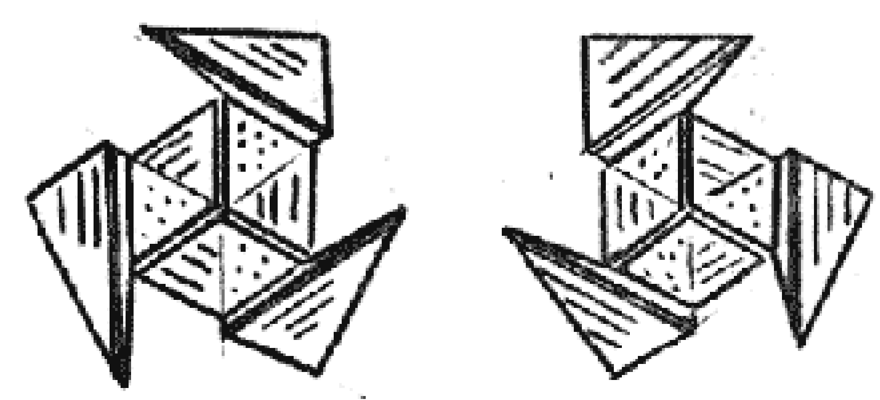


All handmade from selected hardwoods, natural oil finish.

Seven different cabinet woods are used in the construction of this intriguing solid geometrical puzzle. When assembled correctly, as shown above, only one kind of wood appears on each of the six faces. The center is a seventh kind. The accompanying instructions identify the seven woods used, with a brief description of each.

Disassembly Wiggle the puzzle gently until you discover the sliding motion which separates it into two halves. Because of the symmetry of the structure, this motion can take place along any one of four independent axes. Can you locate all of them? The two halves then come apart easily.

Assembly Opposite of disassembly procedure. Confusing? Form the two halves as shown: Hold one in each hand and mate them carefully together. If they do not mate easily it is because one or more of the pieces is not properly aligned.



The use of unrestrained force on this puzzle, as with many things, will generate only more stubborn resistance. With a little love and patience, it will go "clunk" together nicely.

After the assembly technique has been mastered, monkey with the arrangement of the pieces until each face of the puzzle is one solid kind of wood. Then figure out how to do this systematically, rather than a trial-and-error approach. How many different solutions of this sort are there?

Now assemble it such that no like woods touch each other (except for the center blocks). How many different solutions to this are there?

Learn to identify the different woods (numbers are marked inside):

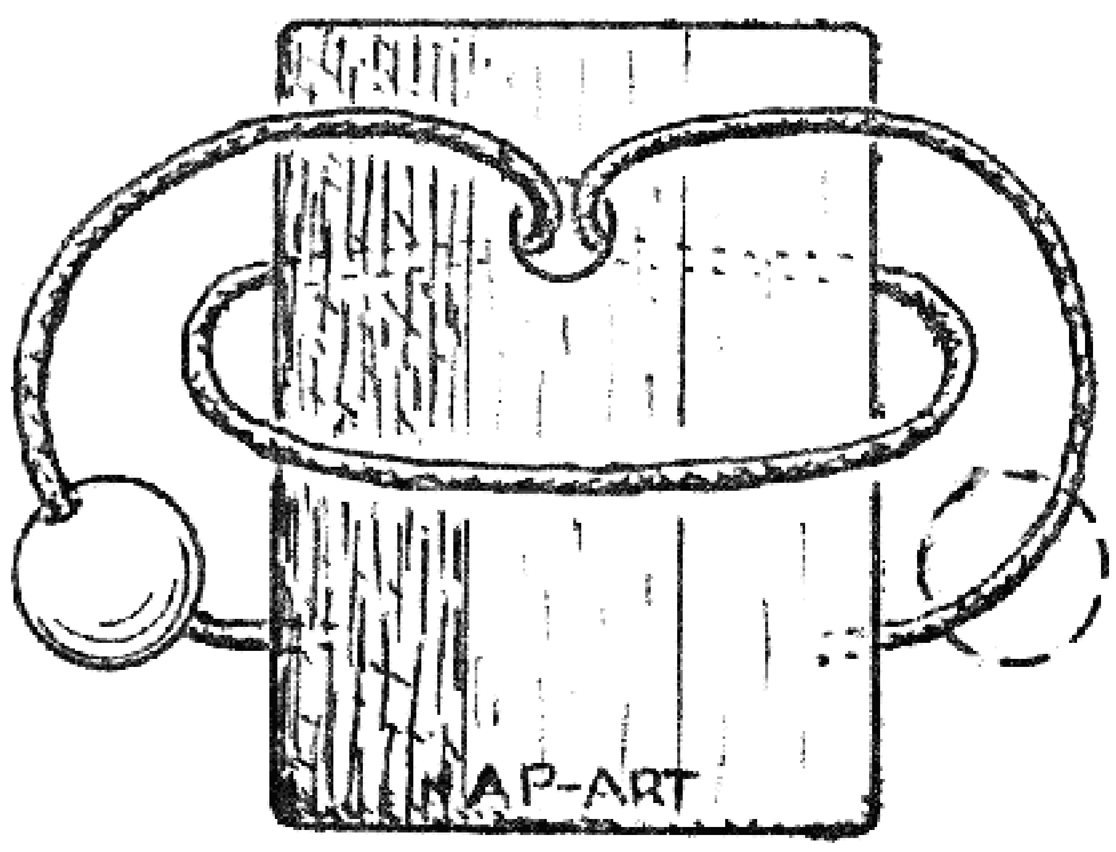
1. Basswood (whitewood, linden) - soft, very light colored, fine even grain, could be mistaken for white pine.
2. Sugar maple (hard maple, rock maple) - hard, strong, dense, fine grained, light colored, tiny reddish brown marks.
3. Black cherry (choke cherry, wild cherry) - hard, fine grained, reddish brown, can be polished easily.
4. Black walnut - dark, shiny chocolate brown, easily worked to a beautiful finish with most tools, used for gun stocks.
5. Oak - very hard, dense, coarse open grain, prominent rays, used for flooring, paneling, furniture, barrels.
6. Mahogany - uniform reddish brown with dark lines, easily worked to a beautiful lustrous finish, used in furniture and boats.
7. Birch - used for the center blocks, hard, fine grain, streaked light to medium reddish brown.

(reprint for Puzzle Craft, 1984)

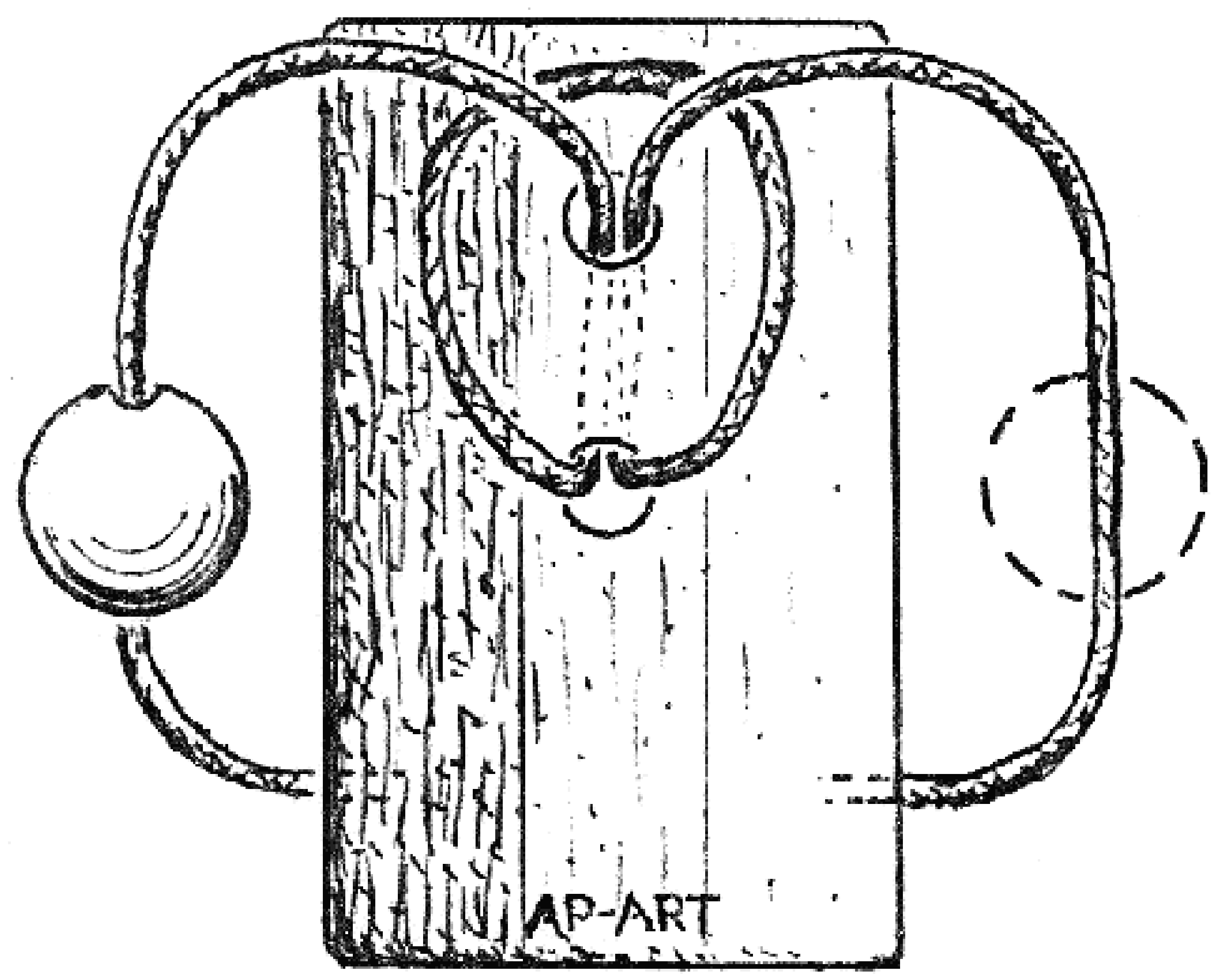
#43 and #44, The SLEEPER-STOPPER and SUPER SLEEPER-STOPPER Puzzles

The SLEEPER-STOPPER and SUPER SLEEPER-STOPPER puzzles each consist of a multi-colored block of wood with holes, a stout cord, and spherical slider. First, lay the puzzle out neatly as illustrated below, and note that the left side of the block is dark, and the right side is light. The object of the puzzle is to slip the slider along the cord from the left-hand loop to the right-hand loop (or vice versa).

These two designs may be recognized as variations of a classic topological puzzle. There are no hidden tricks. The knot in the cord is glued permanently inside the bottom hole. All that is required to solve them is fairly complicated and deliberate manipulation of the slider and cord in one particular way.



SLEEPER-STOPPER

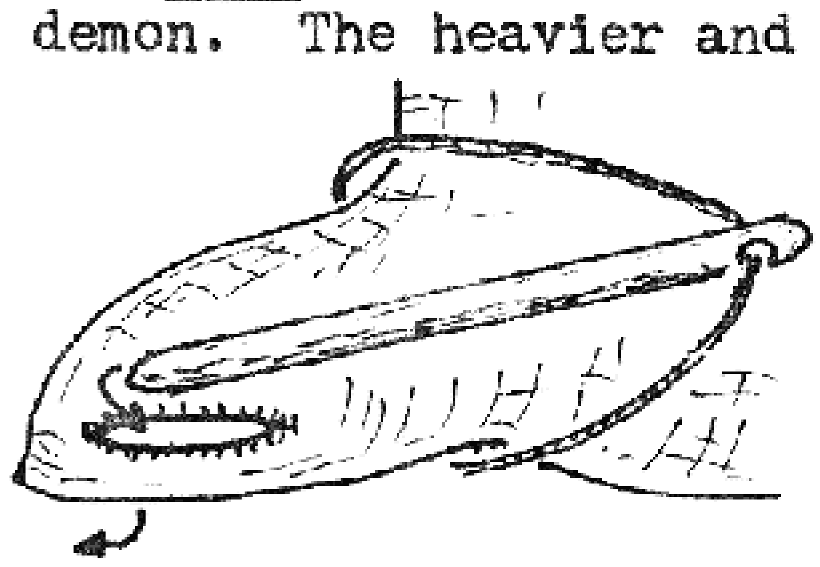


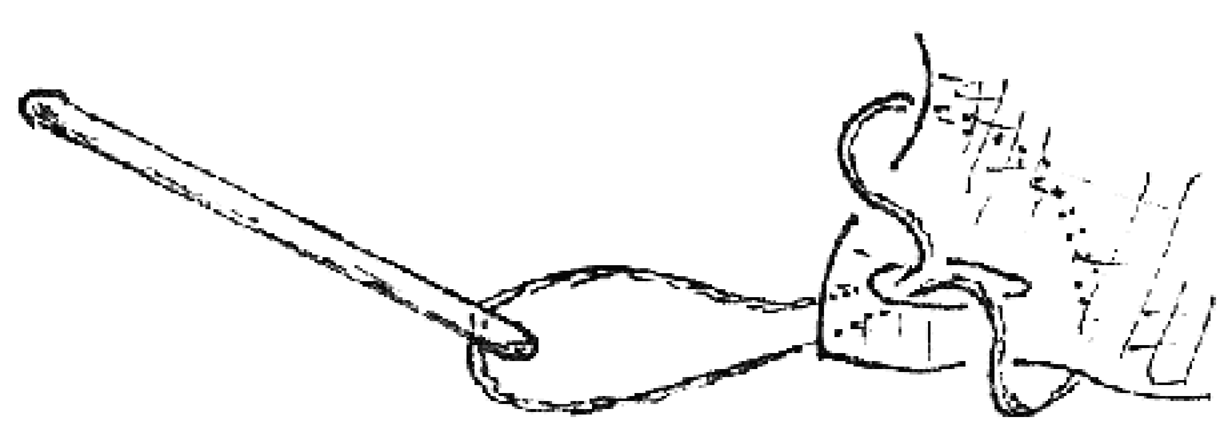
SUPER SLEEPER-STOPPER

#45, The BUTTONHOLE Puzzle

Directions: First, choose a loose material such as a knit sweater, with a buttonhole large enough for the stick to pass through easily. One near a corner is easiest to practice with. Refer to the drawing below. Place the loop of cord around the corner of material containing the buttonhole, and then poke the free end of the stick through the buttonhole, and tighten the cord. Reverse to remove.

After you have mastered that, try the puzzle on bigger game, such as the front of a friend's jacket. After the usual comment of "Oh, what's so hard about that?", wait for the fun to start as they try to remove this little demon. The heavier and stiffer the material, the harder it is.





(Note: We made this puzzle in about 50 different kinds of wood. The instruction and identification sheet had a hole punched in one corner to which the puzzle came attached.)

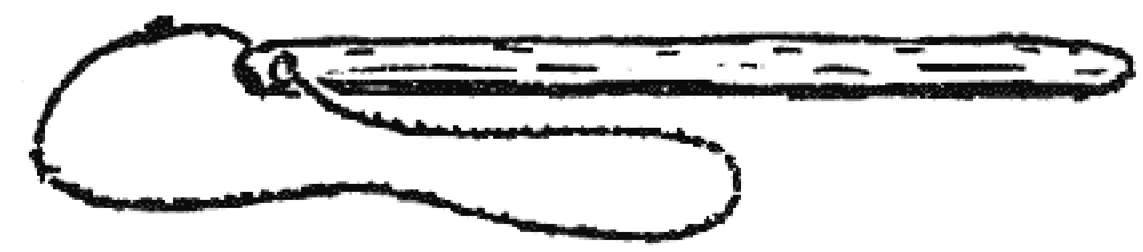
This revised version of the original 1972 instruction sheet has been reprinted for inclusion in Puzzle Craft.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln MA 01773 Nov 1984

#45

The BUTTONHOLE Puzzle

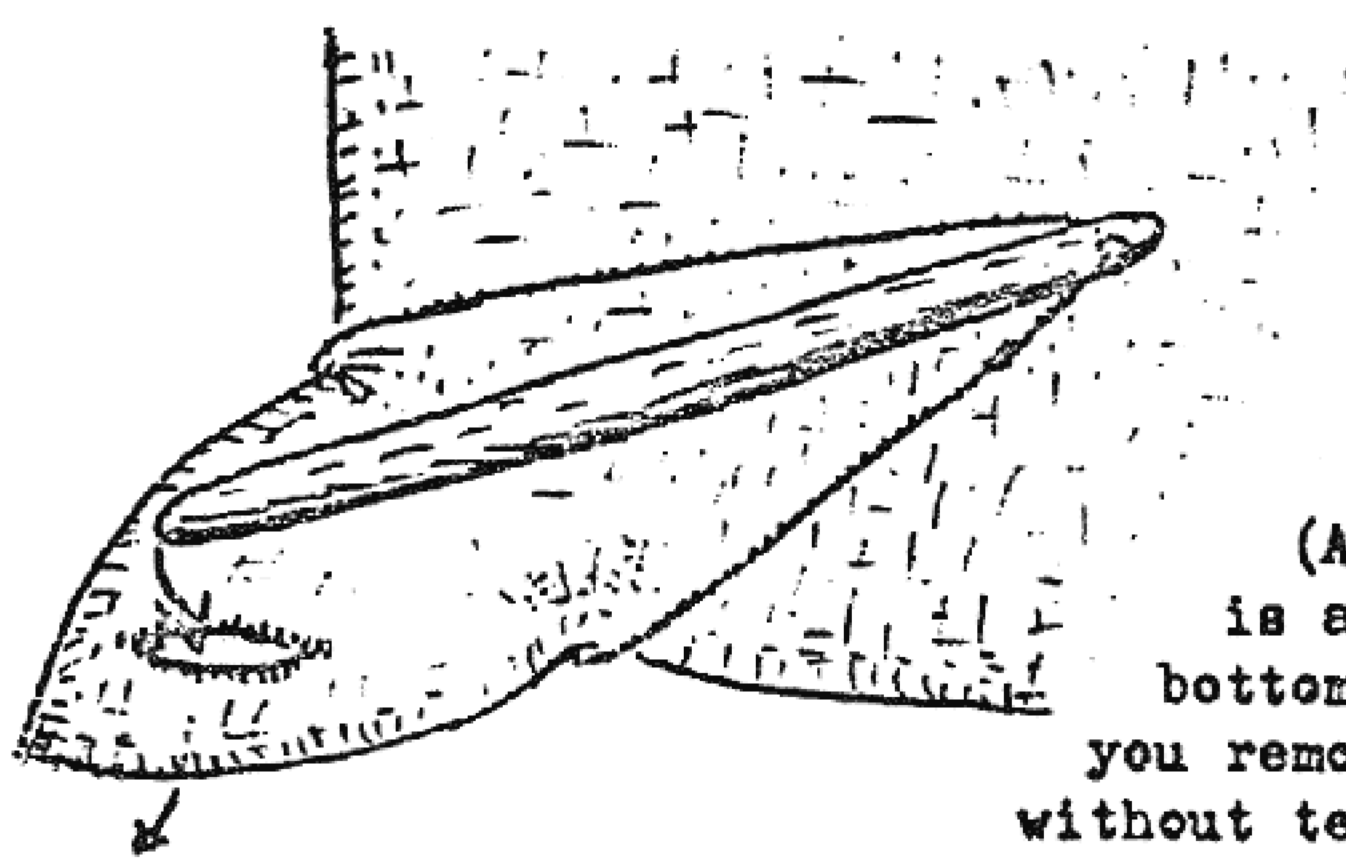
Made in exotic woods from many lands,
all in their natural state,
with a clear wax finish.



The BUTTONHOLE Puzzle, which may at first glance appear too simple to be a puzzle at all, is one of the most diabolical devices ever conceived. Some old-timers know it as the "Idiot Stick". It has been called numerous other names, most of which we would rather not repeat.

DIRECTIONS:

First, choose a loose material such as a knit sweater or soft shirt, preferably your own or that of a trusted friend, with buttonholes large enough for the stick to pass thru easily. If possible, select a buttonhole near a corner of material, such as the bottom buttonhole of a sweater, or shirt cuff. Now refer to the drawing below. Place the loop of cord (L.L. Bean 45 lb Braided Line) around the corner of material containing the buttonhole, and pull the material with buttonhole as far as possible thru the loop. Then, and only then, poke the free end of the stick thru the buttonhole, and tighten. Reverse to remove.



(A practice buttonhole is also provided at the bottom of this sheet. Can you remove or replace puzzle without tearing the paper?)

After you have mastered this, try the puzzle on bigger game, such as the front of a friend's jacket or coat. After the usual comment of "Oh, what's so hard about that?", wait for the fun to start as your former friend tries to disentangle this little demon. If the material is at all heavy or stiff, it is really tough to do.

Now see if you can put it on a handbag strap, belt loop, suspenders, or similar loop of flexible material. The stiffer and fatter the strap, the greater the difficulty.

NOTE:

We make this puzzle and others, including our AP-ART line of geometrical designs, in just about every kind of exotic wood we can lay our hands on, including: Acle, Angico, Benge, Breadnut, Bubinga, Cocobolo, Granadillo, Imbuya, the Mahoganies, Merbau, Mulberry, Osage Orange, Padouk, Paldao, Pau Ferro, Pau Rosa, Peroba, Purpleheart, the Rosewoods, Satinwood, Sumac, Teak, Tulipwood, and Zebrawood. If you know of a beautiful wood we don't have, tell us where we can get some and we will probably use it.

Stewart T. Coffin
Old Sudbury Road
Lincoln, Mass. 01773

STEWART T. COFFIN
79 OLD SUDBURY RD. LINCOLN, MASS. 01773
259-8348

For <Deleted>

Experimental variation of Cluster Buster, No. 47-X.

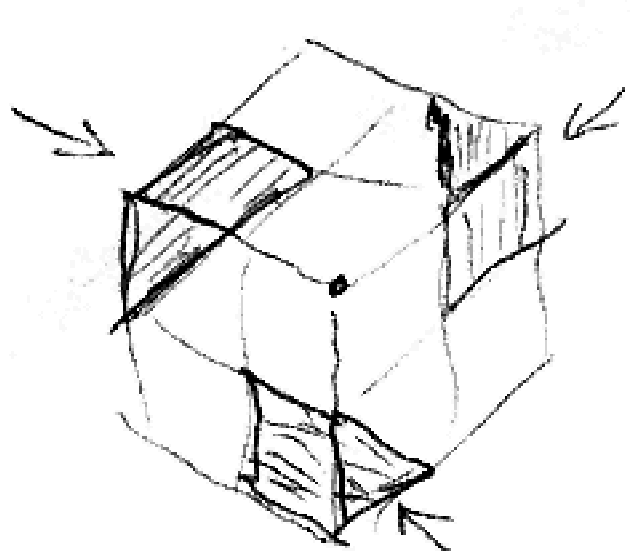
Six dissimilar pieces assemble to form a solid rhombic dodecahedron.

Basically one solution, but may have minor variations.

Designed in 1987. Refinished 1990.

Sitka spruce and Purpleheart.

Not very difficult to assemble. Disassembly may be more difficult than assembly. To disassemble, first locate axis by looking for pencil dots on triangular vertices.  Then push with three fingers of each hand on purpleheart vertices.



push these down

S.T.C.
14 Nov 1990

For <Deleted>

Aug 3, 1983

IMPROVED CLUSTER-BUSTER - Honduras mahogany

This puzzle was designed around 1973. The original CLUSTER-BUSTER had six identical pieces. This version has three matched pairs instead, making it more interesting.

It is more difficult to disassemble than to assemble. You have to push in exactly the correct places. You may think it is stuck, but it isn't. (will be easier, though, in dry weather).

It is shimmed slightly open, so you may see how it works the first time.

S.T.C.

Instructions for PENNYHEDRON, Revised Edition - 1984

Many years ago, when our children were quite small, they used to spend hours in my shop, industriously gluing together odd scraps to make "puzzles" for their friends. One day daughter Abbie assembled twelve rhombic blocks into a simple two-piece arrangement, and that is how the Pennyhedron was discovered. I became fascinated by it, and made a set of jigs so she could glue them properly. Quite a few were made from scrap (and sold for $3.00). We used to put a penny in the hollow center, hence the name. When daughter Tammy found she was missing out on the bonanza, I got her set up making a tiny version of same, which we called the Minihedron, (sold for $1.00). I think we ran out of scraps and they got interested in other things at about the same time.

Unlike most puzzles, the trick with the Pennyhedron is in disassembly rather than assembly. Most persons will grasp with thumb and forefinger of each hand and pull. It will never come apart that way, and they will usually become convinced that it is stuck together. Only by an unnatural grasp with three fingers of each hand can it be pulled apart with ease, and then only after finding the correct axis by careful inspection or trial & error.

There are many possible variations, and this instruction sheet is intended to cover all of them. There are truncated and cubic versions, rounded ones, and augmented (stellated) forms. Many variations are possible in the planes of dissection, which can be especially confusing to someone who thinks they have mastered the standard version. But the original three-prong symmetrical version remains the favorite, (see Puzzle Craft II, page 15-16).

I think we may have originally underestimated the appeal of this little puzzle, and considered it more of a novelty than a "serious" puzzle (whatever that means). One of the biggest mistakes we puzzle designers make is our chronic tendency to make things too complicated. The simplest things are often the best. But looking back now, we always had a lot of fun with the Pennyhedron at craft fairs and with friends, which is more than can be said of many puzzles I have produced. It deserves to be revived.

The new Pennyhedron is more accurate than the old one. This always was a big problem, and they used to fit best only one way. The new set of gluing jigs was made in several stages, each stage correcting slight inaccuracies in the previous one. The final set was made of mahogany, reinforced with steel rods and epoxy. It was made slightly on the tight side, and the final fit was achieved by laboriously lapping the two halves together with grinding compound, to achieve a very high degree of symmetry. The new ones should fit almost equally well all possible ways. On the versions with multiple kinds of wood, one way should produce symmetrical color patterns.

A word of warning: Do not let anyone dig their fingernails into the cracks. It seems to be a universal tendency for persons to do this, even after you warn them not to, and we have seen several Pennyhedrons damaged this way. If it actually does become stuck too tightly together, as sometimes happens, as a last resort you can start it apart by inserting a razor blade in exactly the right place. To make it looser, look for shiny places where it rubs, and scrape off the smallest possible amount. To make them tighter, you can store them assembled and wrapped with rubber bands for a long time.

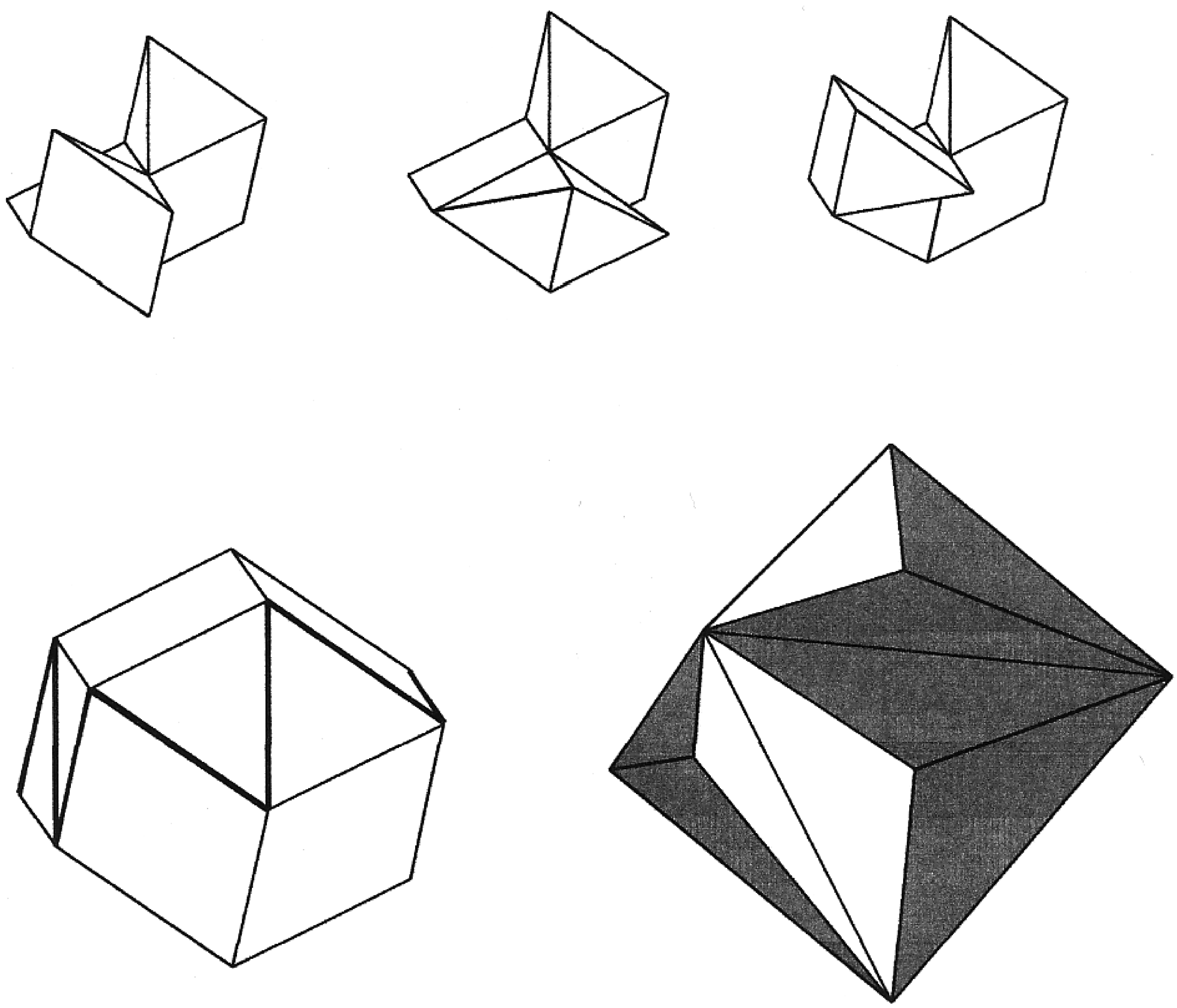
Stewart T. Coffin, 79 Old Sudbury Road, Lincoln MA 01773 Jan 1984

52. Variations of Pennyhedron

Top row: The three dissimilar pieces of the Three-Piece Pennyhedron. If made of three dissimilar woods, the correct grasp for disassembly can be deduced by examination. Otherwise it can be quite confusing to disassemble.

On the lower left, the Zig-Zag Pennyhedron is shown assembled, with the heavy line indicating the dissection that separates it into two identical symmetrical halves.

On the lower right, a standard Pennyhedron has been sanded down to change its shape from a rhombic dodecahedron to an octahedron, producing interesting sculptural patterns of the three contrasting woods.



STEWART T. COFFIN

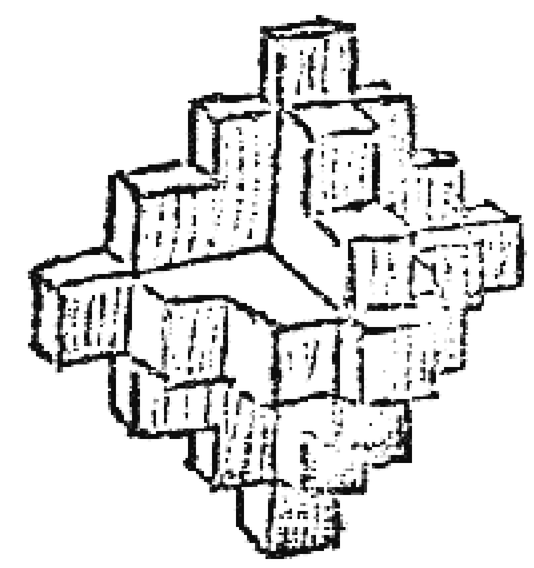
Puzzles

OLD SUDBURY RD. RFD 1 LINCOLN, MASS. 01773

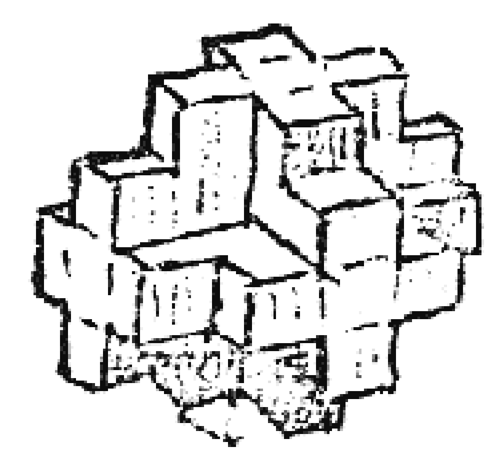
Supplement to SQUARE KNOT Puzzle

The SQUARE KNOT has proven to be a most interesting puzzle, even more so than was realized when the instruction sheet was prepared. To begin with, there are at least three or four distinct solutions, depending on how one wishes to define distinct solutions. In one of them, the Symmetrical Solution, the puzzle slides apart along any one of its three axes. In a second solution, the puzzle slides on two axes. On all the others, it slides on one axis only. Also, a new and totally unexpected solution has been discovered which uses 14
57 → pieces instead of twelve. If you attempt the 14-piece solution by combining pieces from two sets, you must be sure they are both exactly to the same scale, as otherwise they will not fit, and I do vary the scale from time to time.

A number of variations of the SQUARE KNOT have been developed, some of which are described below:

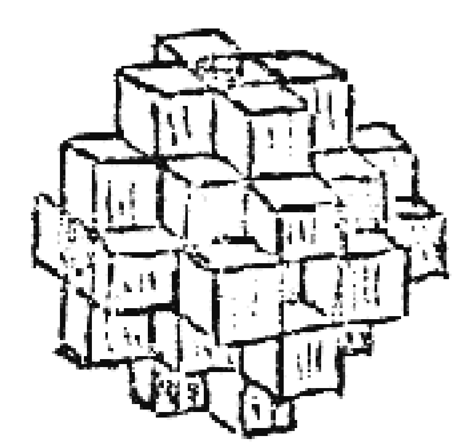


10 - GIANT STEPS This design normally consists of six standard pieces and six T shaped pieces. All of the standard SQUARE KNOT solutions are also possible with this set. The 14-piece solutions are particularly interesting, if enough pieces are available, since symmetrical designs can be made using two, eight, or ten T pieces.

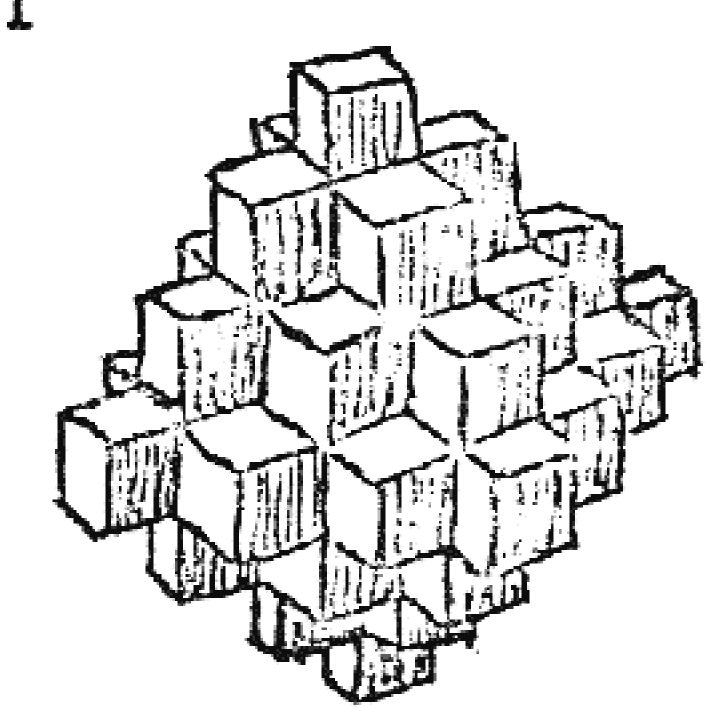


53 - LITTLE GIANT STEPS This is a minor variation of the GIANT STEPS puzzle. It functions in the same manner, and has the same solutions. The six T shaped piece are made by adding blocks one unit in height rather than two, giving the assembled puzzle the surprisingly different appearance of three intersecting cross prisms. Pieces from these two designs may be mixed to create interesting hybrid shapes.

54 - DEFIANT GIANT In assembled form, this puzzle exactly resembles GIANT STEPS. However, the six augmented pieces are formed in an entirely different way, having offset projections at one end. Only one solution and one minor variation are known to exist. There does not appear to be any particular logic to the way it goes together, and it is rated very difficult.



55 - PAGODA This intriguing puzzle consists of four standard pieces, and eight pieces to which have been added an off-centered block - four right-handed and four left-handed. Only one solution is known to exist, and it is rated rather difficult. Although it may not be immediately apparent, there is a sort of logic and warped symmetry to the solution. It is strongly suspected that other solutions exist.

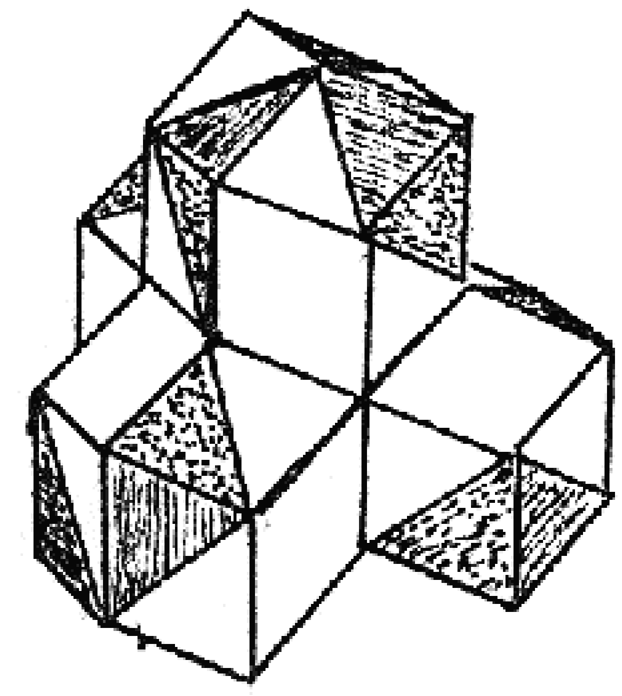


56 - GIANT PAGODA An orthogonal wonder, having octahedral form and symmetry, and the appearance of a double pyramid composed of 63 clustered cubes. It is a combination of the essential features of GIANT STEPS and PAGODA, having two standard pieces and ten augmented pieces. Its solution may at first appear to be hopelessly complicated, but it follows logically from its parents, and will be found not too difficult after they have been mastered.

As in the original design, any of the above may be made in contrasting woods, in which case there is the added challenge of arranging them symmetrically.

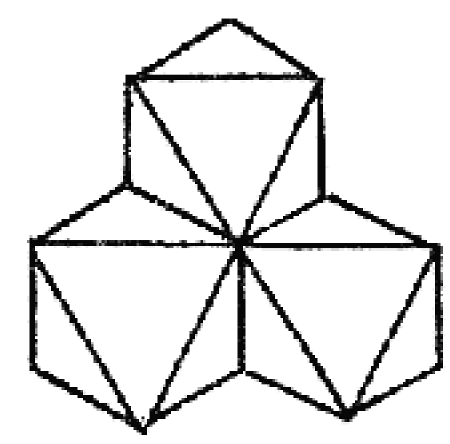
#34

Instructions for the Augmented Four Corners Puzzle

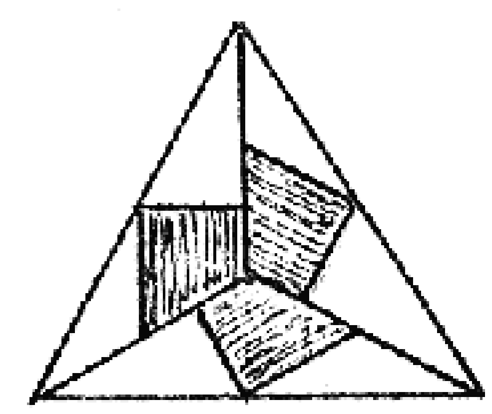


The Augmented Four Corners Puzzle consists of six dissimilar interlocking pieces which assemble one way only, with one sliding axis, to form a geometrical solid with tetrahedral symmetry.

This puzzle has a superficial resemblance to the old Four Corners Puzzle, but functionally it is much more closely related to the Hexagonal Prism Puzzle. Each puzzle piece consists of an identical symmetrical body (light colored wood), to which are attached the twelve dark blocks in such a manner as to produce every possible non-symmetrical puzzle piece. Assembly is a straightforward combinatorial problem, so I see no need to give detailed assembly directions.



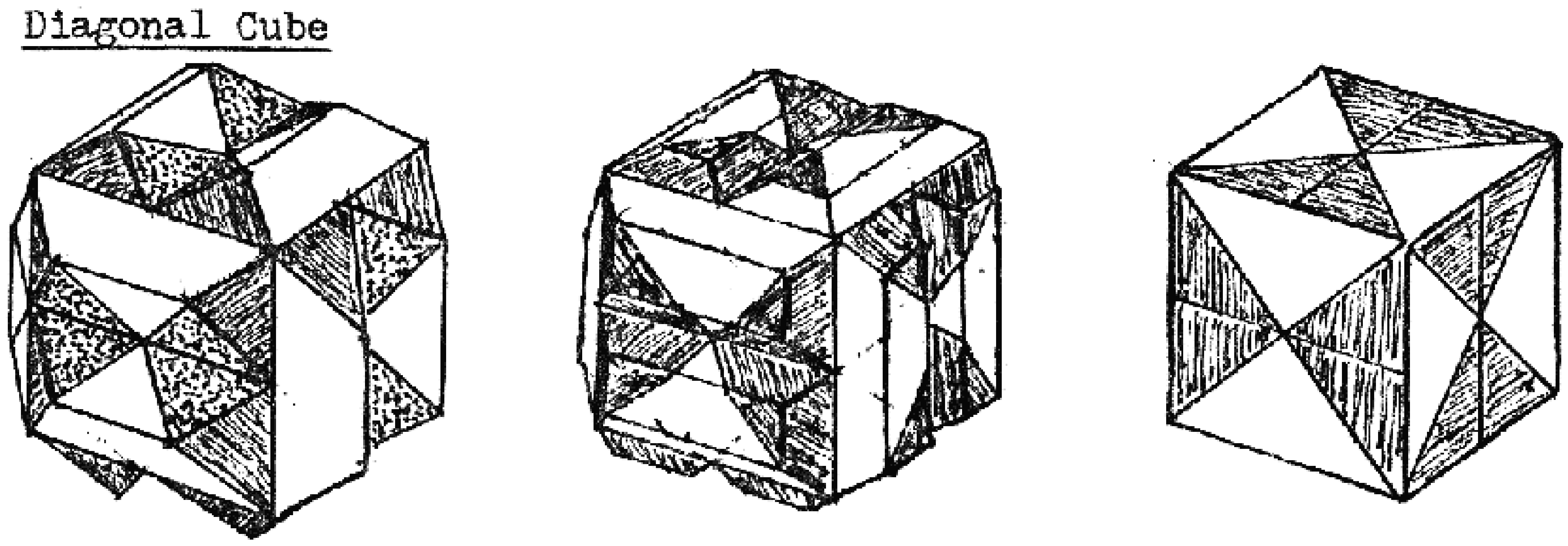
Since we have so much space left over on this sheet, some interesting variations of this puzzle will be described. In the first of these, the four "sides" of the assembled puzzle are sanded down flat until the center point of the side is reached. This minor alteration has the effect of changing all 36 rhombic faces of the original solid into 48 triangular faces .



The reduction of the sides described above can be continued until the shape of the puzzle becomes that of a regular tetrahedron. By using multi-colored woods in making up the puzzle pieces, interesting patterns are made to appear on the faces. I have made only one model of each of these variations, to satisfy my curiosity. I prefer the original version.

By making the two end blocks (light colored wood) on the body of each puzzle piece twice as large, so that the body has planes of symmetry, and then adding twelve more filler blocks (dark colored), the assembled puzzle acquires cubic symmetry. The six sides of this version can then be truncated any desired amount, until eventually a perfect cube is obtained with diagonal face patterns, resulting in an intriguing dissection of the cube that is totally non-orthogonal. This is the Diagonal Cube mentioned on page 12 of Puzzle Craft II.

#58 - Diagonal Cube



Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Jan 1981

Diagonal Cube Puzzle

Made for <Deleted> June 1983.

Cherry + Honduras mahogany.

Note: This model has very precise fit. In order to disassemble, all six fingers must be positioned in exactly the right places to push the two halves apart. A paper shim has been inserted so that you may see how to do this the first time.

S. T. C.

(For discussion of this puzzle, see Puzzle Craft II, page 12)

#59 CORNER-BLOCK PUZZLE

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

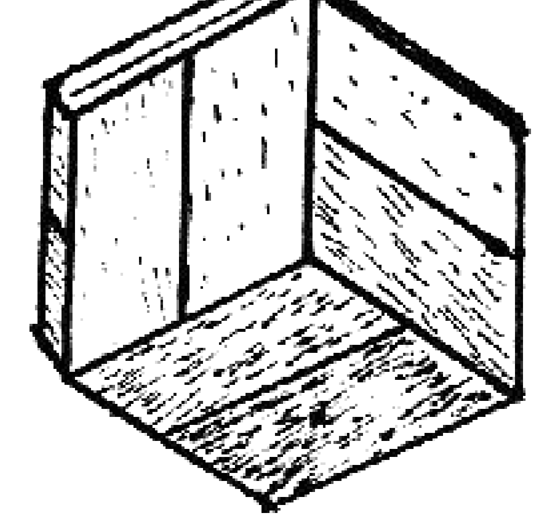
259-8348

Feb 28, 1985

Dear <Deleted>,

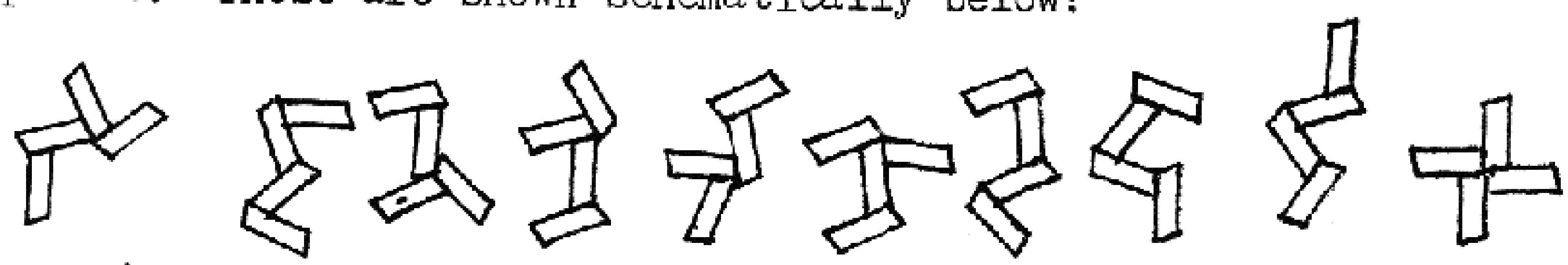
It has been a long while since I have sent you any puzzles. According to my notes, you do not have my Corner-Block Puzzle. I only made and sold about four, a few years ago. I have just now designed an improved version, so am sending you the first one made — in Honduras mahogany + Brazilian rosewood. I have finally solved the problem of dual solutions — this version has essentially one solution with one minor variation.

The GARNET Puzzle #60



The GARNET Puzzle consists of six puzzle pieces which assemble in an interlocking configuration to form a solid rhombic dodecahedron with bisected faces. Each puzzle piece is made up of four blocks joined together different ways, and each block has the shape of a skewed rhomboid pyramid.

This puzzle design has some interesting ramifications. If you consider all possible ways that the four blocks might have been joined, you arrive at a set of ten puzzle pieces. These are shown schematically below:



One object of the design was to find a set of six dissimilar pieces which assemble one way and essentially one order only. A laborious investigation of the 210 possible combinations has (so far) revealed only two satisfactory combinations - ABCDEF and ACDEFG. The latter of these two is the one presently being used. It is decidedly the more interesting of the two, and we leave it to you to figure out why.

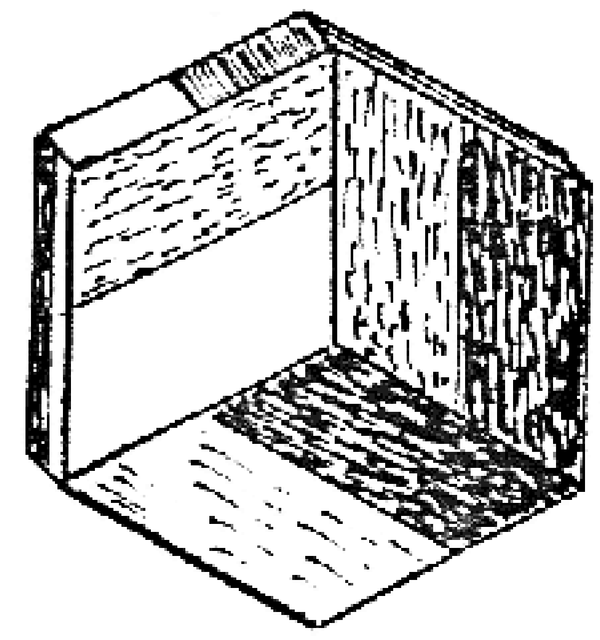
Disassembly may be accomplished by randomly pulling in different directions until you discover the one sliding axis which separates the assembly into two halves. Or you may prefer to carefully study the planes of dissection and see if you can figure it out. This puzzle is normally made in six dissimilar woods - one wood for each piece. This is a departure from all previous designs, and now you see the reason why.

Persons interested in tinkering with the many other possibilities which may exist with this intriguing set of puzzle pieces are encouraged to do so. I can supply a complete set of all ten pieces in Cherry or Mahogany for $40 postpaid. Still better, why not make your own? I can supply the individual blocks in quantity for 40¢ each, and you can glue them up yourself. This allows you the further flexibility of making puzzle pieces with more or less than four blocks, and perhaps discovering some combination with serial interlock and one final key piece.

Ordinarily, it would be quite impractical for the home hobbiest to glue up just a few pieces of a puzzle such as this, because of the precise gluing jigs required. That is not the case here. Being in a hurry as usual, I made the first set by simply holding a cluster of 24 blocks tightly together with rubber bands, and then selectively gluing certain joints, using wax and waxed paper to prevent sticking to the wrong ones. The results were quite good. I then used the first finished puzzle in the same manner as a jig for making the second, the second for the third, and so on. With many geometrical models, the errors would gradually accumulate as you did this. This proved to be a lucky exception to that rule (don't ask me why), and the accuracy gradually improved. And of course, now that you already own an accurate set of pieces, you can omit the first step and use them as your jig. Just be careful that you don't glue them together by mistake.

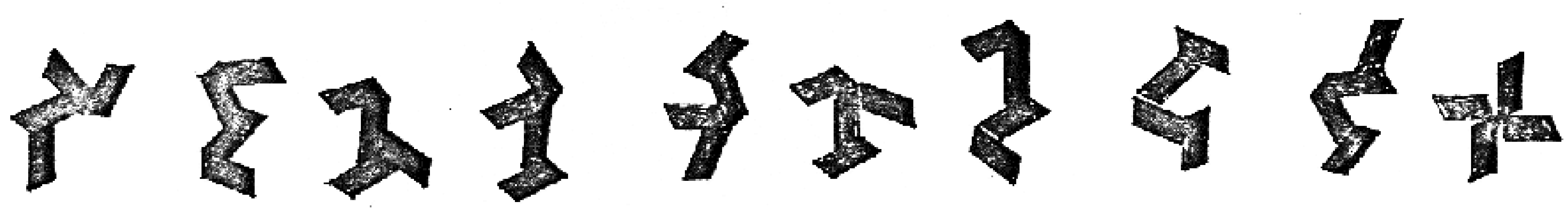
Stewart T. Coffin, 79 Old Sudbury Road, Lincoln MA 01773

The GARNET Puzzle, No. 60



The GARNET Puzzle consists of six puzzle pieces which assemble in an interlocking configuration to form a solid rhombic dodecahedron with bisected faces. Each puzzle piece is made up of four blocks joined together different ways, and each block has the shape of a skewed rhomboid pyramid.

If you consider all practical ways that the four blocks might have been joined, you arrive at a set of ten puzzle pieces. These are shown schematically below as viewed from the inside:



A B C D E F G H I J

One object of the design was to find a set of six dissimilar pieces which assemble one way and essentially one order only. A laborious investigation of the 210 possible combinations has (so far) revealed only two satisfactory combinations - ABCDEF and ACDEFG. Both versions have been or are in production.

Disassembly may be accomplished by randomly pulling in different directions until you discover the one sliding axis which separates the assembly into two halves. Or you may prefer to carefully study the pattern of dissection and see if you can figure it out. This puzzle is normally made in six dissimilar woods - one wood for each piece. This is a departure from all previous designs of mine, and now you see the reason why.

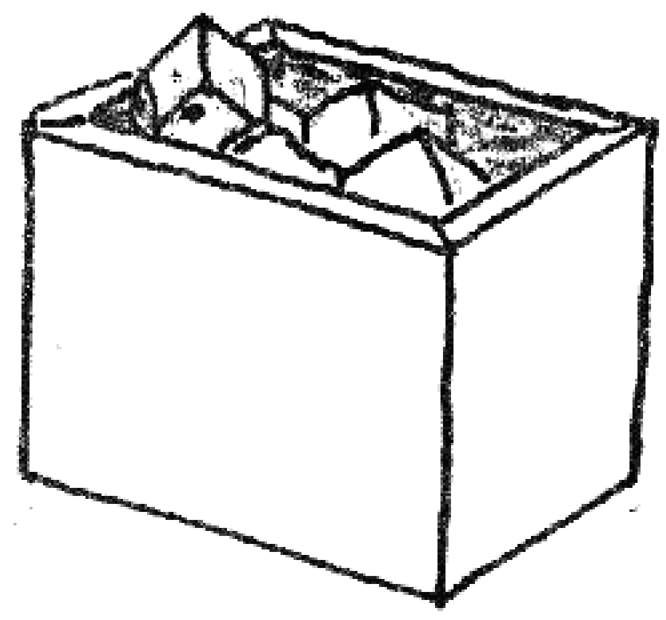
(Note: This puzzle was first produced in Feb. 1984. All those made in 1984 were the mirror image of the version shown here; i.e. like this:  This revised instruction sheet applies to all those made after Jan. 1985.)

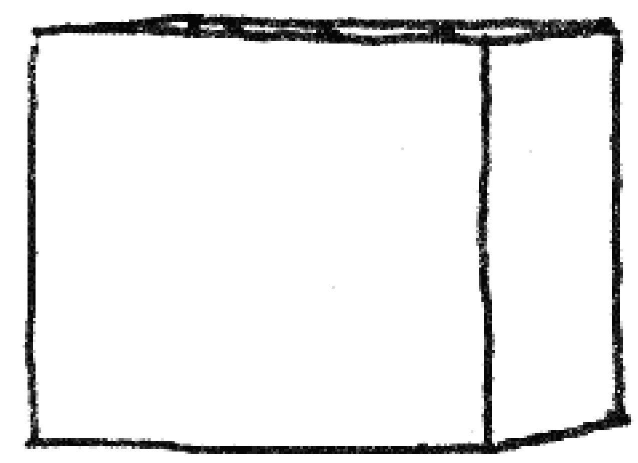
This puzzle has many interesting variations, some of which are still being explored at this time. Although the investigation of the 210 possible combinations was believed to be systematic and thorough, it is possible that other interesting designs may have been overlooked, especially if three-block and five-block pieces are also considered. There are truncated versions which together with different color combinations create some surprising and intriguing new geometrical forms. The possibilities of augmented versions are especially interesting. There are stellated versions and puzzles nesting within puzzles in large number and confusing variety. One such version has eight pieces and is very difficult. Even more complex variations are no doubt possible.

This puzzle is especially suitable for those who like to tinker with their own puzzle designs. It is one of the few so-called polyhedral puzzles that does not require accurate gluing jigs. A satisfactory fit may be achieved by first assembling the 24 blocks carefully with tape and rubber bands, and then selectively gluing the blocks one at a time. Sawing the blocks from 30-60-90 degree triangular stock requires a simple but accurate saw jig. From time to time, I have extra blocks which I can supply at a price of about $10 or more for a set of 24, depending on the type of wood.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773

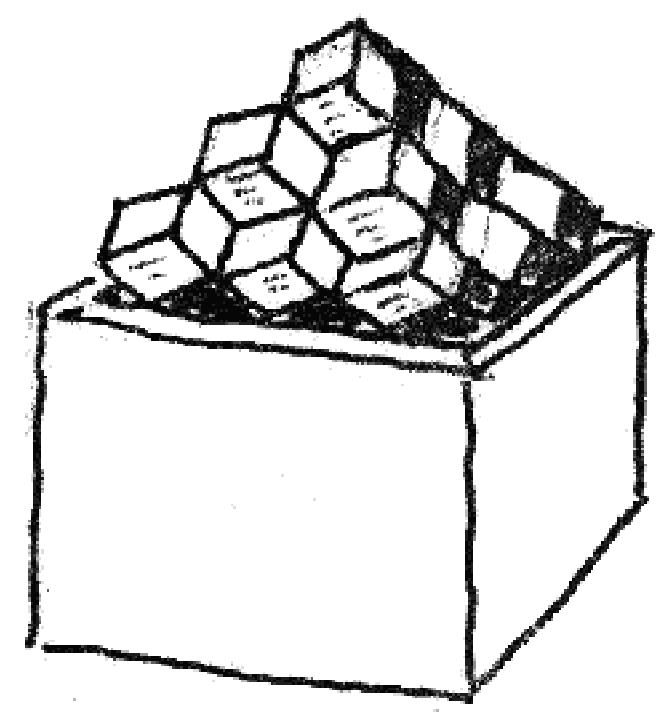
The SETTING HEN Puzzle



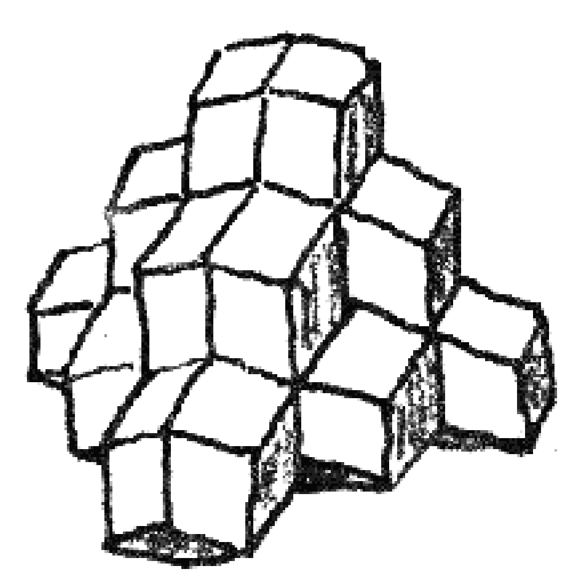


As you can see, Mrs. Hen is setting in her nest with just her head poking out above one corner, no doubt on the lookout for Mr. Fox. She wants to be able to duck and hide so that no part of her or her chicks shows above the top edge of the nest. It's pretty hard to do with such a big family, so can you show her how?

Hint: Dump all the pieces out and make a pyramidal pile with a square base. It will be just the right height. Oops – doesn't the base quite fit in the box? What a shame! Nice try, though. Better start all over again some different way. There are at least three solutions.



After you have solved the square pyramid and the box problem, omit one piece and make a triangular pyramid.



What other interesting shapes can you make? Example: Butterfly with three pieces –

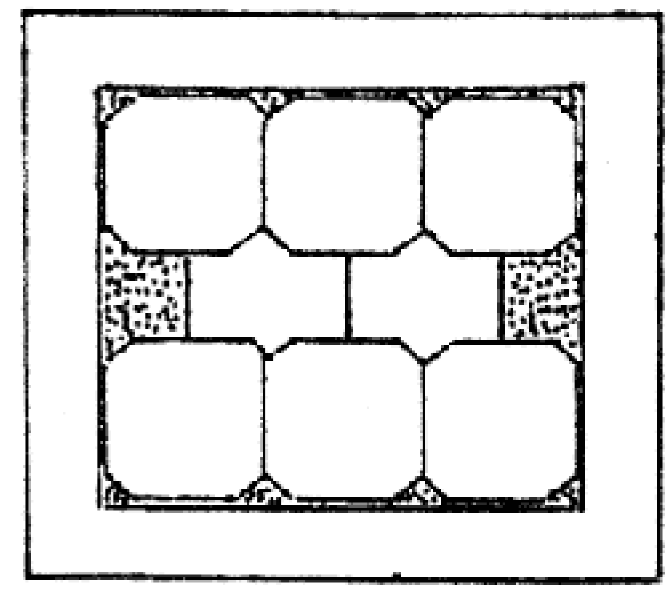
Now put everything back in the box again with Mrs. Hen's head poking out, just the way it was at the beginning, ready for someone else to be totally confused.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln MA 01773

The Distorted Cube Puzzle - No. 61-A

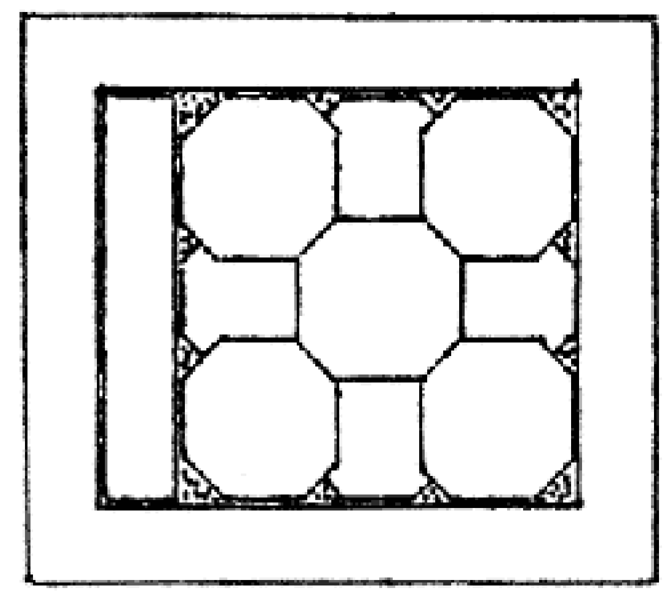
This puzzle consists of four dissimilar puzzle pieces, a rather unusual rectangular box, and a rectangular cover. The puzzle pieces are made up of fourteen identical blocks joined together different ways. Each block is an edge-beveled cube (or truncated rhombic dodecahedron).

1. Pack the four pieces into the box so that the cover placed over them rests flush with the top of the box.

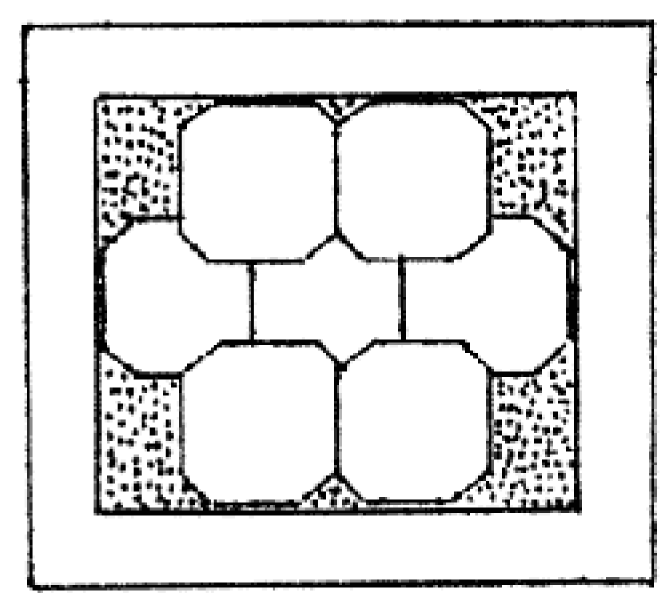


A variation of this is to place the cover inside the box, resting on the bottom, so that the puzzle assembly is displayed flush with the top of the box.

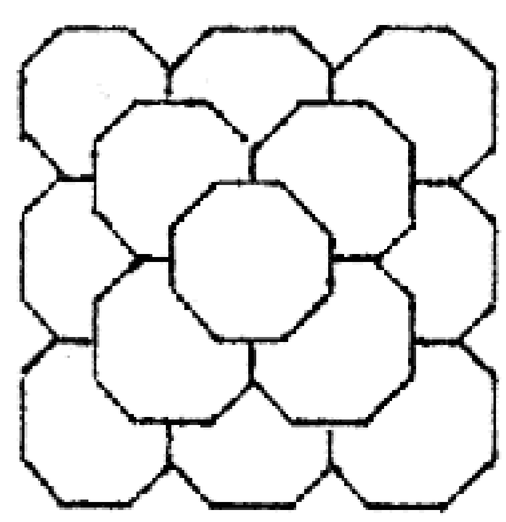
2. Now dump the pieces out and insert the cover vertically into the slot in the bottom of the box. This converts the box into a cubic shape. Assemble the puzzle inside, again with no part projecting above the rim of the box. There are several minor variations to this solution.



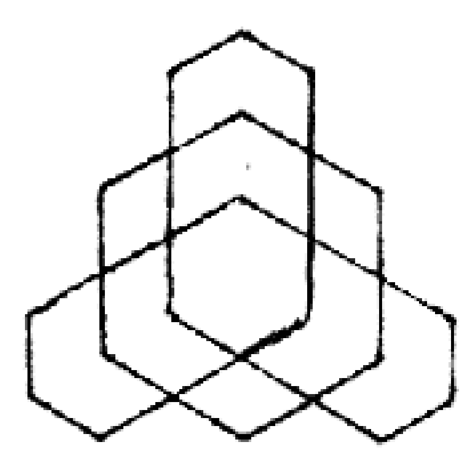
3. With the cover set aside, pack the pieces symmetrically into the box such that the assembly is flush with the top of the box and all four sides.



4. Build a square pyramidal pile.



5. Using only three of the pieces, make a triangular pyramidal pile.



6. How many solutions to each of these problems are there?

What other puzzle problems can you discover?

....

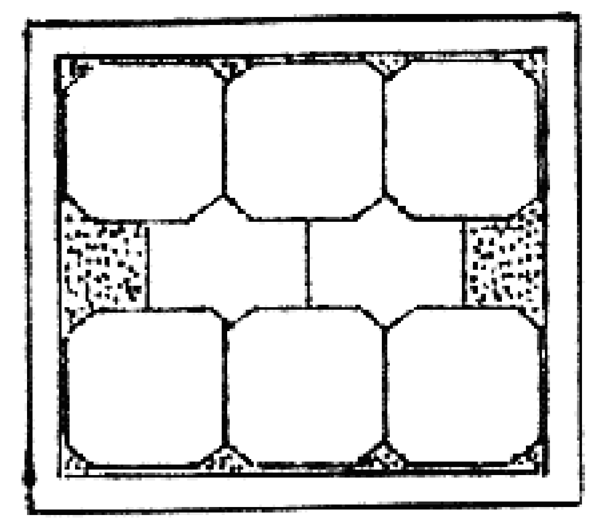
This puzzle is an improved variation of the Setting Hen Puzzle, No. 61. Designed and produced in June, 1988, in a limited edition of eight units.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 June, 1988

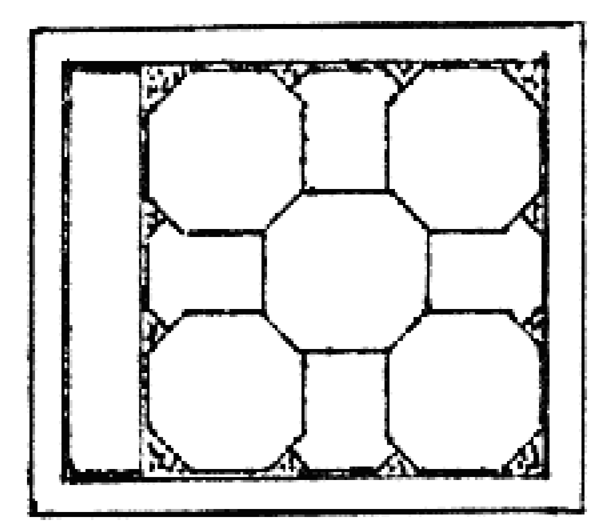
The Distorted Cube Puzzle - No. 61-A

This puzzle was first made in 1988 in a very limited edition of about eight units. It is described in *Puzzle Craft 1992*. This new instruction sheet is for a run of 12 additional units made in December 1996. The new ones are practically identical to the original, but made of cherry rather than spruce. These new instructions are also essentially the same. The four dissimilar puzzle pieces are made up of 14 edge-beveled cubic blocks joined together different ways, all contained in a rather novel rectangular box with cover.

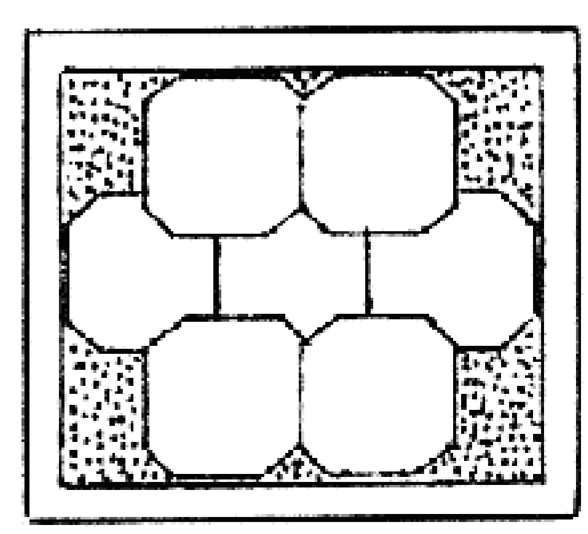
1. The first problem is to pack the four pieces into the box so that the cover placed on top of them will be flush with the top of the box. A variation of this is to first lay the cover in the bottom of the box, in which case the puzzle assembly will be flush with the top. See diagram at right.



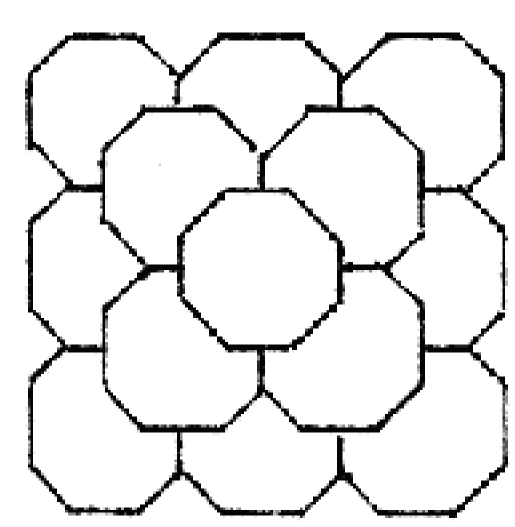
2. For the second exercise, the first step is to convert the box from rectangular to cubic. This is done by inserting the cover vertically into the slot in the bottom of the box. Now assemble the puzzle into this cubic configuration. Again the top of the assembly will be flush with the top of the box. See diagram.



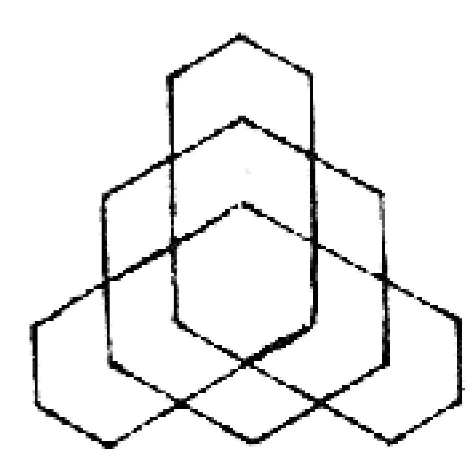
3. Now with the cover set aside, pack the pieces symmetrically into this larger space so that, surprisingly, they are still flush with all four sides and the top, as shown. (In all assemblies, there is some side clearance to allow room for this sheet folded.)



4. Setting the box aside, build a square pyramidal pile, as shown here in top view.



5. Using only three pieces, construct a triangular pyramidal pile, shown likewise in top view.



How many solutions to each of these problems can you discover? (As of this writing, after eight years I have yet to hear from anyone who reports having found even one solution for each of these five exercises. Can they really be that difficult?)

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Dec. 1996

Dec 1983

The NINE BARS Puzzle #62

Anyone who is in the puzzle business must sometimes wonder what customers do with their puzzles after they get them, and every so often I try to find out. Over the past few years, I have supplied four puzzles disassembled, with no instructions. These were: Coffin's Improved Burr, Interrupted Slide Burr, Three-Piece Block, and the Half-Hour Puzzle. These were all easy puzzles, and the assembled shape was known, (all are illustrated on the cover of "Puzzle Craft"). Of those of you who report back (about half), a few reported having solved all of them readily, while others reported varying degrees of difficulty. Some report being unable to solve one or more of them, and I always receive a few requests for explicit step-by-step assembly instructions, which I do not supply.

So - here is a new puzzle design which I have dug out of my archives, being supplied to you disassembled, with no instructions, but this one is not mentioned or illustrated in "Puzzle Craft." It is somewhat more difficult than any of those mentioned above.

The NINE BARS Puzzle consists of nine hexagonal bars with holes, and nine dowels. Eight of these are joined in pairs, making a total of ten puzzle pieces. The solution could be defined as an arrangement such that all of the holes are occupied by dowels. There is only one solution and one order of assembly. You will immediately recognize the similarity of this puzzle to the Cuckoo Nest and Locked Nest, but the dissimilarity is what makes it interesting. If you try to solve it by random trial and error, then it is perhaps possible but unlikely you will ever stumble upon the solution. On the other hand, if you ponder a bit and look for the principle upon which all puzzles of this sort work, then you may find it quite easy.

Price: $18.00 postpaid anywhere in the U.S. and Canada. $20.00 airmail anywhere in the world. (Probably the last new puzzle I can offer for under $20.00).

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln MA 01773

Puzzle Club News Item:

In the first "Puzzle Club" bulletin three years ago, we mentioned the possibility of printing a roster of names and addresses, if no one objected. I don't believe anyone did, and some of you have been asking for a copy. For various reasons, too complicated to explain, I have decided to keep this list confidential, except for initials which you already have. There is one way, however, that you may indirectly gain access to it. You may submit small classified notices for insertion in any of our irregular and infrequent mailings. This offer stands through 1984 only, as plans are uncertain after that. You may submit them as printed slips, or just send the information and I will type it in somewhere. No charge for small insertions, but for larger ones which may require additional postage, note that with 60 now on the mailing list in the U.S. and Canada, plus 20 overseas, the cost of First Class and Airmail postage would be $20 additional.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln MA 01773

Jan 1984

STEWART T. COFFIN

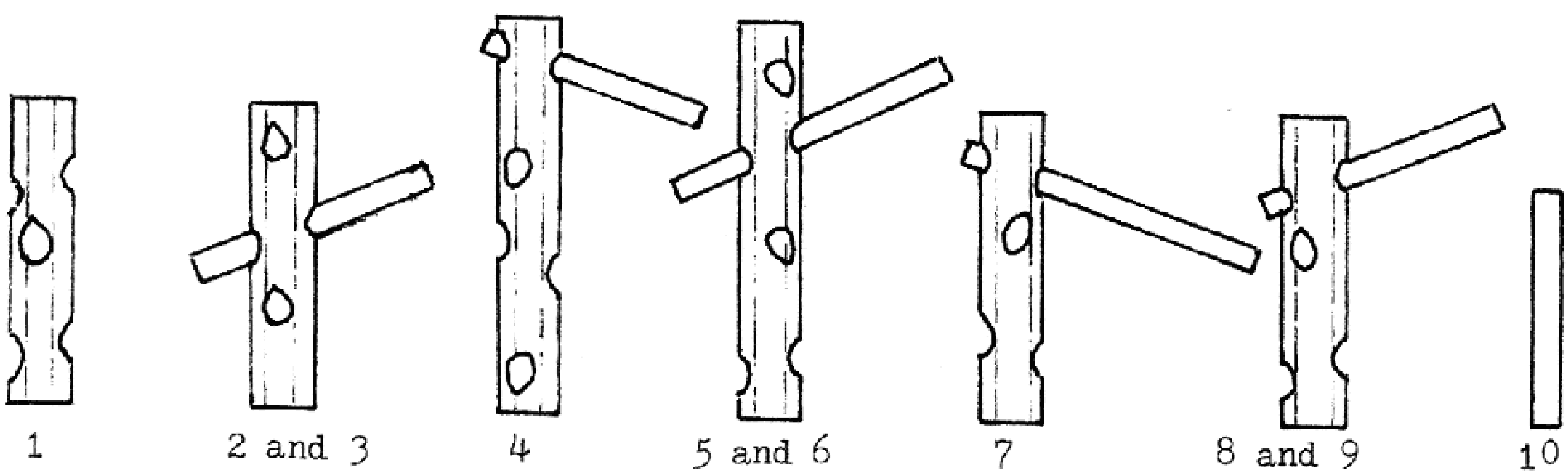
79 OLD SUDBURY RD.   LINCOLN, MASS. 01773

259-8348

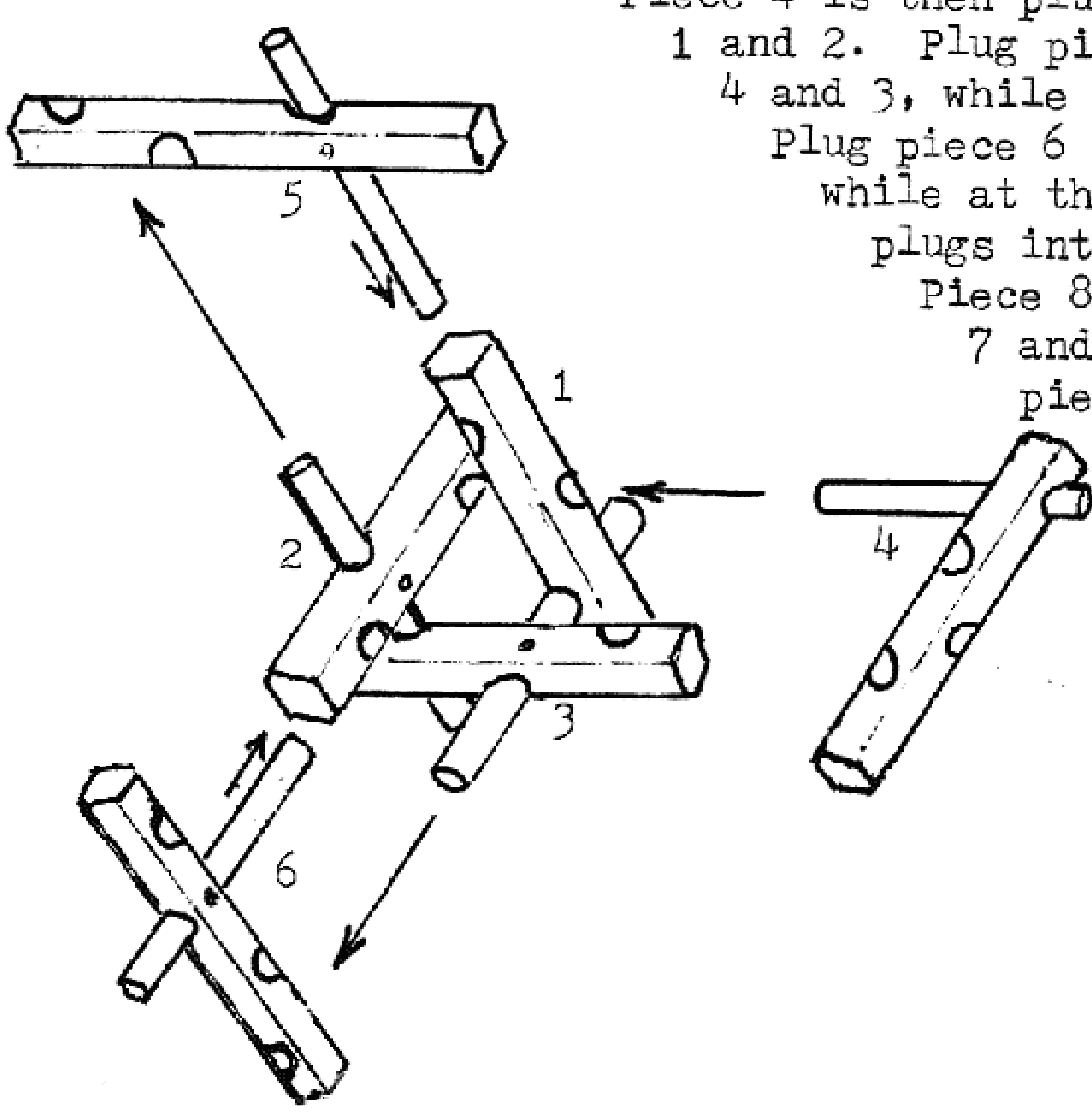
Solution to the Nine Bars puzzle, No. 62

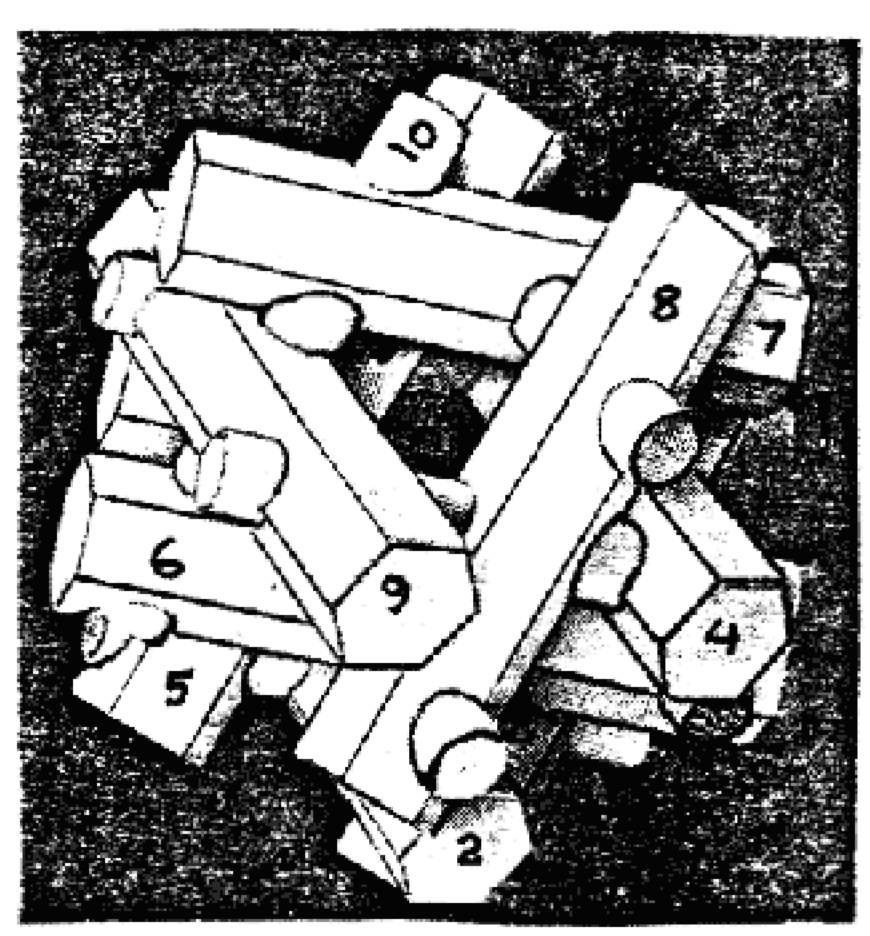
In December, 1983, and early 1984, I produced and sold possibly a couple dozen of these puzzles. In an especially mean-spirited mood, they were all shipped disassembled with no instructions and no illustration. I understand that many of them have remained disassembled to this day. The assembled puzzle is shown on page 115 of Puzzling World..., and that should help. Here are explicit assembly directions:

Lay the ten pieces out as shown below. They are assembled in the order numbered, and there is only one solution.



Form a triangular nest with pieces 1, 2, and 3 as shown below. Piece 4 is then plugged into the pair of aligned holes in pieces 1 and 2. Plug piece 5 into the pair of aligned holes in pieces 4 and 3, while at the same time piece 2 plugs into piece 5. Plug piece 6 into the pair of aligned holes in pieces 5 and 1, while at the same time piece 3 plugs into piece 6. Piece 7 plugs into three aligned holes in pieces 4, 6, and 2. Piece 8 plugs into the pair of aligned holes in pieces 7 and 5, while at the same time piece 6 plugs into piece 8. Piece 9 goes in likewise. Locking pin 10 completes the assembly.





S.T.C.
Nov 1990

STEWART T. COFFIN

79 OLD SUDBURY RD.   LINCOLN, MASS. 01773

259-8348

Design No. ~~62-A~~ 65-A

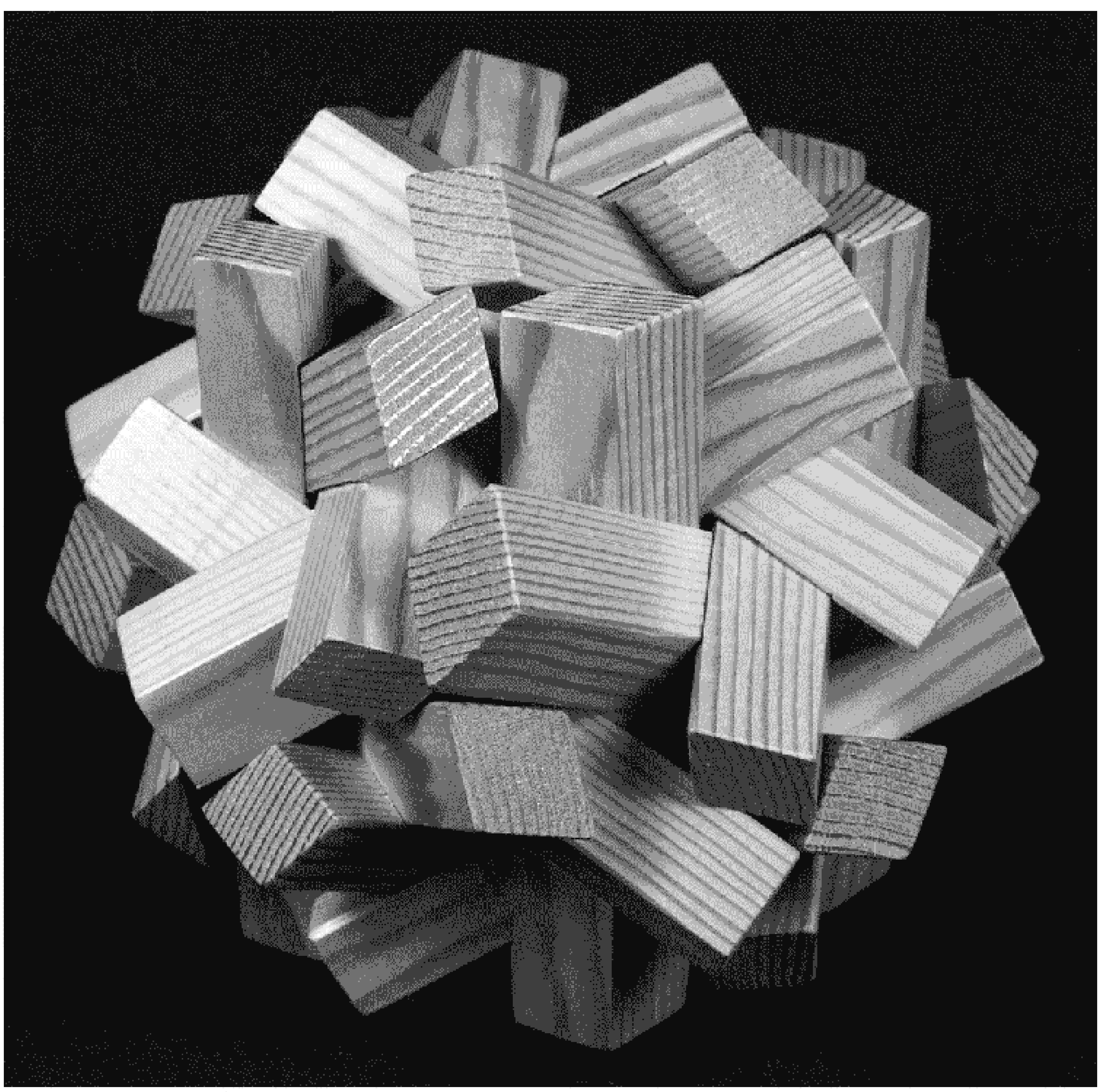
Thirty Notched Rhombic Sticks

A puzzle of this sort is discussed in Puzzle Craft on pages 50 and 95.. This new and improved version uses thirty notched rhombic sticks with squared off ends. Five of the sticks have one end reduced to permit assembly.

Disassembly is easy. First locate and remove the five sticks with triangular ends. Five more parallel pieces are then removed. The remainder then separates into two identical basket-shaped subassemblies.

Assembly is the reverse. This may take some dexterity the first time, but once the solution is learned it will become easy and not a test of dexterity.

S. T. C.
Nov 23, 1987



STEWART T. COFFIN

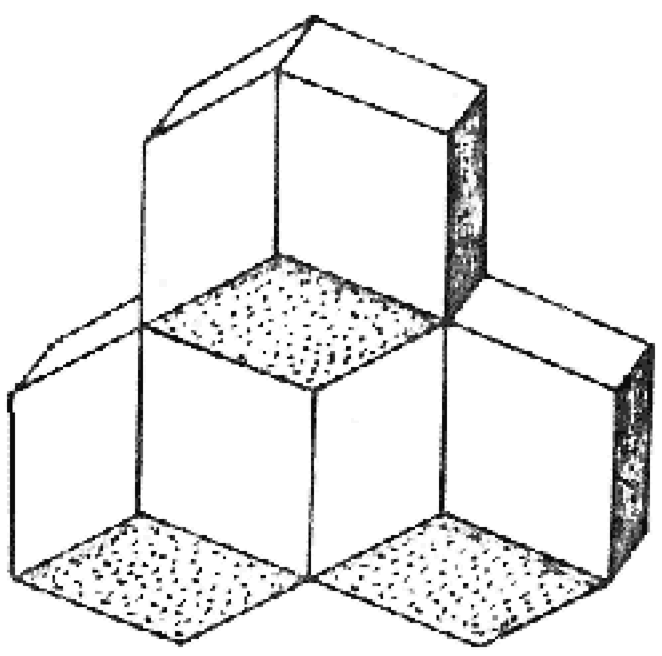
79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

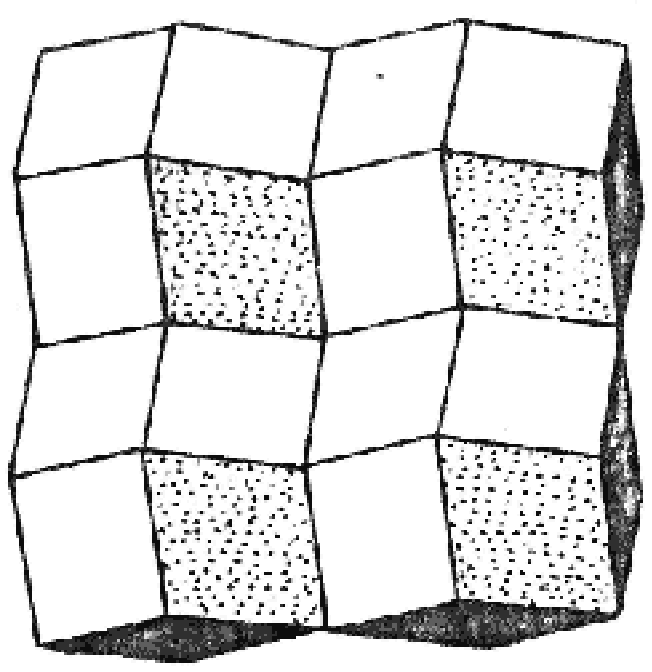
THE PEANUT PUZZLE - No. 67

The Peanut Puzzle is based on a two-piece dissection of the rhombic dodecahedron. The half-pieces are joined different ways to make this set of six Peanut Puzzle pieces. There are twelve ways that the half-pieces might have been joined in pairs to make usable pieces having no axis of symmetry. This special set of six was found by Mike Beeler, using a computer, to be the only one of the 924 possible sets that will construct all of the symmetrical shapes shown below.

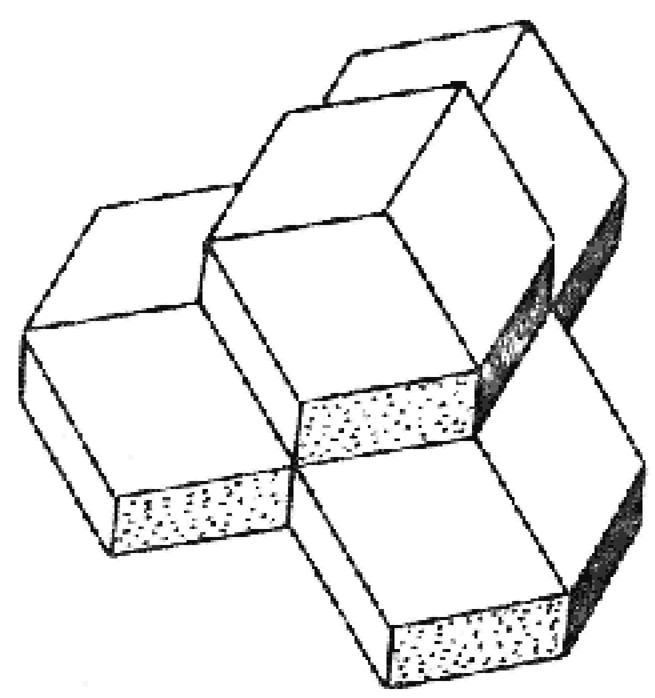
If any closed loop is considered a Peanut Puzzle construction of sorts, then many others are possible, some having symmetries and some not. See how many you can discover; then sketch them and invent names for them.



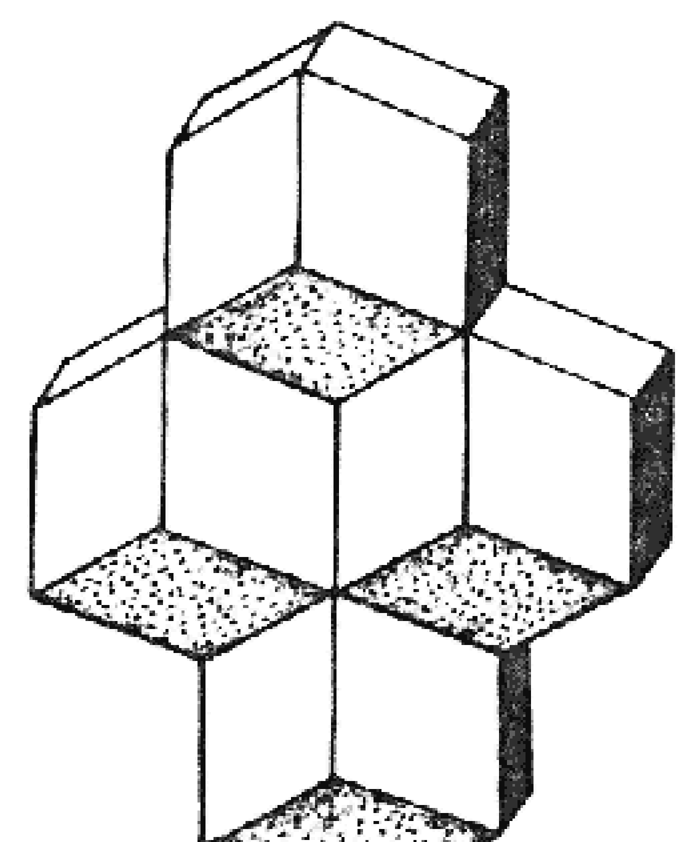
Triangle
three pieces
one solution



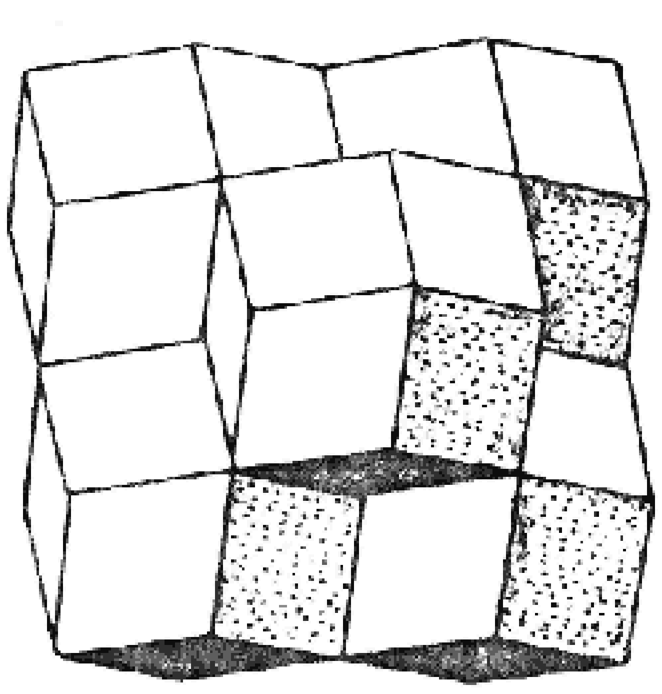
Square
four pieces
two solutions



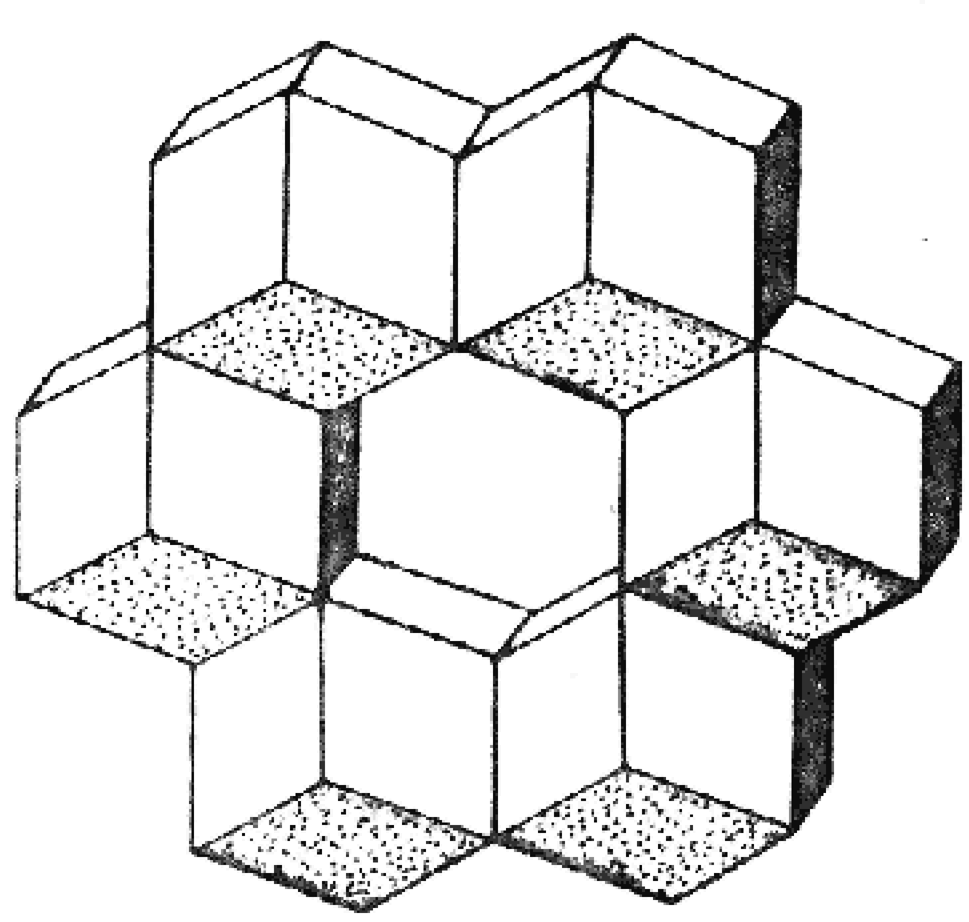
Tetrahedron
four pieces
one solution



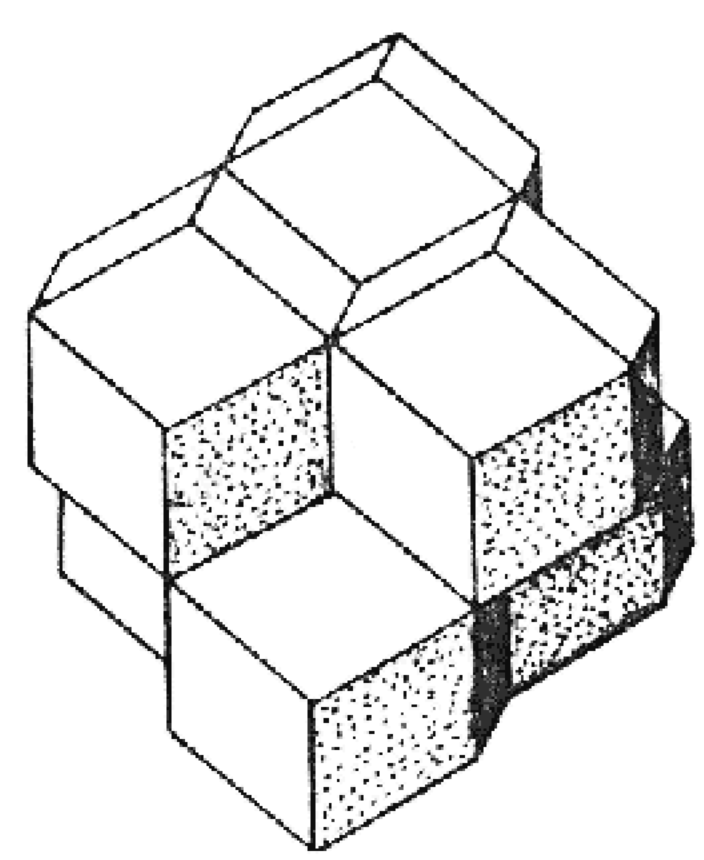
Diamond
four pieces
one solution



Square pyramid
five pieces
four solutions



Hexagonal ring
six pieces
two solutions



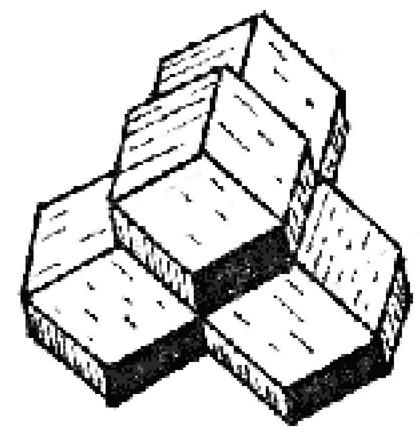
Octahedral cluster
six pieces
two solutions

June, 1988

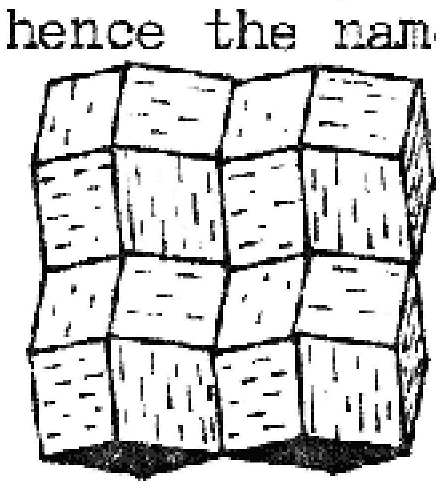
The PENNYDOODLE Puzzle

The Pennydoodle puzzle consists of three whole puzzle pieces plus two half-pieces. You will probably recognize the half-pieces as the two mirror-image halves of the old Pennyhedron puzzle.

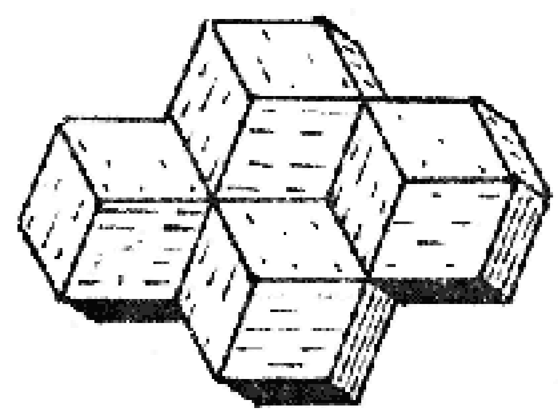
The object of the puzzle is to assemble these five pieces to form a square arrangement, a tetrahedral arrangement, or numerous other shapes, some of which are shown below. A total of 24 different shapes are possible to assemble if mirror-images are included. How many of these can you find? All but four have multiple solutions. The pieces are also fun to just doodle with, hence the name.



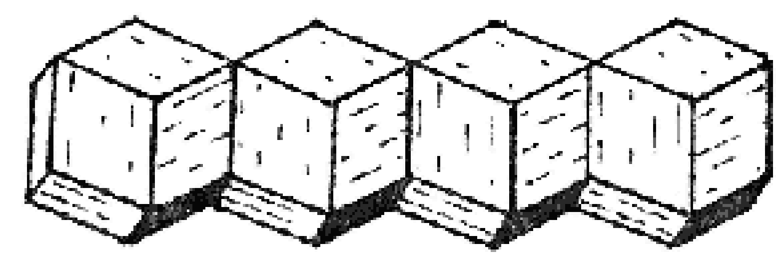
Tetrahedron
1 solution



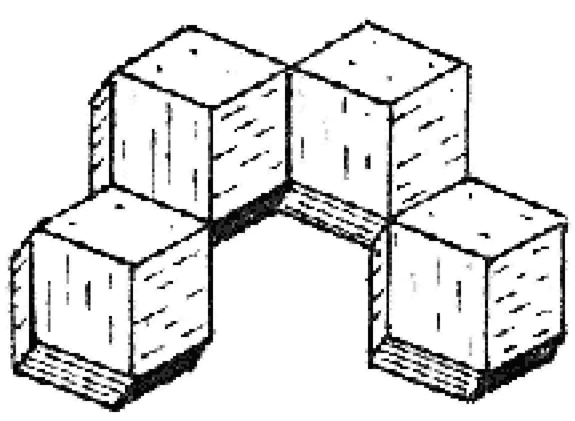
Square
1 solution



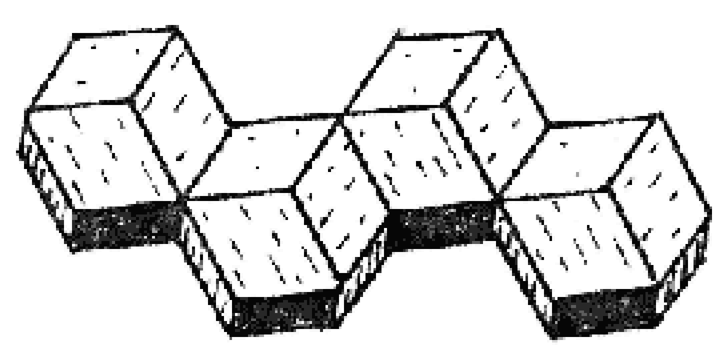
Diamond
6 solutions



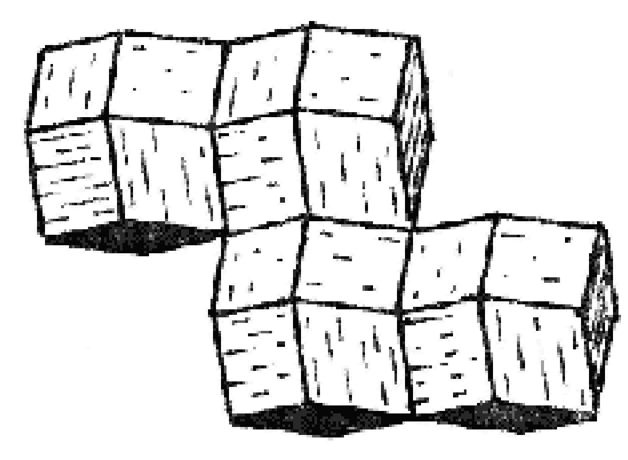
Straight
3 solutions



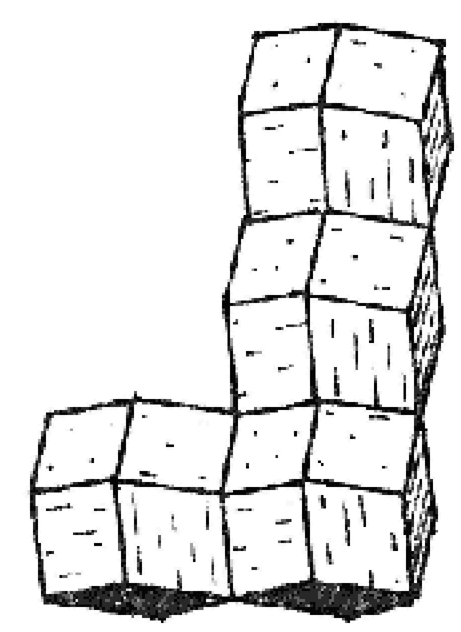
Arch
5 solutions



Snake
6 solutions



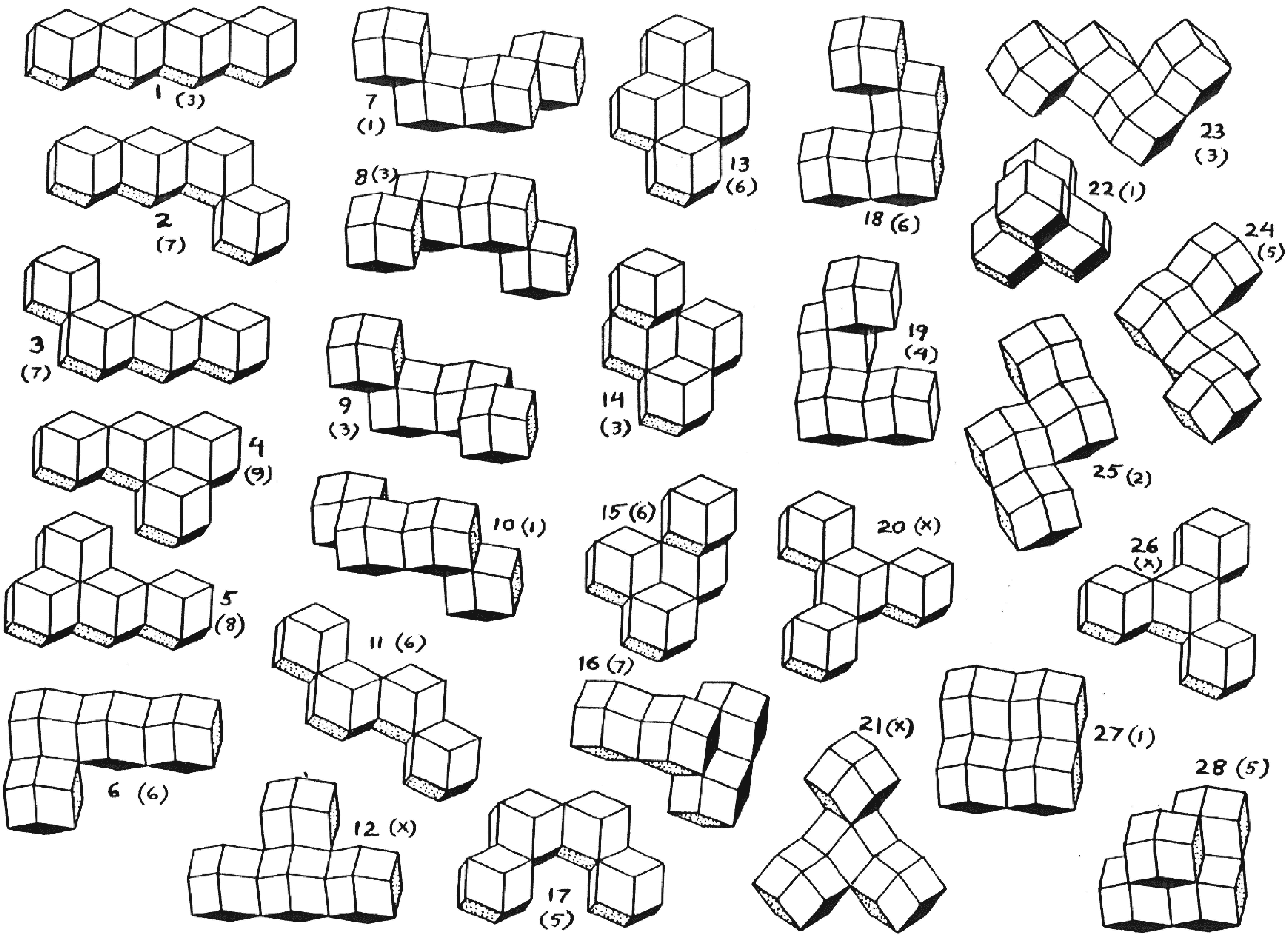
Zig-zag
2 solutions



Angle
6 solutions

For your further information: There are twelve possible ways of joining Pennyhedron half-pieces in pairs that do not have an axis of symmetry. There are theoretically 220 different ways of choosing sets of three such pieces. This particular puzzle set was the result of an arduous search for an optimum design. First, it was required that both the square and the tetrahedral solutions be possible. Many sets have this feature. Secondly, it was decided to consider only those having unique solutions for both of these shapes. Thirdly, for maximum entertainment a set was desired that could be assembled as many different ways as possible. This set can be assembled 108 different ways, which is the maximum number theoretically possible. After a long search, this was the first such set found having all these features. There may or may not be others. Finally, by an extraordinary stroke of luck, this particular set was found to permit coloring of the pieces in such a way that both the square and tetrahedral solutions have color symmetry. The resulting four-color version of this puzzle is thus somewhat easier because of the clues provided by the coloring patterns. The more difficult version uses all one wood.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Nov. 1989



Shown above are the 28 possible ways of joining four rhombic dodecahedra. Four of these obviously cannot be assembled with the Pennydoodle puzzle pieces because they are not serially connectible. All of the other 24 shapes can be assembled with Pennydoodle. The numbers of solutions are shown in parentheses. How many can you solve?

S.T.C.
Nov 1989

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

NOTICE:

In order to be entirely satisfactory, this puzzle requires a fit that neither binds nor is too loose. The mating parts must be made accurate to within a few thousandths of an inch and maintained that way. As shipped, this puzzle has a proper fit, but I do not know what effects aging and changes in humidity may have on it. If any of the connections tend to become too tight, look for telltale shiny spots on the mating surfaces and scrape them with a sharp knife. This should correct the problem. If it does not, the puzzle may be returned for adjustment, replacement, or refund.

The Confessional Puzzle
No. 68

This puzzle, with its twelve identical (or nearly identical!) pieces is my version of the simple burr known as the Altekruse puzzle, after William Altekruse, who patented the design in 1890. To all of you who were expecting me to introduce a new and challenging design for the Seattle Puzzle Party, I apologize for what must appear to be a disappointing reversion to traditional puzzles. But the time flies by, and one does not always accomplish all that one might wish. Furthermore, increasingly enfeebled by the infirmities of old age, both mental and physical, I now find myself apparently no longer able to achieve the precise accuracy for which my puzzles were once noted. After years of working with weird polyhedral angles, I seem to have developed a mental disorder which prevents me from making right angles. Alas, these misshapen pieces are obviously badly out-of-square, and they may not even be all alike. Nevertheless, if you juggle them around the right way, I guarantee that they will indeed assemble into the traditional Altekruse burr, except perhaps slightly askew.

The main reason for supplying this burr disassembled is that I am always trying to discover which of you actually solve puzzles, as opposed to merely acquiring them or regarding them as sculptural objects. When corresponding, please let me know if you have solved this puzzle, and if so how challenging you found it.

An inherent fault of notched wooden stick (burr) puzzles is that they tend to be too loose when dry and too tight when humid, with this burr being no exception. Anticipating high humidity in Seattle in August, it has been made slightly looser than normal, dried, and sealed in a plastic bag. Even so, it may go together rather tightly if the humidity is high. Likewise, disassembly may require some force in exactly the right places when very humid. By storing the puzzle pieces in a drier place for even just a few hours before assembly or disassembly, this problem can be avoided.

STC, July 1994

Stewart Coffin, 79 Old Sudbury Road, Lincoln, MA 01773

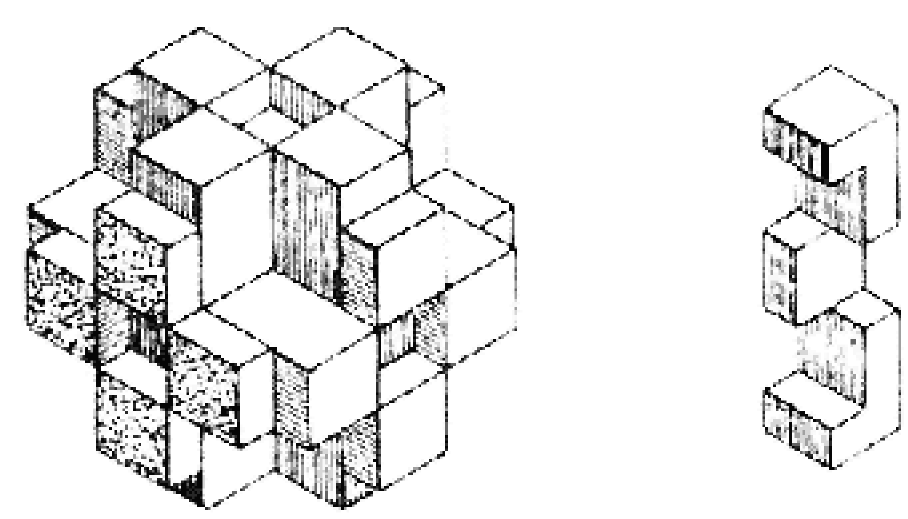
AP-ART

The sculptural art that comes apart

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773
617-259-8348

Analysis and solution to the Confessional Puzzle, No. 68

The Confessional Puzzle is a variation of a familiar 12-piece burr known as the Altekruse Puzzle, after William Altekruse who patented the design in 1890. In the Altekruse version, all 12 pieces are identical. The Confessional Puzzle uses sticks of rhombic rather than square cross-section, and this modification makes the solution ever so much more confusing. As a preliminary exercise to solving this puzzle, I suggest you first master the standard Altekruse Puzzle. It can be found in some puzzle stores, or you can make one by following plans shown in either of my books - *The Puzzling World of Polyhedral Dissections* or *Puzzle Craft 1985.*

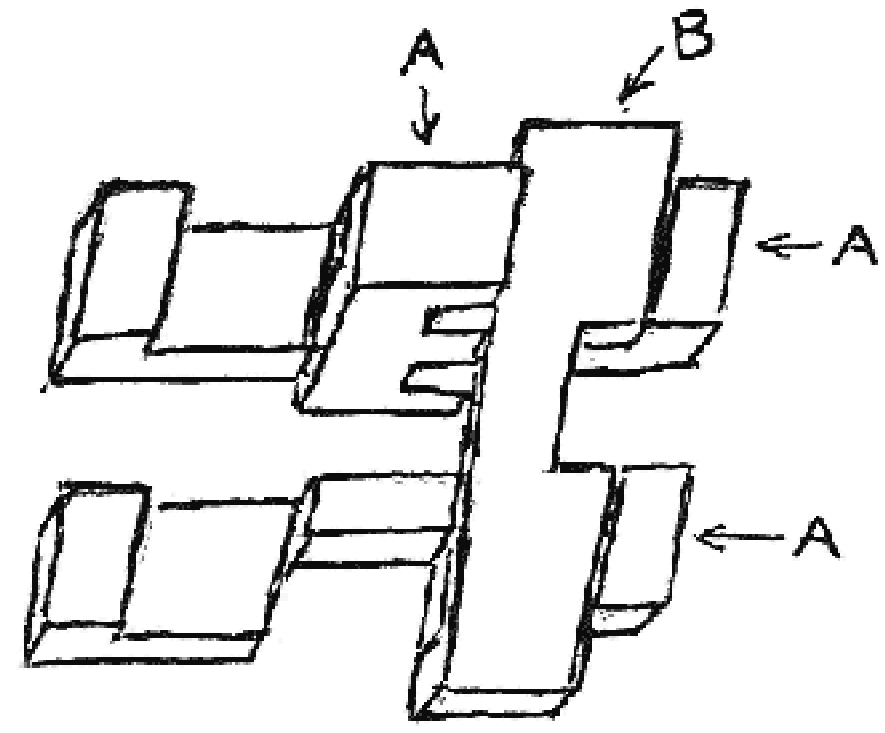


Altekruse Puzzle

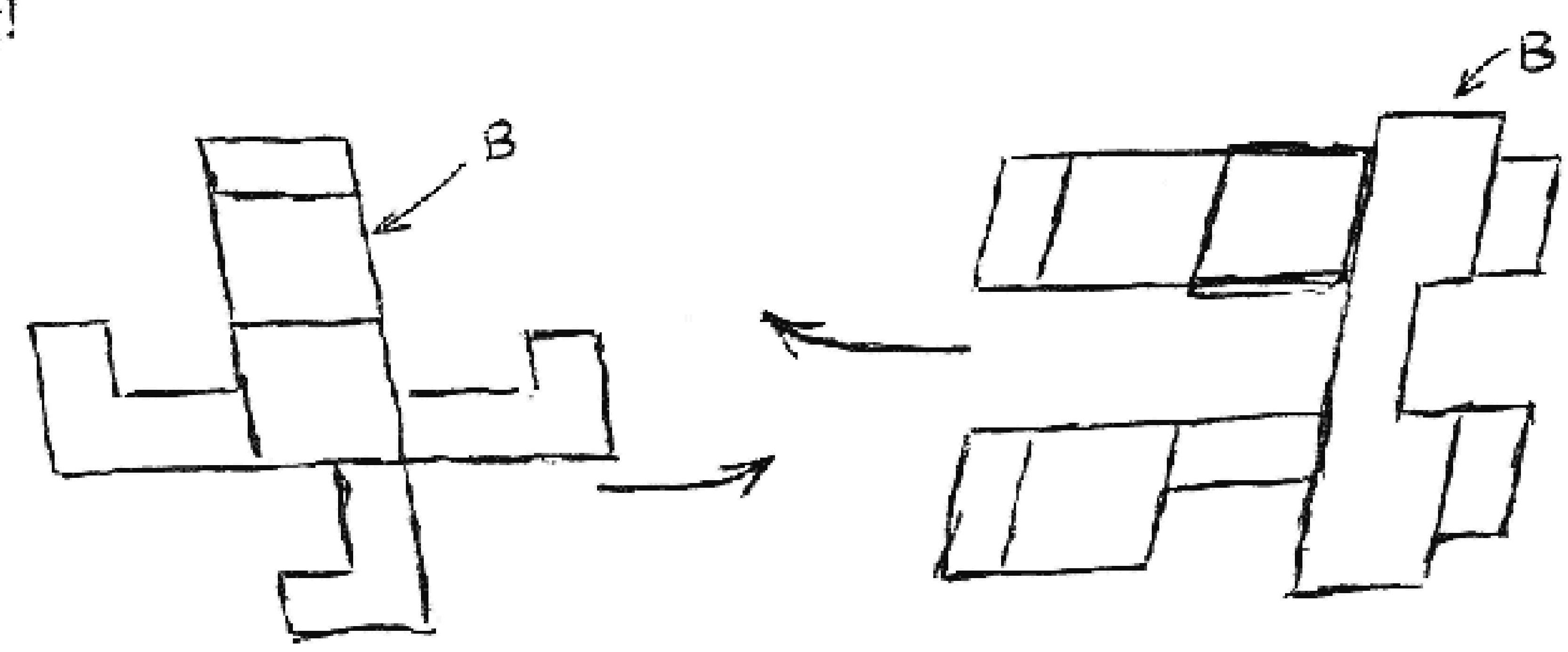
Examine the 12 pieces of the Confessional Puzzle and note that there are eight of one kind, which we will call **type-A**, and four pieces which we will call **type-B.** Now try joining two pieces by their center notches to form a cross, and note that only like kinds of pieces can be so joined, and in only one way. The configuration of the assembled puzzle can be regarded as consisting of six such crossed pairs, corresponding to the six faces of a cube. It follows that four of these crossed pairs will be **type-A** and two will be **type-B**.

Next we consider the location of the two **type-B** crosses in the assembly. There are only two possibilities - either they are adjacent to each other or opposite each other. If adjacent to each other, an assembly is theoretically possible except that there is no sliding axis for the first step of disassembly. Therefore, they must be opposite each other. This consideration leads directly to the one unique solution. There is, however, one tricky step in assembly that, surprisingly, involves a twisting motion.

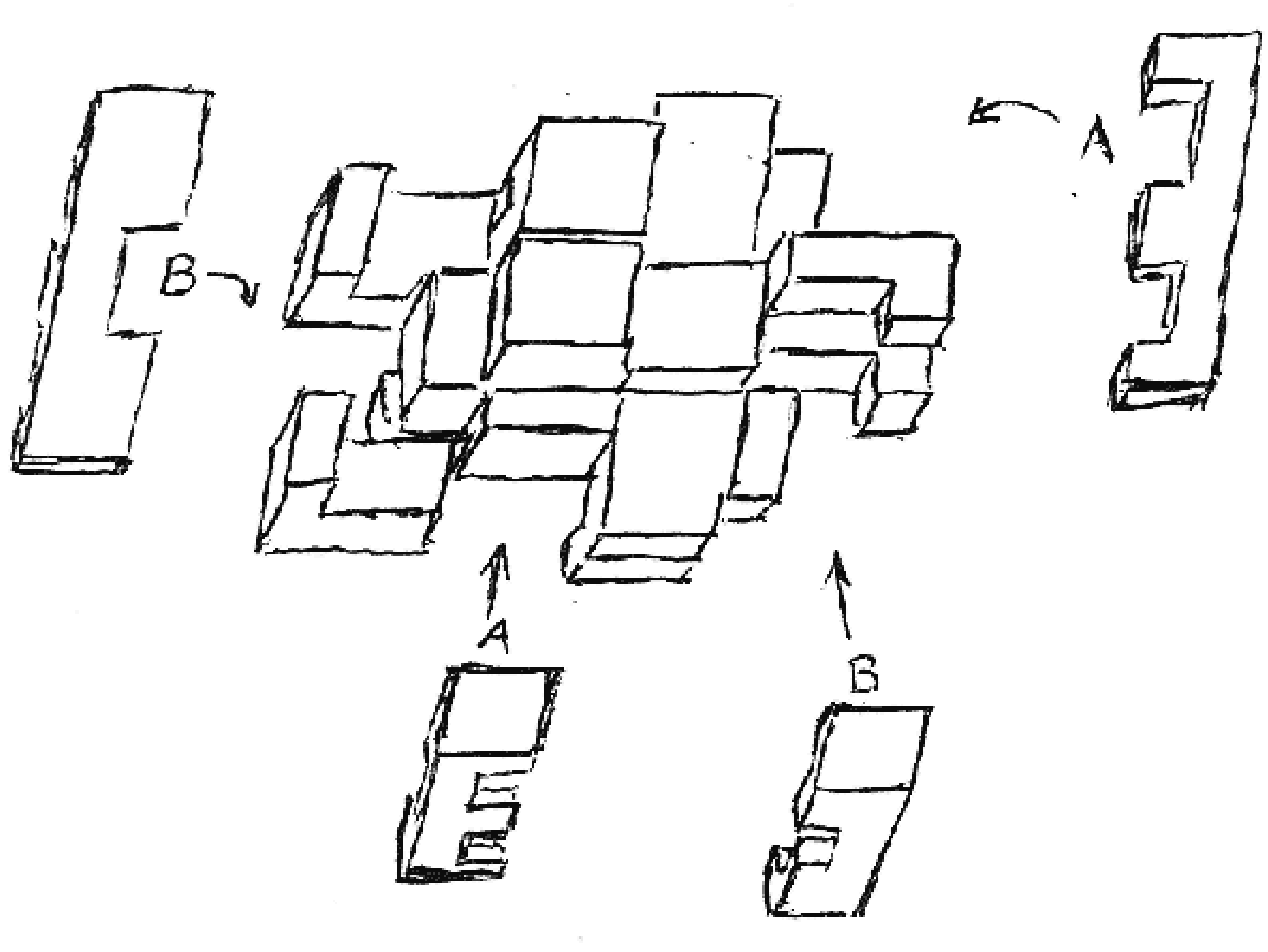
Make two identical subassemblies, each one consisting of three **type-A** pieces and one **type-B** piece, as shown below.



Now position them as shown below and bring them together while rotating them a quarter-turn with respect to each other, as indicated by the arrows. That's right, rotating!



The remaining four pieces then go in the empty spaces, and the two sub-assemblies slide and mesh together to complete the assembly



STC
Sept 1994

AP-ART
The sculptural art that comes apart

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773
617-259-8348

Supplementary instruction sheet for the modified (long) version of the Confessional Puzzle, No. 68-B

It never ceases to amaze me that just when you think you have completely analyzed a particular puzzle configuration, you stumble upon some new discovery, and in this case yet another. I came up with the original Confessional puzzle around January, 1994, while playing around with burr puzzles made with rhombic sticks. Several versions are possible depending upon the mix of pieces. I chose the most perplexing version, which involves the surprising rotation of two subassemblies to assemble, as explained on the solution sheet. I took about 50 of these to the 14th International Puzzle Collector's Party in Seattle in August, 1994, which were sold disassembled and without directions. Several customers reported solving it and only two have requested the solution. But I think that is because solvers are more eager to report back than non-solvers. I'll bet that more than half remain apart.

It has been known for a long time that at least one solution to the standard Altekruse puzzle, known as the symmetrical solution, is possible only with pieces not longer than four times their width (Ed Wallner pointed this out to me around 1970). I assumed incorrectly that such was the case with the Confessional puzzle, and so it was thus produced. Recently, I discovered that it can indeed be assembled with long pieces, by a pair of tricky rotations in the next to last step of assembly. This also makes it much more difficult to disassemble.

Directions: Follow the published solution for the Confessional Puzzle, No. 68, up to the illustration at the bottom of the page, where four pieces remain to go in. Set the two **type A** pieces aside - they go in last. In order to insert the two **type B** pieces, the two subassemblies must be rotated slightly with respect to each other, as was done to assemble them together, first one way to insert one of the pieces and then another way to insert the other piece. This may take some patience. The remaining two **type A** pieces then go in easily. Note carefully that this procedure must be followed in reverse to disassemble - deliberately and exactly. Random pushing and shaking will not likely dislodge these two **type B** pieces.

I have started producing this improved (if that is the right word!) version of the Confessional puzzle in January, 1995, after making 58 of the original short version.

S.T.C.
Jan. 1995

AP-ART
The sculptural art that comes apart

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773
617-259-8348

Stucksticks, No. 71

Two questions that I am sometimes asked are why do I so seldom use multicolored combinations of fancy woods any more, and why don't I hire help in order to produce more puzzles. This sheet addresses both of those seemingly unrelated questions.

I use multicolored wood combinations only when they serve some functional purpose, not just for decoration. Most of my recent designs do not lend themselves to that. For years I have had some colorful woods set aside, waiting for just the right project to use them advantageously This would have been one of them, if only . . . Which brings us to the second question.

My good friends, the Essleys, have a son Karl who is frequently out of work, for reasons that will shortly become all too obvious. I have used him in the past and, having learned nothing from that mistake, decided to do so again. Our latest project was to produce some oversized and precisely made Hexsticks puzzles in four contrasting woods, to be assembled in color symmetry. This was my intention in the original design way back in 1969, which for some unknown reason 3M failed to follow. So here at last would have been the fruition of that idea, in four contrasting colorful woods. Alas, I did not factor in Karl. After making several very nice such sets, this sorcerer's apprentice decided to amuse himself one afternoon by gluing many of the pieces together, and in a seemingly random fashion. What a mess! After all that work and all that beautiful wood, I hated to throw them away, so here they are for you to play with. Perhaps someone can figure out some way to put them together. And would it be expecting too much if possibly there might even be a solution with color symmetry? If anyone discovers such a solution, I hope they will let me know. Who knows but what there may have been some method in Karl's madness after all. One can only wonder what mischief he will think up next!

Note: We managed to salvage a few sets of pieces not glued together, and these are being offered as the companion Four-Color Hexsticks, No. 25-C.

S.T.C., March 1995

72AS

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MAS[illegible]773

To <Deleted>

Two-tiered triacontahedral puzzle

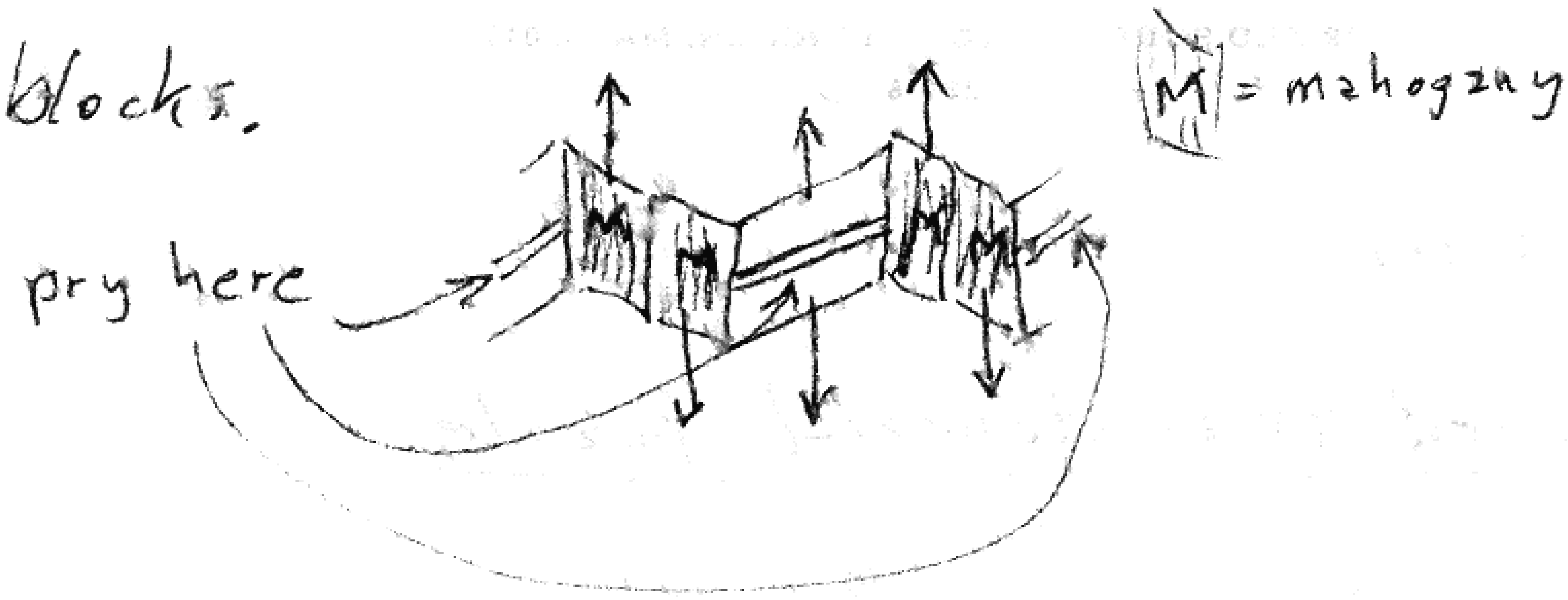
This is my first, and definitely my last attempt to make a two-tiered triacontahedral puzzle. Far too much work to make, as well as not a very interesting puzzle for all that trouble. But ok as a sculpture I suppose.

Assembly is quite easy, as one need only note that all like woods are in matched pairs, and all like pairs are mutually parallel, (same as Jupiter). Some trial and error is required to discover the one correct sequence. To make it even easier, the steps are numbered inside.

Disassembly is actually harder, as it takes some practice as well as a knowledge of the parting axis to place your fingers in exactly the right places. If tight, it is ok to pry gently with a knife blade, noting that the parting line is indicated by the mahogany

(over)

blocks.



Woods are mahogany
satinwood
sumac
purpleheart
tulipwood
rosewood

S.T.C.
12 Mar. 1990

(it is shimmed apart with paper wads for ease of disassembly first time)

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

For <Deleted>

Puzzle No. 72-X

This is a variation on Design No. 72, only one made.

woods are: Rosewood, Tulipwood, Purpleheart, Satinwood, Sumac, Mahogany

The woods are arranged in color symmetry. Each wood defines one axis.

The puzzle separates into two halves, and then each half separates into three dissimilar interlocking pieces. Assembly is easy, as the mating parts are marked inside by letters. You may erase these if you want a harder puzzle. The axis of disassembly is identified as the mahogany axis and is further marked by a birch 1/8" dowel set into one of the vertices: 

S.T.C.
31 Oct 1990

Seven-Piece Third Stellation, No. 73-A

This is a reissue of a puzzle first made in 1985. The original puzzle was called The Third Stellation, No. 73. I believe no more than half a dozen were made, all in mahogany. Here, the name has been changed slightly to avoid confusion, since lately I have made several different puzzles having the shape of the third stellation of the rhombic dodecahedron. This is the only one with seven pieces. This new version uses four contrasting fancy woods arranged in color symmetry, and the size is 20% smaller than the original. There is one other slight change.

The original puzzle never had an instruction sheet or printed solution. Recently I have come to the realization that some persons will not take apart difficult looking AP-ART puzzles if they lack directions, for fear they will not get them together again. What a pity! I would rate this puzzle one of the more difficult I have produced, and accordingly assembly directions of sorts are furnished as follows:

Note that one of the pieces is just a long triangular stick. Set this piece aside, as it goes in last. Now examine the remaining six pieces, and note that each one contains a center block (teak) to which are attached various triangular sticks. For the moment, regard only the eleven triangular sticks attached directly to the center blocks and ignore the other eleven, which are slightly shorter. Take the three pieces with yellow (satinwood) sticks. These three pieces assemble together with coordinate motion. This is exceedingly tricky, as it also involves rotation. When these pieces are correctly assembled, all like colored sticks are parallel to each other, and this applies at each step. See the color illustration on the cover of ***The Puzzling World***, lower right. In this subassembly, the three satinwood arms point straight up. The small piece goes in next, then the large piece, then the remaining sixth piece, always observing the color matching. The key piece completes the assembly and locks the whole thing together.

The first step is a good example of coordinate motion, somewhat like my Three Pairs puzzle, except that it also involves rotation. The remaining steps are a good example of what I call serial interlock, since they assemble in one order only. Furthermore, the whole puzzle could be considered a combinatorial puzzle, since all but one pair of pieces are dissimilar. Very rarely do you find all four of these features combined in one puzzle. Find another if you can!

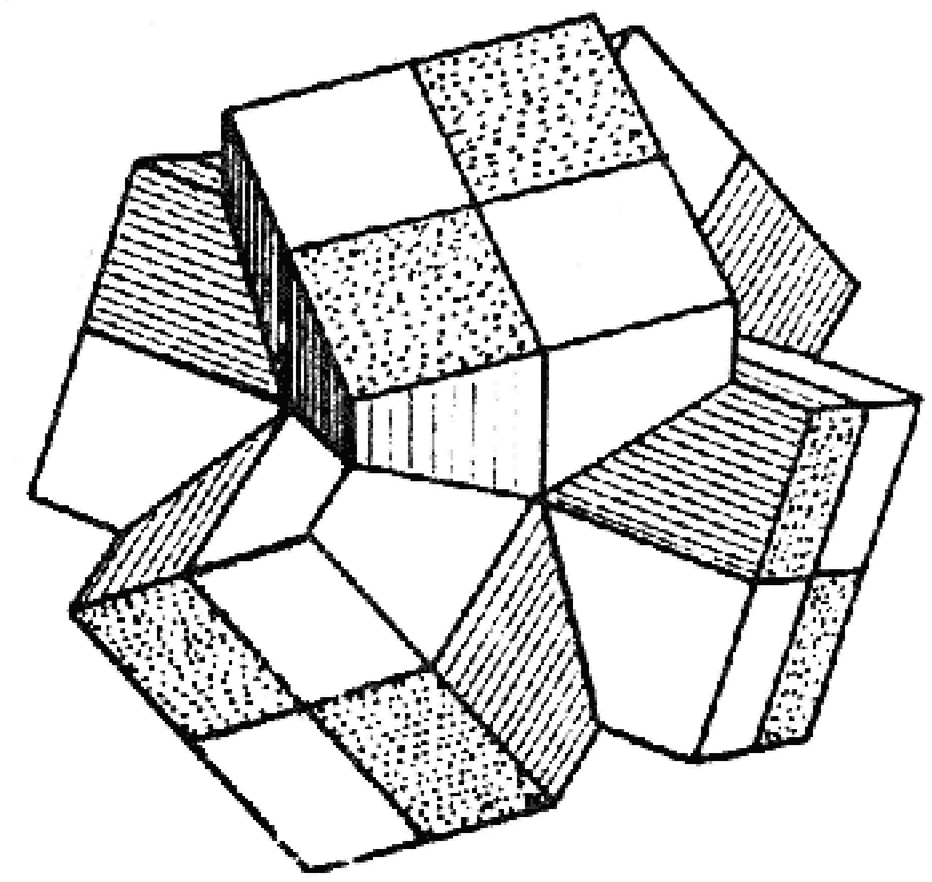
Note that the use of multi-colored woods arranged in color symmetry makes this puzzle easier to solve than it would be otherwise. And you thought that we puzzle designers are always trying to think of ways to make things more confusing. Here we surely have proof to the contrary.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 January 1996

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348



The SQUARE FACE Puzzle

No. 74 and 74-A

Evidently I designed this puzzle during or before 1985, since it appears on the cover of Puzzle Craft, 1985. I may have made and sold three or four of them in mahogany around 1985. As a result of it being published in Puzzle Craft, I received many requests for the puzzle subsequently, all of which I declined, as I did not consider it one of my better designs. Also, I never did undertake to make the necessary jigs for an accurate fit. The puzzle is also described in Puzzling World...

I find some notes in my files dated 1987 showing that I made a complete analysis of the puzzle and found that it had not one but two solutions.

Recently, in cleaning out accumulations of experimental models stashed away in my shop, I have discovered an improved version of the Square Face puzzle that I had nearly forgotten about, now numbered 74-A. Like so many of my AP-ART combinatorial puzzles, 74-A has six dissimilar, non-symmetrical pieces and essentially only one solution. It also features only one confusing diagonal axis of assembly and disassembly. But its most interesting feature is that one step of assembly involves coordinate motion. I do not know of any other practical puzzle design - my own or anyone else's - that combines all of these features in one puzzle. Since it is not too difficult, detailed assembly directions are not given, that you may have the pleasure of discovering this fascinating feature for yourself.

S.T.C.
Nov 1990

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

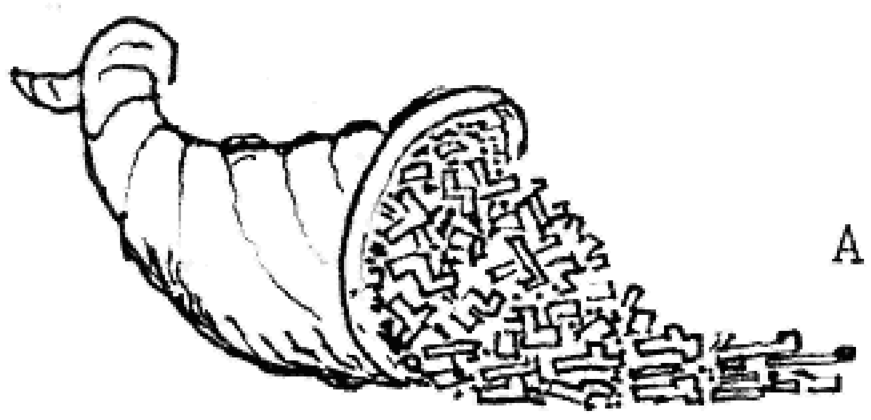
259-8348

for <Deleted>

Experimental two-tiered puzzle, #75-X, mahogany, 1985.

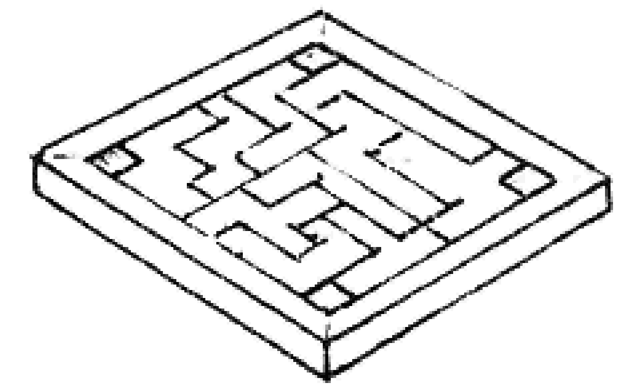
I think this is my best sample of a two-tiered puzzle. It is difficult to make them with a proper fit. This one fits pretty well. It is the only one made of this particular version, and the design is not recorded. It is very difficult to solve. It can also be rather tricky to disassemble but I have inserted paper shims to identify the first step of disassembly. I used it for display for a while, but now it is yours.

S.T.C.
3 May 1991



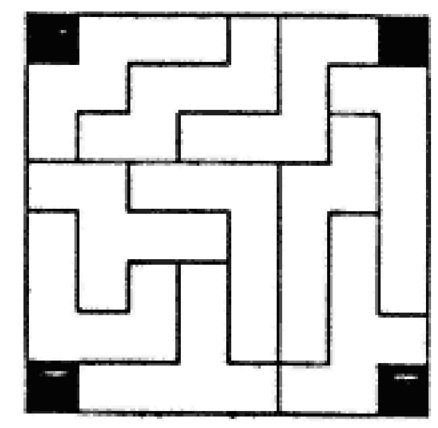
CORNUCOPIA

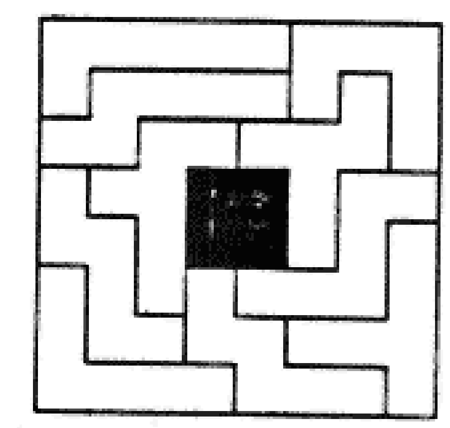
A Coffin-Beeler Production
1985



CORNUCOPIA consists of ten hexomino-type puzzle pieces which fit onto a tricky two-sided tray many different ways. What makes this puzzle series most unusual is that each individual set is custom designed by computer, and no two are alike. That being the case, we can offer to each customer a choice of degree of difficulty and other special features.

Arranging the ten puzzle pieces on an 8x8 tray results in four empty squares. In the standard versions of the puzzle, these vacancies occur in the four corners, and one side of the tricky tray is made to accomodate them (see illustration at right). In the non-standard versions, the vacant squares are located elsewhere (example, far right).





Since there are only 17 hexomino pieces which we define as usable in this puzzle, combinatorial theory states that there are 19,448 possible subsets of ten. Each one of these is being examined by computer to see if it will form any one of thirteen different symmetrical patterns, and if so in how many different ways, (slow work, even for a large computer). Preliminary results indicate probably at least 1000 usable subsets.

The standard versions of CORNUCOPIA all have at least one solution with corners vacant, and a solution diagram is included. They may make many other symmetrical square patterns also, using the other side of the tricky tray, and usually have many rectangular solutions as well - all quite difficult.

The non-standard versions are generally much more difficult, and come with ~~no solution diagram. These are best suited for those who would like to try~~ solving them by computer, (see Scientific American, Sept. 1985).

Each CORNUCOPIA consists of a set of ten puzzle pieces made of 3/4-inch blocks, a two-sided tray, and a four-page instruction booklet. You also get exclusive ownership and all rights to your own unique design, with our guarantee that none other like it will be made or sold to anyone else - ever!

The puzzle may be purchased complete, in fine hardwood, with an oil finish. Or you may purchase it in kit form, with blocks and tray parts to be glued together, with instructions. Or you may purchase just the plans, with instructions and computer-generated design.

This offer must of course expire when we exhaust the supply of usable subsets, whenever that might be. (But we have a sequel now in the planning stage, likewise computer-customized, based on Bill Cutler's analysis of the intriguing six-piece burr and its many variations.)

ORDER BLANK

Finished CORNUCOPIA ----☐	$30.00	postpaid, U.S. & Canada
Kit, with instructions -☐	15.00	"
Plans only ------------☐	5.00	"

Standard version, with solution ---☐
Non-standard version, no solution -☐

(Mass. res. - 5% Sales Tax)

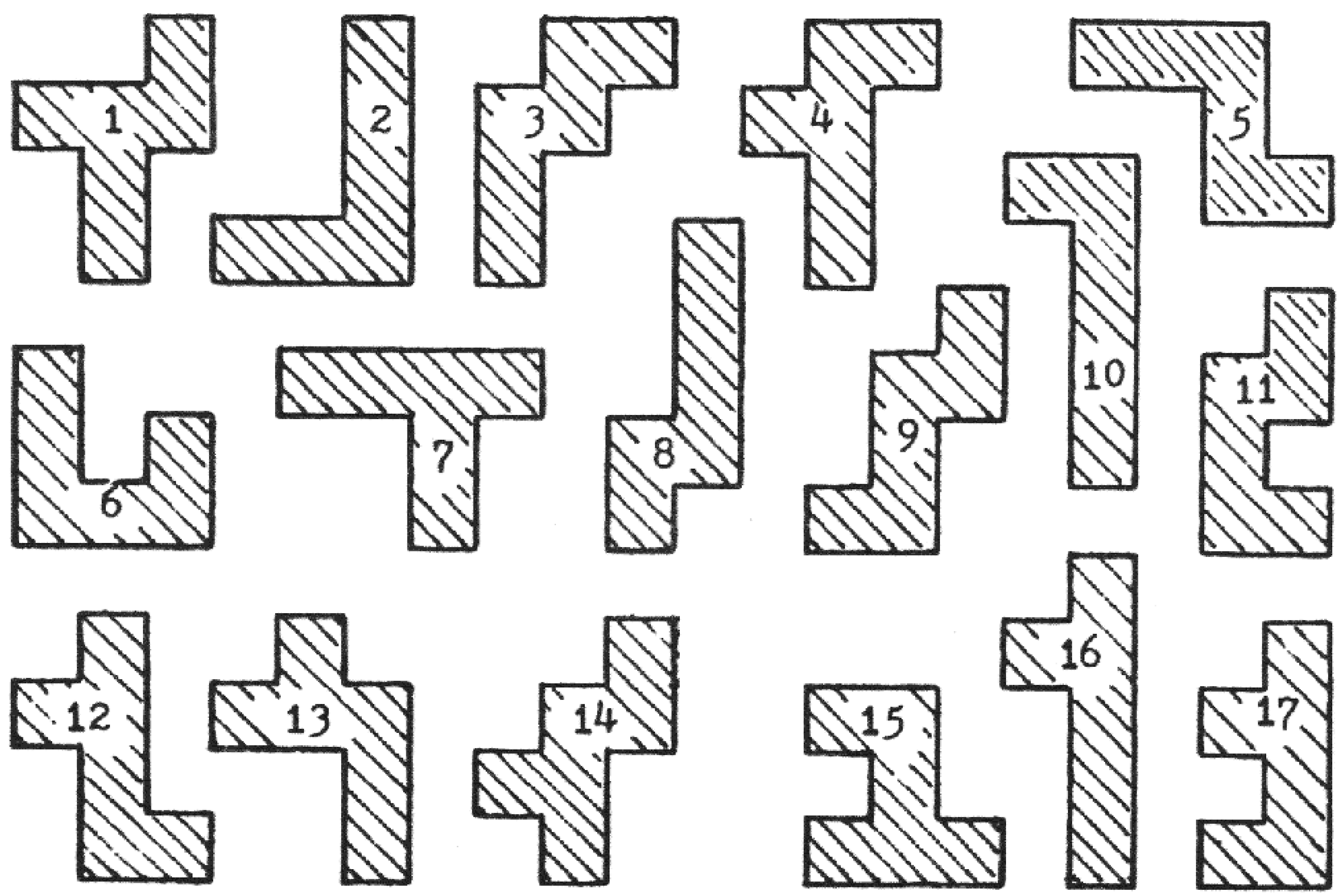
Hard -----------☐
Very hard ------☐
Extremely hard -☐

Name and address:

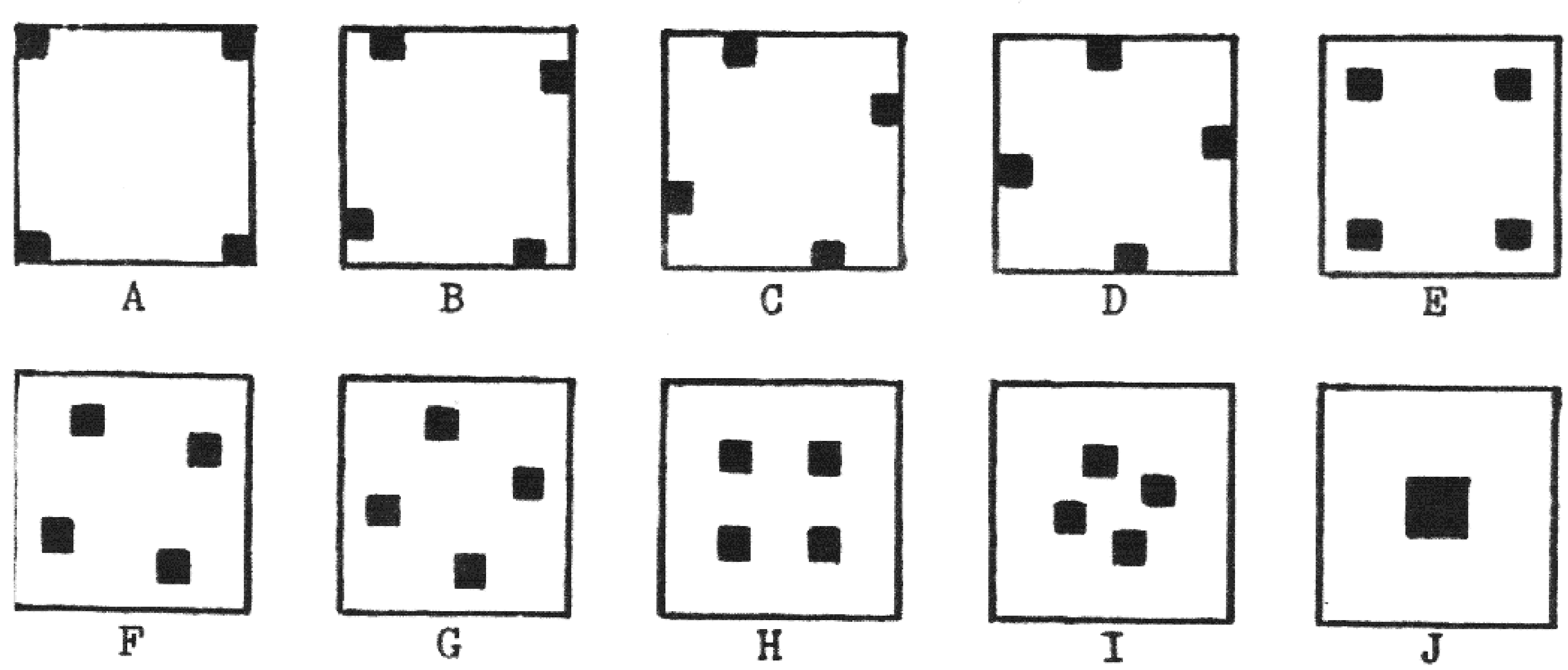
CORNUCOPIA - THE PUZZLE WITH THE TRICKY TRAY (#76)

Puzzles with pieces made up of squares (or cubes) must be just about the ultimate in combinatorial puzzles because they fit obligingly together so many different ways. Countless puzzles have been devised using such pieces. (For more information, see my book *Puzzle Craft.*)

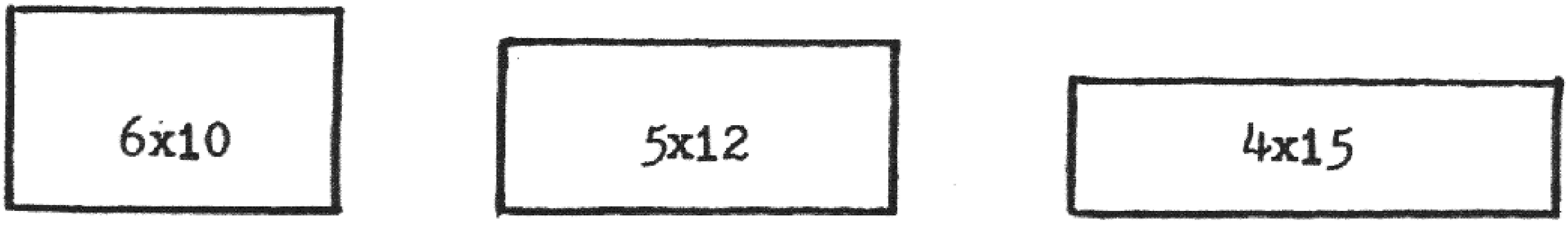
Six square tiles fit together 35 different ways, not counting reflections. If we exclude those which are symmetrical and those which contain a 2x2 square (because they make the puzzle too easy), we are left with a set of 17 pieces, shown below:



Any subset of ten of these pieces placed on an 8x8 tray will leave four empty spaces. These vacant spots may be placed many different ways. Those arrangements having four-fold symmetry are shown below:



Other obvious puzzle problems with such a subset would be the solid rectangles of sizes 6x10, 5x12, and 4x15. (The 3x20 is impossible.)



If you had a complete set of all seventeen pieces to work with, you would find that forming one of these patterns could be easy or otherwise, depending on which particular pattern you were trying.

Easy - A, 6x10

Harder - E, 5x12

Very hard - C, I, J

Extremely hard - B, D, F, G, H, 4x15

If instead of having the entire set of 17 to work with, you first randomly choose your subset of ten pieces and then try to solve one of these pattern problems using only them, the puzzle becomes decidedly more challenging. Combinatorial theory tells us that 19,448 subsets are possible. How many of these are usable as puzzles, how many different patterns will each usable subset make, and in how many different ways? Expert puzzle analyst Mike Beeler fed all these questions into a computer, which is the only possible way of dealing with the truly incredible numbers of possible combinations involved. When the initial results began to emerge, indicating that probably over one thousand usable subsets would be found, we had an inspiration. Make each one different! We guarantee each puzzle set in this edition to be unique. When we run out of usable sets, no more will be sold and the project ends. With the purchase of this puzzle, you also acquire exclusive ownership and all rights to the design (whatever that means!). So far as we know, this is a totally new concept in puzzle making.

(In anticipation that this new idea may really catch on, and the possibility that the demand may exceed the definitely limited supply, please note that we have another similar puzzle in the works based on Bill Cutler's computer analysis of the intriguing six-piece burr and its many variations.)

Each puzzle has its own cryptic identification code. The first number is simply its serial number. The second number, in case you are curious, identifies your unique subset in octal code thusly: Convert the number from octal to binary. For example (14377 becomes 000 001 100 011 111 111, which tells us that this subset contains pieces 13 12 8 7 6 5 4 3 2 1. The rest of the letters and numbers indicate all possible solutions for each possible pattern.

The Tricky Tray is two-sided. Usually one side has the four corner squares blocked, and the other side is the full 8x8, but there are some special cases which are slightly different. Sometimes the full 8x8 side will have a pattern problem marked in pencil. The numbers of possible solutions are usually marked on at least one side of the tray, and sometimes both sides, depending on what is most appropriate for your own Particular design.

For an easy practice exercise, you can just fit all ten pieces on the board any way. We have never computed how many 'ways there are to do this, but they must be in the thousands. Or you can try to discover some new pattern with the empty spaces and compile a library of puzzle problems. If your set is one of those which has rectangular solutions, you may wish to make special trays to hold them.

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773

CORNUCOPIA - the Puzzle with the Tricky Tra

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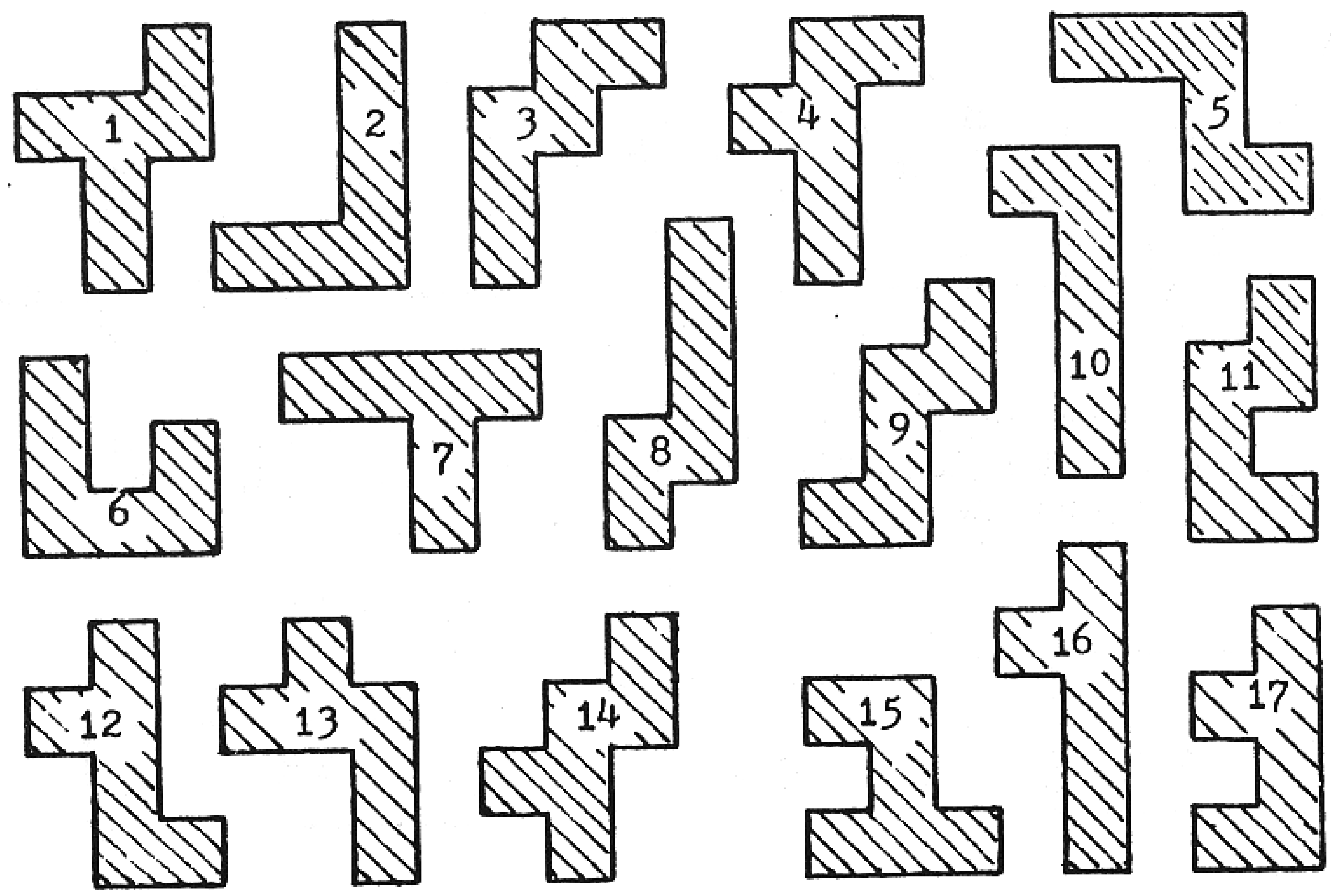

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Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773

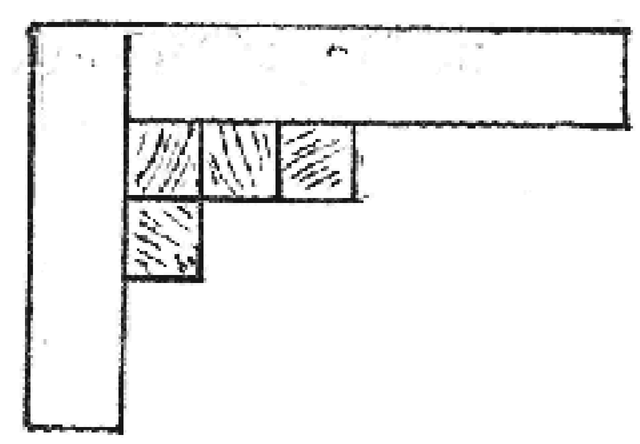
Instructions for Cornucopia Kit

Glue the puzzle pieces first, and assemble the tray last.

The puzzle piece blocks are nominally 0.750 inches square and $\frac{1}{2}$-inch thick. First smooth all rough edges with fine sandpaper. You will need a flat surface to work on. A cutting board or plate of glass is fine, but make sure it is reasonably flat because most are not. Wax it or cover with waxed paper so glue will not stick. Keep it clean and smooth. You will also need an accurate inside right-angle, such as a try square or combination square.

In gluing the blocks, the main thing to keep in mind is that none of them are perfectly accurate, and even if they were, the thickness of the glue joint introduces errors. These may not seem like much, but in puzzles of this sort they can easily accumulate into intolerable amounts, as any puzzle maker is all too well aware.

Use any wood glue, such as Titebond. Do not try to glue up a whole piece at once. Make subassemblies of two or three blocks in a line, using straight edges on both sides to hold them true. First bring them together without glue to see how they fit. With Titebond, you will get an almost instant bond and it is then too late to correct mistakes.



Many pieces can be made by first joining two pairs of blocks together in an L shape using the inside right-angle for accuracy, and then adding two more blocks. Never work by sight. Always use other blocks as gauges.

After the glue has set, sand the pieces top and bottom just enough to true the surfaces and remove glue spills. A belt sander is handy for this.

Now assemble the tray without glue to make sure that the assembled puzzle fits inside with about 1/16-inch to spare all around. If it is too tight, you can sand down the rails. Now glue the tray, measuring carefully or using a square cardboard template to make sure it is square. Hold with rubber bands until the glue sets. Then sand smooth.

In most versions of Cornucopia, one side of the tray is left square, and the other side has blocks glued in the four corners (or sometimes elsewhere). You may also want to make some trays for the rectangular solutions if your particular version has any.

Any wood finish may be used. I prefer Tung Oil diluted with turpentine and rubbed in lightly with a piece of cloth.

....

For more information on woodworking techniques, care and repair, and puzzles in general, please refer to my book Puzzle Craft.

....

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 June 1985

Instructions for AP-ART design 76-B, Cornucopia 107715

This puzzle consists of ten dissimilar pieces and a two-sided tray. One side of the tray is a plain square and the other side is a square with the four corners occupied by square blocks.

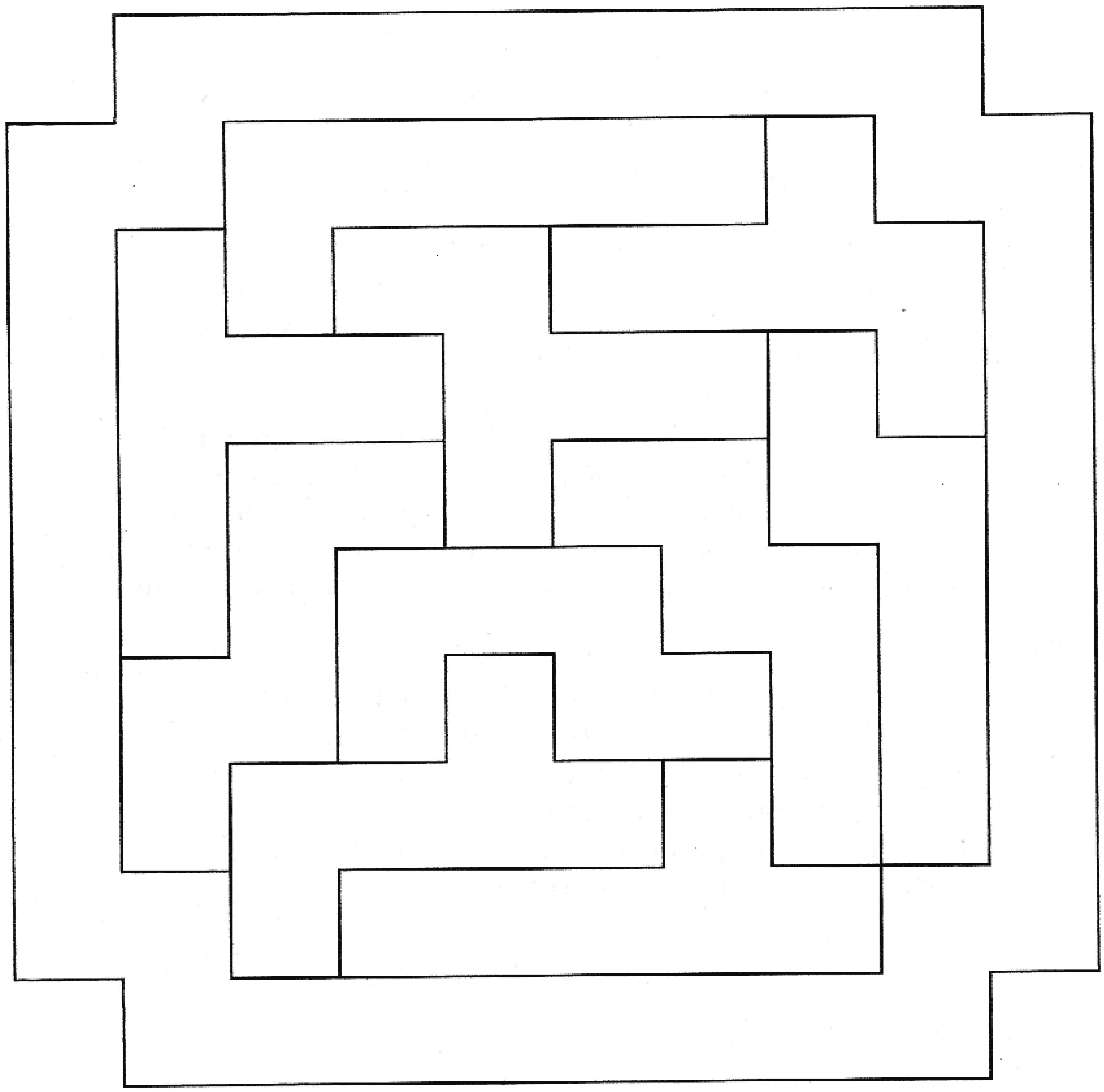
The main object of the puzzle is to assemble the ten pieces onto the side of the tray that has the corners occupied. There is only one way to do this. Note that ten different woods are used for the pieces. Both the solution and the names of the woods are shown on the other side of this sheet.

For an easier problem, assemble the ten pieces on the other side of the tray. There will be four empty squares, and they can be almost anywhere. For a more challenging problem, assemble the pieces so that the four empty spaces form a 2x2 square in the center. There is only one way to do this.

STC, Jan. 2001

Note: This instruction sheet is for a version of this puzzle a few of which were made in ten dissimilar fancy woods in 2001. It is trimmed along the border marked on the other side to fit into the tray. The names of the various woods are then penned in by hand for each individual one.

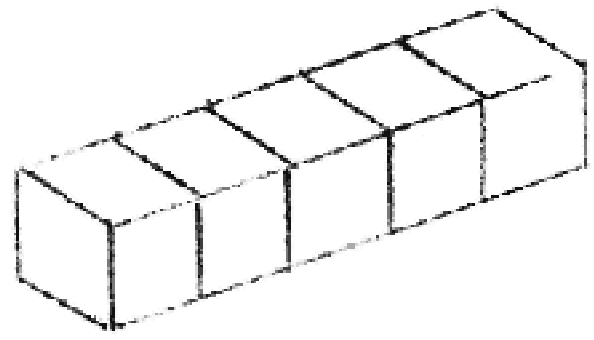
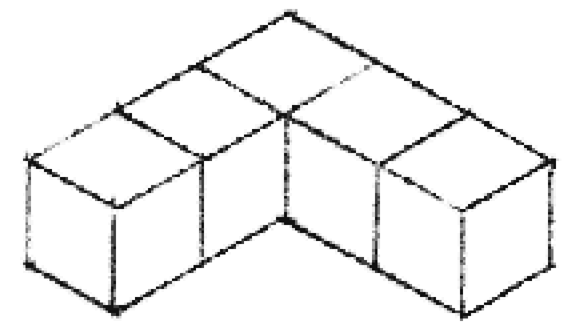
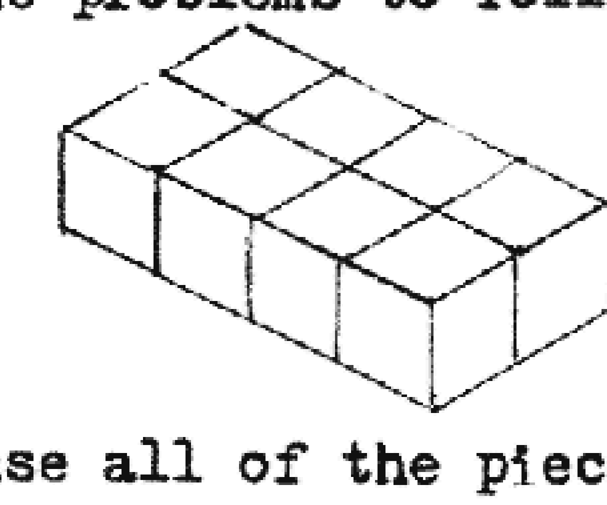
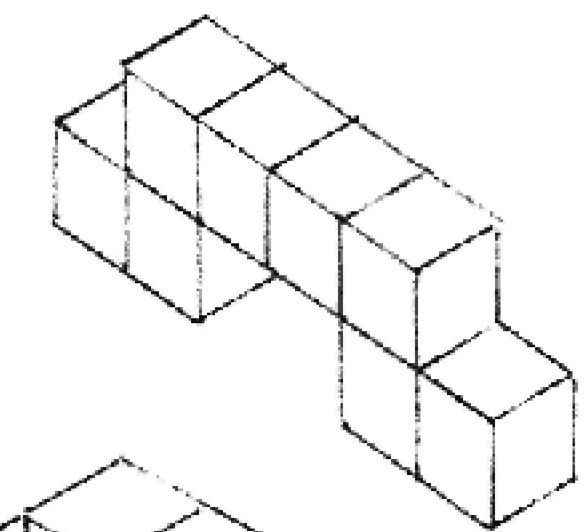
Previously a version of this puzzle was laser-cut by W.H. and used as an exchange puzzle at IPP-16. Prior to that it existed only as a page in both **Puzzle Craft 1985** and **Puzzle Craft 1992**, and before that as a printout of Mike Beeler's computer program.



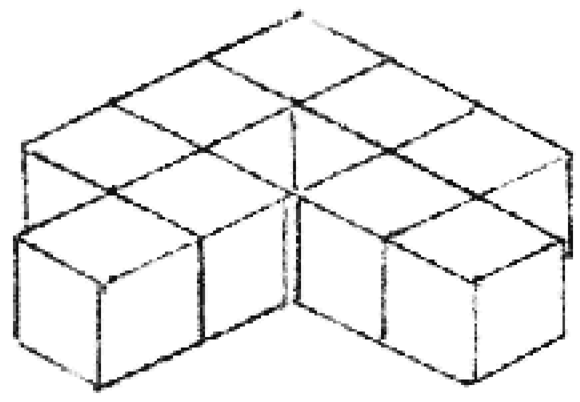
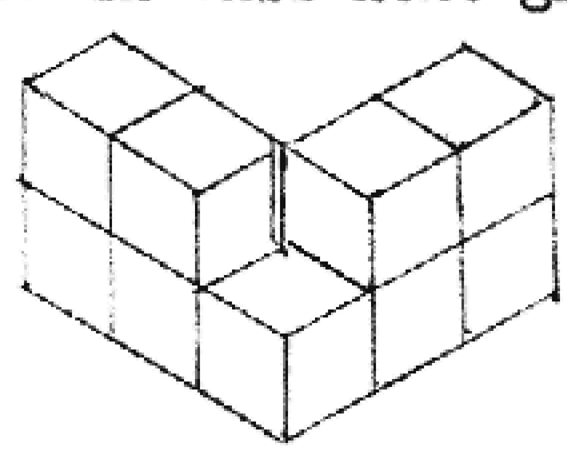
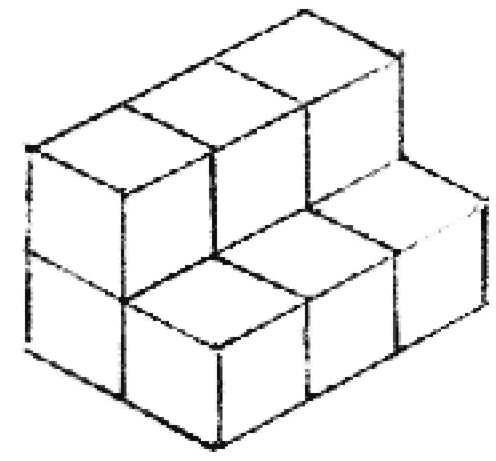
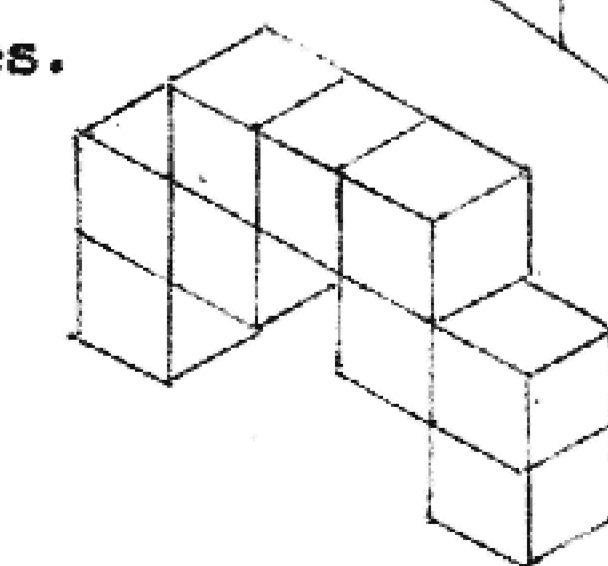
INSTRUCTIONS FOR THE PIECES-OF-EIGHT PUZZLE No. 77

The PIECES-OF-EIGHT Puzzle consists of eight dissimilar full-pieces plus two half-pieces, all of which can be coaxed to fit back into the square box they came in and do a number of other amazing things.

The problem figures in the first group shown below use the two half-pieces and some but not all of the full-pieces. Most of these are quite easy, but they are good basic practice exercises for some of the problems to follow.

The problem figures in this next group use all of the pieces.

Note that all of the problem figures shown above have some sort of symmetry. No doubt there are many others waiting to be discovered. See how many you can find. Or, if solving more problems does not suit your fancy, just doodle with the pieces and see what interesting new shapes emerge. Sketch your favorite ones and invent appropriate names for them.

Now for some real puzzlers! Set the two half-pieces aside and see how many of the problem figures shown on the opposite side of this sheet you can do using just the full-pieces. Again, note that all of the figures shown have some sort of symmetry. No doubt you can discover many others, with or without this property.

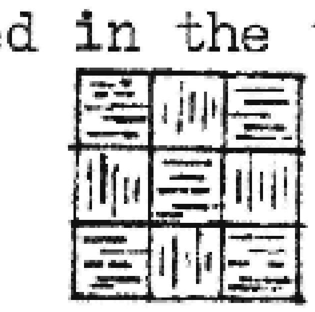
What other sorts of problems can be invented for this puzzling set of pieces? The only limit is your imagination. Here is one example: Tape the two half-pieces together to make B piece and set the A piece aside. Now assemble this new set - B,B,C,D,E,F,G,H - to form the cube. There is essentially only one solution and it is hard! Try to discover other problems which have only one solution.

Finally, put the pieces back into the square box again. There are two distinctly different solutions. In one of them, the two half-pieces are joined together to make a cubic block, not connected to the other pieces. In the second solution, all of the pieces are joined together in one continuous chain. Can you solve both of them?

Supplementary Instructions for the Improved (1989) Version with Grain Symmetry

All of the above instructions also apply to this improved version, which is mechanically identical to the original. The difference is in the direction of woodgrain. Examine the two half-pieces and note that they are opposites with regard to the direction of grain. Call them type A and type B. Then four of the full-pieces are type A-B, two are type A-A, and two are type B-B.

Although you may not have noticed, as delivered assembled in the tray, the top face had a symmetrical grain pattern like this:
See if you can reconstruct it. It is not too difficult.
There is essentially one way with minor variations.

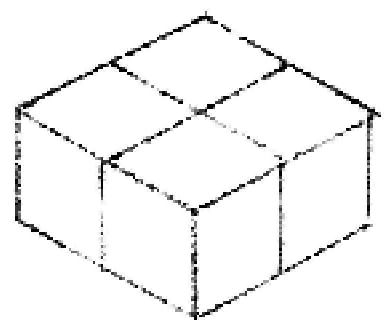


Now for the big challenge! Try to assemble the eight full-pieces into the CUBE such that each face shows identical four-fold symmetry of woodgrain. There is only one way.

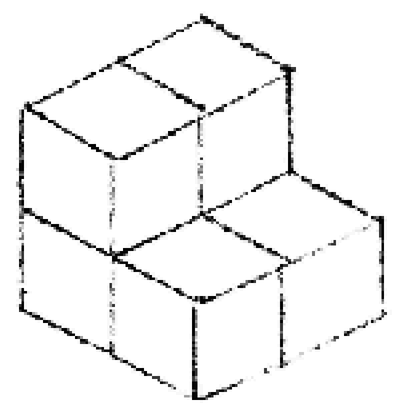
For your further information: there are theoretically 2^{16} or 65,536 ways of combining A and B into a set of eight whole-pieces, but because of symmetry considerations, this reduces to 5832 distinctly different sets. Of these, this particular set is the one and only one that produces a unique solution with symmetry.

S.T.C. Jan. 1990

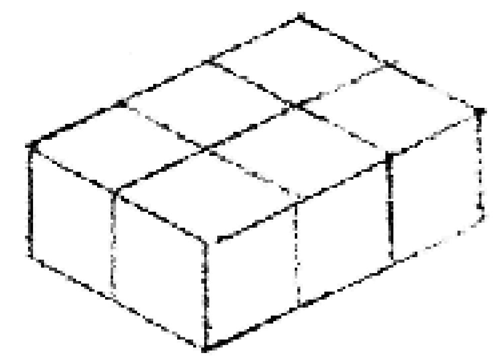
Problem figures for the Pieces-of-Eight Puzzle using only the full-pieces, joined together in a closed loop.



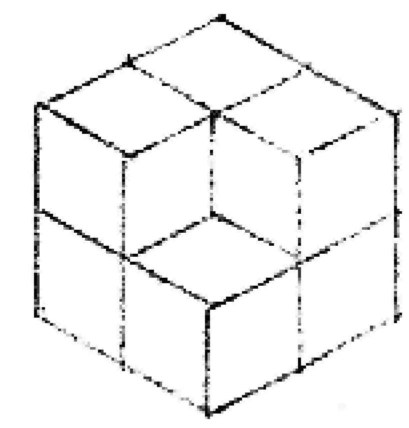
SQUARE - the only figure possible using 4 pieces



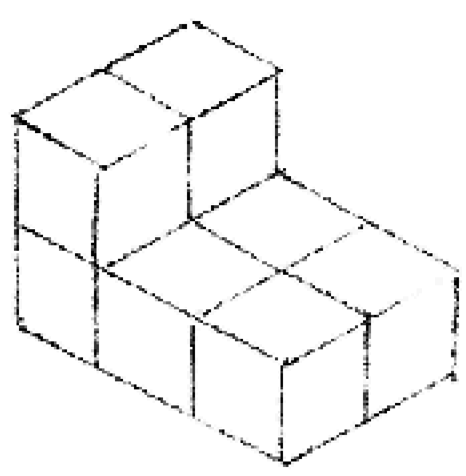
CHAIR
6 pieces



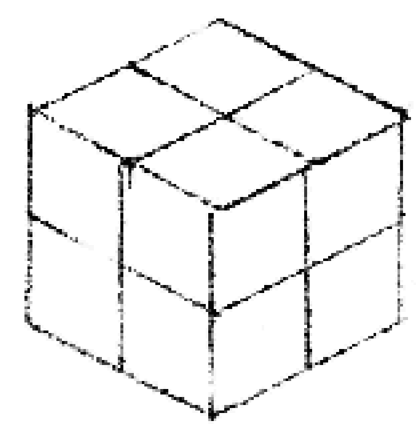
TWO-by-THREE
6 pieces



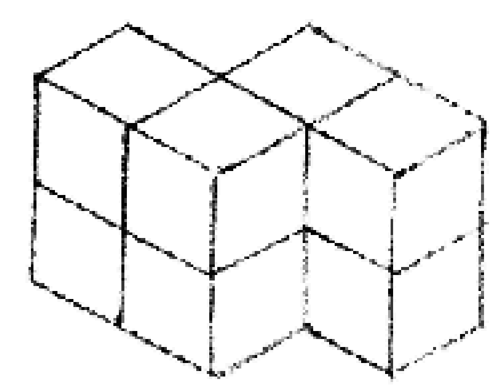
TWIST
6 pieces



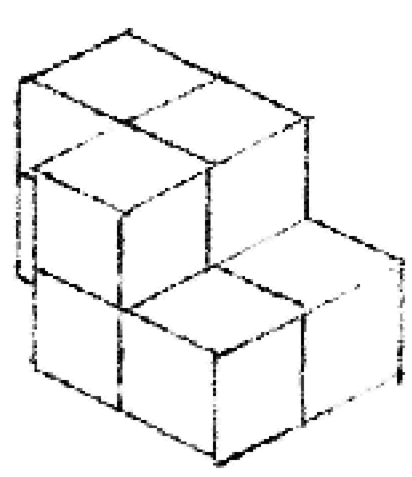
BED



THE CUBE!
Has 11 distinct solutions (not counting reflections)

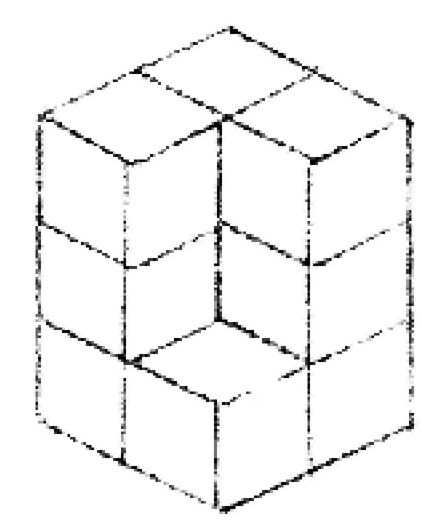


ZEE



YOU-NAME-IT

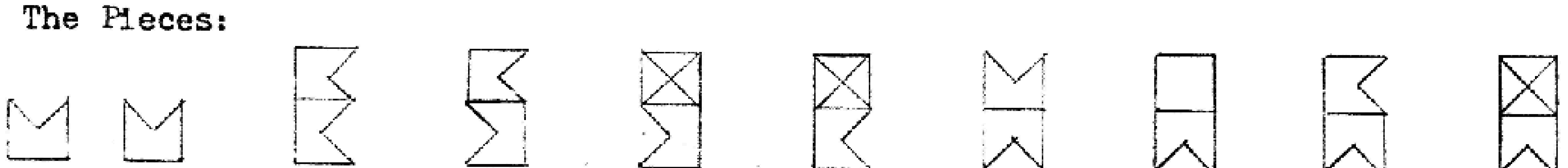
Now try to invent some new problem figures of your own



LEANING TOWER

....

The Pieces:



Half-Pieces A B C D E F G H

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773

SUPPLEMENTARY INSTRUCTION SHEET FOR THE PIECES-of-EIGHT PUZZLE

In the belief that most persons do not care to read lengthy and complicated instructions, the condensed instruction folder for the Pieces-of-Eight puzzle contains just seventeen fairly straightforward problem figures and a few other puzzling suggestions. If you become as fascinated with this puzzle as I think you will, then you will probably want to see what other interesting problem figures can be constructed. Please send me a sketch of your favorite ones for possible inclusion in a revised and expanded instruction booklet.

Solving puzzles of this sort usually involves a combination of trial and error, intuition, logic, and systematic analysis in varying proportions depending upon the nature of the puzzle and the solver. Some puzzles are designed deliberately to discourage random trial and error and to encourage the solver to think. Even better is when this property is an inherent characteristic of the puzzle. Pieces-of-Eight is a good example of a thinker's puzzle, and probably the best I have yet discovered. A fascinating aspect of this puzzle is that as you solve even the simplest of problems, you build up a store of knowledge which becomes useful in solving more difficult problems later - the essence of science and mathematics. (If only junior high school students could be exposed to real problems like these instead of an entire year of Euclidean geometry. No wonder math is the most hated subject in school!) An entire book could probably be written on just the ins and outs of this puzzle, once they become known. Following is just a sampling of ideas which might be pursued:

1. Using just the two half-pieces, find all the different ways that they may be joined. You will of course arrive at the eight full-pieces, but this exercise can be instructive.

2. Using just the full-pieces, prove that four pieces are the fewest number that may be joined together. (It is to be understood that the only constructions allowed are those which consist of complete cubes with no disconnected joints.) Prove that the SQUARE is the only such possible figure. Can two separate SQUAREs be made using all eight full-pieces? Which piece must always be used in the SQUARE?

3. Prove that the TWO-by-FOUR is impossible using just the eight full-pieces. (Problems of this sort can always be solved by systematically trying every piece in every possible combination, but one should always look for shorter and more elegant ways using logic, which in this case should tell you what other similar shapes cannot be made for the same reason.)

4. Prove that all figures using just the full-pieces must use an even number of pieces.

5. Using six full-pieces, can any figures be made other than the three shown in the instruction folder?

6. Find all of the figures which can be constructed with the set of eight full-pieces. How many of them have some sort of symmetry?

7. For all of the problems mentioned, how many distinct solutions are there for each one?

8. Which piece can never be used in the TWIST? Which pieces must always be used in the TWO-by-THREE?

9. In THE CUBE, there are two pieces which must always have the same position with respect to each other. If you can discover which two they are, the analysis of THE CUBE is much easier. There may be other shortcuts too.

10. The two half-pieces and six of the full-pieces have reflexive symmetry, i.e. they look the same when seen in a mirror. The other two full-pieces are a reflexive pair. Which ones? It necessarily follows that any solution must have a corresponding reflexive solution or be self-reflexive. These are not counted as separate solutions.

11. If each piece were one solid color, is there any way of coloring them and assembling them such that each face of THE CUBE has four different colors? If not, how close can one come? Five out of six? Four out of six? What are the corresponding fewest numbers of different colors required, and how would the pieces be colored? Is there more than one solution?

12. If each face of each piece is colored individually, obviously there is no problem having four different colors on each of the six faces of THE CUBE using only four different colors. Can you find such a coloring which has only one solution, or one which has many solutions?

13. Are there interesting color problems for any of the other figures shown on the instruction folder? (Note - as I write this, almost none of these color problems has been given much study and I do not know the answers. Same applies to many of the other questions listed here.)

14. What interesting new problem figures could be constructed with <u>two</u> sets of eight full-pieces?

15. Suppose that three half-pieces rather than two were joined together to make puzzle pieces. How many such pieces are there? (What fascinating problems could be fashioned around them!)

16. The question of joining three half-pieces in a straight line has already been given some study. There is at least one interesting puzzle which could be constructed using twelve or fourteen such pieces. The pieces could be all identical, but the puzzle would be considerably more intriguing if they were not. Can you figure out what this puzzle would be? Larger constructions and many variations would also be possible based on the same idea.

17. The Pieces-of-Eight Puzzle is based on the dissection of the cube. What other space-filling geometrical solids can be dissected in similar fashion and joined to make puzzle pieces? One of these is the rhombic dodecahedron, which can be dissected two different ways. One way is essentially the same as that used in the Pieces-of-Eight Puzzle, but there the similarity ends. The two halves may be joined face-to-face twelve different ways to make assemblable non-symmetrical puzzle pieces. A subset of six such pieces has been discovered which will construct many beautiful geometrical figures, most of which are very difficult and confusing, (described in my book <u>Puzzle Craft</u> as the Peanut Puzzle). The alternate dissection of the rhombic dodecahedron produces two reflexive halves with three-fold symmetry, (see the Pennyhedron Puzzle, also in <u>Puzzle Craft</u>), and these half-pieces may also be joined in pairs many different ways to make puzzle pieces equally confusing. (Incidentally, a cube may also be dissected in this fashion, and the possibilities of joining such half-pieces has not been studied at all yet.) Likewise, the two-piece dissection of the truncated octahedron awaits investigation.

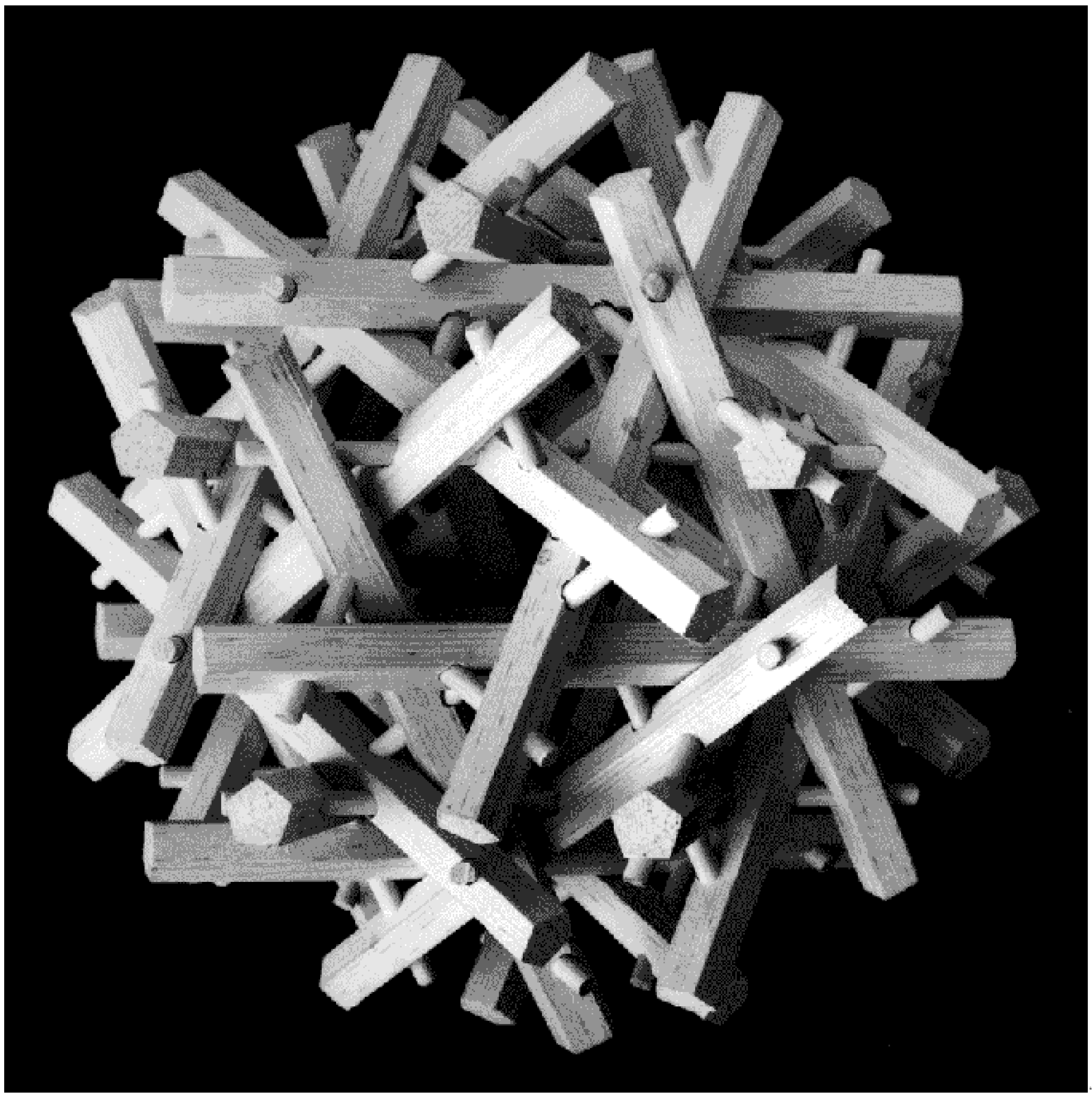
Some of these puzzle pieces just described would be difficult and expensive to make accurately in wood. I will be making a limited number of Pieces-of-Eight Puzzles in hopes of generating some interest in this truly fascinating puzzle. Then perhaps it could be manufactured in plastic, with the even more intriguing Peanut Puzzle as a sequel.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Sept. 23, 1986

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348



Instructions for Design No. 80 - Thirty Pentagonal Sticks and Dowels

This design is a logical extension of the Pin-Hole Puzzle and Locked Nest Puzzle and completes this family. Each of the thirty identical pentagonal sticks has seven holes. (Other versions are possible having three, five, or nine holes.)

Assembly should not be too difficult using the illustration. Note that if elbow pieces were used, as in the Locked Nest, it could be turned into an exceedingly difficult puzzle. If some of the dowels are found to be too tight, they may be sanded or waxed, or better still, the holes can be reamed through in the assembled state using a $\frac{1}{4}$-inch chainsaw file.

Note the beautiful symmetries and other intriguing properties of the structure. If extended along any axis using longer sticks and dowels, the design repeats itself indefinitely in the form of a chain.

This design had been stored in the back of my mind for ten years. It is mentioned on page 49 of Puzzle Craft. I finally had to make one to photograph for my new book. Having gone to the trouble of making the necessary drilling jig, and finding the assembly more intriguing than I had imagined, I am making about half a dozen of them at this time for distribution.

S. T. C. - July 1987

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

The Two-Three Puzzle

Design No. 81-A

This puzzle consists of three hexagonal sticks and three round dowels. Each stick has two holes.

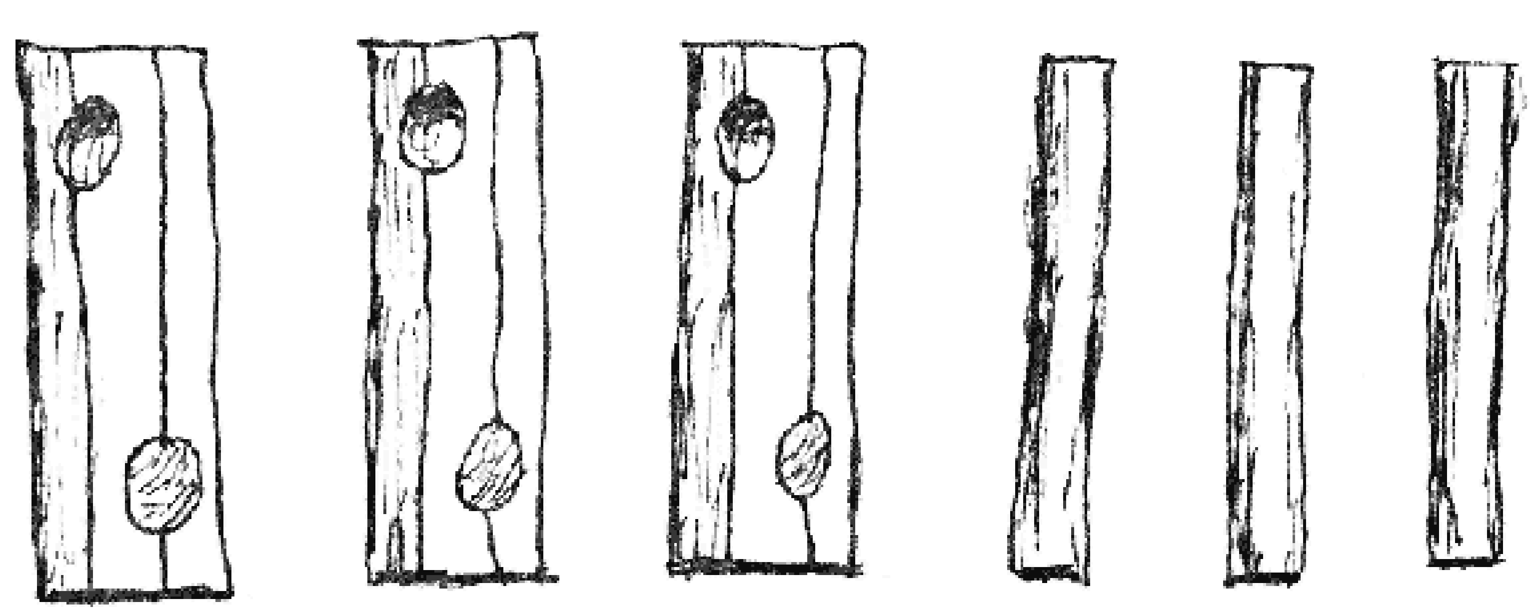
There are two solutions. One solution uses two sticks and two dowels and has twofold symmetry. The second solution uses all six pieces and has threefold symmetry. In both solutions, each dowel passes through two holes, and the assembly is rigid.

It is surprising that so simple a puzzle could be so confusing. Discovering or being shown one solution is no help in doing the other solution - quite the contrary. Thus, an entertaining way of playing this puzzle is to give it to someone assembled one way and ask that the other solution be found with one stick and one dowel removed or added, as the case may be.

This puzzle will be described and illustrated in my new book. The solutions are not shown here because doing so would make the puzzle too easy and rather defeat its purpose.

Note that many other variations of this puzzle idea are possible using more pieces and sticks with three or more holes. With a large number of pieces it might become rather more of a geometrical construction set. With twelve sticks having at least three holes each, solutions resembling the Locked Nest Puzzle are possible. Even larger assemblies are also possible.

S. T. C.
Nov 9, 1987



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STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

The Four-Legged Stand Puzzle

Design No. 81-B

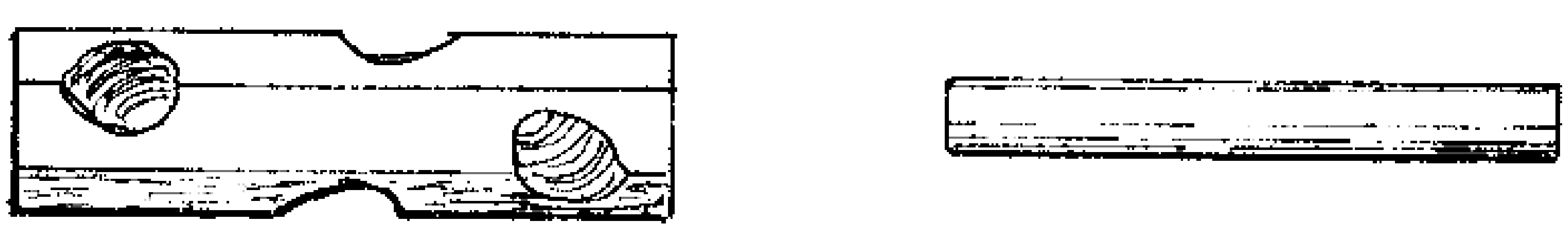
BIRCH

This puzzle consists of four identical hexagonal sticks and four round dowels. Each stick has three holes.

The object of the puzzle is to assemble all eight pieces such that all of the holes are occupied by dowels. The resulting assembly will be rigid, will have fourfold symmetry, and will rather resemble a four-legged stand for a flower pot or table top.

Note that pieces from this puzzle may be combined with those from the Two-Three Puzzle, No. 81-A, to create many hybrid solutions.

S. T. C.
Nov 9, 1987



four of each

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

Design No. 81-B and No. 81-B-1

The Four-Legged Stand Puzzle

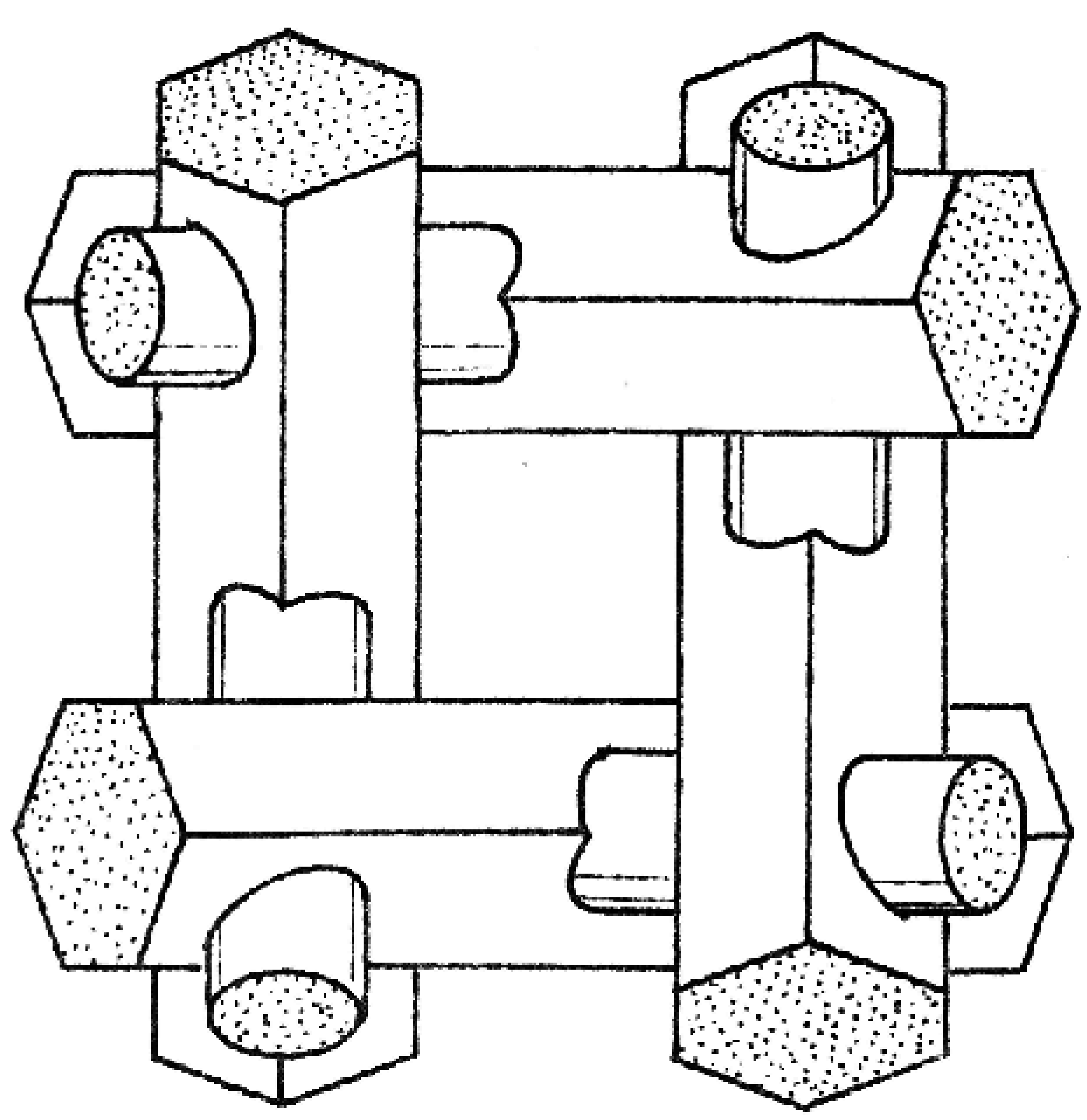
This puzzle is made up of four identical hexagonal sticks and four round dowels. Each stick has three holes.

The object of the puzzle is to assemble all of the pieces such that all of the holes are occupied by dowels. The resulting assembly will have fourfold symmetry, as illustrated below.

The original version of this puzzle consisted of the four sticks and four dowels as eight separate puzzle pieces. It was supplied disassembled with no illustration and no directions other than that which is given above.

In the modified and improved version of this puzzle, Design No. 81-B-1, one stick-dowel pair is joined together to form an elbow piece and another pair is joined together to form a cross piece, so now there are only six puzzle pieces. This makes the puzzle rather more interesting.

Note that pieces of this puzzle may be combined with those of the Two-Three Puzzle, No. 81-A, to create hybrid solutions.



S.T.C.
Nov 17, 1987

Design No. 81-C

The Double Four-Legged Puzzle

This puzzle consists of eight identical hexagonal sticks and eight dowels. Each stick has four holes.

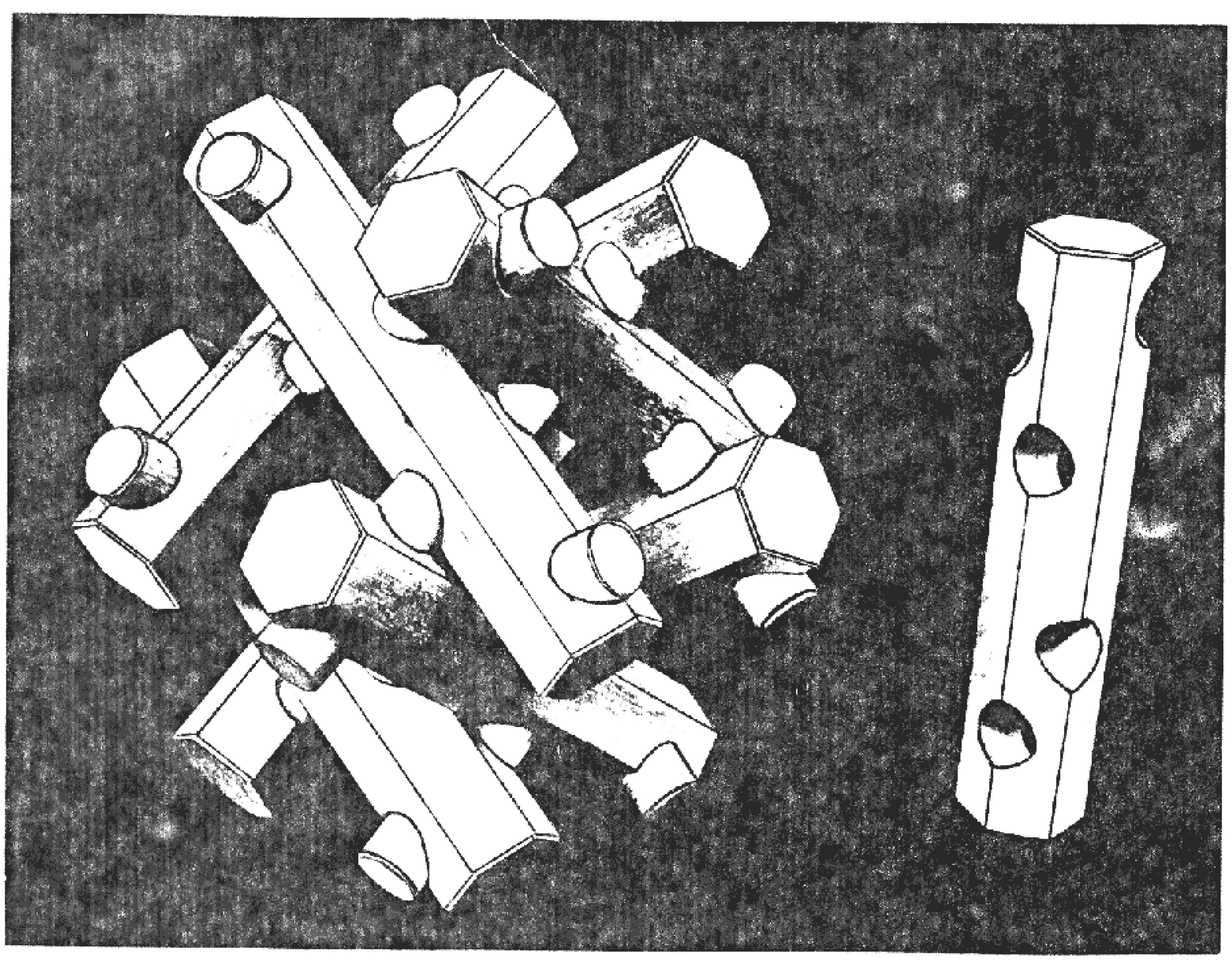
It was designed and constructed simply to illustrate a point in my new book. In short, it combines the geometry of both the Locked Nest Puzzle and the Cuckoo Nest Puzzle. It can also be thought of as two Four-Legged Stand Puzzles back-to-back.

Without the illustration, it might make an entertaining assembly puzzle. With the illustration at hand, it is obviously quite easy.

Design No. 81-C-1

This is a modified version of the above in which four pairs are joined to form elbow pieces. This in turn has its sub-variations, since two different kinds of elbow pieces are possible. In the standard version, all four elbow pieces are identical and there is essentially only one solution. (Who wants to analyse all possible variations and send me the results?)

S. T. C.
Nov 30, 1987



79 OLD SUDBURY RD.   LINCOLN, MASS. 01773

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 0177?

The Pentagonal Stand Puzzle

Design No. 83

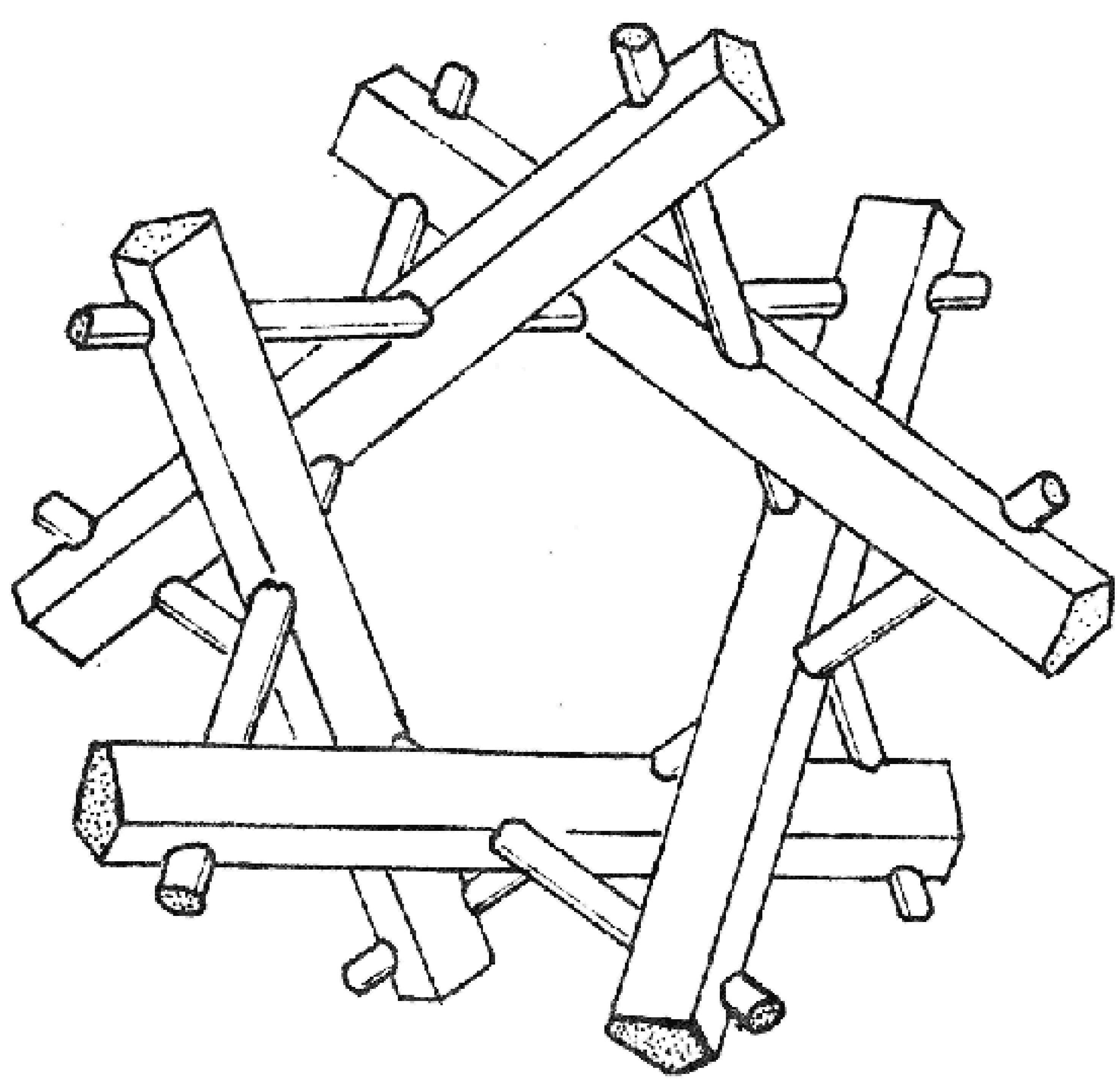
This puzzle, or geometrical model, consists of five identical pentagonal sticks and five round dowels. Each stick has four holes.

The object of the puzzle is to assemble the ten pieces such that all of the holes are occupied by dowels. The resulting assembly will be rigid and will have fivefold symmetry.

Some enterprising furniture craftsman might produce a scaled-up version of this design as an intriguing table stand. It could be sold with or without instructions. The compactness of the unassembled kit would be an advantage in storage and shipment.

Note that the cross-section of the sticks need not necessarily be pentagonal, although that is the version I prefer and also find the easiest to make. The proportions can be made more upright by changing the angles. These same observations would also apply to its simpler cousin, the Four-Legged Stand Puzzle, No. 81-B.

S. T. C.
Nov 11, 1987



Design No. 83-A

Practically all of the few dozen Pentagonal Stand puzzles made and sold in 1987 and 1988 were this improved version in which two sticks and dowels are joined to make two elbow pieces. There are two solutions.

S.T.C.
Nov 1990

STEWART T. COFFIN
79 OLD SUDBURY RD. LINCOLN, MASS. 01773
259-8348

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Design No. 85 mahogany

This puzzle was designed over the past few days, and this is the first one made. It is but a slight variation of a model designed about 15 years ago but never produced. On that one, the ends of the pieces were cut square, and there were multiple key pieces. In this new and improved version, there is only one key piece. It is fairly difficult to disassemble, and even more confusing to assemble. I would rate it as one of the more difficult puzzles I have produced. I call it a combination-type puzzle, since exactly the right combination of moves are required to disassemble and assemble, even though most of the pieces are identical.

S.T.C.
Dec. 19, 1988

Design No. 85 - The Twelve-Piece Separation Puzzle

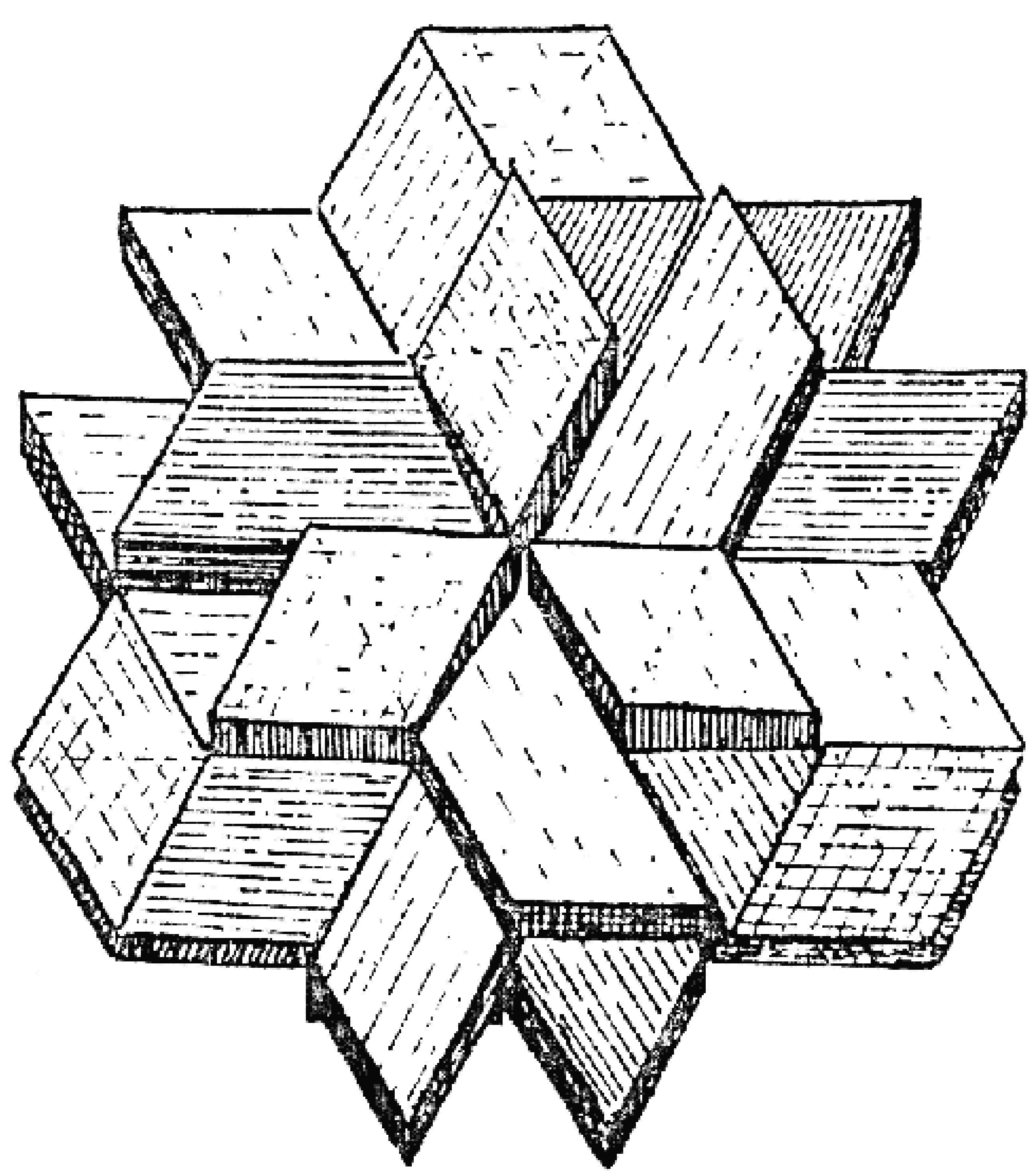
In a recent international survey, this puzzle was recommended as a cure for polyhedronania by fewer psychiatrists than any other device.

The Twelve-Piece Separation Puzzle is a symmetrical interlocking assembly of twelve nearly identical puzzle pieces. Ten of the pieces are identical and consist of a triangular stick, to each end of which are attached rhombic pyramid end blocks. The key piece has one of these end blocks missing, and there is one odd piece augmented by this displaced block.

What makes this puzzle so unusual and in fact unique among all polyhedral puzzles I have produced is that the pieces must be shifted back and forth in exactly the correct complicated and confusing manner in order to assemble or disassemble the puzzle, even though they are all essentially identical in shape. Furthermore, there is only one solution, with minor variations, and the die is cast on this one correct path or one of several incorrect ones when only a few of the pieces are in place. Added to that, the augmented piece, which must go in early on, must also be in the correct location.

Holding the first few pieces in position may require some dexterity and patience, but with about six pieces in place the subassembly tends to become self-supporting. Thereafter, each addition becomes a puzzling challenge of not only where it should go but also of shifting pieces back and forth in order to get it into place. Disassembly is not as difficult as assembly, but is by no means easy.

This new design is a perfect example of a puzzle inventor's dream - a design that is inherently simple yet elegant and interesting but evidently overlooked until now. It involves very little on the part of the designer that could be considered invention. It was there since the beginning of time, and one just has the good fortune to occasionally stumble upon such things. This is but one of a large family of related designs. There are much simpler three-piece and four-piece versions.



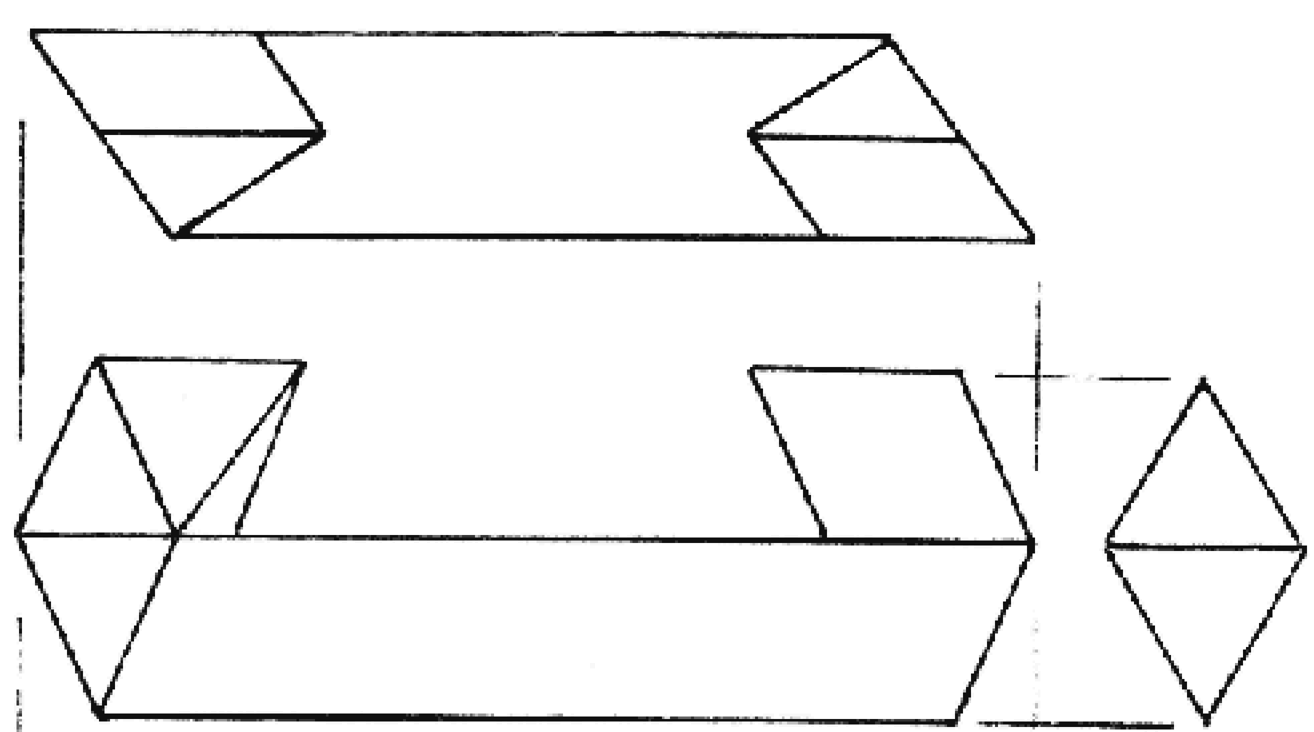
Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Dec. 20, 1988
Revised Feb. 1994

Twelve-Piece Separation Puzzle

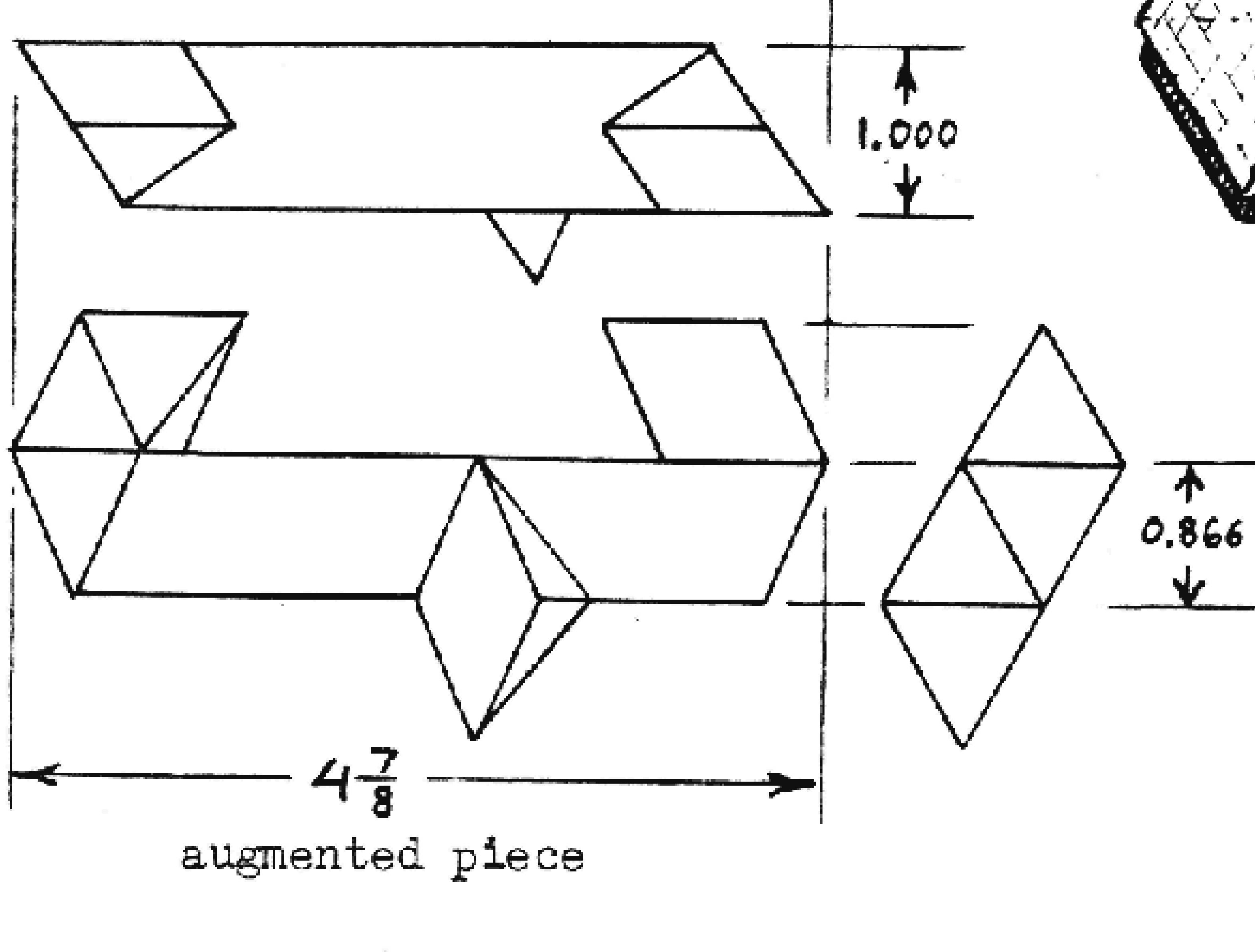
This unusual and thoroughly fascinating burr puzzle came to light in 1988 and is here published for the first time. It consists of twelve nearly identical pieces which go together with considerable difficulty one way only to form an intriguing symmetrical interlocking assembly. Ten of the pieces are identical and consist of an equilateral-triangular cross-section stick, to each end of which is attached a rhombic pyramid end block. One key piece has a block missing from one end, and one augmented piece has this extra block attached to it.

Start with about 8 feet of accurate and uniform triangular stock. All of the cross-cuts are at the same 55-degree angle and are made with the special jig shown on page 70. Some experimenting and sanding may be required to get just the right fit, neither too tight nor too loose. The augmented block is positioned in place with the puzzle assembled. This is one of the more difficult puzzles to make in this book, but well worth the extra effort.

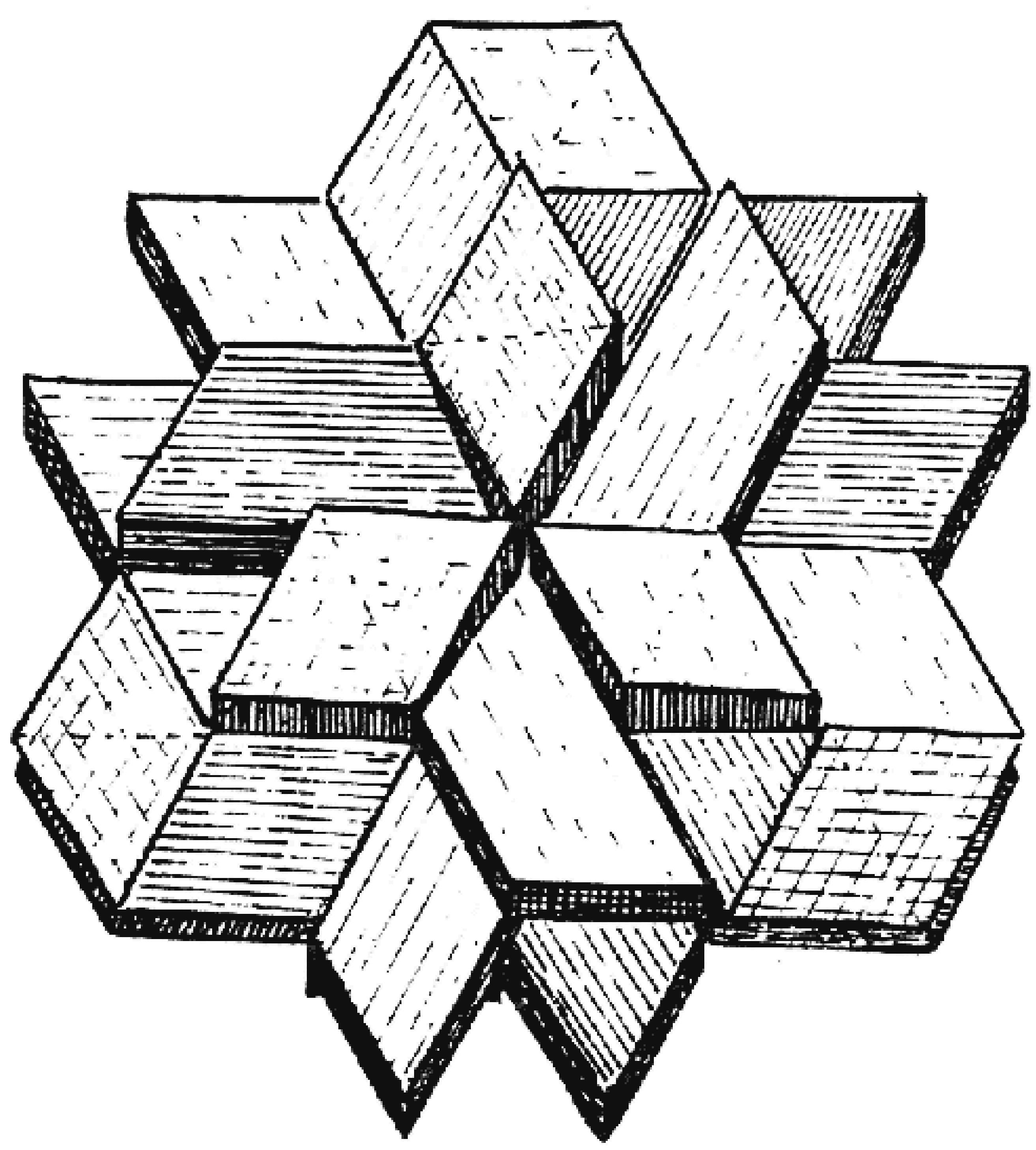
Detailed assembly directions are given on the next page. For those who prefer to try solving this puzzle (or others like it) on their own, note the following: This puzzle, like so many others of its kind, was designed in reverse. That is, the pieces were all assembled with the last few end blocks being glued in place after the several key-like pieces were poked into position. Then the one actual key piece was removed, and the big question was whether or not the remaining eleven pieces could be disassembled. After considerable doubts, I discovered to my surprise and delight that they could indeed be, with considerable difficulty and one way only. Seldom do things work out so perfectly - a puzzle designer's dream!



standard piece



augmented piece



Assembly directions for puzzle #85, the TWELVE-PIECE SEPARATION.

Pieces are numbered in order of assembly. All figures are looking straight down from the top.

1. Assemble three pieces as shown in Fig. 1 to form a triangular base.

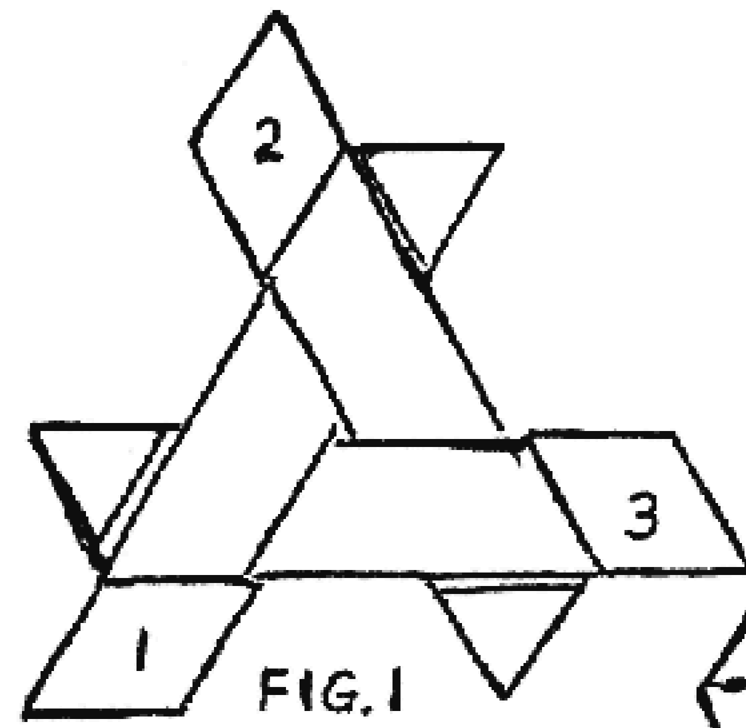


FIG. 1

2. Insert piece 4 vertically, hook augmented piece 5 around it, and then insert piece 6 vertically from below, as shown in Fig. 2.

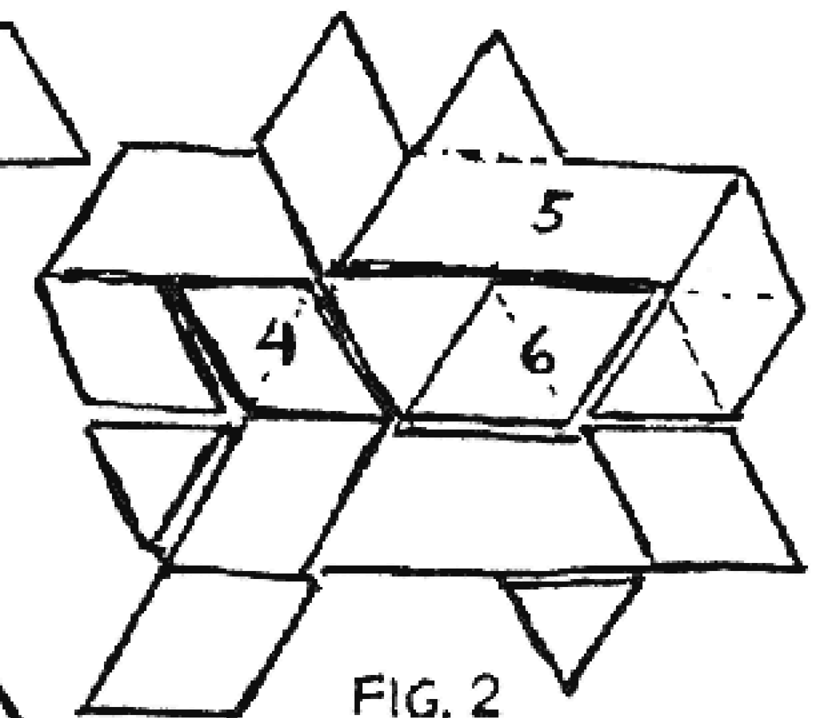


FIG. 2

3. Push piece 1 inward all the way and piece 3 one inch to the right in order to insert piece 7, as shown in Fig. 3. Return piece 3 and then piece 1 to their previous locations.

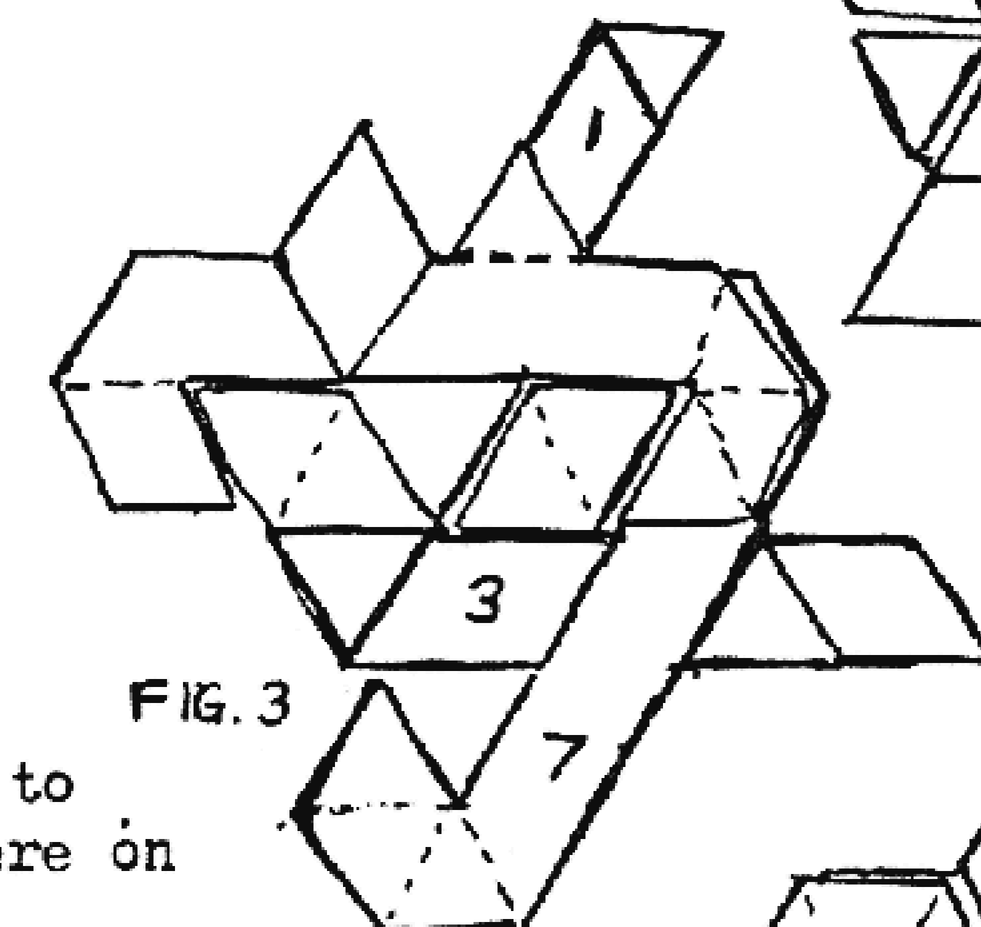


FIG. 3

4. Install piece 8 from the left, as shown in Fig. 4. These first four steps will require some dexterity and patience to hold all the pieces in place, but from here on it gets easier.

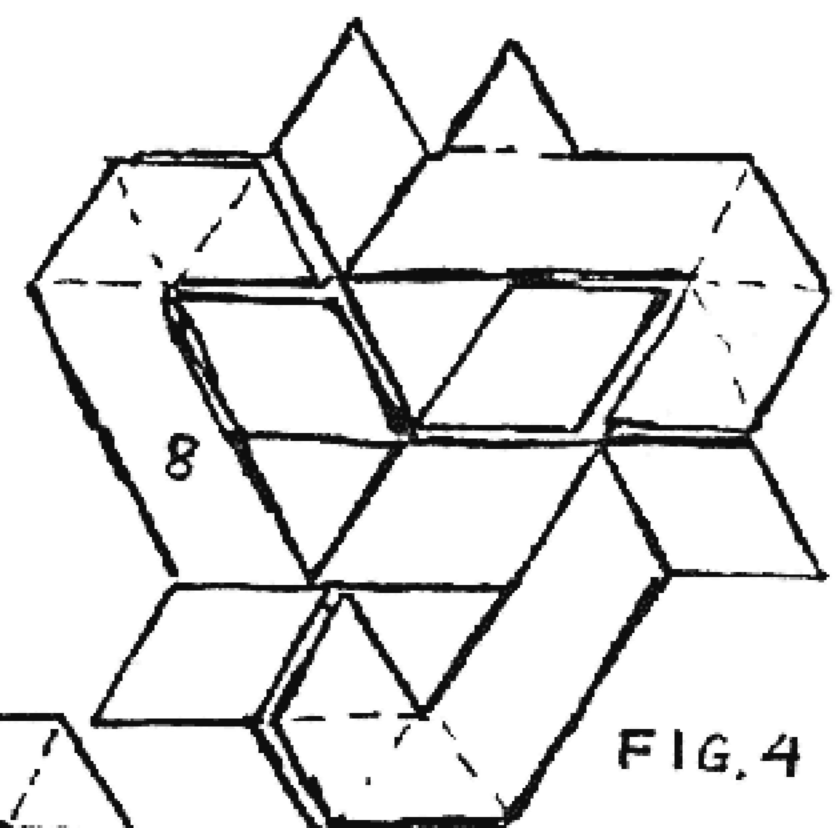


FIG. 4

5. Drop piece 4 down, push piece 7 in, and slide piece 8 one inch to the right in order to install piece 9 vertically. With piece 9 dropped all the way down, return piece 7, then piece 8, and raise all vertical pieces into position, as shown in Fig. 5

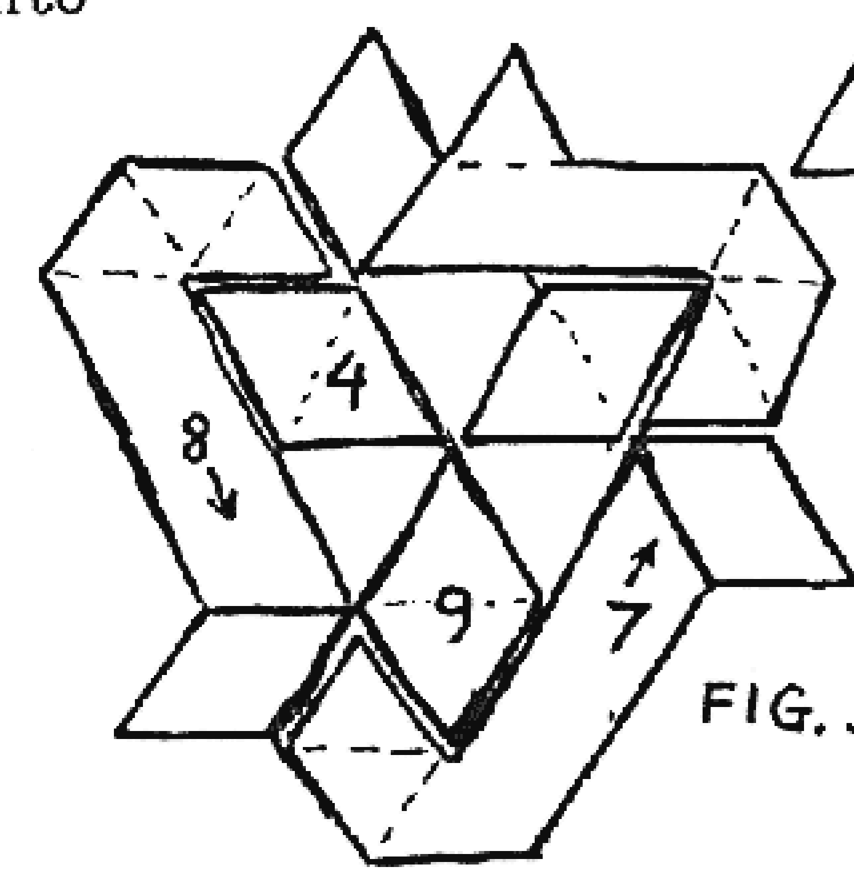


FIG. 5

6. Piece 10 is directly installed from the left, as shown in Fig. 6.

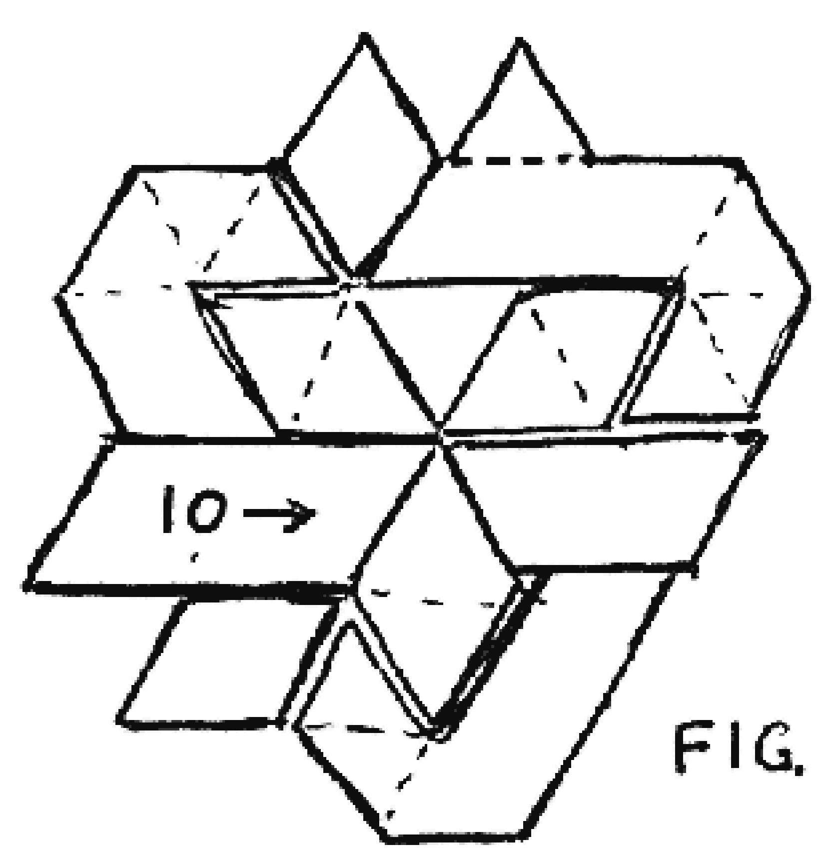


FIG. 6

7. Now the tricky step. Drop pieces 4 and 6 down, slide piece 8 far to the lower right, then piece 10 one inch to the right in order to insert piece 11, as shown in Fig. 7. Return piece 10 left, raise piece 6, slide piece 11 into place, return piece 8, and raise piece 4 into place.

8. Insert key piece 12 to complete the assembly.

Disassembly follows this procedure in reverse at least until pieces 8 and 9 are removed. Minor variations may be possible.

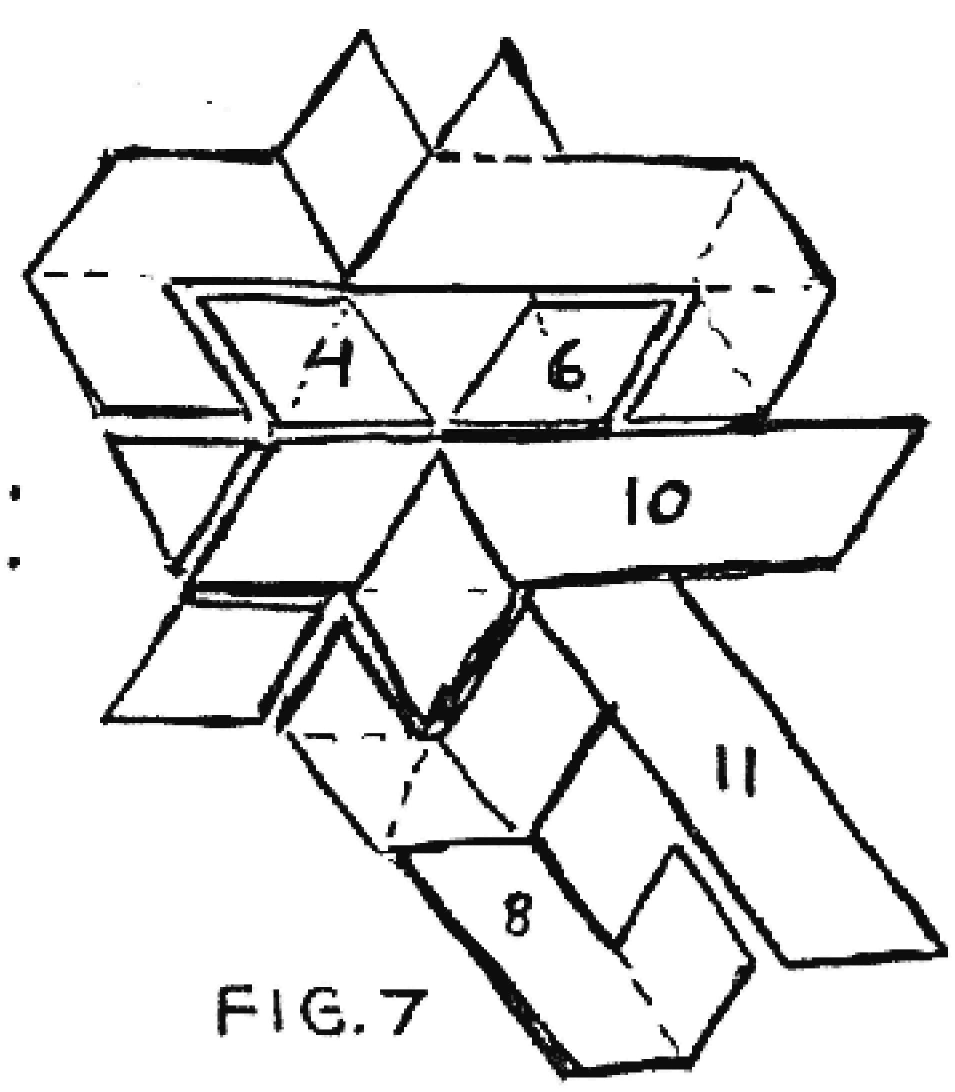


FIG. 7

S.T.C.
JAN. 1990

Stewart T. Coffin

The GEODYNAMICS Puzzle, No. 85-A

This puzzle is one in a new series of designs based on the concept of taking some of my existing designs having polyhedral symmetry and distorting them in some manner, a new phase of my work begun in December 1993. In this case, the original design was obviously the Twelve-Piece Separation Puzzle, No. 85. The GEODYNAMICS Puzzle can be visualized as the Twelve-Piece Separation Puzzle that has been expanded along one of its fourfold axes of symmetry and compressed along another of its fourfold axes of symmetry, thus giving it the symmetry of a brick. The way it was actually created was quite different, however. The mother design used sticks of equilateral-triangular cross-section. I was curious to see what would happen if the sticks were all changed to 50-60-70 degrees cross-section, and this was the result.

I do not normally make a practice of incorporating extreme difficulty into my puzzle designs (although some of my customers will dispute this). Until recently, I did not usually publish solutions to my puzzles, with a few exceptions. The Twelve-Piece Separation Puzzle was one of my more difficult ones, and it came with explicit assembly directions. This puzzle is much harder still, perhaps the most difficult puzzle I have yet produced. That was not necessarily my intention, but I believe in letting nature take its course. When one tinkers too much with natural form to suit one's purpose, the design tends to become contrived and less satisfactory esthetically. So, let it be!

If, after one year, you are unable to reassemble this puzzle, you may request assembly directions, or perhaps more properly called helpful hints, with which it is probably still a challenge.

In terms of both woodworking and geometrical design, I consider this puzzle to be my best effort so far, certainly surpassing the Jupiter Puzzle. I am encouraged to pursue this new concept further and see where it will lead.

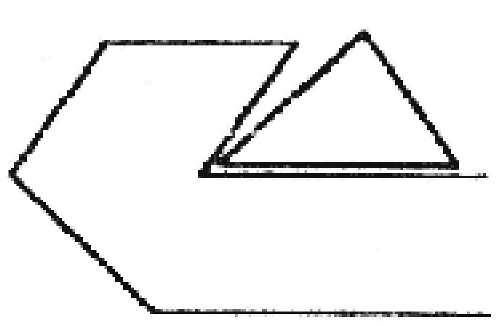
S.T.C.
February 1994

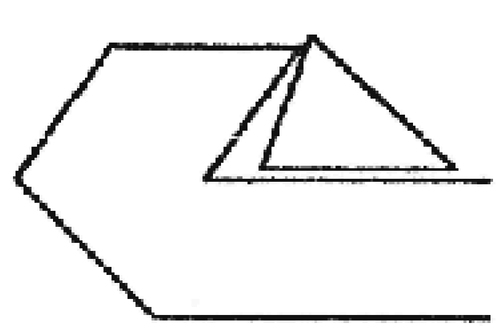
Assembly directions for The GEODYNAMICS Puzzle, No. 85-A

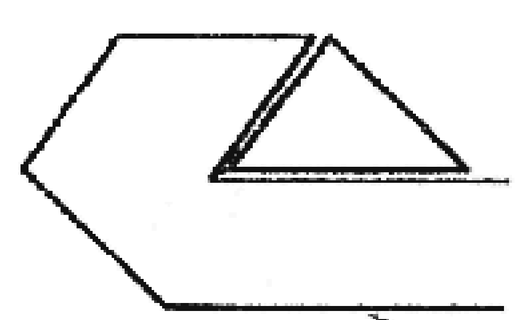
These directions assume familiarity with the Twelve-Piece Separation Puzzle, No. 85. Practicing until you become adept with it will make the solution to this variation of it much easier. If for some reason you do not have the Twelve-Piece Separation Puzzle, at least the assembly directions for it should be used, as they are referred to in the directions below.

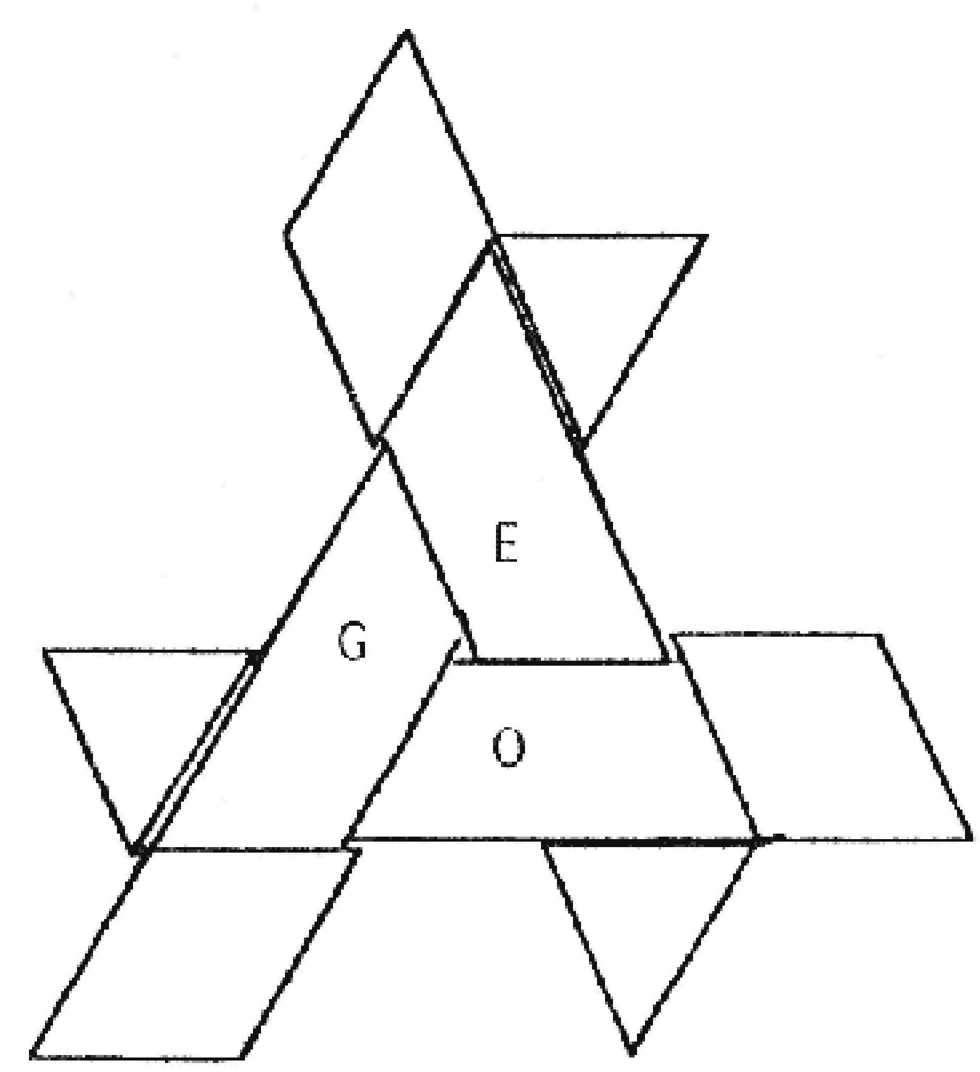
The important difference between this puzzle and the Twelve-Piece Separation Puzzle is that in this one there are three different types of pieces (not counting the key piece and augmented piece), whereas in the Twelve-Piece Separation Puzzle they are all alike. Furthermore, in this puzzle the pieces are non-symmetrical, so they have a right way and wrong way. This feature greatly increases the difficulty.

In order to facilitate the assembly of this puzzle, the pieces are lettered. The letters G-E-O-D-Y-N-A-M-I-C-S correspond to the numbers 1-2-3-4-5-6-7-8-9-10-11 in the solution to the Twelve-Piece Separation Puzzle, and therefore they are assembled in that order, with the key piece K, corresponding to 12, going in last to complete the assembly. Thus, start by making the triangular base with pieces G-E-O (see below). Since there are three different angles involved in the sticks and notches - 50, 60, and 70 degrees - at each step, every piece must be examined to see that it mates snugly with its adjoining pieces. If it does not, then one or more of the pieces is in backwards and must be reversed. This may require some patience and tinkering at the start, but once the triangular base is completed successfully, it becomes increasingly easier. Next insert piece D vertically, hook augmented piece Y around it, insert piece N vertically from below, and so on, following the same procedure as for the Twelve-Piece Separation Puzzle.


WRONG


WRONG


CORRECT



Stewart T. Coffin

February 1995

Assembly Directions for Puzzle #85A, GEODYNAMICS.

Pieces are numbered in order of assembly. All figures are looking straight down from the top.

1. Assemble three pieces as shown in Fig. 1 to form a triangular base.

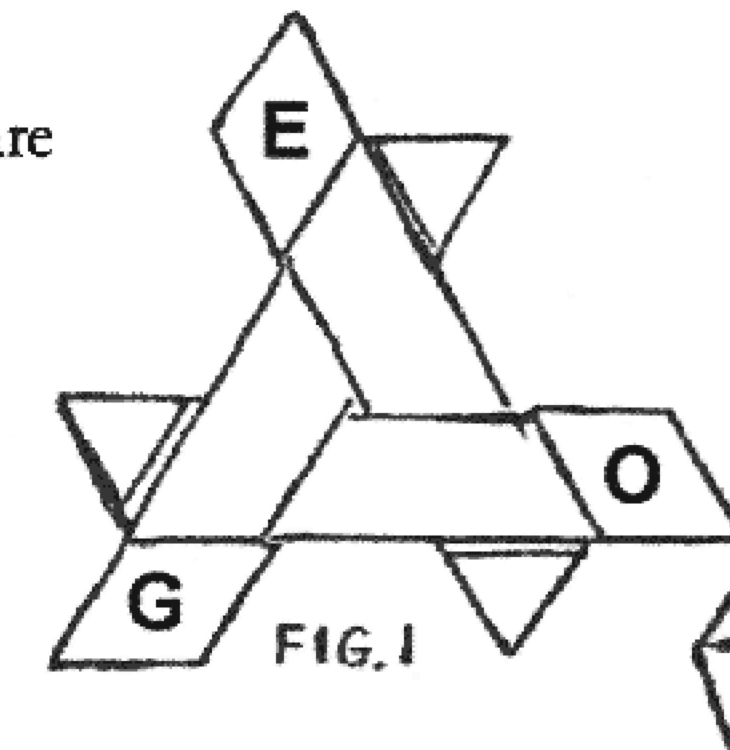


FIG. 1

2. Insert piece D vertically, hook augmented piece Y around it and then insert piece N vertically from below as shown in Fig. 2.

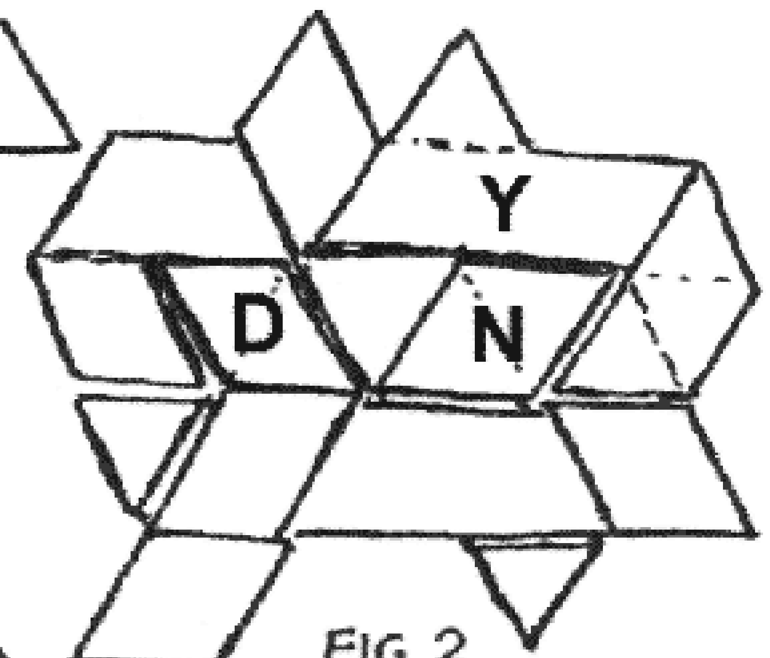


FIG. 2

3. Push piece G inward all the way and piece O one inch to the right in order to insert piece A as shown in Fig. 3. Return piece O and then piece G to their previous locations.

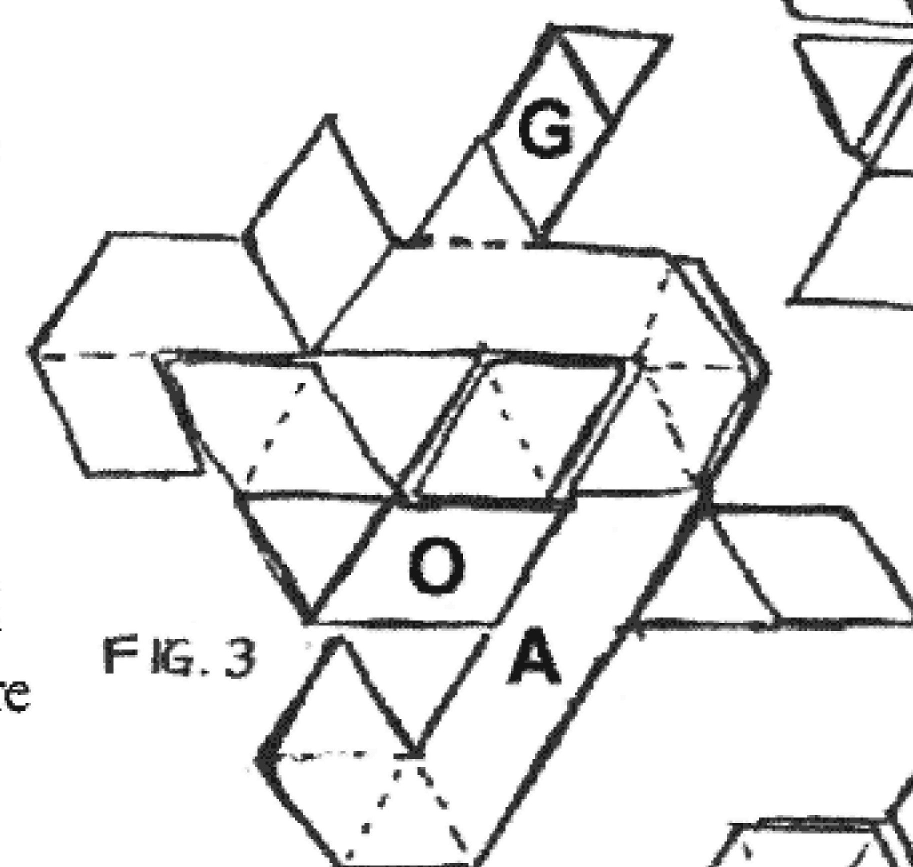


FIG. 3

4. Install piece M from the left as shown in Fig. 4. These first four steps will require some dexterity and patience to hold all the pieces in place, but from here on it gets easier.

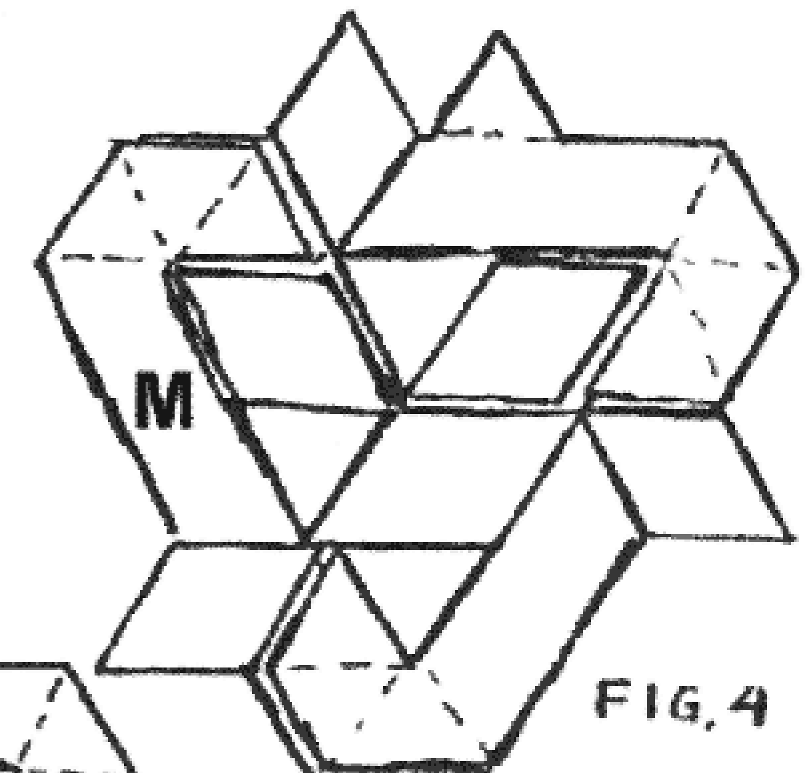


FIG. 4

5. Drop piece D down, push piece A in, and slide piece M one inch to the right in order to install piece I vertically. With piece I dropped all the way down, return piece A, then piece M and raise all vertical pieces into position as shown in Fig. 5.

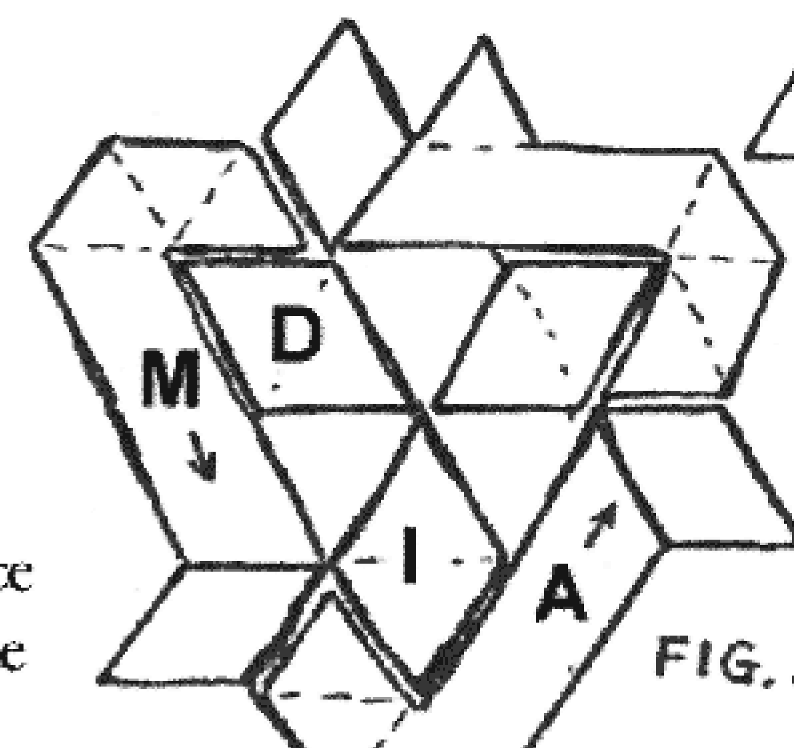


FIG. 5

6. Piece C is directly installed from the left, as shown in Fig. 6.

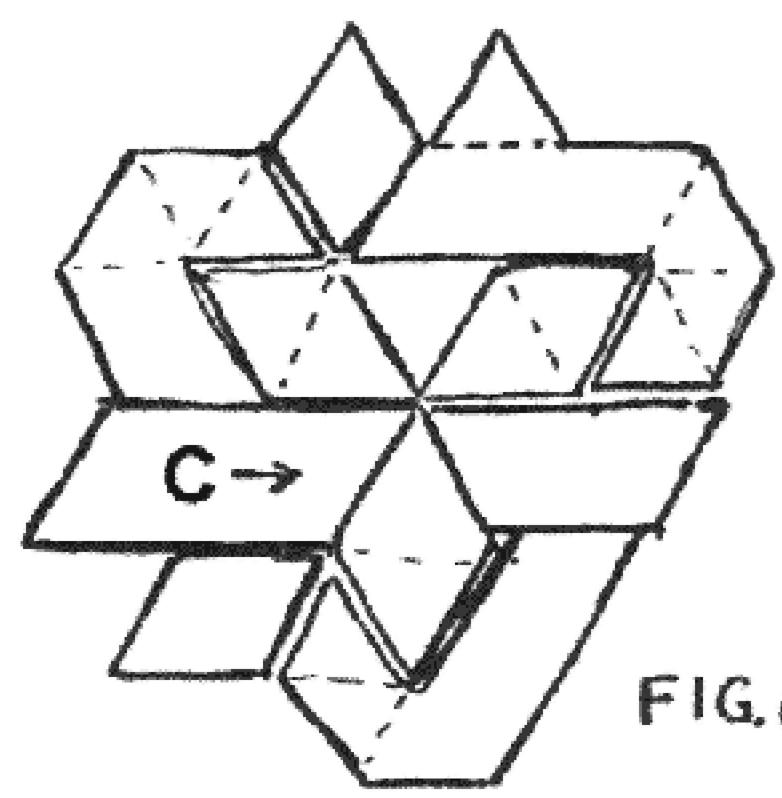


FIG. 6

7. Now the tricky step. Drop pieces D and N down, slide piece M far to the lower right, then piece C one inch to the right in order to insert piece S as shown in Fig. 7. Return piece C left, raise piece N, slide piece S into place, return piece M and raise piece D into place.

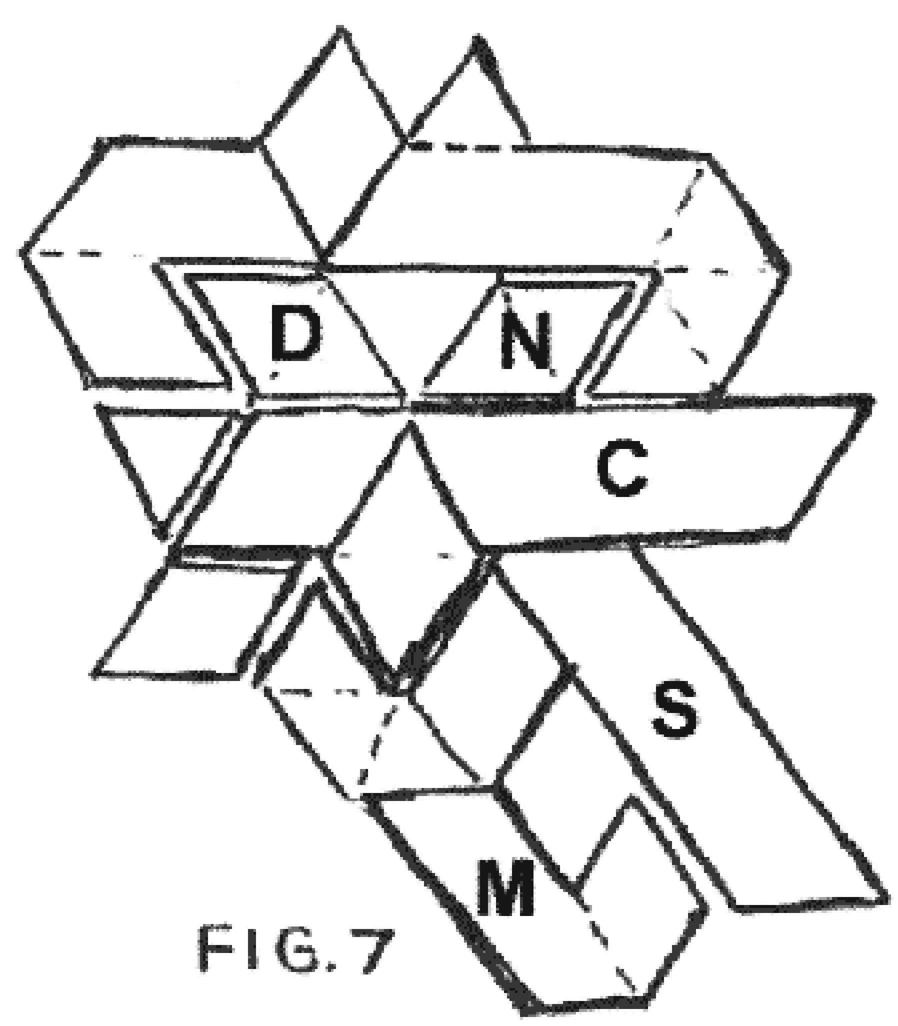


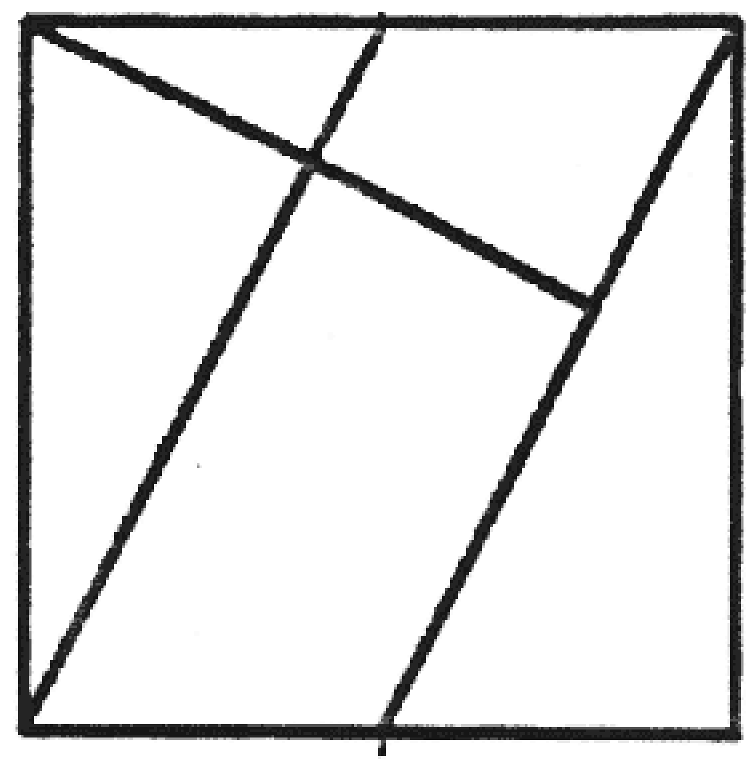
FIG. 7

8. Insert key piece to complete the assembly.

Disassembly follows this procedure in reverse at least until pieces M and I are removed. Minor variations may be possible.

S.T.C.
JAN. 1990

Two-Sided Tray (#87)

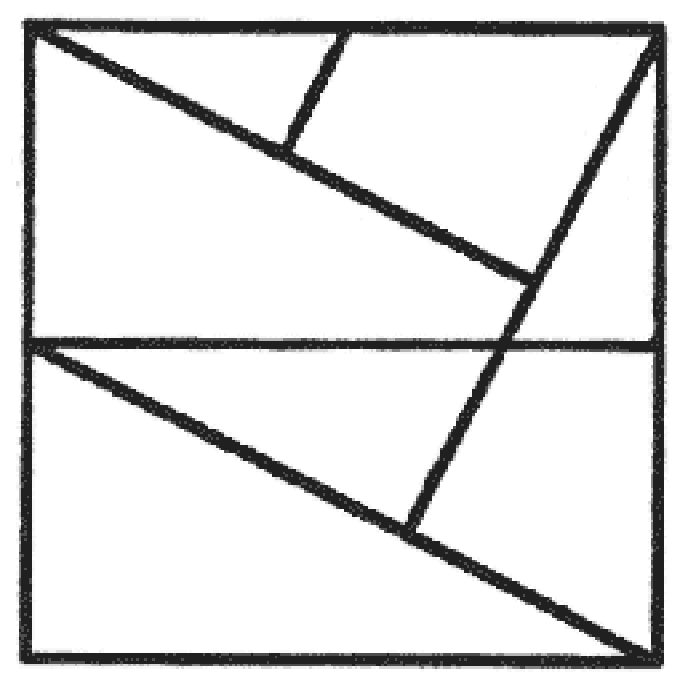


The object of the puzzle is to scramble the pieces and reconstruct the square (quite easy) or to construct various other problem shapes shown below. In puzzles of this sort, it is understood that all of the puzzle pieces are to be used for each solution unless indicated otherwise. For further recreation, you can tinker with the pieces to invent your own original problem shapes. Compile a booklet of them and think up imaginative names for them. By the way, young children are especially good at this. How many convex figures are possible, a convex shape being one without any holes or inside corners?

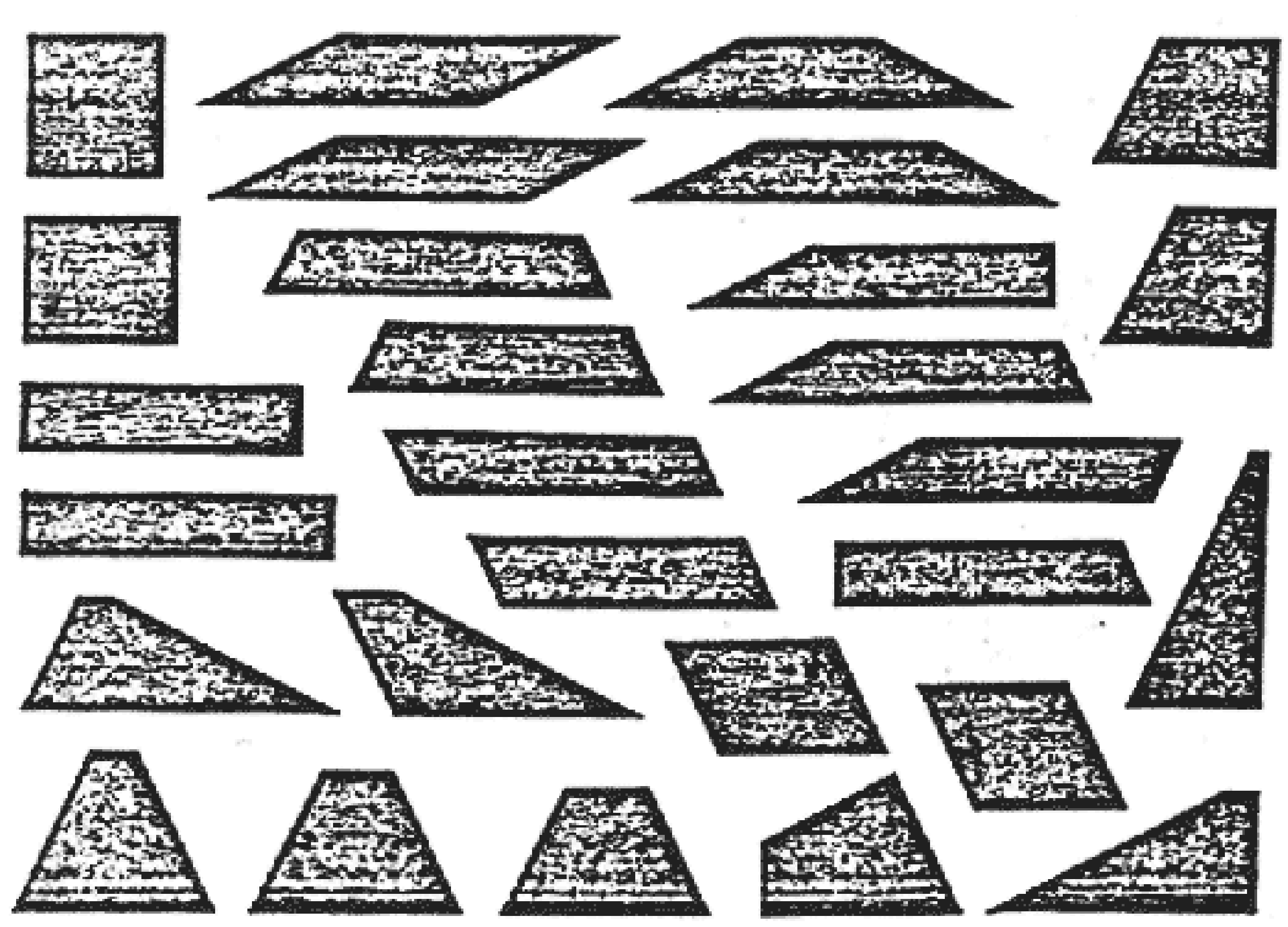
Quadrilateral (#87-A)

Quadrilateral Puzzle

This puzzle was developed in 1989 and is here published for the first time. To lay out this puzzle on cardboard, again start with a square. Locate the midpoints of all four sides. Draw diagonal construction lines from these to the corners. Now add one horizontal bisecting line, as shown below. Then cut out the seven puzzle pieces as shown.



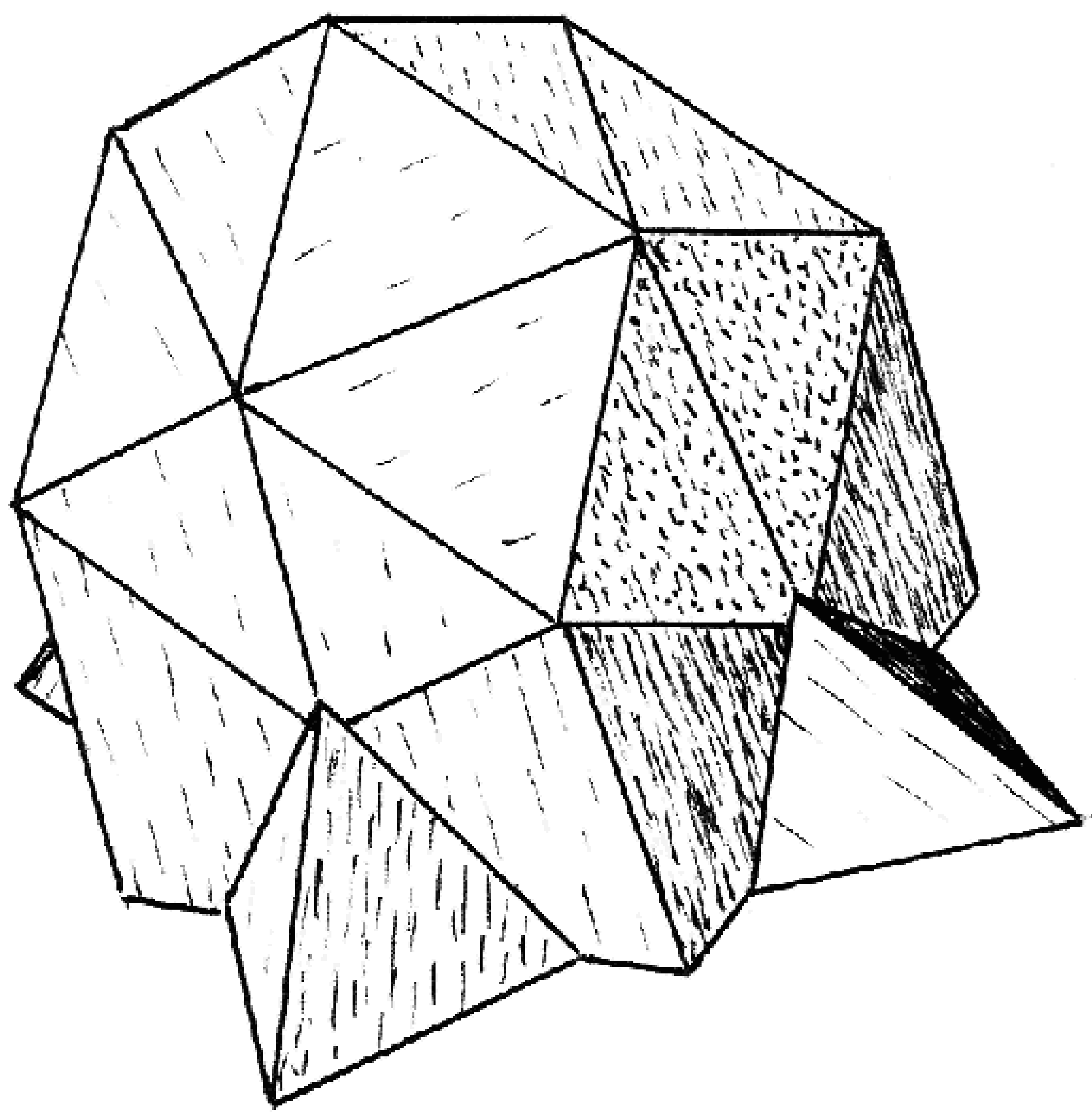
The object of this puzzle is to assemble all seven pieces to form various four-sided shapes (quadrilaterals) as many ways as you can. The 28 known shapes are shown below, but their solutions are left for you to figure out. Some of them differ from each other only slightly, so you will have to examine them closely. Now you will see why accurately made puzzle pieces are so important. Most of them have multiple solutions. For added recreation, you can see how many of these you can discover on your own without referring to the diagrams. Are any other quadrilateral shapes possible? I may have missed some. You might also try triangular or five-sided shapes.



No. 88

The Little Rocket

This puzzle consists of six dissimilar pieces that assemble one way only to form a rhombic dodecahedron. A recessed launch stand holds the assembled puzzle ready to blast off. Dump the pieces out and let your guests - and their children - amuse themselves by trying to reconstruct this intriguing geometrical solid. The pieces are made to be virtually indestructable, so you need not be as concerned about rough handling as with some other of my AP-ART creations.



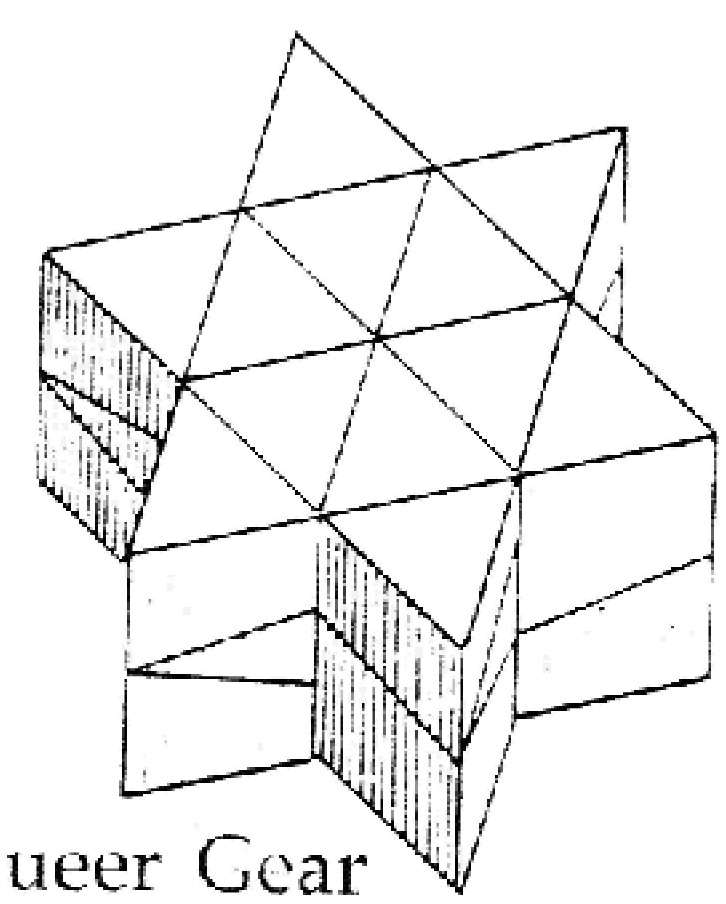
For your further information: The tetrahedral blocks used in this puzzle are scrap pieces, too nice to discard, that were left over from making the Pieces-of-Eight Puzzle. Five of the pieces represent all of the ways that four or fewer such blocks can be assembled concavely, which are then arranged such that the five-block remainder is doubly concave. Other variations on this theme are possible, but this version seems to be the most stable and interesting.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Dec 1989

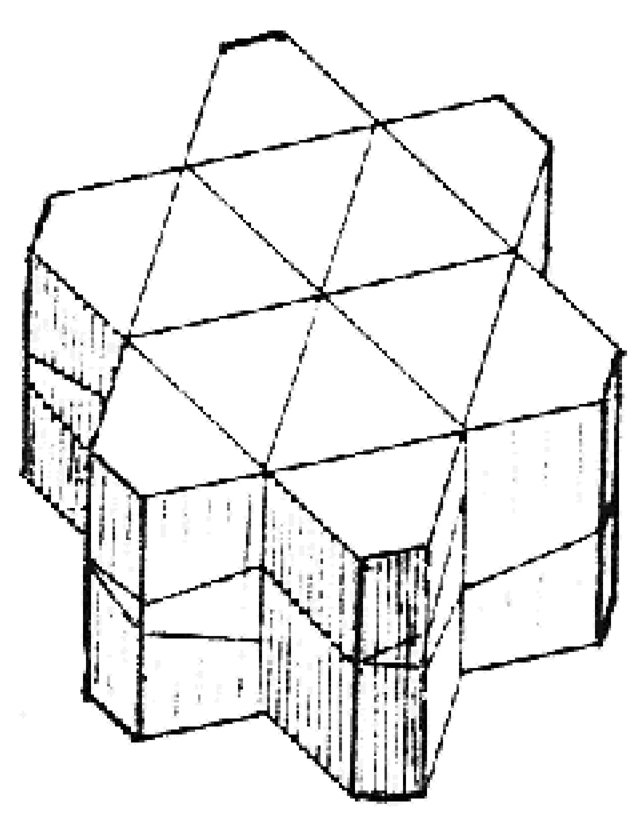
The Queer Gear, No. 92 and Second Gear, No. 92-A

The origin of the Queer Gear Puzzle is rather obscure. Over the years, I have produced and sold many one-of-a-kind experimental models for which I kept no records and have scant recollection. The first Queer Gear Puzzle was one such. In my records, it first appears on the cover photo of the 1985 edition of *Puzzle Craft*. I probably sold that one mahogany model shortly after it was photographed in 1985. The Queer Gear next appears on a supplementary page of *Puzzle Craft* that was inserted in 1988, with plans for the fabrication of its six dissimilar pieces (see below). The same design is shown on page 131 of my other book, *The Puzzling World of Polyhedral Dissections*. That one is described as a revised and improved design, but what the changes (if any) were I do not now recall. My records indicate that I made only about three of these over the next year or two. A few years later, it got belatedly added to my Serial Listing of AP-ART Puzzles, hence the misleadingly high number 92. This instruction sheet is being issued even more belatedly because it relates to the new version described below.

As so often happens, when I set out to reissue an old puzzle for which there is pent up demand, I end up coming out with a revised and improved version. Such is the case here. This version, Second Gear 92-A, is the same idea, with six dissimilar interlocking pieces and diagonal axis of assembly. The distinctively beveled teeth in this version permit the use of fancy woods in the 3/4-inch lumber now available, since my supply of one-inch fancy woods is nearly gone. It is also more confusing to assemble, due to a slight change in the make-up of the pieces. Another change which I hope does not go unnoticed is the 22% axial scale compression of the geometrical framework to make a more aesthetically pleasing shape, which required recalculation of all the angles and the making of an entirely new set of accurate saw and glue jigs.



Queer Gear



Second Gear

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 March 1996

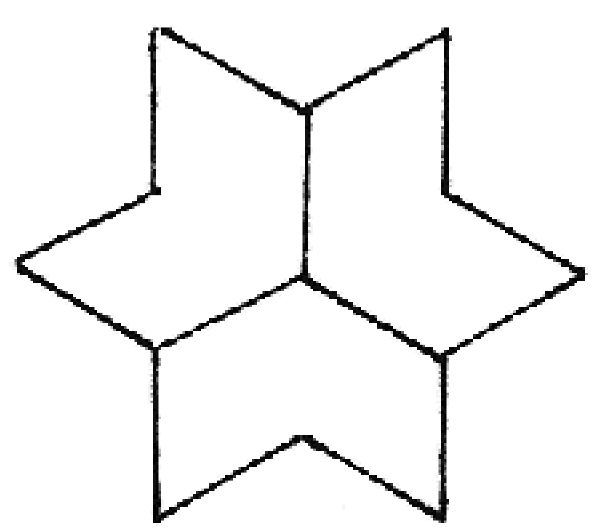
The ALL STAR Puzzle, No. 95

My recent survey showed, rather as expected, that three favorite puzzle features are interlocking pieces that form intriguing polyhedral shapes, use of colorful woods, and multiple problems with the same set of pieces. Several of my previous designs have had one or two of these features. This design combines all three of them onto one team.

These six dissimilar puzzle pieces can be assembled to form three different solids having a threefold axis of symmetry. They also assemble into two solids having reflexive symmetry, as well as into an unknown number of weird, nondescript shapes. The five symmetrical assembly shapes are illustrated below as viewed along their axis or plane of symmetry, with the numbers of solutions given for each. There are two types of solutions, referred to as axial and diagonal. In an axial solution, the first step of disassembly separates the puzzle along its axis of symmetry into two halves. In the much more confusing diagonal solution, you must discover the surprising manner of separation, which is even more confusing to re-assemble.

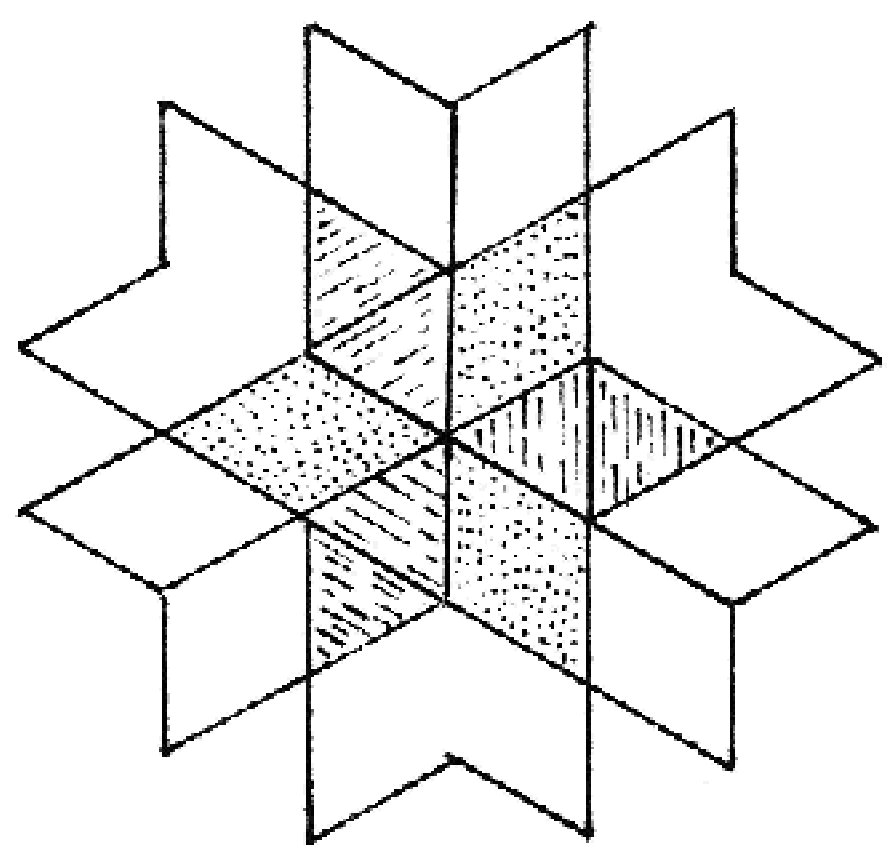
In each solution, the multi-colored woods used in the construction will automatically be arranged in color symmetry, and the wood-grain directions will also be symmetrically oriented. It is interesting to note that every solution is some form of stellated rhombic dodecahedron; yet so far as I know, none of these intriguing geometrical solids have previously been published or produced.

For assembly directions, see other side.



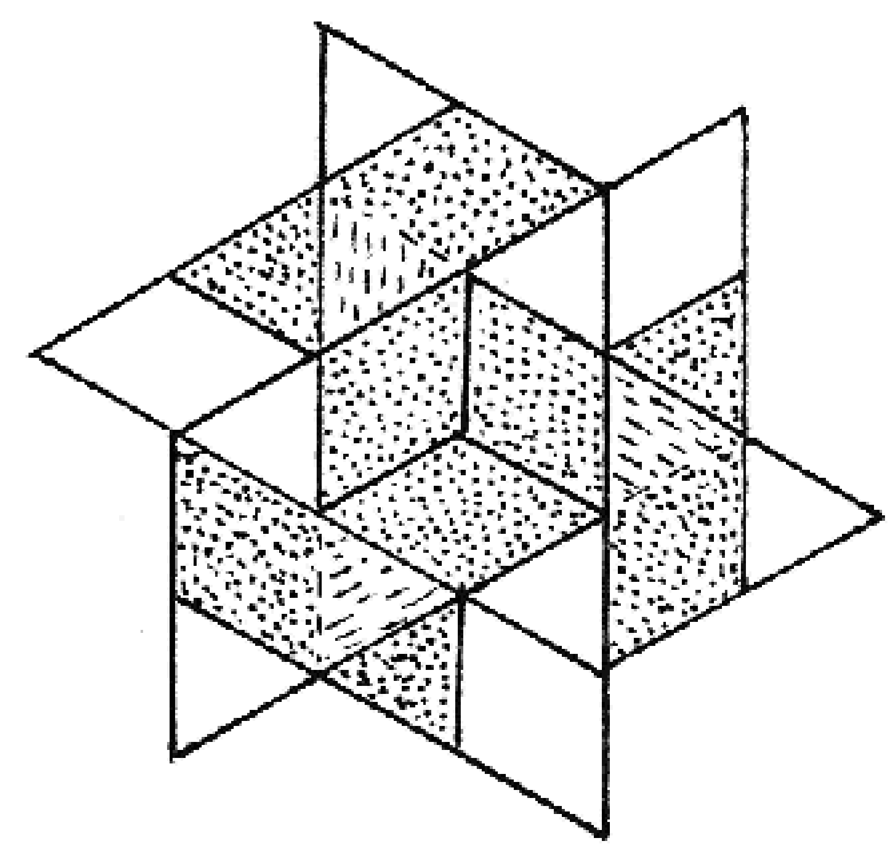
Star-shaped column with stellated ends

2 diagonal solutions



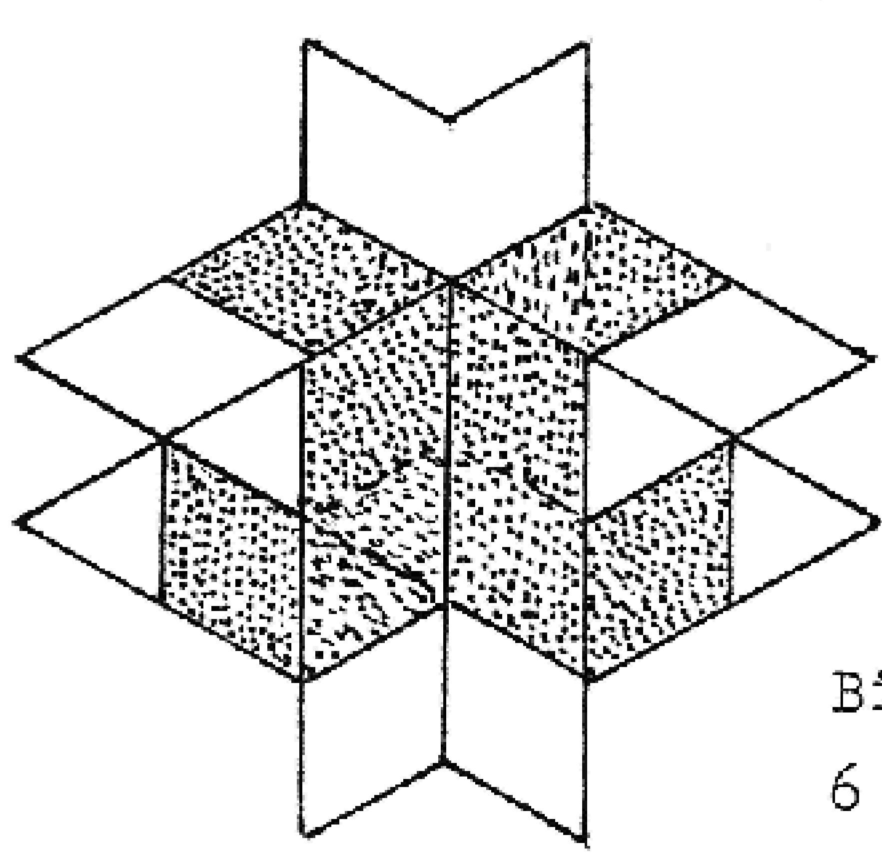
Oblate solid with six- and twelve-pointed star patterns

2 axial solutions



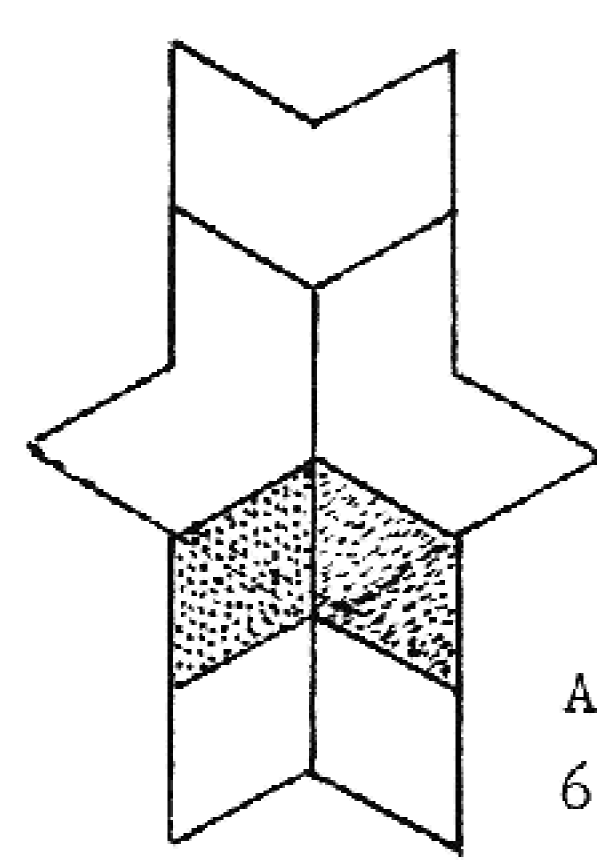
A bizarre solid with triangular patterns and twelve points

2 diagonal solutions and 2 axial solutions



Bird

6 solutions



Animal

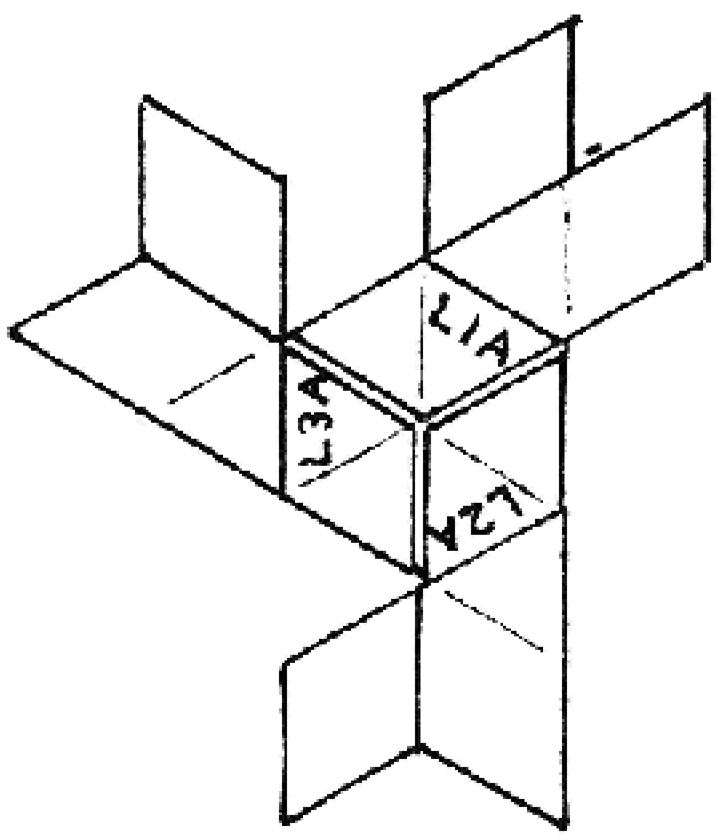
6 solutions

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Mar. 1990

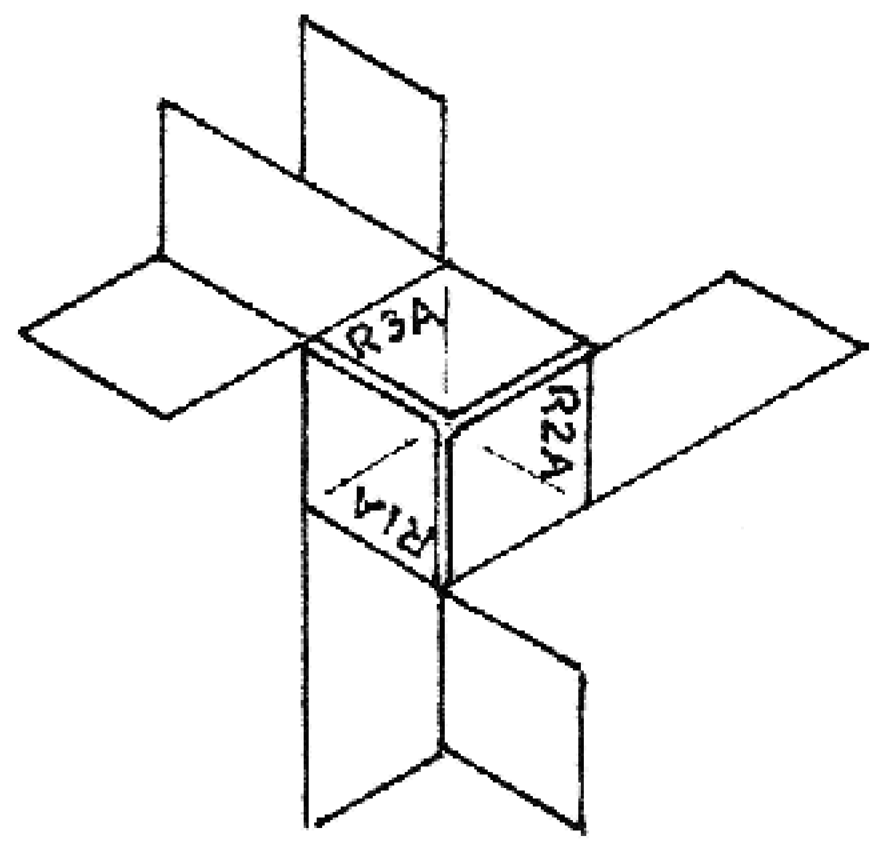
Assembly directions for the ALL STAR puzzle:

Like so many of my six-piece polyhedral puzzles, the ALL STAR goes together in two halves of three pieces each. In every solution, the pieces are always arranged in the same opposite pairs: L1 opposite R1, L2 opposite R2, L3 opposite R3, as the pieces are so marked. The two ends of each piece are further identified as A and B.

One solution to the oblate solid is illustrated below. Note that in each subassembly, the three pieces are arranged in a sort of twisted configuration, and that the two halves twist in opposite directions, as they always must. The configuration on the left is referred to as clockwise, and so the one on the right is of course counterclockwise.



clockwise



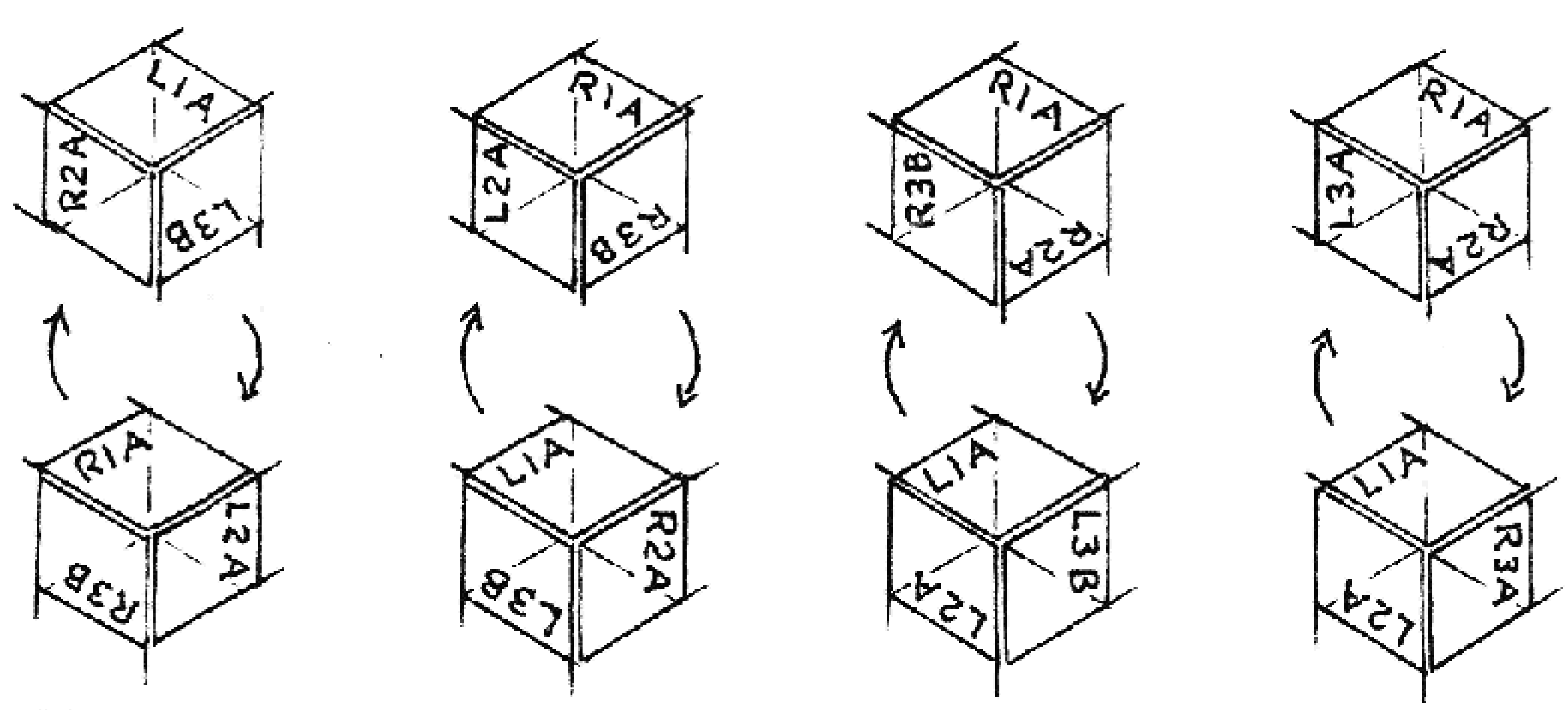
counterclockwise

Hold the three pieces of each half snugly together using three fingers of each hand and mate the two halves. The correct alignment of the two halves can be determined by trial and error or by inspection, noting which pieces are opposite each other as explained above. Note also that in each pairing, end A of one piece always mates with end B of the other piece.

In the diagrams of the other solutions below, for simplicity only the centers are shown:

clockwise

counterclockwise



Star column Bizarre solid Bird Animal

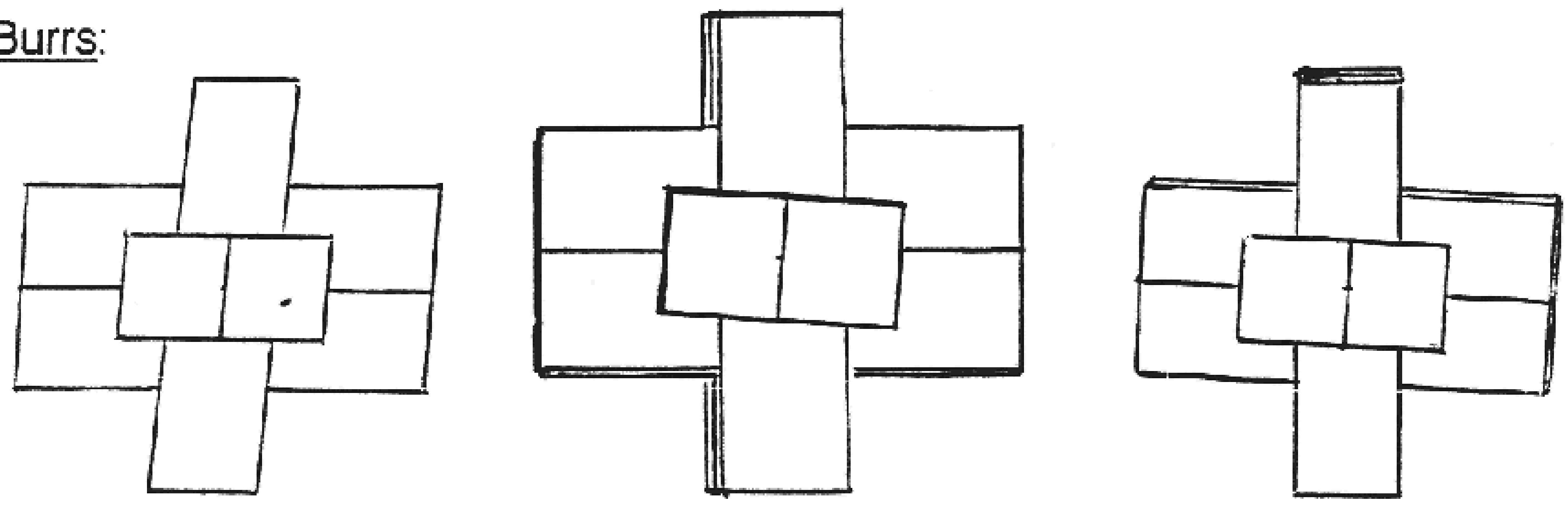
The other 15 solutions are left for you to discover. Following the rules for paired pieces given above, there are a total of 32 ways of assembly, any one of which is an interesting shape of some sort.

AP-ART

The sculptural art that comes apart

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773
617-259-8348

Wild Burrs:



Teddy Burr, No. 96; Grizzly Burr, No. 96-A; and **Yogi Burr, No. 98**

These three burr puzzles are new introductions for 1994. They are all variations of the standard six-piece burr, which is traditionally made with square sticks and rectangular notches. When one departs from this familiar rectilinear plan by some systematic geometrical distortion, even simple and well-behaved burrs suddenly become mean and ugly.

Teddy Burr, No. 96, is the simplest of these. The sticks are of rhombic rather than square cross-section. It is not very difficult. When I made one last Christmas just as a practice exercise and toy for the family to play with, to my surprise everyone was fascinated by it and some found it quite confusing. So, it became the first in the new series and has led in turn to many others.

Grizzly Burr, No. 96-A, uses the traditional square sticks arranged in the traditional three mutually perpendicular pairs. However, the pairs of sticks are all rotated 5 degrees from their normal positions. This simple transformation turns a friendly burr into a wild monster. In order to make this puzzle, I had to invent a new type of saw jig with independent motion along two perpendicular axes.

Yogi Burr, No. 98, is the most sophisticated of the three in terms of geometrical concept, woodworking technique, and difficulty of solution. All six pieces are dissimilar. In cutting the notches, tolerances are held to 0.005 inch. I will not attempt to describe it other than to say it is made of 3/4-inch square sticks of choice woods arranged in a most diabolical departure from perpendicularity.

This is a fascinating new area of puzzle invention. I expect that others will follow.

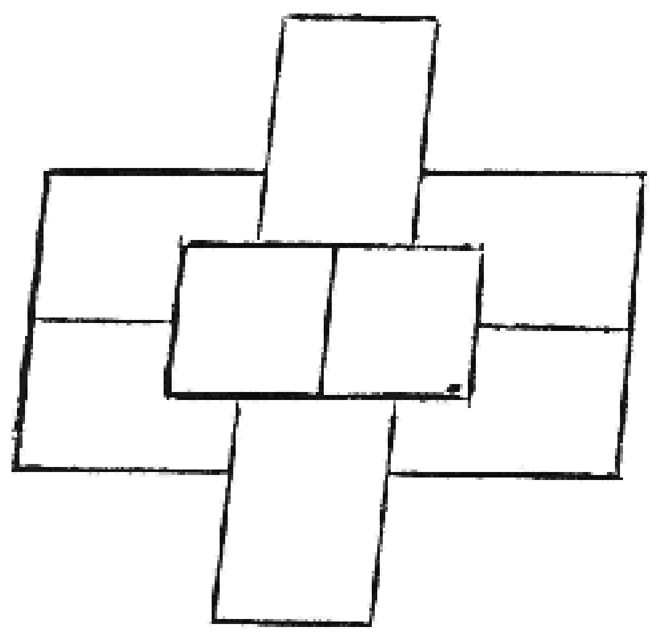
S.T.C.
Feb. 1994

AP-ART

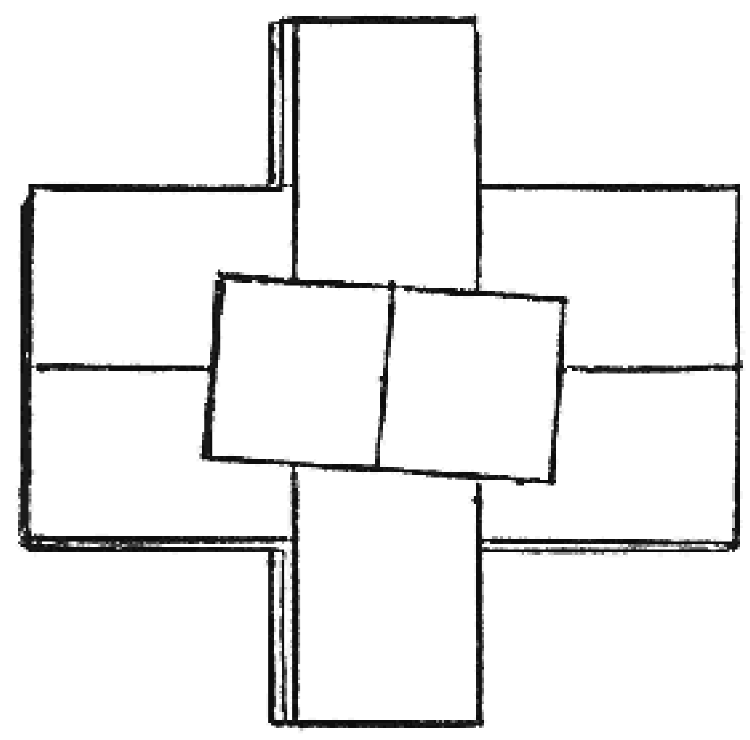
The sculptural art that comes apart

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773
617-259-8348

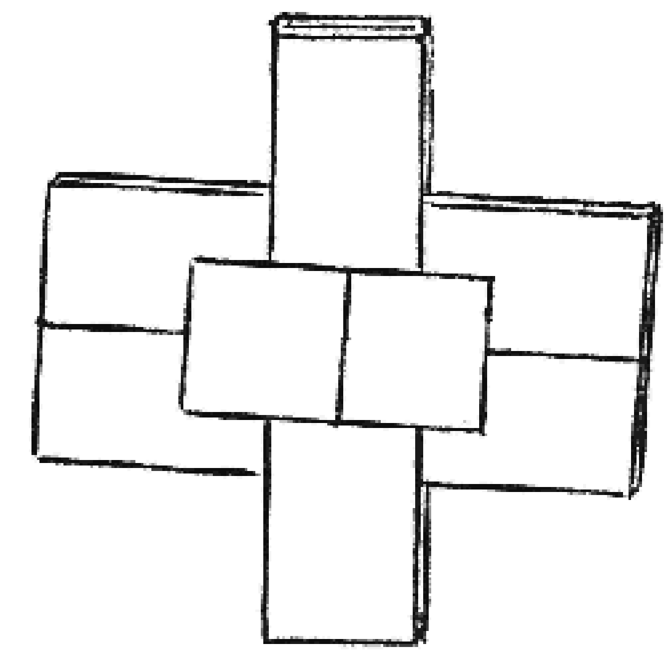
Wild Burrs:



Teddy Burr, No. 96



Grizzly Burr, No. 96-A



Slant Six, No. 98-A

These three burr puzzles are new introductions for 1994. They are all variations of the standard six-piece burr, which is traditionally made with square sticks and rectangular notches. When one departs from this familiar rectilinear plan by some systematic geometrical distortion, even simple and well-behaved burrs suddenly become mean and cantankerous.

Teddy Burr, No. 96, is the simplest of these. The sticks are of rhombic rather than square cross-section. It is not very difficult. When I made one last Christmas just as a practice exercise and toy for the family to play with, to my surprise everyone was fascinated by it and some found it quite confusing. So, it became the first in the new series and has led in turn to many others.

Grizzly Burr, No. 96-A, uses the traditional square sticks arranged in the traditional three mutually perpendicular pairs. However, the pairs of sticks are all rotated 5 degrees from their normal positions. This simple transformation turns a friendly burr into a wild monster. In order to make this puzzle, I had to invent a new type of saw jig with independent motion along two perpendicular axes.

Slant Six, No. 98-A, is probably the most confusing of the three. It is made of the usual six notched sticks with 3/4-inch square cross section, but watch out for the notches!

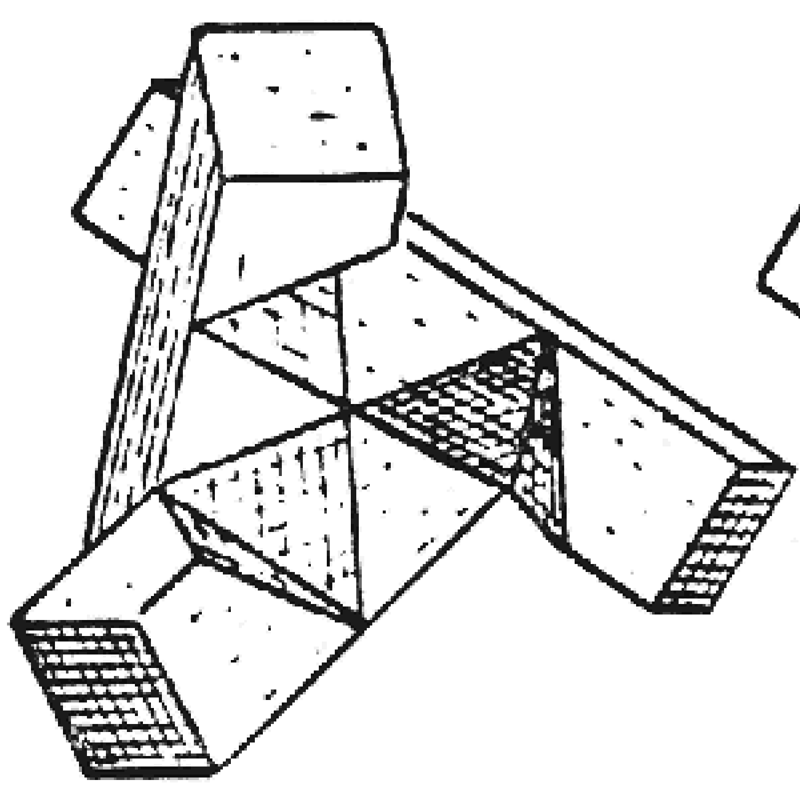
These puzzles are normally sent disassembled, without assembly directions.

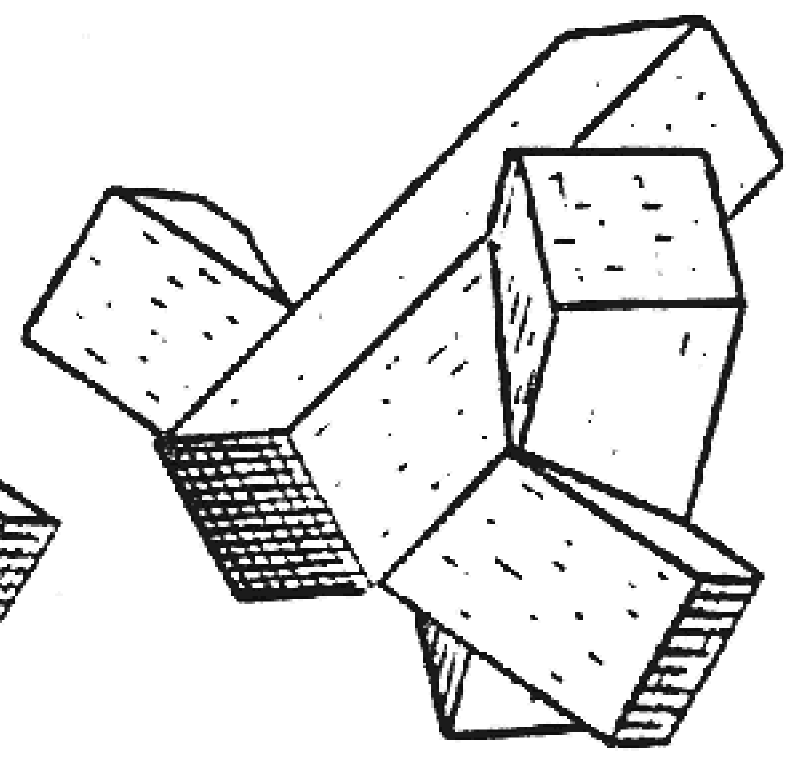
S.T.C., March 1994

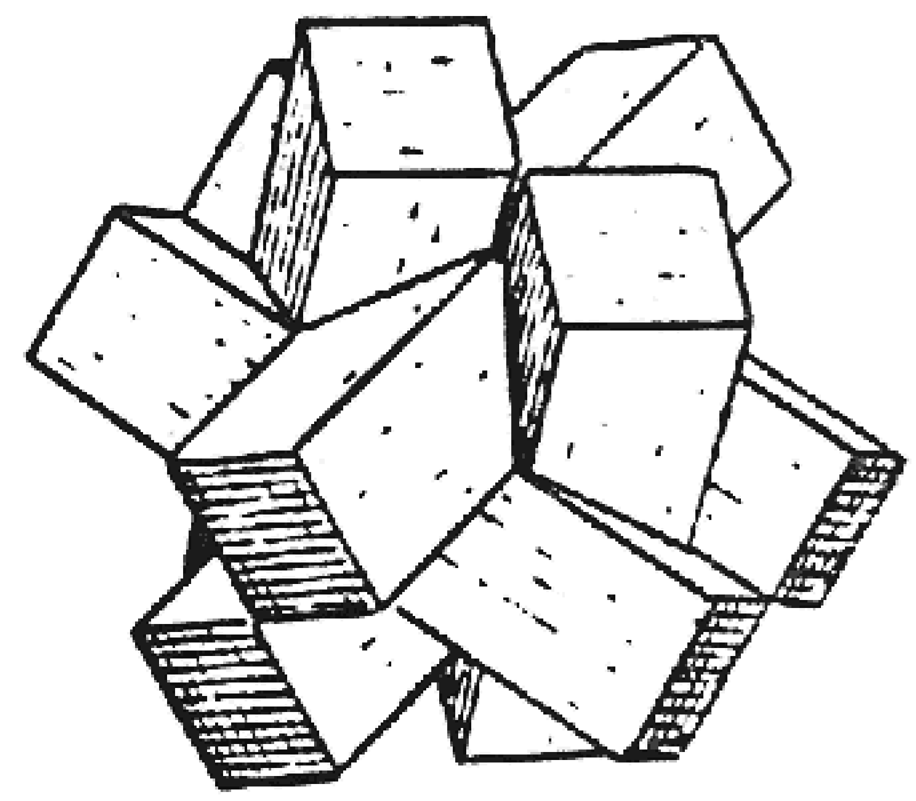
AP-ART

The sculptural art that comes apart

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773
617-259-8348







Crooked Notches
No. 97

"An unusual and original six-piece diagonal burr designed by Stewart Coffin specially for the puzzle exchange at the 14th International Puzzle Collector's Party, Seattle, 1994. Noted in the past for the accuracy of his woodworking, could the grotesque slant of these notches and non-squareness indicate Coffin's oncoming senility or just failing eyesight? Let us hope that you can somehow assemble the puzzle in spite of all these lamentable distortions."

I made 100 of these for Tom Rodgers, to be used as his exchange puzzle at the 14th IPP. The above quote is taken from the terse and not very helpful instruction sheet which accompanied the puzzle. They were made of southern yellow pine and supplied disassembled. I rate this puzzle not very difficult.

This improved edition is made of teak, my most stable wood, with a natural finish. The notches are lightly waxed. The diagonal burr is especially susceptible to changes in humidity, and even teak will be slightly affected. If the puzzle is too tight to assemble or disassemble easily, placing it in a drier place for a few hours should correct this.

S.T.C., Jan 1995

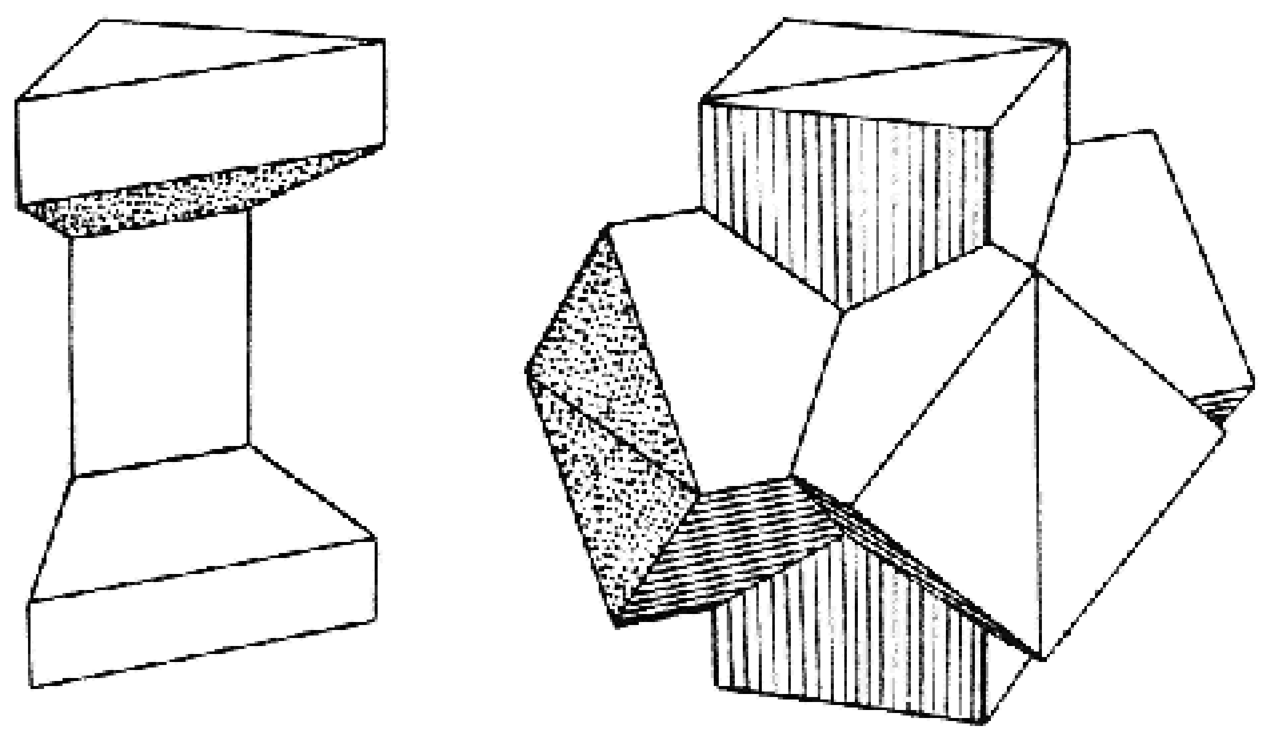
AP-ART

The sculptural art that comes apart

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773
617-259-8348

The DISINCLINATION Puzzle

Design No. 99

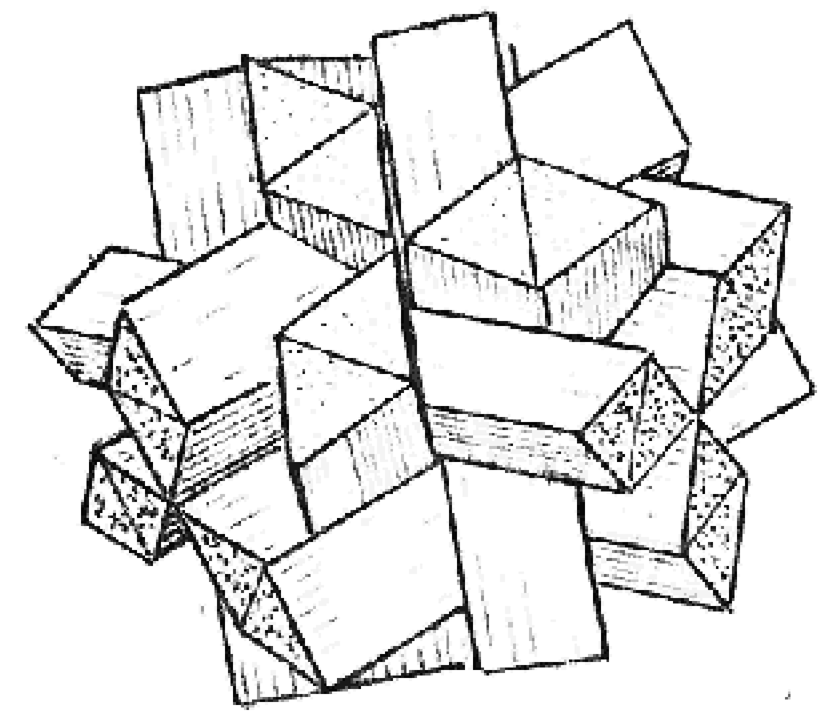


This is one in a new series of puzzle designs, all based on the principle of taking certain of my previous designs and distorting them in some manner. This idea came to me many years ago, and was mentioned in the 1985 edition of ***Puzzle Craft***. At that time, the problems involved in computing all the dimensions and especially in setting up all the necessary accurate sawing jigs (and gluing jigs when required) struck me as quite laborious, and so I put the idea aside until perhaps more leisure time was available. Obviously, that time has now arrived. This puzzle is the seventh designed in the new series. Once I got thoroughly involved and gained experience, I found that the computations and set-up were not as laborious as I had supposed. I think that part of the reason is that for the designer and craftsman, this is a most entertaining and fascinating new adventure, which always makes the job seem less tedious.

The Disinclination Puzzle could be described as my old Seven Woods Puzzle, No. 42, in which the dimensions have been compressed along one of the threefold axes of symmetry such that the triangular cross-sections all become 40-50-90 degrees. This creates havoc in assembly. The solution is still the mating of two mirror-image halves of three pieces each (see ***Puzzle Craft*** or ***Puzzling World***), but now the pieces are not all alike and furthermore are non-symmetrical. It will require some dexterity to hold the two halves. Slight indentations are made in the center notch to facilitate holding the pieces in position.

This configuration is very susceptible to changes in humidity. Therefore, I am producing this very limited edition using my one plank of choice Burma padauk, one of the most stable woods known to me, obtained many years ago from a wood collector in Louisiana. Nevertheless, the puzzle may tend to be tight in summer and loose in winter.

S.T.C.
Feb. 1994



The ISOSCELES Puzzle, No. 101

This challenging puzzle could be described as a Twelve Piece Separation Puzzle (No. 85) with the following differences: The ends of the pieces are cut off square rather than diagonal, there are three key pieces rather than one, and the triangular sticks are of 50-65-65-degree cross-section rather than equilateral. This isosceles cross-section produces a puzzle that has a slightly squat polyhedral shape with one fourfold axis of symmetry. It also creates considerable added confusion in assembly.

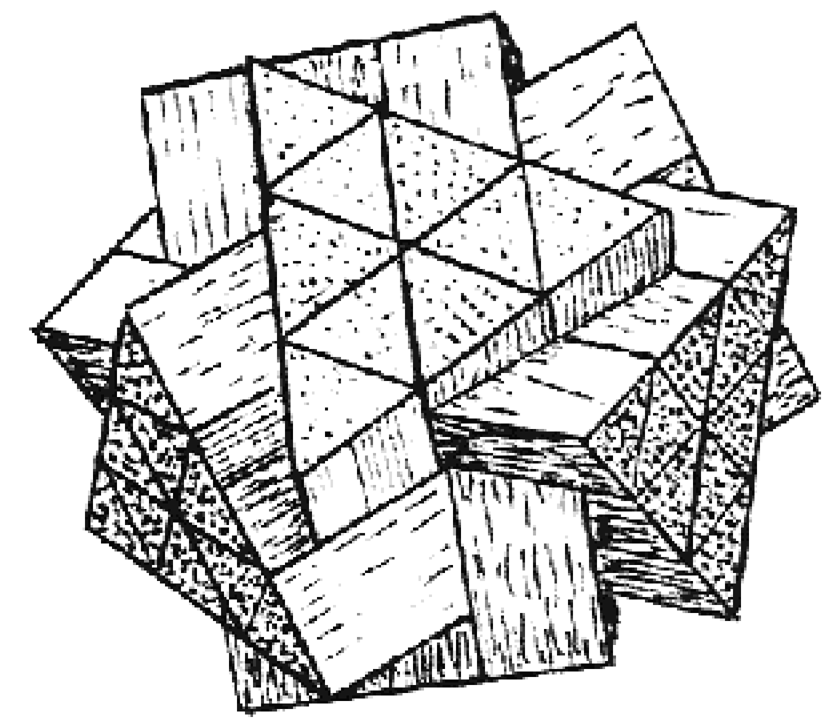
The symmetrical version of this polyhedral configuration is an idea that has been in the works for a long time. My records indicate that I came up with a somewhat similar scheme in 1973 (#32, Triful, in the Old List), which was to be manufactured in plastic but never was. After being shelved and forgotten for many years, I resurrected the idea for inclusion in *The Puzzling World of Polyhedral Dissections* (page 118). That version had four key pieces. It was never put into production, fortunately, for the unessential fourth key piece was a design flaw just now discovered and corrected. The idea of using isosceles rather than equilateral triangular sticks is just a little added novelty to make the puzzle new and more intriguing.

The aromatic camphorwood used for this puzzle has an interesting history. I picked up the one large board of it that I found in a stack of exotic woods being sold by the old Schwamb Mill in Arlington, Mass. in 1972. This lumber first passed through the hands of Peter Boshco, a retired (and now deceased) Boston industrialist, from the liquidation of the old Irving & Casson Furniture Company, in which apparently he held some business interest. As I recall, one of the two partners in that furniture factory was said to have traveled all over the world many years ago collecting rare and exotic woods. Peter Boshco donated much of it to the Schwamb Mill, which in turn sold it to craftsmen like myself. The income from this helped support the historic preservation and craft center at the Mill for many years. Peter Boshco happened to be there when I got this camphorwood, and he told me that it was from "mainland China" and evidently rather rare. It has gathered dust in my workshop for 22 years awaiting some worthy project for this beautiful wood. I am using up most of it to make just thirty of these Isosceles puzzles.

Disassembly is easily accomplished by removing the three key pieces, after which it practically falls apart. Explicit directions for reassembly are available for the asking, on a separate sheet. There is essentially one solution, with minor variations. Incidentally, familiarity with the solution to the Twelve Piece Separation puzzle will be of little help in solving this puzzle, which has a solution quite unlike any other of my puzzle designs.

S. T. C.
May 1994

The ISO-PRISM Puzzle, No. 101-A



This puzzle is simply a modification of the Isosceles Puzzle, No. 101, in which 24 more triangular end blocks have been added to create the effect of four mutually intersecting isosceles-triangular prisms. They are added in a manner such that all twelve puzzle pieces are dissimilar and non-symmetrical. Even though this was done in a straightforward, systematic manner with no particular attempt to make the puzzle any more difficult than it naturally would be, this has the effect of making the assembly of this puzzle somewhat of a combinatorial problem as well as confusing geometrical construction. In other words, this puzzle should prove to be very difficult, by my standards at least. Anyone who solves this puzzle straight-away, given the pieces disassembled, can consider it quite an accomplishment. However, the more logical approach would be to solve the Isosceles Puzzle first. Having done that and discovered the unusual and surprising solution, then this puzzle, which goes together the same way, should not be so very difficult.

To design this puzzle, set up all the various sawing jigs, and then get all the pieces to fit together smoothly and precisely was somewhat of a woodworking challenge. I regard it as one of my more significant pieces of work. It is being made in very limited quantity from my very limited supply of China camphorwood, the interesting history of which may be found on the Isosceles Puzzle sheet.

I have no immediate plans to publish assembly instructions for this puzzle. Caveat emptor!

S. T. C.
May 1994

<u>THE INCONGRUOUS BURR</u> No. 102

from Tom Rodgers

for the puzzle exchange at the 15th International Puzzle Collector's Party

---

Another Stewart Coffin puzzle! Another disaster!! And another apology!!! Evidently, what happened was this: Increasingly mentally enfeebled by the infirmities of old age and unable to come up with a new design for this year's exchange, Coffin resorted to the timeworn standard diagonal six-piece burr, with the mundane variation of rhombic sticks in place of square ones, as seems to be his preoccupation of late. But then, after having sawn out some 480 puzzle pieces, it was discovered that because of the rhombicness, they *could not be assembled!* What to do?

With time running short, in desperation it was decided to convert them to the degenerate version of the six-piece diagonal burr with two extra notches and sliding key piece. But then yet another goof! Coffin, evidently confused and rattled, added only *one* extra notch rather than the required two, blithely packaged them up, and shipped them off. The embarrassing result - a diagonal burr that obviously cannot be assembled either by the usual method of mating two halves or, alternately, by employing a sliding key piece. In other words, a "puzzle" that apparently is *impossible to assemble!*

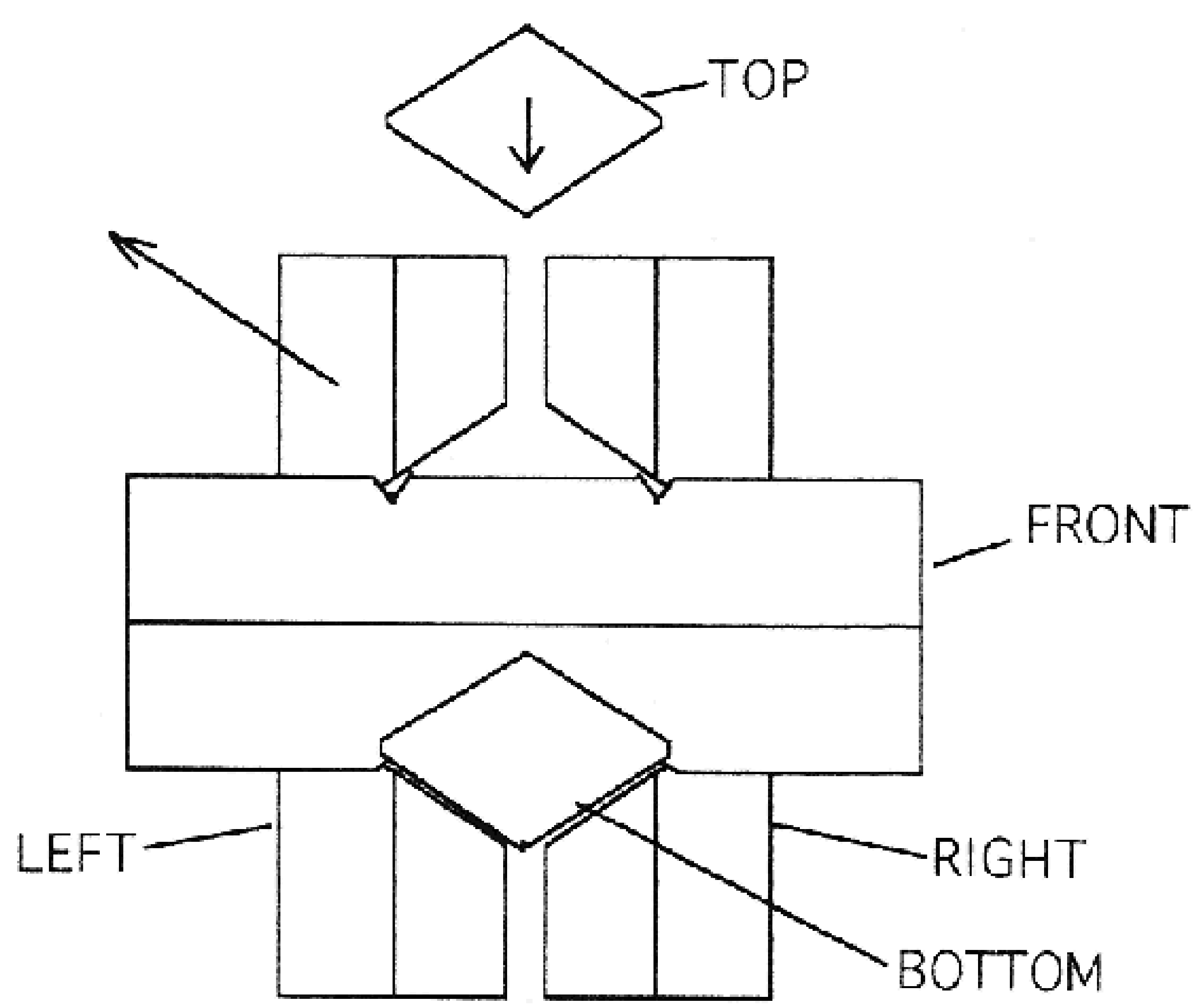
(Or is it?)

Analysis and solution for The Incongruous Burr puzzle

This is a coordinate motion puzzle quite unlike any other made by me (or known to me). Other puzzles of this type have depend upon symmetry for their operation (see *Puzzling World,* Chapter 12). In order for this one to work, it depends upon a *departure* from symmetry!

Assemble the five standard pieces with the vacancy on top and place this partial assembly on a level surface. Identify the two vertical pieces as **left** and **right**, and the others as **bottom**, **front**, and **rear** (see diagram). While holding the **right** piece fixed, lift the **left** piece upward and to the left, while keeping it vertical, in a direction such that the **bottom** piece remains fixed and the **front** and **rear** pieces move symmetrically away from each other. Just before the point is reached at which the assembly collapses, the **top** piece is dropped into place with its extra notch towards the right. This is touchy, and it may take some practice and patience before you achieve it. It might help to have four hands. Then compress the assembly together. The final step will have a slight snapping action that holds the assembly tightly together and makes disassembly puzzling as well. All of this assumes normal humidity. The puzzle may be very difficult to assemble or disassemble if the humidity is high, but this can be corrected by placing the puzzle in a dry place for a few hours.

Unlike the series of burr puzzles produced by me a year or two ago having sticks of arbitrary rhombic rather than square cross-section, the angles in this puzzle must be calculated exactly. The obtuse angle is 103.12 degrees. (A good exercise in vector analysis is to see if you can figure out how this is calculated.) If the angle is any greater than this, theoretically the puzzle cannot be assembled. As a practical matter, I make the angle about half a degree less, as this causes it to explode on disassembly for added amusement.



Stewart Coffin
January 1995

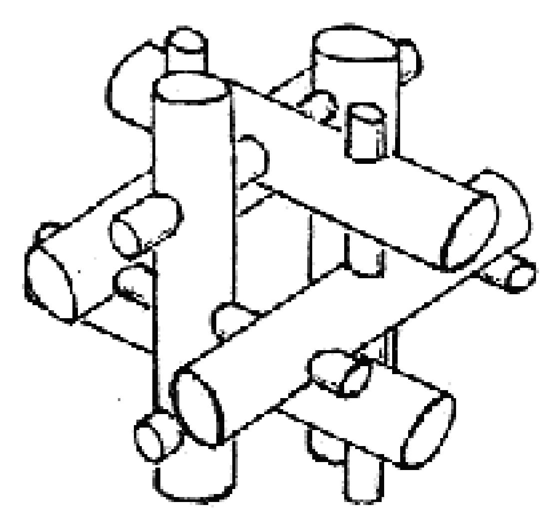
No. 103
The Missing Piece Puzzle

from Tom Rodgers

for the puzzle exchange at the 16th International Puzzle Collector's Party

- - - - - - - - - - - - - - -

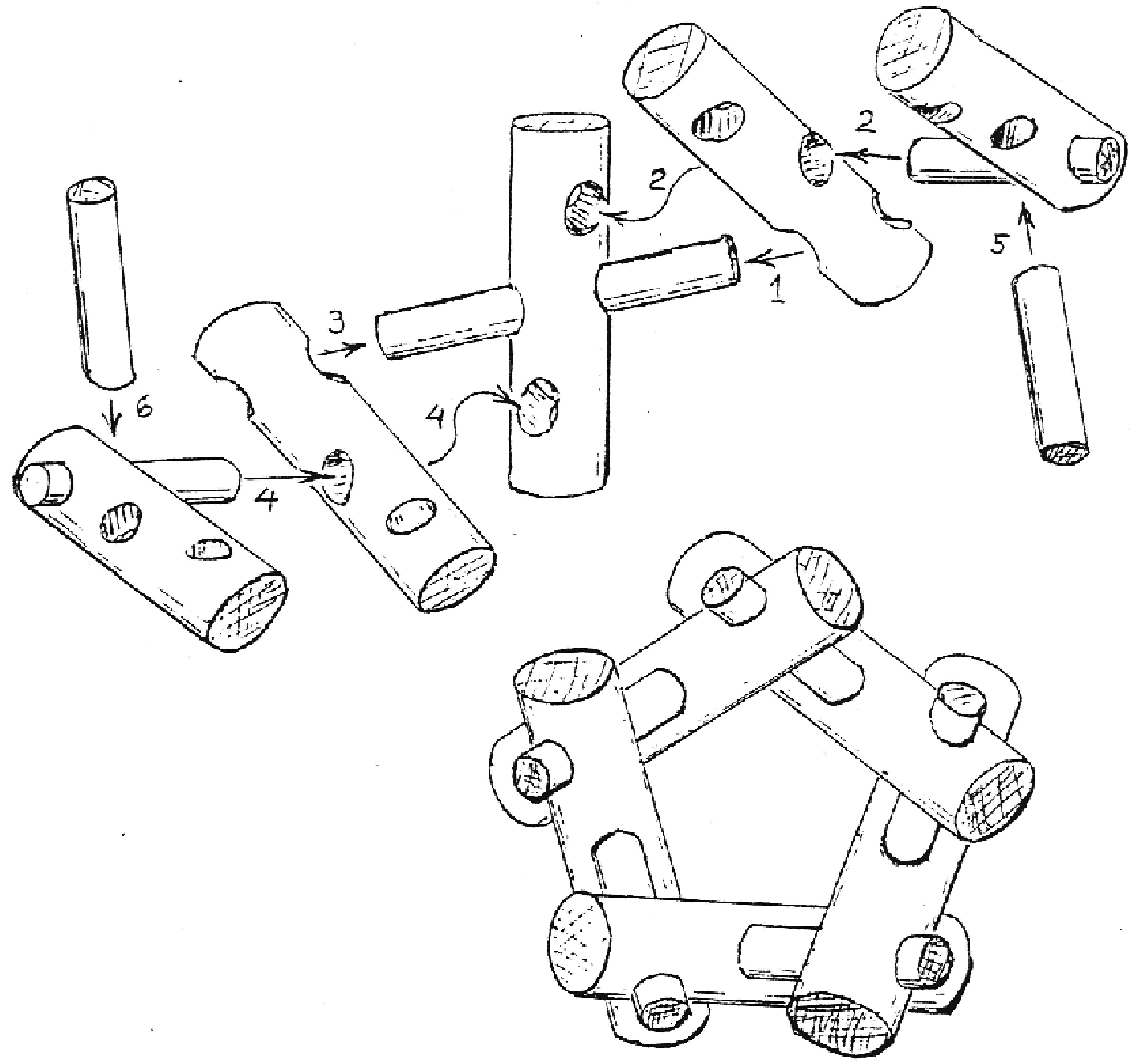
Another Stewart Coffin puzzle, and yet another disaster! This design is obviously but a slight variation of Coffin's old Cuckoo Nest Puzzle (1977), which consisted of six hexagonal sticks with three holes each, arranged rather like a flattened six-piece burr and held together with six pins. It employed five pairs of sticks and pins joined together various ways for a total of seven puzzle pieces. It does not require very much imagination to realize that round dowels could be substituted for hexagonal sticks, as shown below:



This new version also has seven puzzle pieces all right, but the design has been changed to include a cross piece in place of one of the elbow pieces. But alas, after all that, evidently Coffin became confused when packing, and supplied too few pieces in each baggie. Count them and see for yourself! Seven puzzle pieces all right, but using only five pins and five drilled dowels, rather than the required six of each. When asked for an explanation, his rather unsatisfactory response was simply a shrug of disconcern. Then he suggested that rather than supply the missing piece, it might be easier to just change the name of the puzzle, hence the name! And furthermore, he suggested that perhaps someone may discover some way to assemble just this short supply of pieces into some sort of harmonious configuration? Let us hope so!

#103

Assembly directions for the Missing Piece Puzzle



STC
Nov 1995

AP-ART
The sculptural art that comes apart

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773
617-259-8348

Special puzzle notice to T.B., J.D., J.E., E.H., T.R., and J.S.:

Tech-Sticks
No. 104

For the past few months, I have been arduously producing recently announced puzzles to fill a deluge of orders, with little likelihood of ever satisfying all of them. When enslaved to the workbench like that doing repetitive tasks, my mind tends to wander, wishing I were doing something more creative.

Lately I have been tinkering with distorted versions of earlier polyhedral designs. The notion of a distorted Hexsticks puzzle has been in the back of my mind for a long time. So, I decided to take a week off and see if I could produce one. First, I calculated all the angles, using one of those nifty pocket calculators. Then a few days of painstaking work were required to set up the sawing and planing jigs, in order to make all of the various odd-angled blocks and notches accurately. The remainder of the week was spent producing seven such puzzles in Honduras mahogany, of which I will depart with six and keep one. They are not easy to make, and I doubt if I will make any more. Mostly, I just wanted to see if it could be done. Technically, this is perhaps my most advanced puzzle design thus far, hence the name.

This puzzle could be described as a Hexsticks puzzle that has been distorted by compression along one of its four-fold axes and by elongation along a second axis. In other words, having somewhat the symmetry of a brick, the same as was done to the Twelve-Piece Separation puzzle to create the Geodynamics puzzle. The degree of distortion is the same in both, so many of the angles are the same also, making the job easier than it would have been otherwise.

Making the extra notches for the three odd pieces, as in Hexsticks, presented special problems. So instead, since I was using glued-up notches, I modified the design to use displaced blocks and augmented pieces, as in many other of my recent designs.

These are all being supplied disassembled, with no assembly instructions, but only a few helpful hints. I expect that most of you will be able to solve this puzzle without too much frustration. I would think that solving it by analysis and logic ought to be a satisfying experience. I suppose it might be solved by blind trial-and-error, but would likely take a very long time. I would appreciate a reply from all of those who receive this puzzle, reporting on their degree of success and satisfaction.

S.T.C., March 1995

Helpful hints for Tech-Sticks, No. 104:

Ignoring for the moment the displaced blocks which create the three key pieces and three augmented pieces, there are basically three types of pieces, which we will call types A, B, and C, four of each. A is widest, C narrowest. The key pieces are one each of types A, B, and C. The augmented pieces are two of type A and one of type C. Each notch in each piece will accommodate only one type of piece in only one way. If the piece does not fit precisely into the notch, then it does not belong, as the angles of the notches vary in exact ten degree increments (110, 120, and 130 degrees), and all are accurate to within a fraction of a degree. Under average humidity, the puzzle will go together with little force.

S.T.C., March 1995

Edward - instruction sheet for puzzle is your responsibility, so the following are just some suggestions of mine for your consideration:

Name?

(This puzzle design is number 105 in my serial listing and called Lock Nut, but you may rename it anything you wish.)

from Edward Hordern

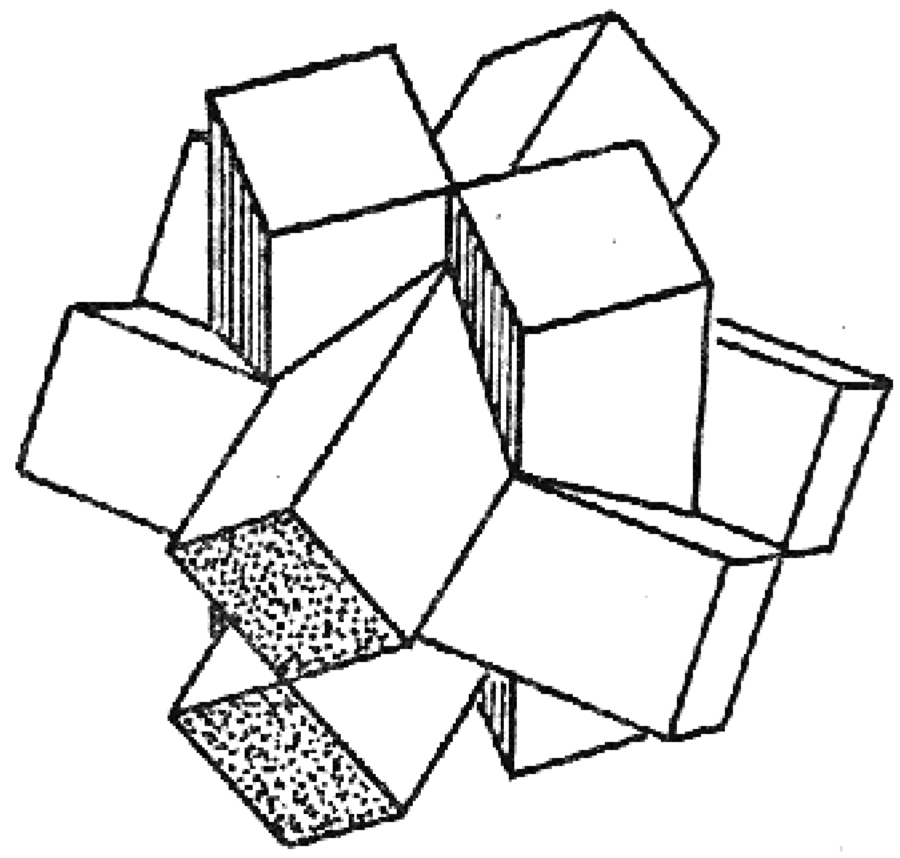
for the puzzle exchange at the 16th International Puzzle Collector's Party

---

This puzzle was designed and made by Stewart Coffin specially for the exchange. It consists of two sets of three identical notched sticks, one set being the exact mirror image of the other. Most puzzle collectors will easily recognize it as but a variation on the familiar six-piece diagonal burr, assembled naturally by first forming two subassemblies of three pieces each and then mating the two halves. Alas, you may have a little difficulty forming the subassemblies, as some of the notches may not be cut quite exactly true. (Poor Stew just can't seem to get it right these days!) However, don't give up, for every set has been tested for assembly before packaging, and with sufficient maneuvering they do indeed go together to form the symmetrical six-piece burr shown below.

Burr Noodle

No. 106



This simple six-piece diagonal burr puzzle is named in honor of the famous Swiss mathematician and inventor Jacob Burrnoodle, whose theories in the field of fluid dynamics led to the development of the high-speed manufacture of noodles.

Detailed assembly directions are probably not necessary. Anyone familiar with the good old diagonal burr and its many variations knows that it is most easily assembled by mating two halves of three pieces each. There is, however, one slight complication with this puzzle. It is made of wood from the infamous Ji Yama tree, which grows only on higher elevations in eastern Asia. Alas, this rare and exotic wood is dimensionally quite unstable. It has the unique and peculiar property of being affected, not by humidity like all proper woods, but rather by changes in atmospheric pressure. Examine the pieces carefully to see if they are perfectly square in cross-section. If they are not, then you may be in for some serious trouble. One approach would be to take the puzzle pieces along with you the next time you climb to at least 20,000 feet altitude. If that is not practical, you might seek other ingenious approaches. Some claim that meditation helps.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 December 1995

The Spare Pair Burr, No. 110

When it comes to the standard six-piece burr and its many variations, it seems like it is becoming ever more difficult to invent a version that is truly novel and original. Finding my creative powers to be fast approaching a state of severe exhaustion, in my desperation to come up with just one more burr to use up some scrap lumber and foist upon my faithful puzzle friends, I am producing a few of these Spare Pair burrs.

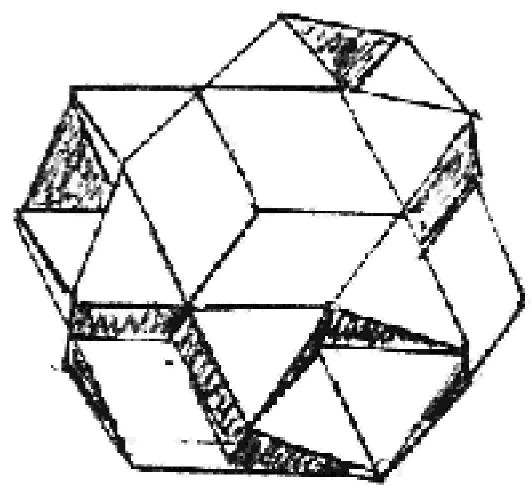
In a rare moment of true inspiration, I had the following thought: Sometimes puzzle pieces get lost, broken, or even chewed up by the family dog. Why discard the puzzle for lack of just one piece? If the puzzle uses several identical pieces, why not include some spare pieces with each puzzle set? Isn't that a great idea!

Now here is yet another marvelous thought: Not everyone enjoys challenging puzzles. In fact, some persons are positively repelled by them, even frightened. Why not make things easier for the novice puzzler by subassembling some of the pieces? Which brings us to the Spare Pair Burr.

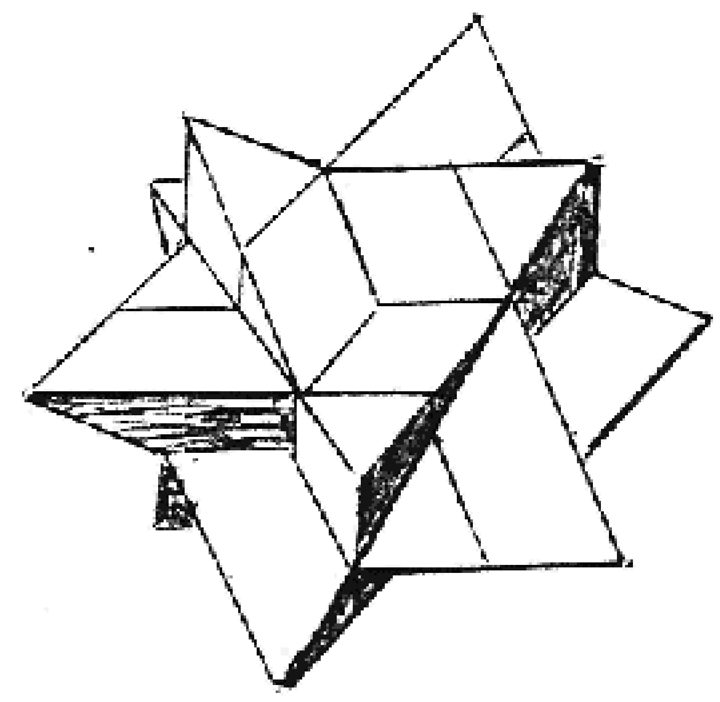
Note that there are two types of pieces used in this puzzle, four of which contain only one notch, with the other four having an extra notch. For your convenience, two pairs of pieces are pre-assembled by gluing them together. Thus there are actually six puzzle pieces. All that remains is the trivial task of completing the assembly of this simple six-piece burr.

For those who enjoy more challenging puzzles than this, my apology.

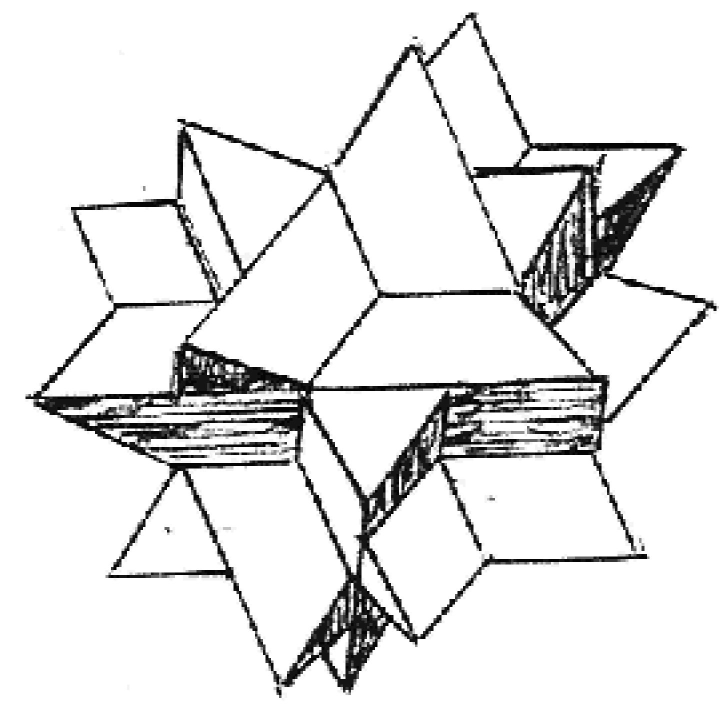
Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 March 1996



Lost & Found, (111)



Lucky Star, (111-A)



Star Dust, (111-B)
and **A-B-C**, (111-C)

This puzzle family has an interesting history. When I started out in the puzzle business around 1970, I had an agent nearby whose purpose was to help me license my puzzle inventions for commercial manufacture. After a few years, he quit the business as being unprofitable and moved to a new job in Spokane, evidently taking many of my prototype models with him. All communications from him soon ceased. I assumed that all the models were lost. I had duplicates, plans, or at least recollections for most of them, so it was no great loss. Then, after a lapse of over 20 years, a few months ago a large box was mysteriously delivered to me from Spokane, containing a few dozen of my long lost models, including a few that I had forgotten completely. This long lost and forgotten puzzle was among them, hence the name Lost & Found. The marking inside indicated that I had created it in 1973.

This is a coordinate motion puzzle of six pieces, which goes together in two halves somewhat like my confusing Three Pairs puzzle. But these six pieces are identical, yet the two halves are quite dissimilar, somewhat like my Four Corners puzzle. This combination of features is unique among all puzzles known to me. With all those hints, it is not too difficult, so that is all the help you will get from me. Disassembly can also be confusing, and in this respect it somewhat resembles my Cluster-Buster puzzle. Probably the best way is to randomly push on groups of triangular end faces until you find the three that move in unison.

Lucky Star (No. 111-A) is a modified version which has the shape of an intermediate form of the stellated rhombic dodecahedron, like my old Vega puzzle.

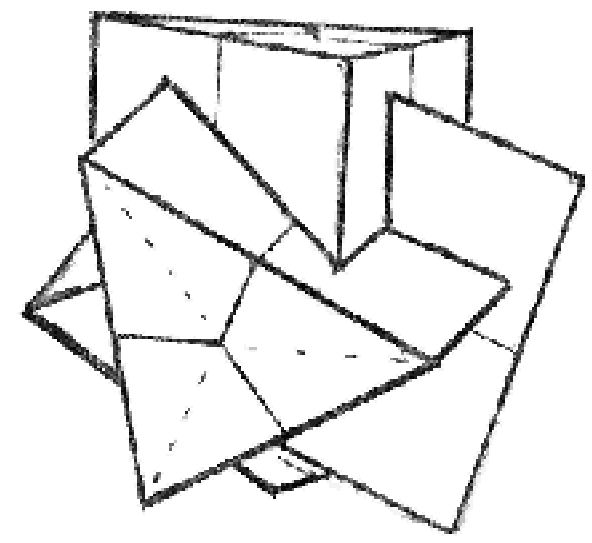
Star Dust (No. 111-B) is another modified version which has the shape of the intriguing third stellation of the rhombic dodecahedron.

A-B-C (No. 111-C) is a bit more complicated. It has the same shape as Star Dust, but there are three kinds of pieces, two of each (simple as A-B-C).

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773

December 1995

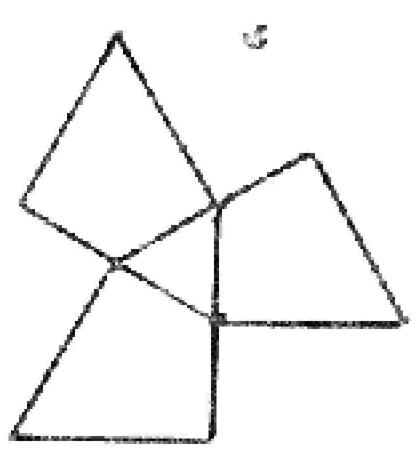
Burr Muda, No. 112



Brace yourself! The legendary Bermuda Triangle was no doubt a myth, but this one is definitely not. And here we have not one but four terrible triangles to deal with, all at the same time. If you received this puzzle assembled, the first task is to disassemble it. But before doing so, read all of these instructions, for if you think that disassembly is tricky, wait until you try putting it back together again!

Disassembly requires recognizing that this is a coordinate motion puzzle. All six pieces must be gradually worked away from each other, simultaneously and equally. No force is required, and any used will be counterproductive.

To reassemble, note first that all six pieces are identical and symmetrical. Take any three pieces and tape the corners of their faces securely together, as shown below in Figure 1. Use a strong, sturdy tape such as mending tape. Place this subassembly face-down on a flat surface. Drop the remaining three pieces into place on top, holding them in place by taping their corners to those of the bottom subassembly in the same manner. The three points that interlock at the top should appear as in Figure 2. This same pattern is repeated in three other places. Put rubber bands around each of the three upper faces, as shown in Figure 3. (It may be possible to assemble this puzzle without using either tape or rubber bands, but if so, I have not yet been able to.) Now carefully hold the assembly cupped in your hand and remove the tapes, a bit at a time, while engaging the pieces by not more than one-sixteenth of an inch as shown in Figure 4. When all of the pieces are slightly engaged, work the puzzle gradually together.



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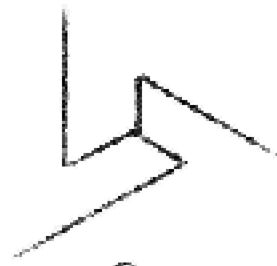

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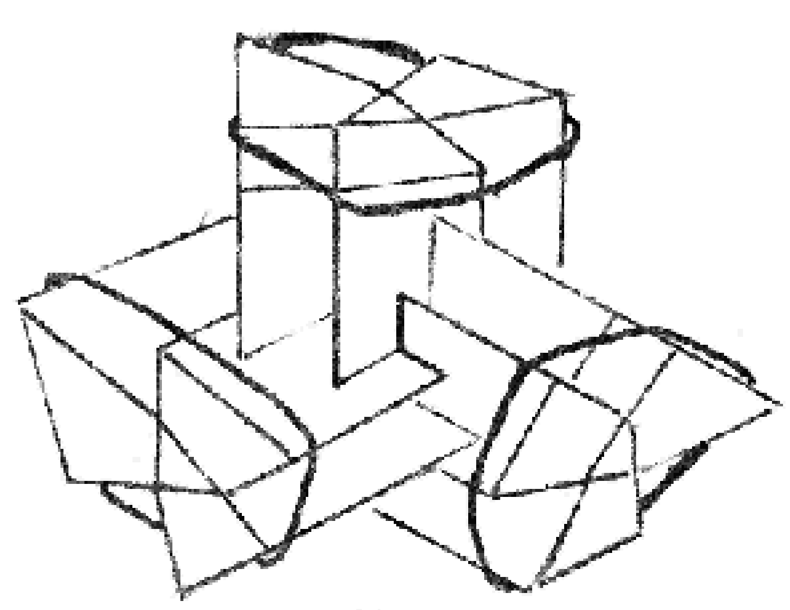

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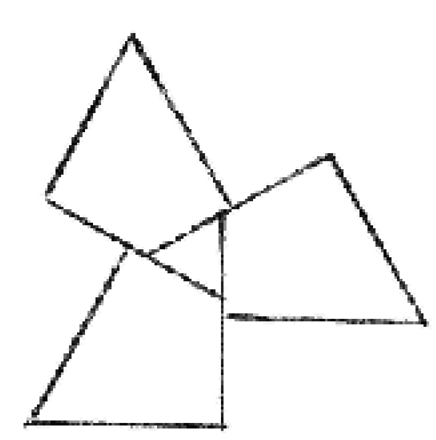


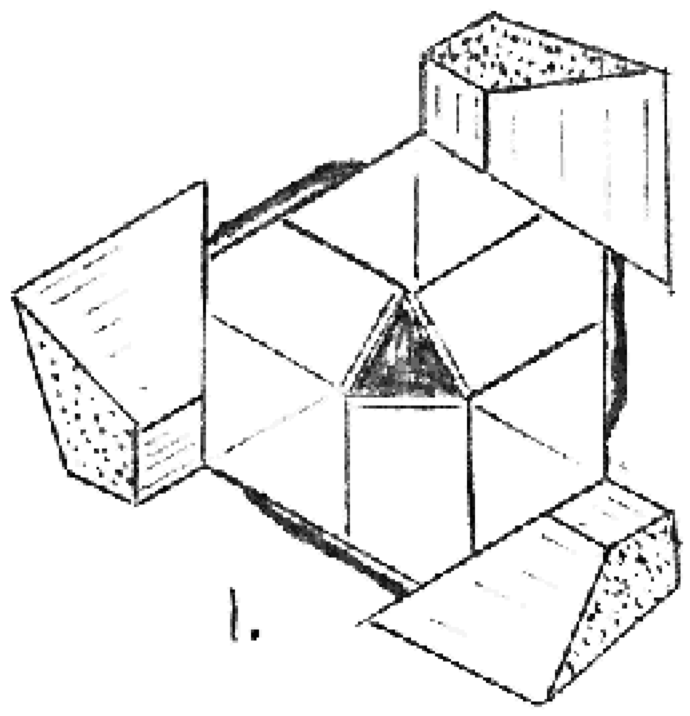
4.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 Dec. 1995

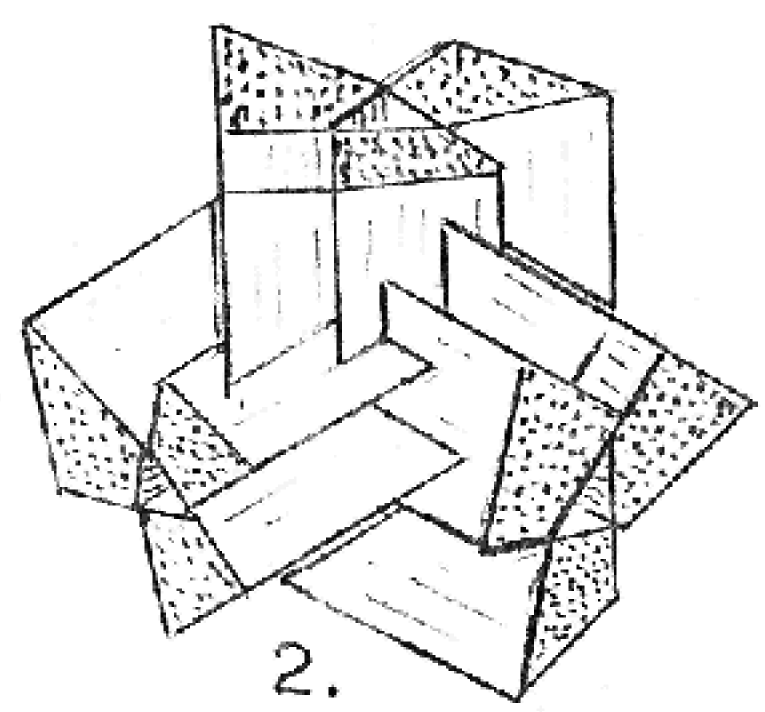
Burr Muda, No. 112 - Supplement for Assembly Jig

The assembly procedure for this puzzle involving tape and rubber bands, described on the Dec. 1995 instruction sheet, is not easy. During fabrication, the puzzle must be assembled several times to check the fit, and I soon decided that I needed a better way. I came up with the simple assembly jig described below. This jig is now included with each puzzle sold. Even using this jig, assembly is tricky and requires patience. It gets easier with practice. I can now do it in a minute or two, depending upon how accurately the puzzle is made. As is often the case with coordinate motion puzzles of this sort, as more are made, slight inaccuracies in the sawing and gluing jigs are gradually worked out, and as a consequence, the puzzle becomes ever more difficult to assemble.

Place three pieces in the jig as shown in Figure 1 below, and secure them with a strong rubber band around the base of all three. Then carefully work the remaining three pieces into position as shown in Figure 2, and engage the three exposed faces slightly as shown in Figure 3. This requires some patience. Then remove the jig and rubber band, engage the remaining face, and work the puzzle gradually together.



1.



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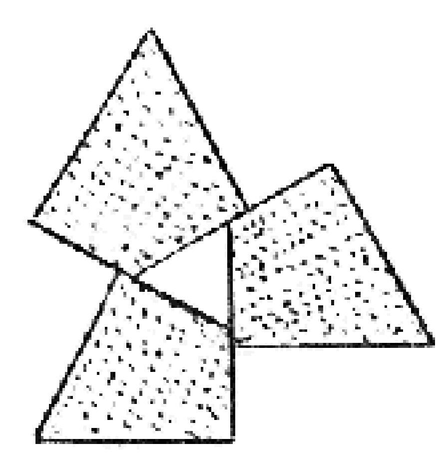


3.

Normally I am not a strong advocate of dexterity puzzles, so why this one? To begin with, it is not strictly a manual dexterity puzzle. It does call for patience, but even in this one, mental insight is more useful than sheer manual dexterity. In all other respects, it is a gem. A simple, symmetrical dissection of this intriguing geometrical solid yields a challenging and novel coordinate motion puzzle straightaway without any further complications. So lucky! Note that the pieces are made with notched glue joints - the first time I have used this technique. They should be quite strong.

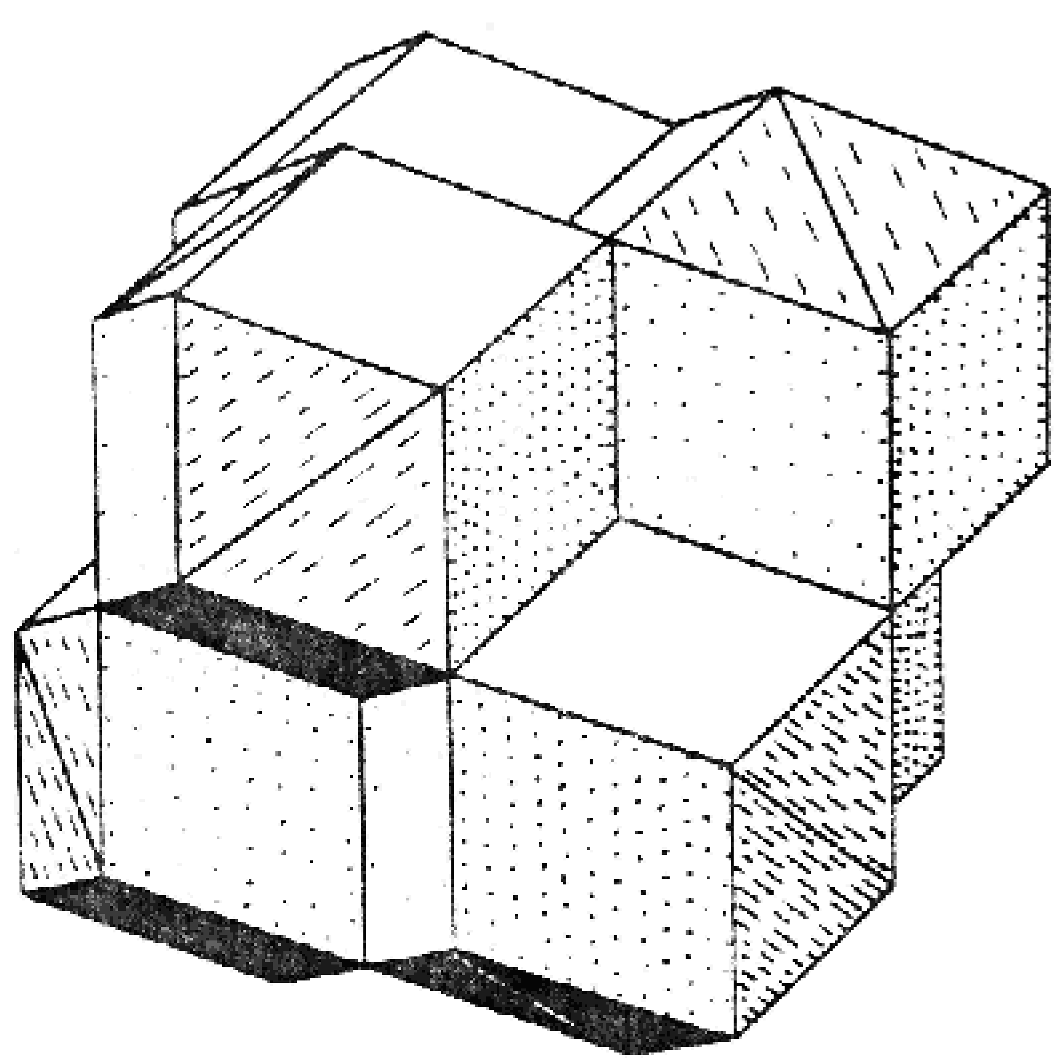
This puzzle is made to function best with relative humidity of around 50% With typical summertime humidity of 70-80%, you may still be able to get it apart, but you may have a devil of a time getting it back together. This can be helped by placing it in a warm oven or other dry place for a day or two.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA, 01773 Jan. 1996

Cluster Plus, No. 114

First there was the Cluster Buster, No. 47 in 1973, followed shortly by the Truncated Cluster Buster and the Improved Cluster Buster. My records indicate that only about 20 of these were made altogether. They weren't really very terrific puzzles. Yet I always receive requests from persons who have spotted them in my AP-ART serial listing and figure they have missed something. As so often happens, whenever I decide to reissue a puzzle that ancient, I find that it can be improved. Such is certainly the case here.

The trick of the Cluster Buster was taking it apart. You had to place three fingers of each hand in exactly the correct spots and push in opposition. There never was an instruction sheet, but it is shown and explained in ***Puzzle Craft 1985***, page 46, and in ***Puzzling World*** on page 97. This one is slightly different in that the first step of disassembly involves placing thumb and forefinger of each hand in exactly the correct places and squeezing. You may be able to determine where by close inspection, or you can resort to random trial & error. But that is only the beginning. The remainder of disassembly involves separating the three pieces in each half. It will amaze you. Note carefully what happens, because putting them back together is a lot more difficult than getting them apart. It involves a bizarre combination of coordinate motion plus rotation, and requires patience plus intuition. It gets easier with practice. I suggest you leave one half assembled so you can study the action and practice with the other half until it is mastered. For additional amusement, note that all six pieces are dissimilar and non-symmetrical, so this is also a combinatorial puzzle. It should keep some of you occupied for a while.



Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 January 1996

AP-ART
The sculptural art that comes apart

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773
617-259-8348

Fancy This !

No. 115 (and 115-A)

This unusual seven-piece polyhedral design incorporates the following features: contrasting fancy woods arranged in isometric color symmetry, all pieces dissimilar and non-symmetrical, serial interlock, and baffling coordinate motion. Although many other of my AP-ART creations have had one or more of these features, this is the first to combine all four of them into one puzzle.

The assembled shape of No. 115 might be described as a truncated third stellation of the rhombic dodecahedron, the same familiar form as my 14-B Augmented Second Stellation and essentially the same as the Scorpius family of designs.

To avoid confusion, I should mention that mechanically this puzzle is internally similar to my No. 73 Third Stellation, which was designed in 1985 but for unknown reasons never produced in quantity. There was also a four-woods version, 73-A, scaled down in size by 20%, a few of which were produced in early 1996. But it was not quite the same mechanically, as two of its pieces were identical in shape.

I am producing at most just a few of these for my select list of puzzle enthusiasts. Consequently, assembly instructions will not be published for this design. I would rate it as being fairly difficult, especially if you have the good fortune to receive it disassembled or ask someone else to disassemble it for you. The use of multiple woods arranged symmetrically should make it considerably easier than it would be otherwise. I will say only that the first step of assembly requires tricky coordinate motion of three pieces, and with just the right touch requires no force whatsoever.

Although I have not yet done so, when and if I were to produce on special order the even more challenging version of this puzzle in plain wood rather than multi-colored, it will have the numerical designation 115-A.

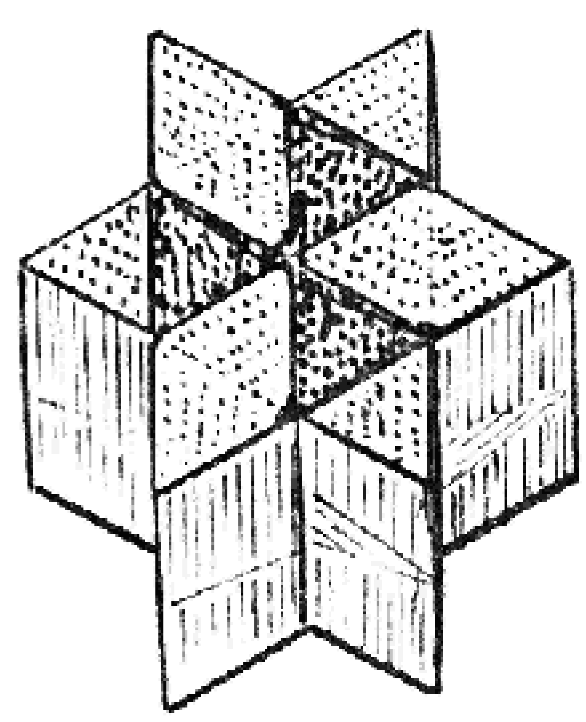
S.T.C.
Dec. 1996

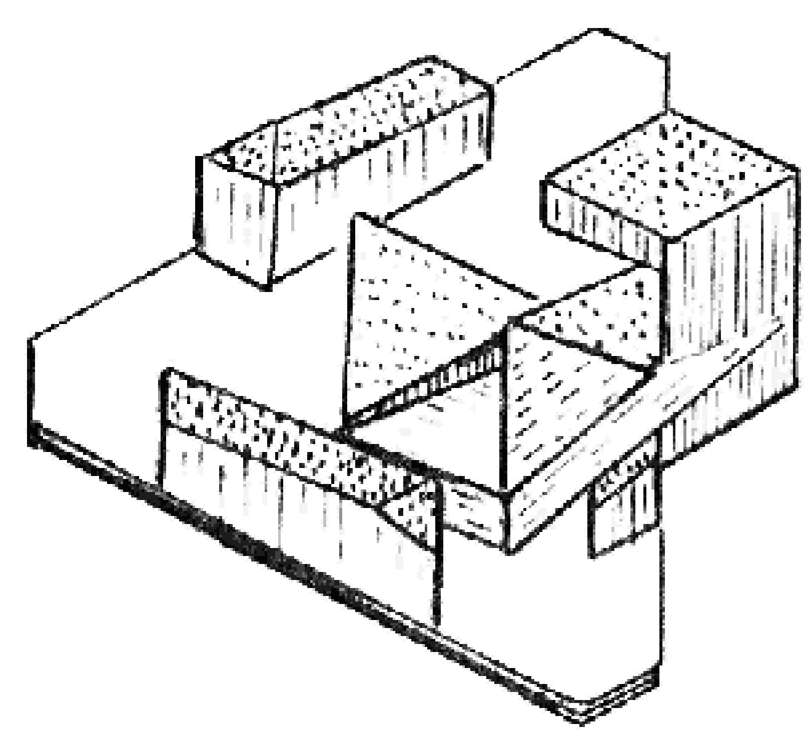
Overdrive
No. 117

This puzzle started out as merely an improved version of the Queer Gear, No. 92, but soon took on a life of its own. It may look the same, but internally and functionally it is entirely different, hence the new name and numbering.

The Overdrive features a six-way coordinate motion mechanism, somewhat like the Rosebud, No. 39. It is not quite as difficult to assemble as the infamous Rosebud. It can be done with two hands and no aids, but requires much patience and just the right touch. Since some persons might be intimidated by this and never experience the fascination of taking the puzzle apart and reassembling it, it is normally supplied with an assembly jig.

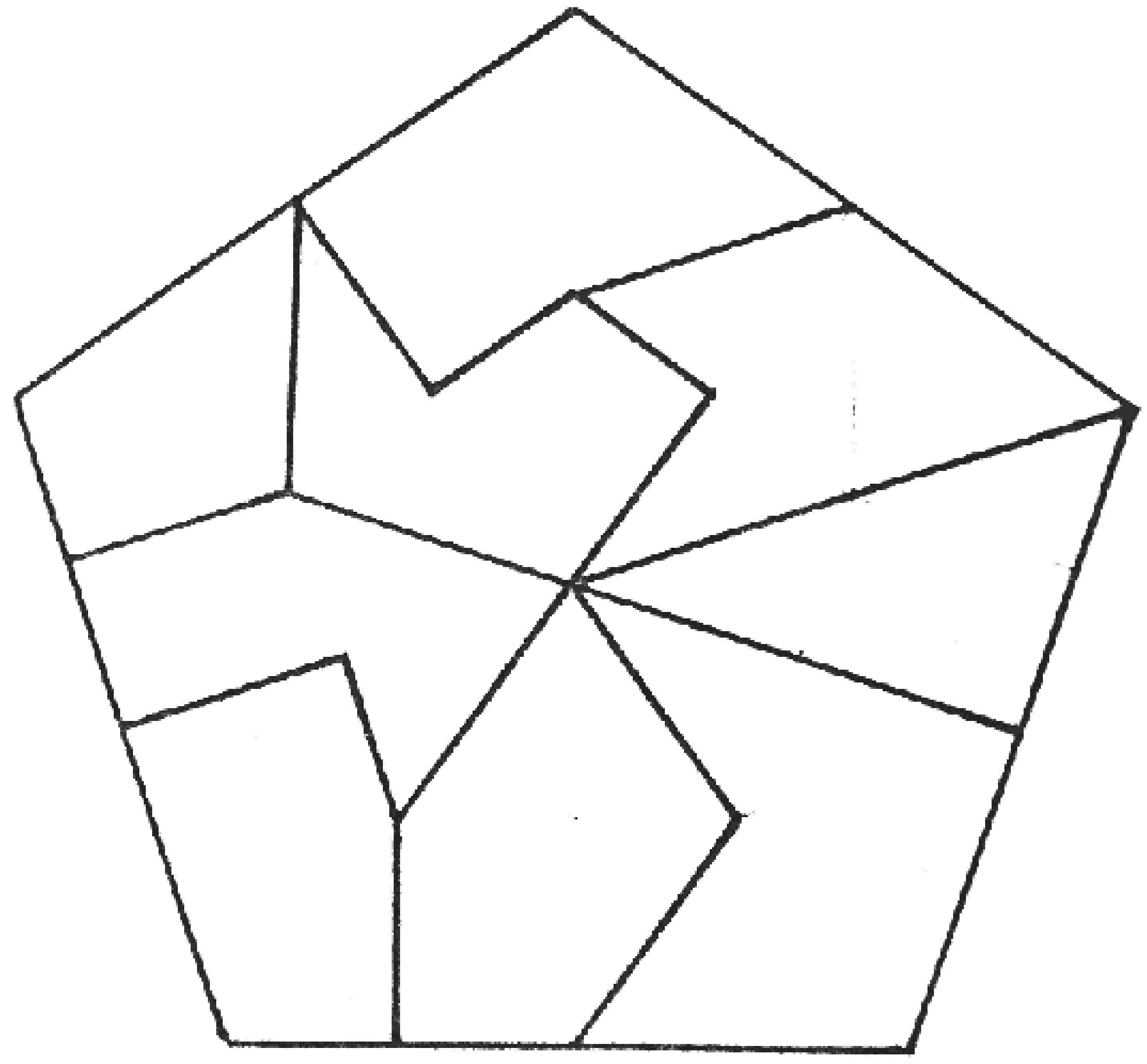
The puzzle consists of three identical pieces which we shall call left-handed pieces, and three more called right-handed. The assembly jig is shown below with one of the left-handed pieces in place. Place the other two left-handed pieces around symmetrically likewise. Then work the remaining three right-handed pieces into position by lifting the other pieces slightly. When all are just barely engaged with each other, compress gently together, lift from the jig, and compress the rest of the way together.



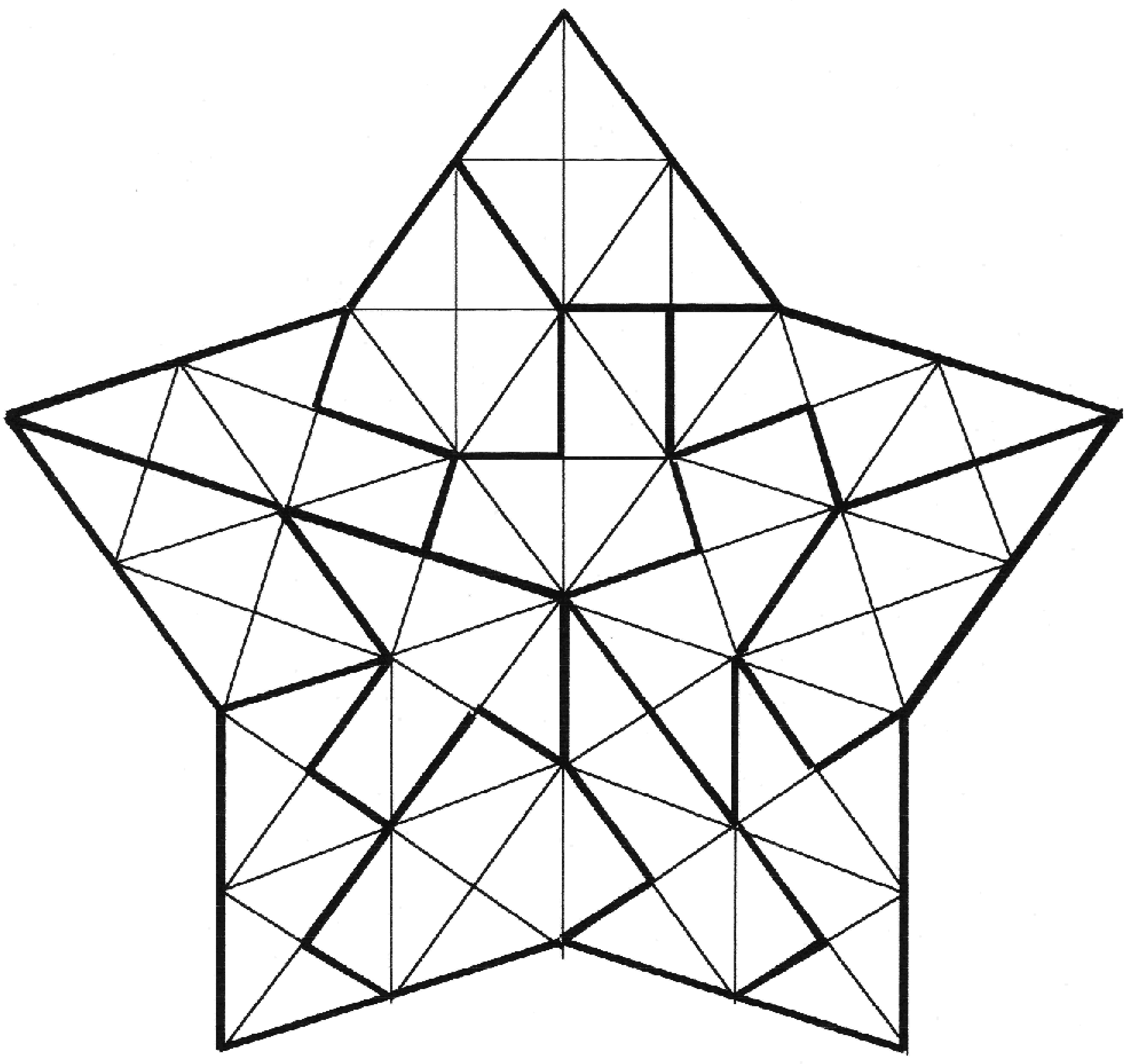


Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 February 1996

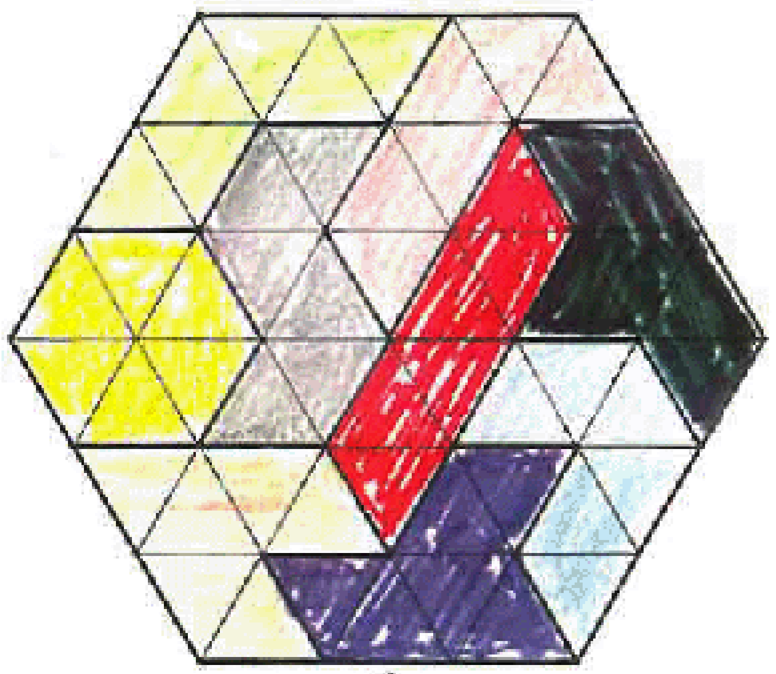
No. 120 Nine-Piece Pentagon



No.121, Pentagonal Star



SOLUTIONS TO RHOMBIC DISSECTION PUZZLE #122



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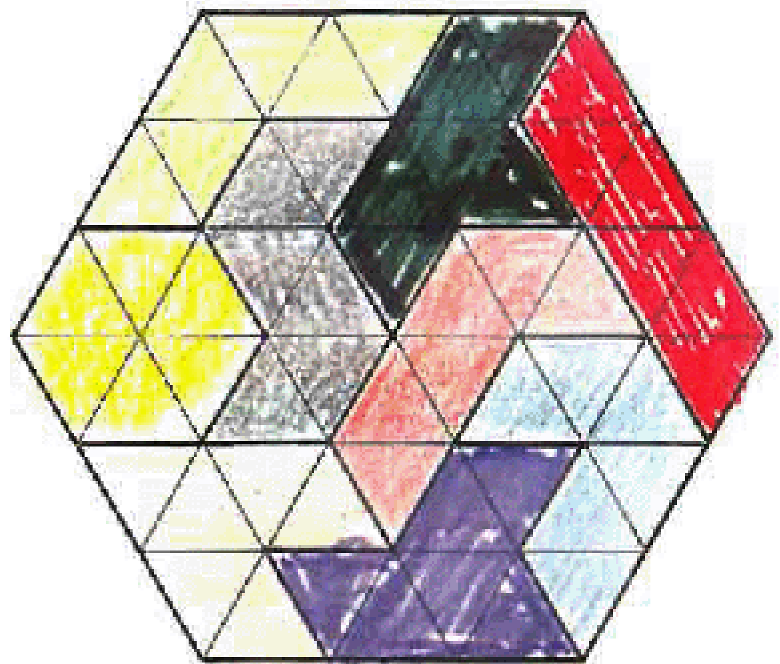

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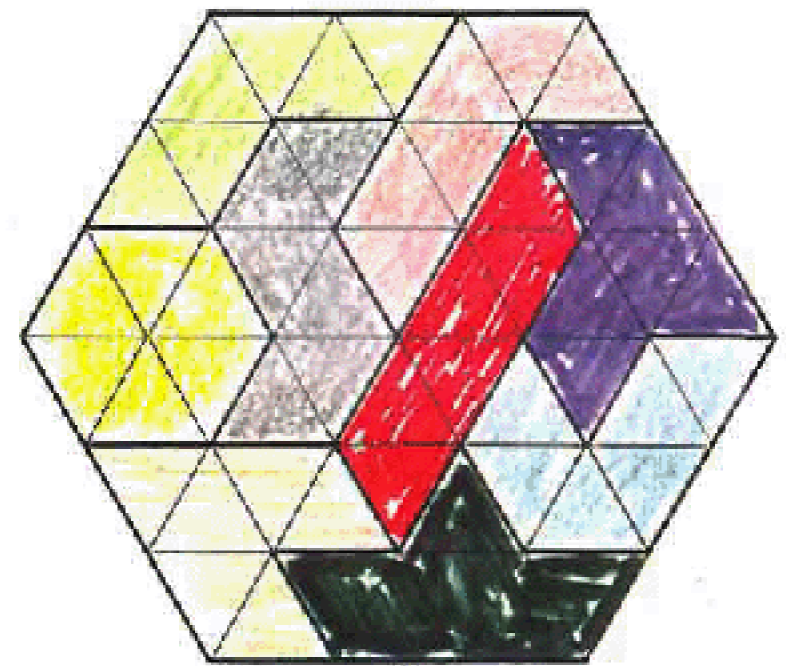

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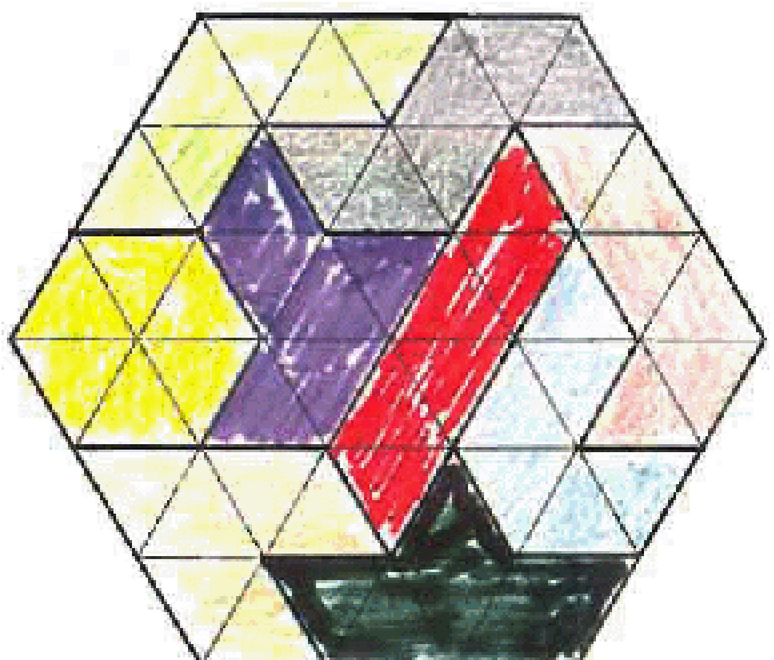

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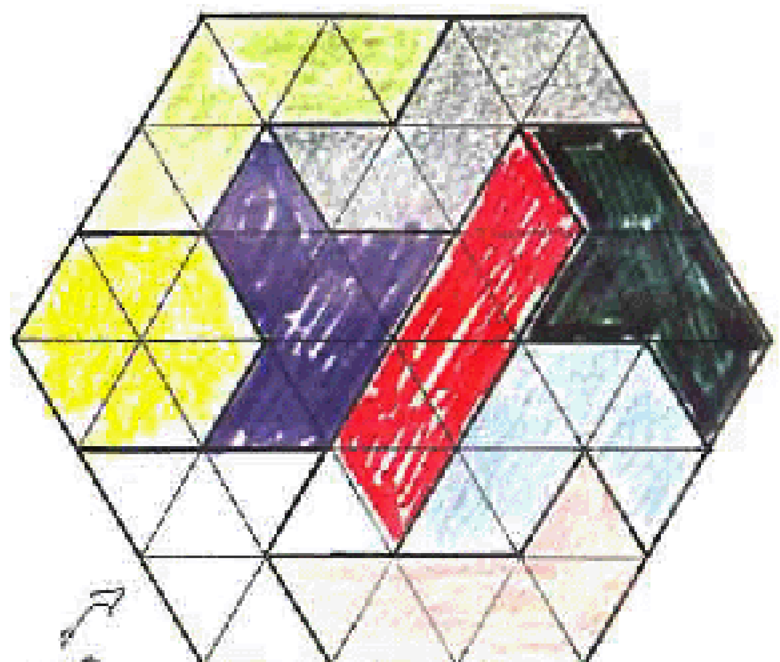
error



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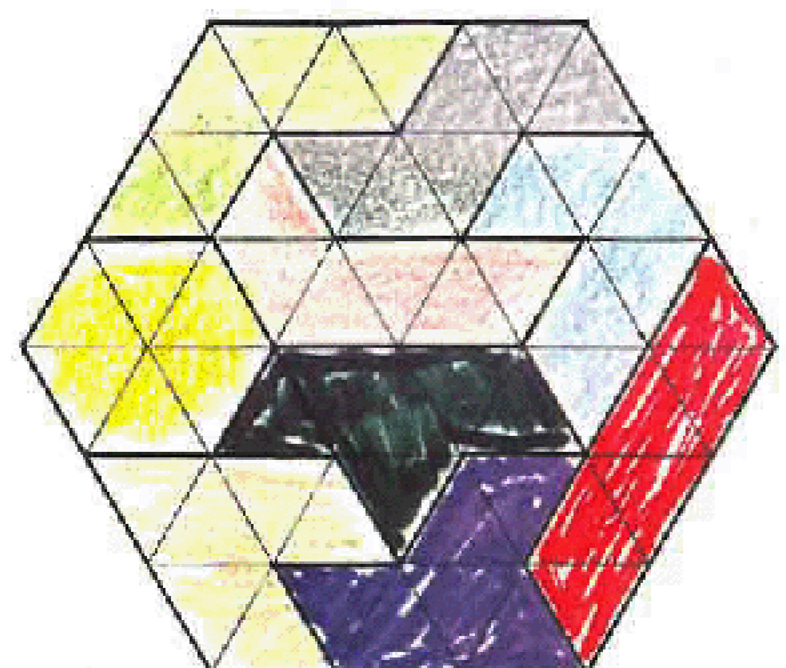

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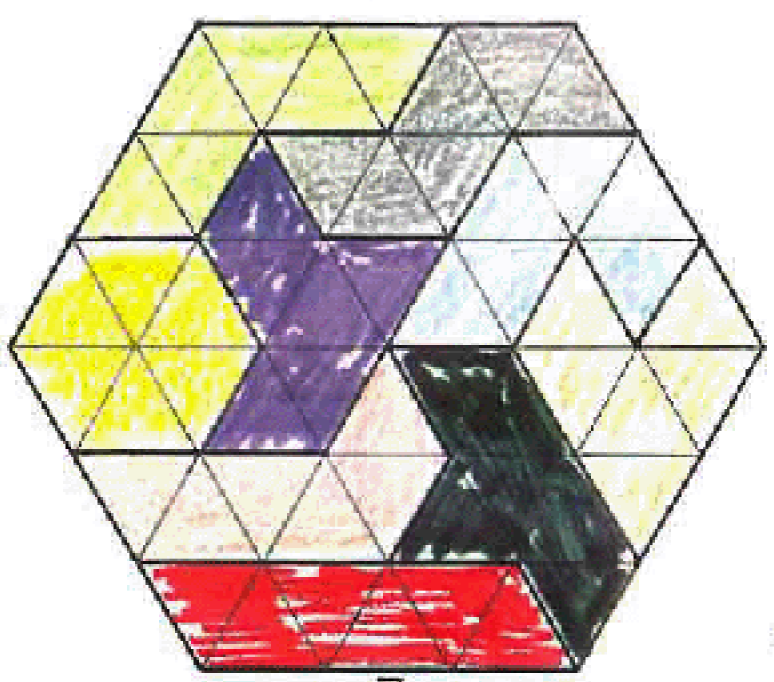

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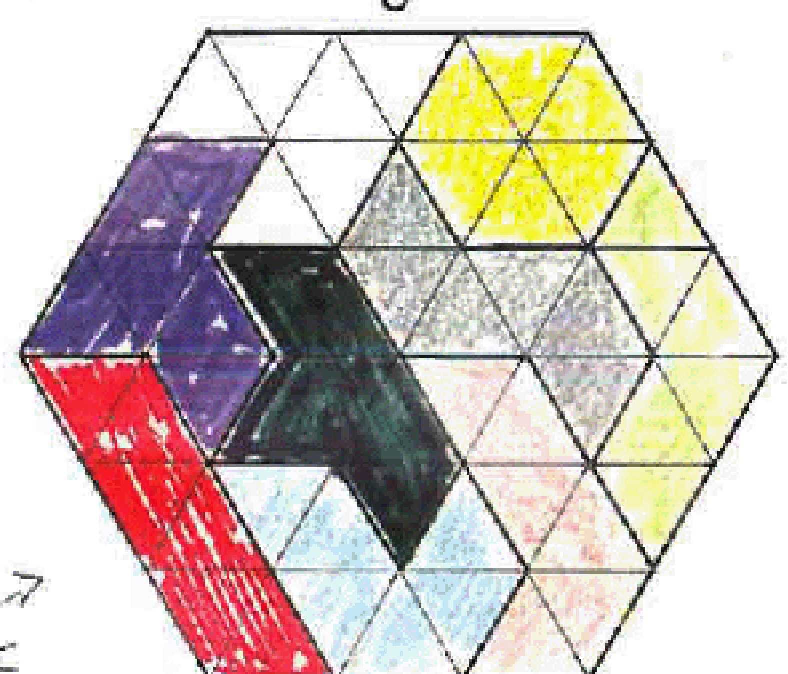

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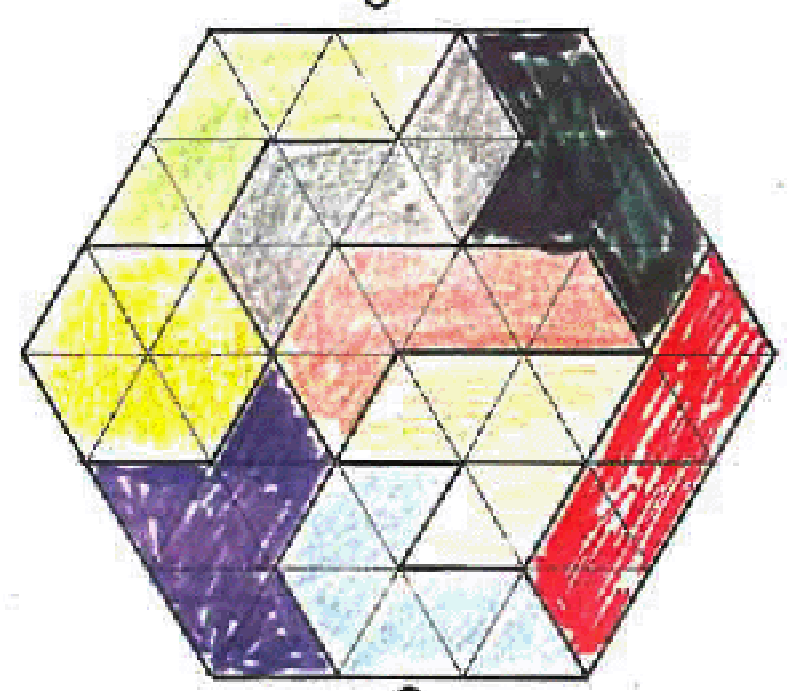

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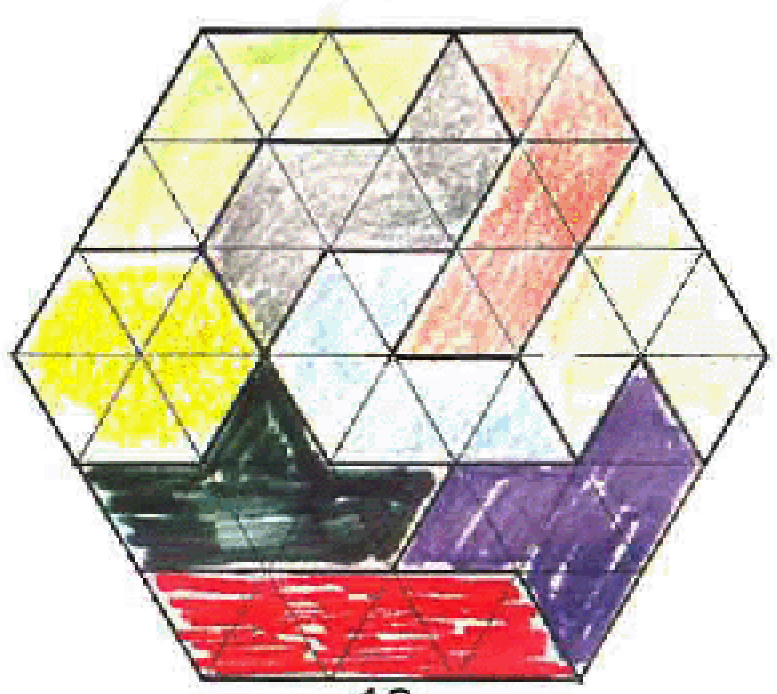

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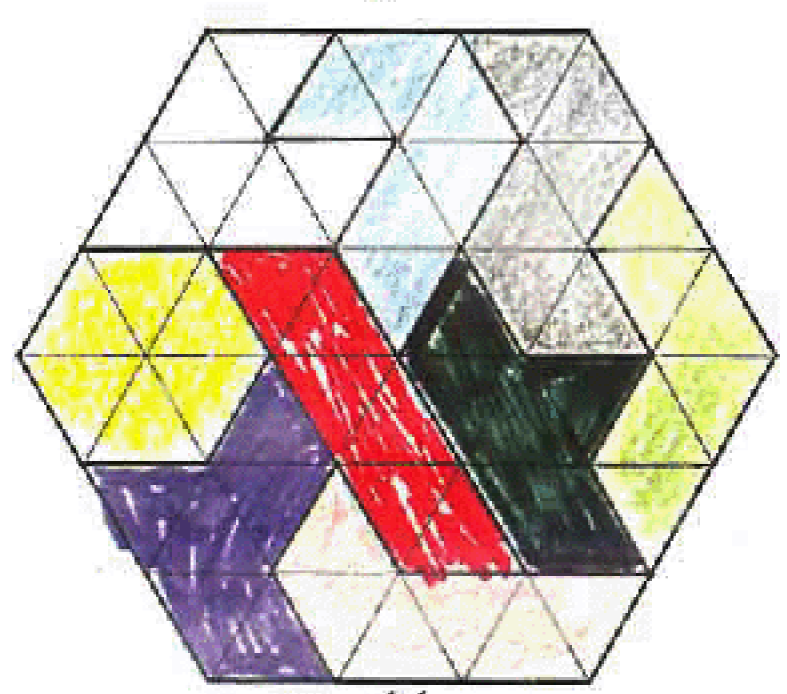

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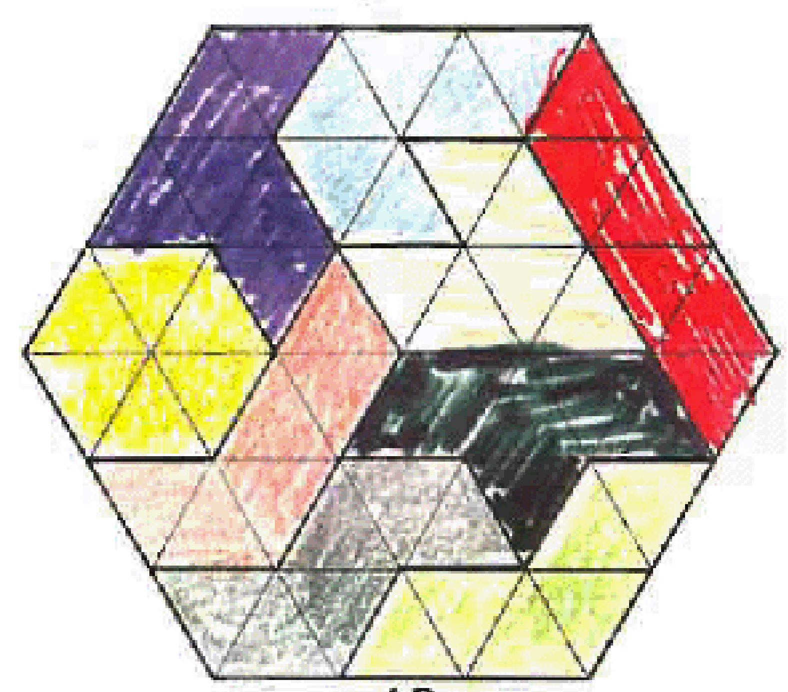

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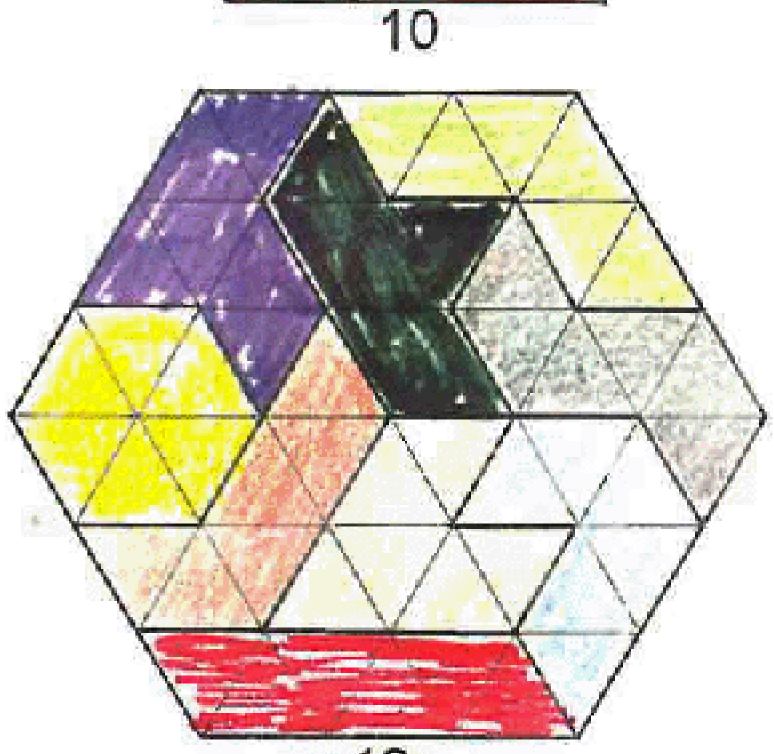

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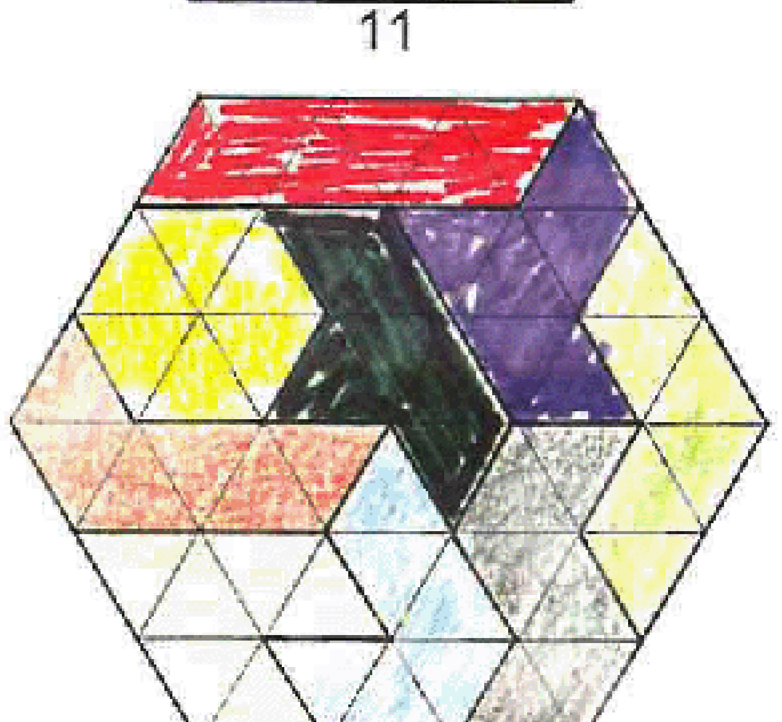

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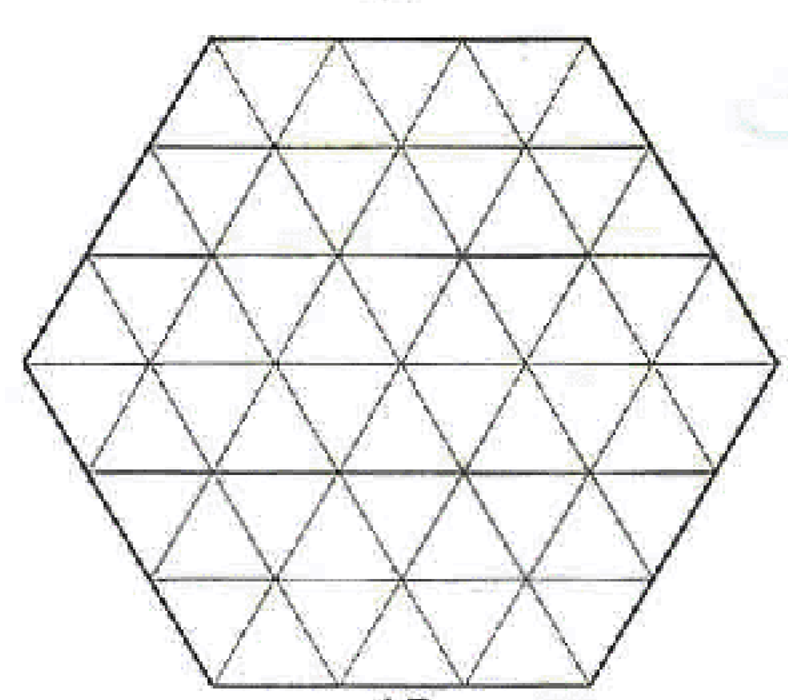

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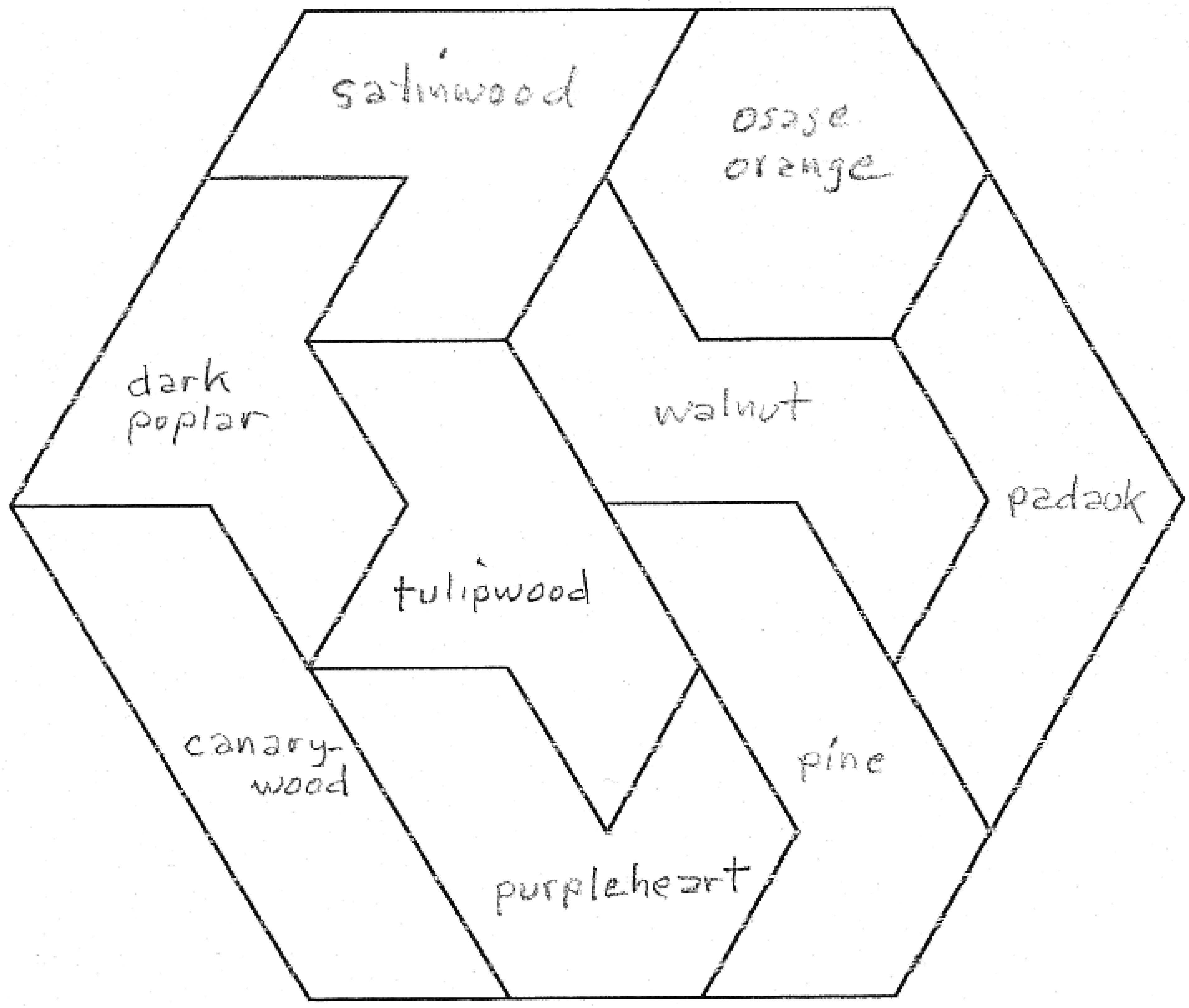

satinwood
osage orange
dark poplar
walnut
padauk
tulipwood
canary-wood
pine
purpleheart

Abel's Chimney
No. 123

The inspiration for this puzzle arose from a rather interesting problem in stone masonry. The object was to create a do-it-yourself kit for constructing your own stone chimney cap. My good friend Abel Cutter invented a very ingenious design which combined economy with elegance. The eight solid blocks are to be fitted together to form a rectangular assembly having an open passageway from bottom to top with a rectangular hole centered at the bottom and top, and with smaller holes on all four sides for improved draft. For economy of both materials and labor, the eight blocks are sawn from one solid rectangular block without waste. It follows, therefore, that they can also be packed snugly into a rectangular shipping box without waste packing space around the sides and bottom. Having somewhat of a whimsical bent, Abel decided that all eight blocks should be dissimilar and non-rectangular, turning the whole project into a puzzle of sorts. Alas, the assembly instructions were so confusing that soon after it went on the market, disgruntled customers started returning kits which they were unable to assemble. And this is where Abel showed his true genius. Anticipating this reaction, he had cleverly designed the kit such that the eight blocks could be preassembled into the chimney configuration and sent back to the customer using the <u>same</u> rectangular shipping box, into which they too fit equally snugly all around. And as a token of goodwill, fitting neatly inside the chimney hole he included an extra rectangular block of finely polished stone, for whatever purpose I am not sure. Perhaps it serves to keep varmints out when the chimney is not in use. Here is an accurate scale model of Abel's Chimney in hardwood.

Directions: The eight blocks come packed in the box, with the extra rectangular block outside. Before you dump them out, take a good look. You may not see them that way again for a while! Now assemble them into the chimney configuration, and drop the extra block into the hole in the top of the chimney. Both solutions fit snugly into the box with about 1/32-inch clearance both ways. Hint: It is impractical to assemble the blocks inside the box. The easier way is to assemble them outside and then carefully fit the box upside down over them. Another big hint: Note the wood grain carefully. The eight blocks are sawn from one solid rectangular block without waste. If after one year you are unable to solve this puzzle, ask for more helpful hints, or perhaps even the solution.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 January 1997

Description and Instructions for AP-ART Design No. 123, Rock Pile

(Formerly known as Abel's Chimney)

Design No. 123, Rock Pile, consists of eight dissimilar blocks, plus two extra smaller blocks that are alike, plus a box to contain them. The box is actually two identical half-boxes, one of which serves as the cover.

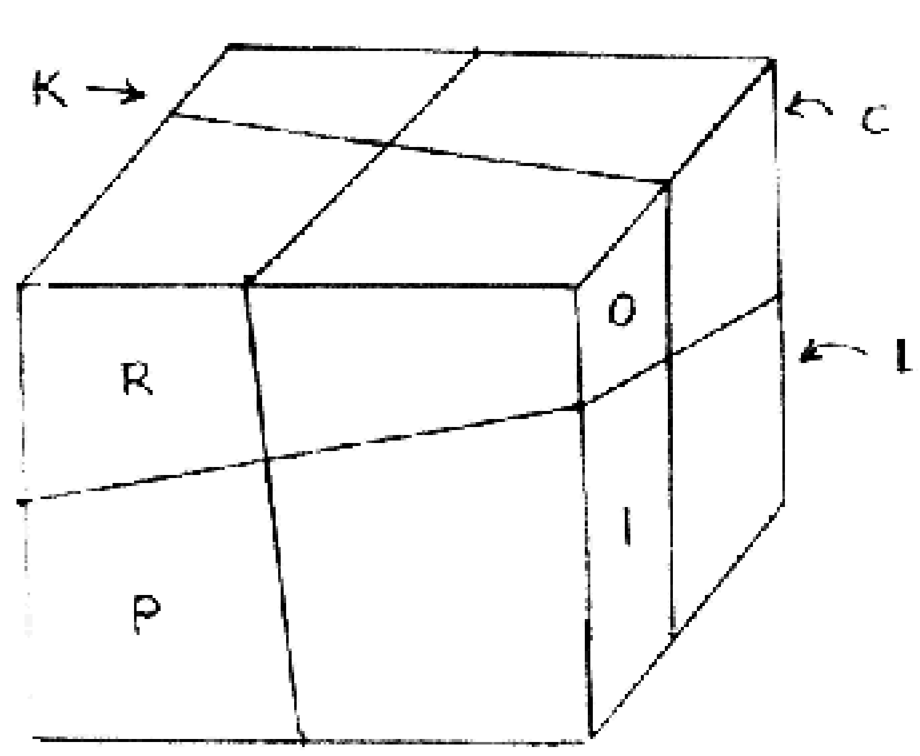
If used as an exchange puzzle, I would suggest exchanging it with the eight blocks assembled in the box, and with the two extra blocks outside. The problem then is to rearrange the eight blocks so that the two extra blocks can also be included in the box. A further problem is to just restore the assembly of eight blocks as they originally were. It is not easy! In all of the dozens of times that I have done it, I have depended on markings.

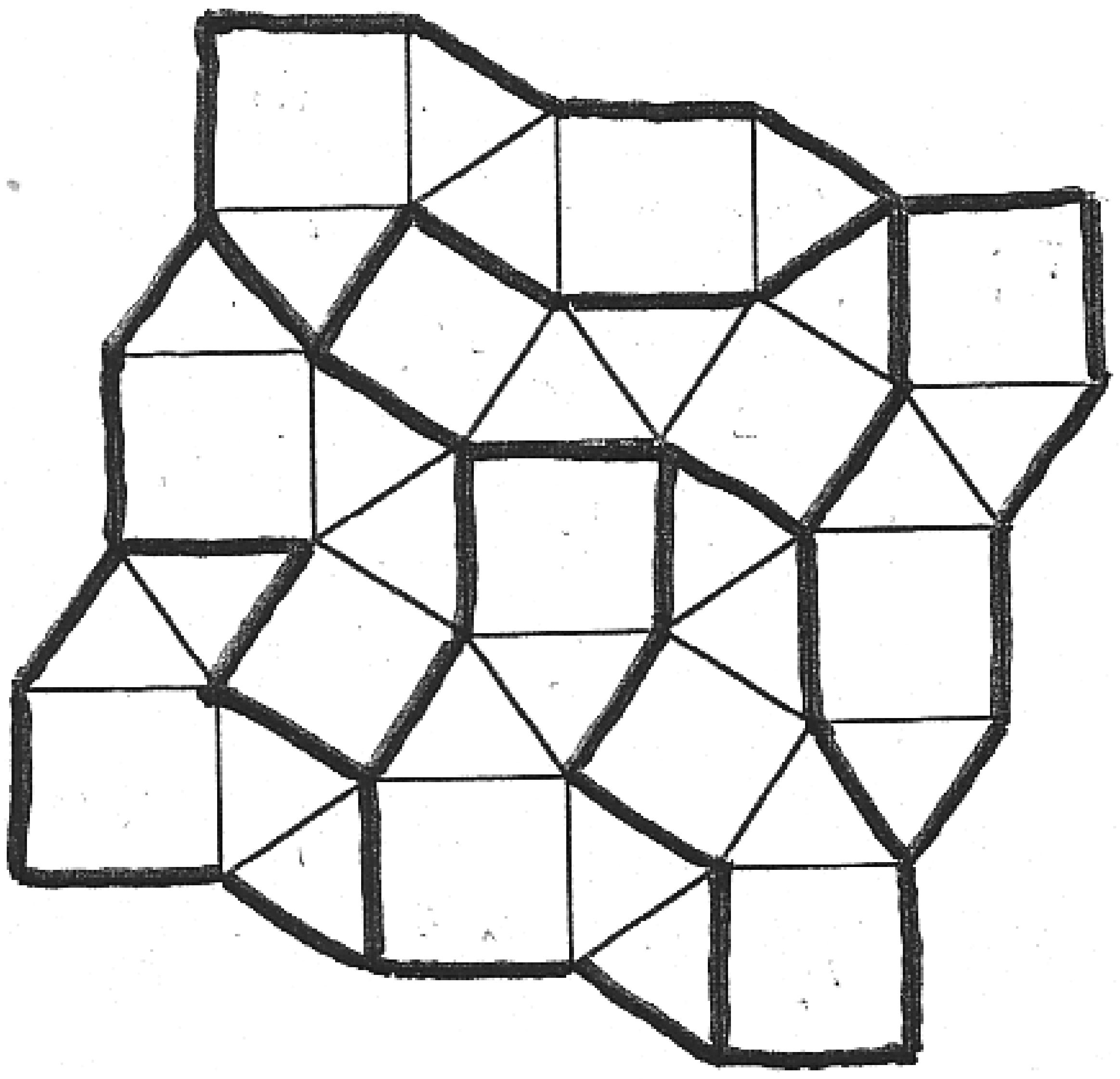
The blocks are all marked for easy assembly, if you know the code. The bottom layer is marked P-I-L-E , and the top layer is marked R-O-C-K, as shown on the accompanying drawing. The bottom layer will go in one order only, or you can drop all four in at once.

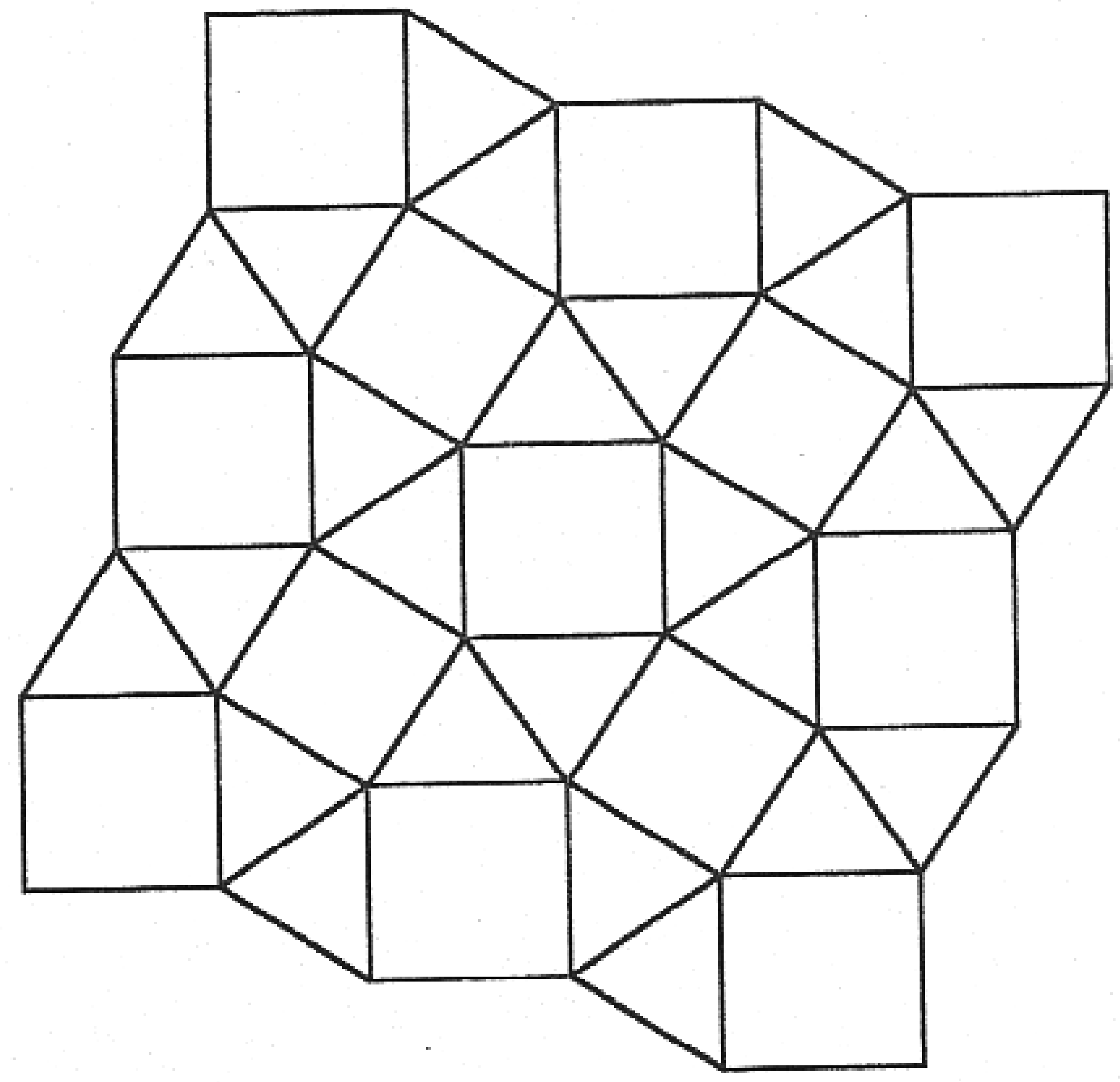
Now the tricky part. In order to insert the two extra blocks, first assemble the ROCK PILE outside the box. Carefully lift off the top layer of four blocks, set them down, and place the bottom layer on top of them, thus exchanging blocks top and bottom. Do the same front and back, then left and right. Now each block has been moved to its diagonally opposite corner without rotation. Two square holes should appear on the sides. Turn the pile 90 degrees so that the holes are top and bottom, and place them in the box that way. Trying to lift the whole pile at once is usually a disaster. Easier to do it one layer at a time. Now insert the two extra blocks.

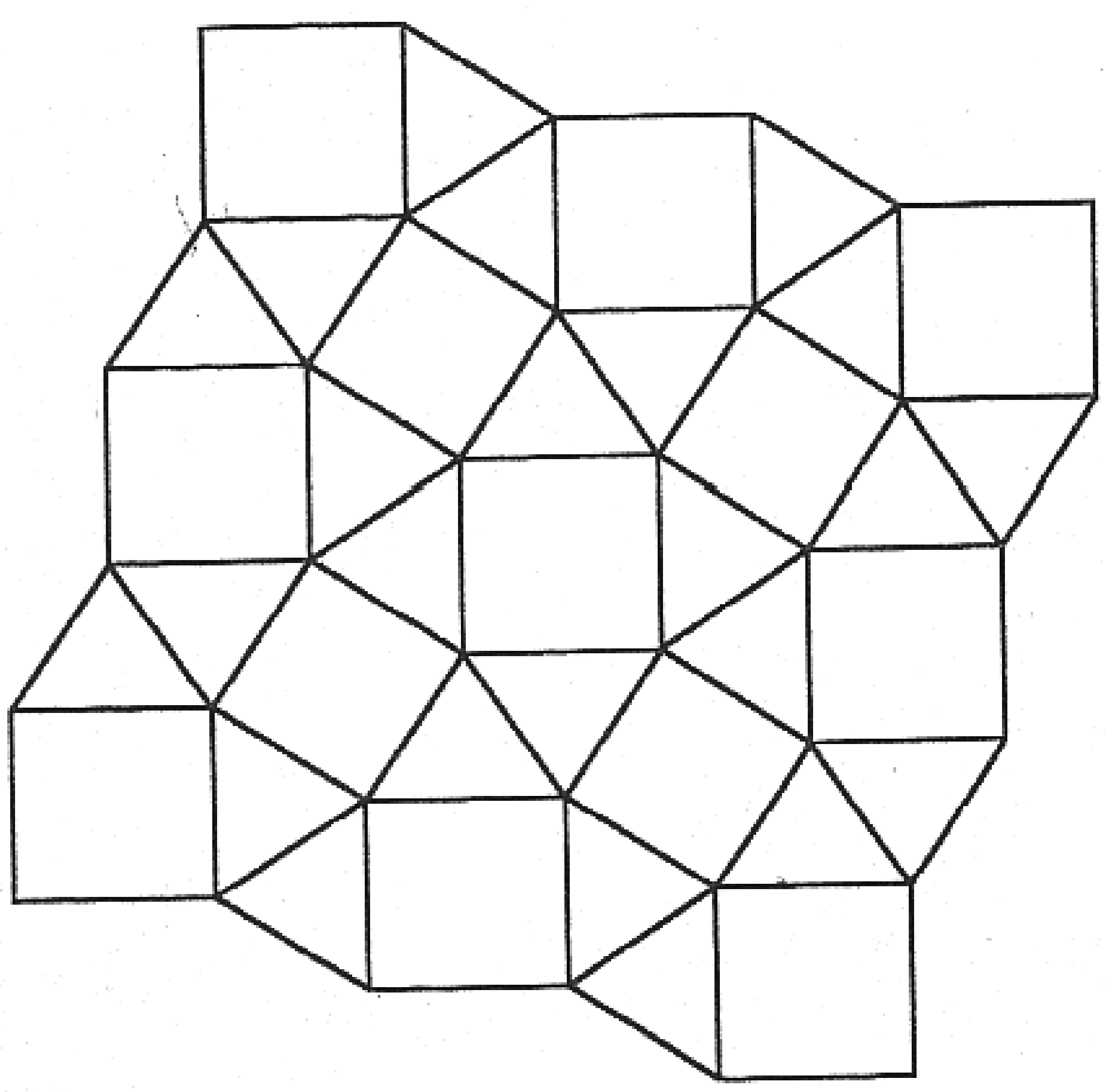
Once set up, this puzzle should be quite easy to produce, with simple saw cuts. Only the angles need to be accurate. I will provide more helpful hints and instructions if someone can be found to make them. Note that by making them in pairs, with the wood grain running in different directions, blocks can be exchanged between the two checkerboard fashion, as I have done, so that the wood grain does not give away the solution.

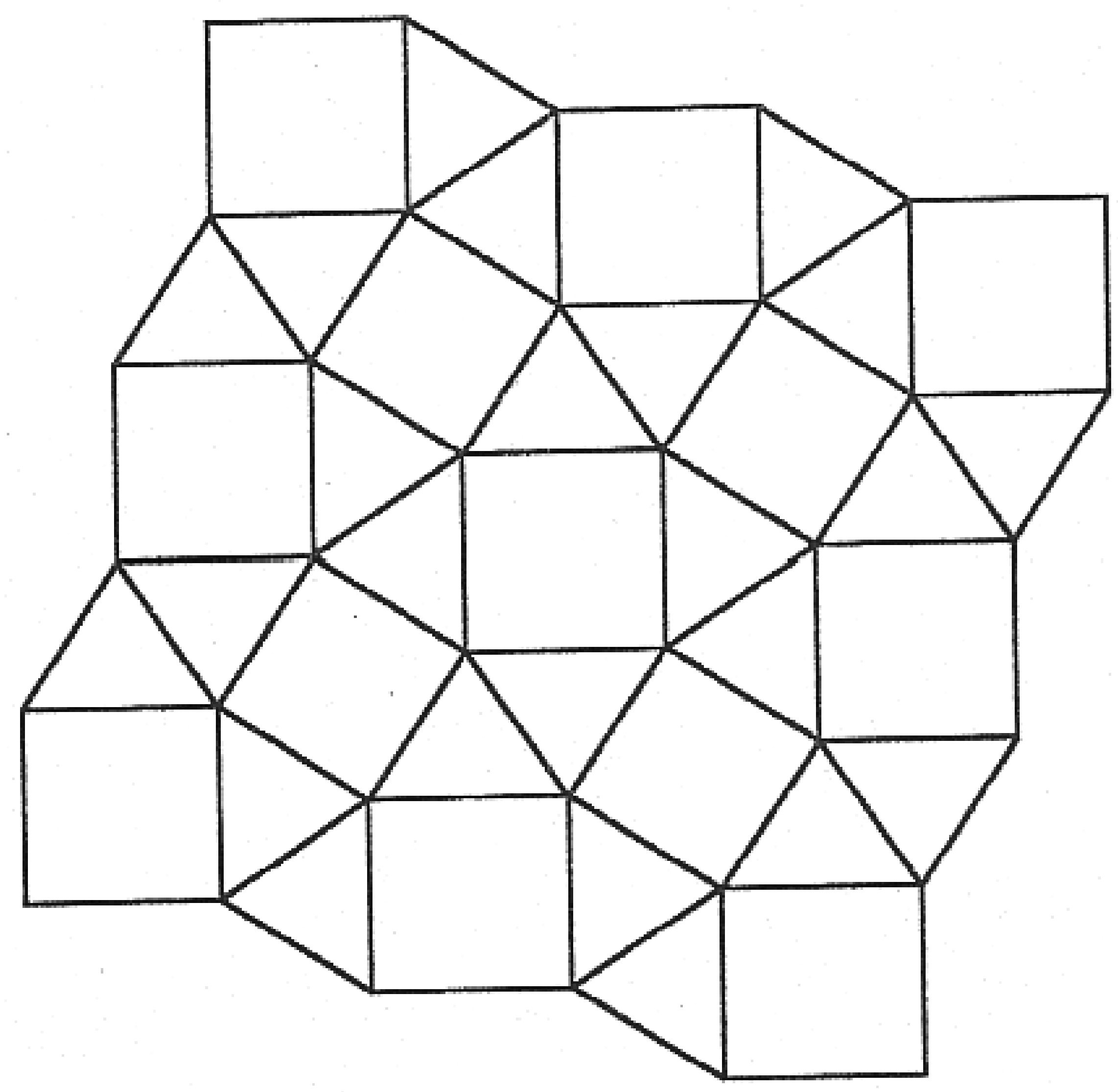
STC, January 2001











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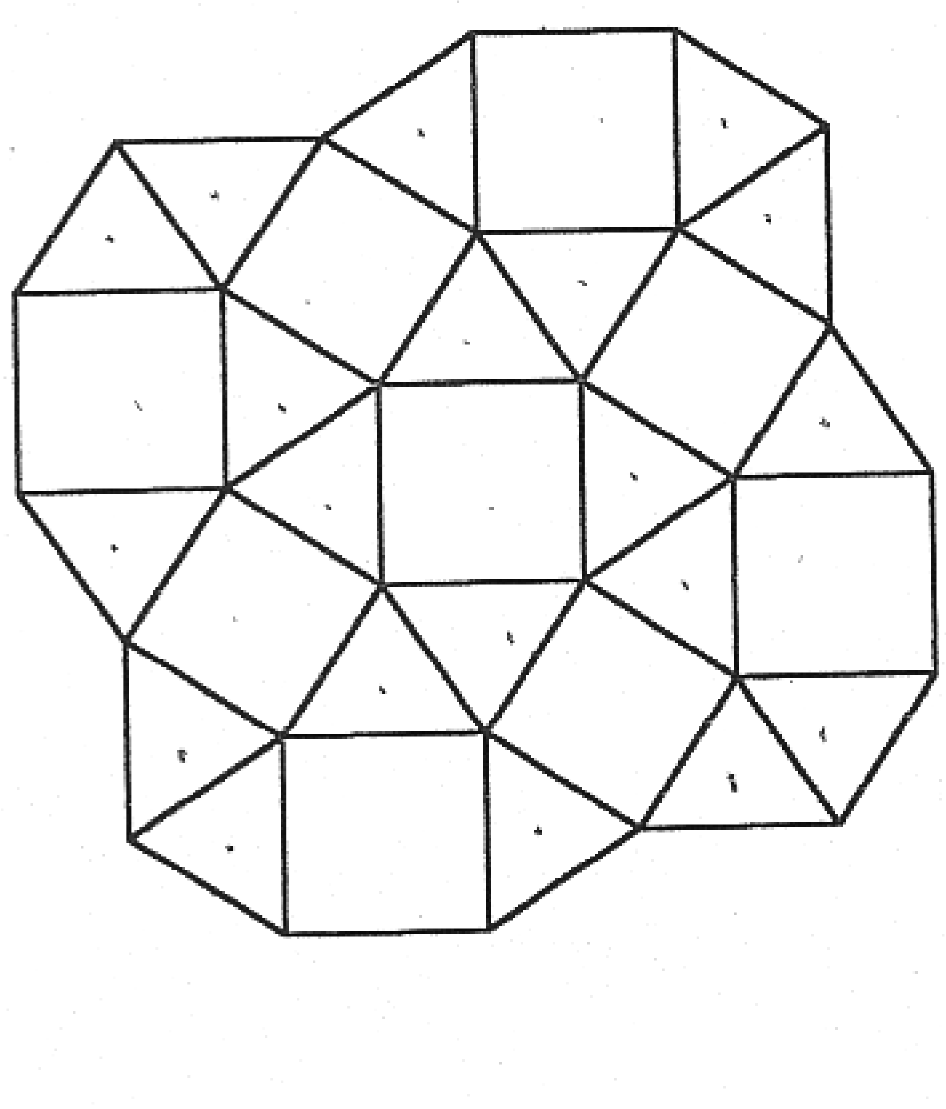
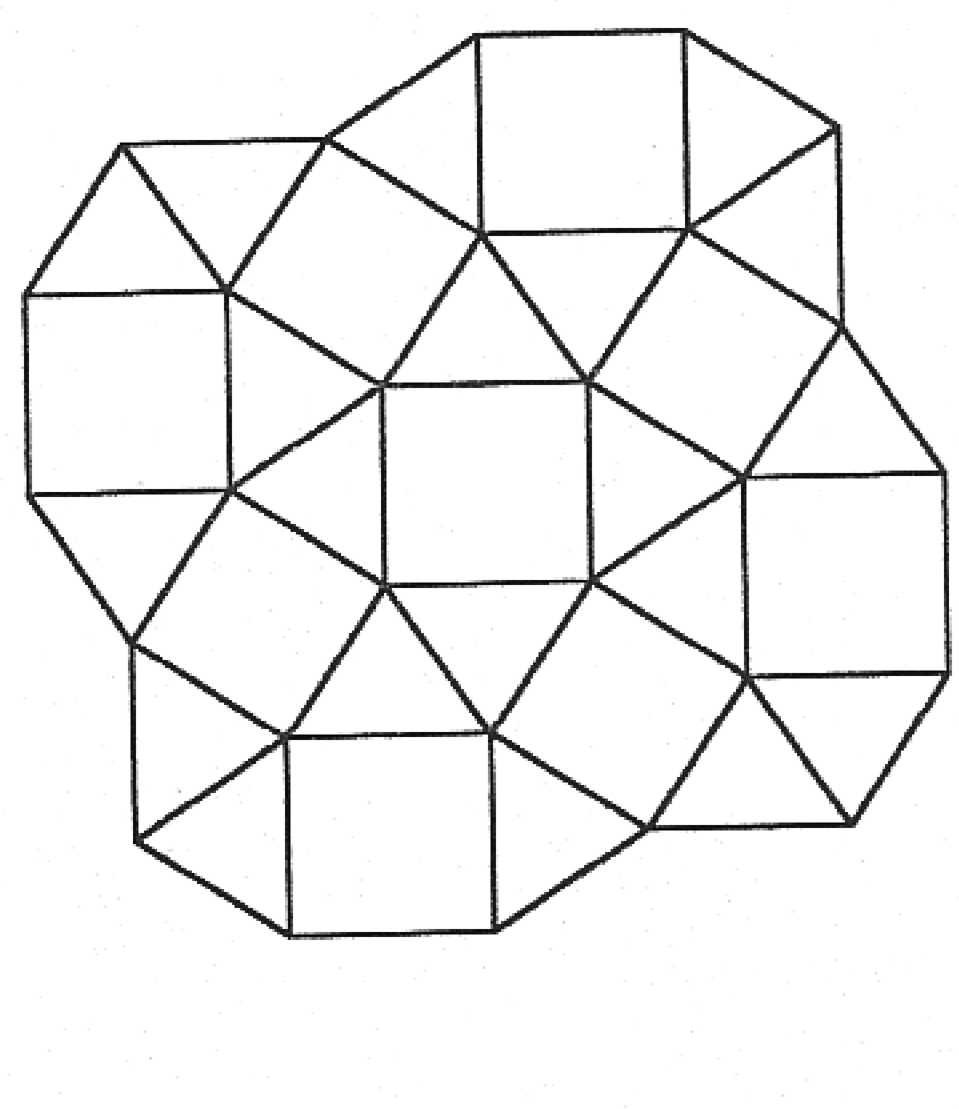
24 △
13 □
37





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9 □
29

Stew's Scrap Pile

A souvenir from Tom Rodgers for the puzzle exchange at the
17th International Puzzle Collector's Party in San Francisco, August 16-17, 1997

Once known as a reputable puzzle inventor and maker, but alas now increasingly enfeebled by the infirmities of old age, in desperation Coffin has thrown together this set of odd puzzle pieces for the IPP-17 exchange. They would appear to have been salvaged from his scrap pile of leftovers from three different six-piece burrs. He even suggests that there may be some strange way to fit them all together, but just what he might have had in mind remains a mystery. Possibly someone can discover a practical use for this motley collection of scrap pieces.

Note: This was the Exchange name for Rock-Pile, a.k.a Abel's Chimney.

Description of box-packing puzzles No. 127 and No. 127-A

The basic Puzzle No. 127 consists of eight rectangular blocks and a rectangular box. The dimensions of the blocks are 2x5x6, 3x4x5, 3x4x6, 3x4x7, 3x5x6, 4x4x5, 4x5x5, and 4x5x6. The inside dimensions of the box are nominally 11x9x7. These numbers all represent units of length, width, and height. In my model, the incremental unit of length is 1/4-inch.

The first problem is to fit all the blocks into the box. There are probably several ways. I know of three. I have never bothered to do a complete analysis. It might take several hours, but could probably be done quickly with Bill Cutler's computer program.

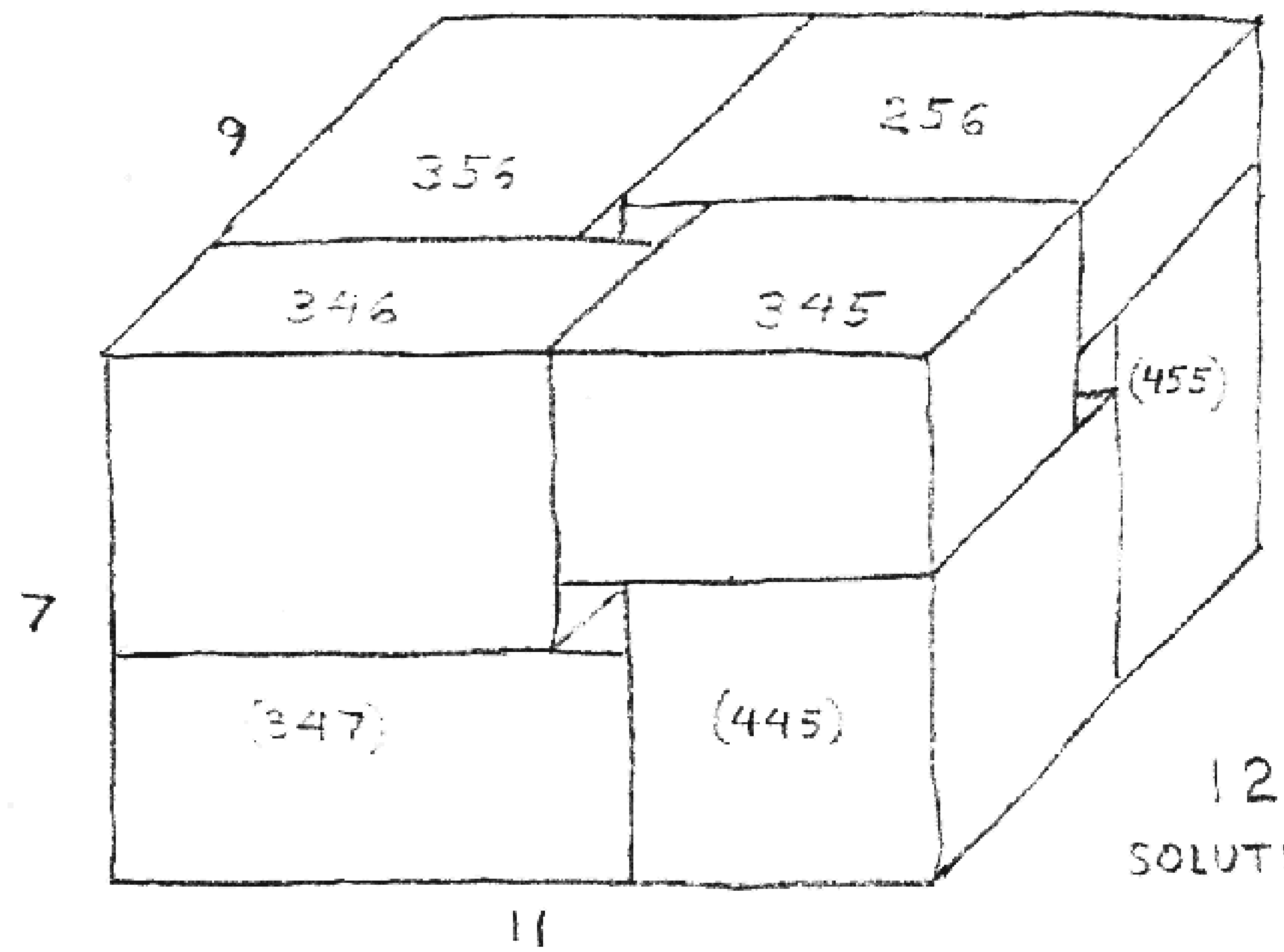
The second and more difficult problem is to pack the eight blocks into the box so that a 1x1 hole appears on all six faces. I know of one solution, shown on the solution sheet, and do not know if any others exist.

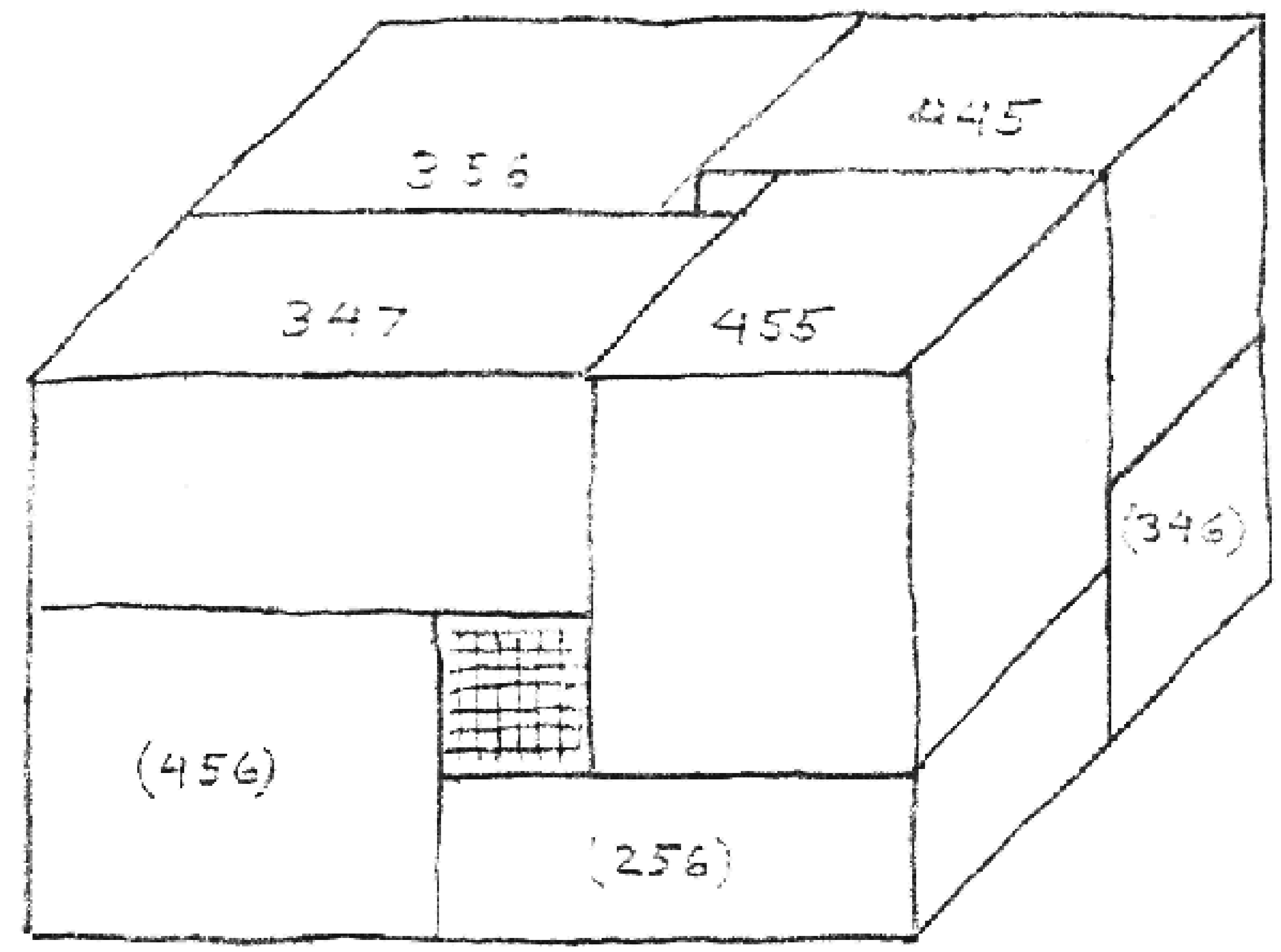
A third problem involves the optional ninth block which measures 2x2x5. The problem is to fit all nine blocks into the box, hence the listed name "Make Room." There are at least two solutions, one of which is shown.

Puzzle No. 127-A is similar to the above except for different dimensions. The eight basic blocks are 2x5x6, 3x4x5, 3x4x6, 3x5x6, 4x5x7, 4x5x8, 4x6x7, and 5x6x7. The box is 11x10x9. The extra block is again 2x2x5. The one known solution for the 1x1 hole on all six faces and the one known solution for all nine blocks are both shown on the accompanying solution sheet.

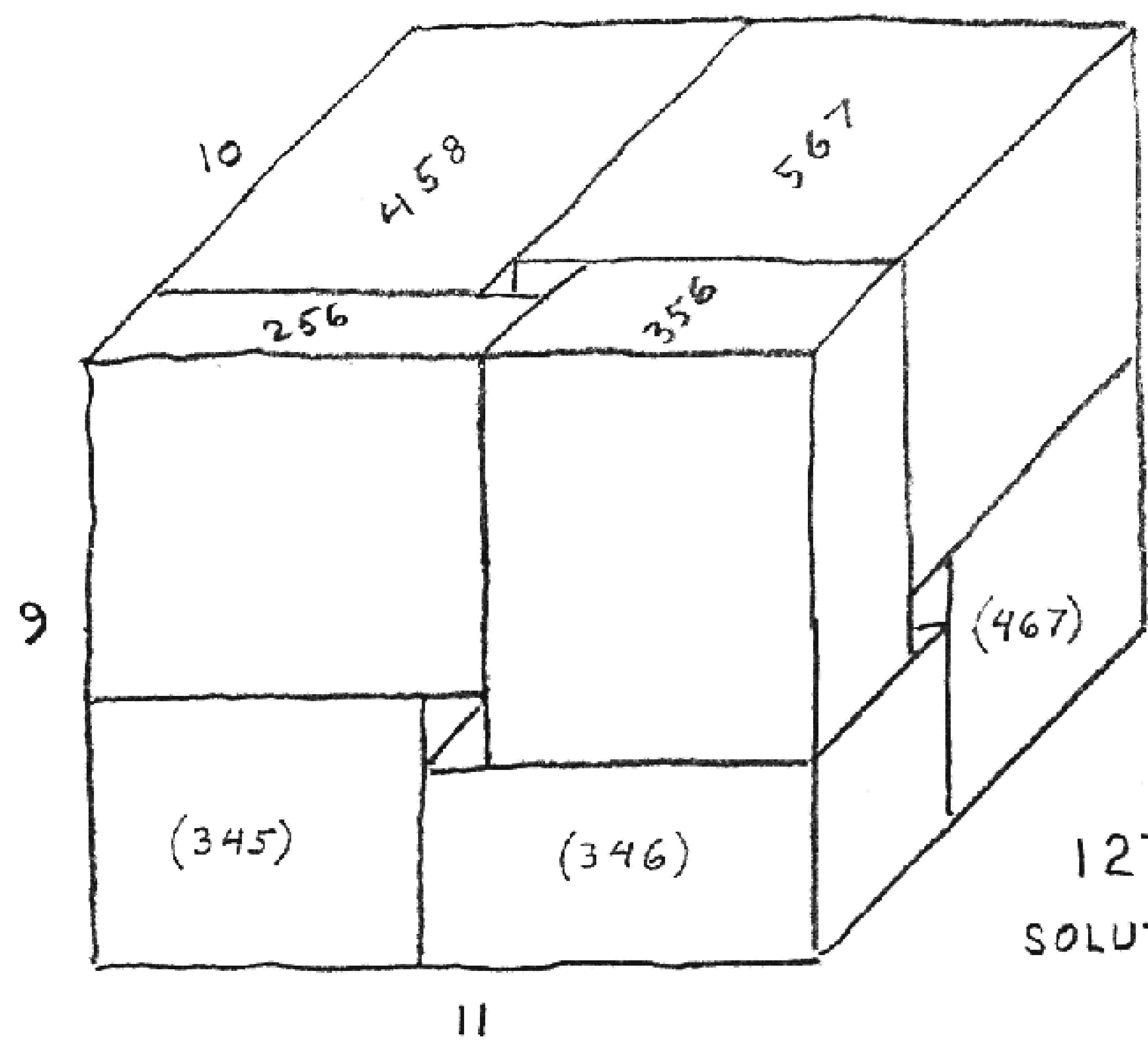
Additional note: Both of these were designed in 1997. Only one model of each was made at that time, and B.F. has them both. He discovered the second solution to the 11x9x7 version but found no other solutions to 11x10x9 version. I have now made a second set of rough models for possible consideration as exchange puzzle designs. I have marked the blocks to correspond with the solution illustrations. The black pencil marks are for the six-hole solutions, and the red pencil marks are for the nine-block solutions. As matters stand now, I think the 11x10x9 version is the better of the two, but that could change if a computer analysis shows it to have multiple solutions.

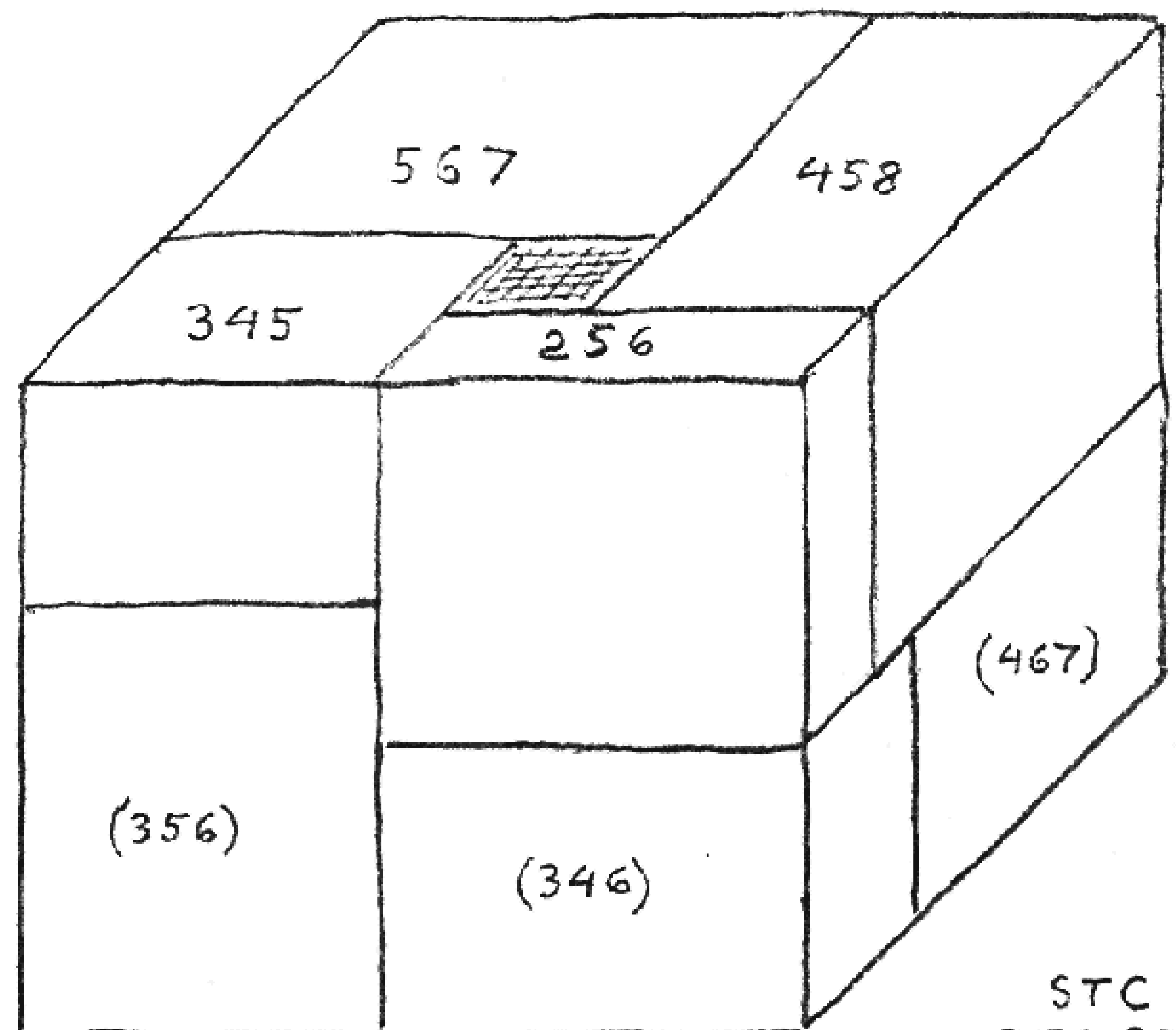
Stewart Coffin
December 24, 2000





127
SOLUTIONS



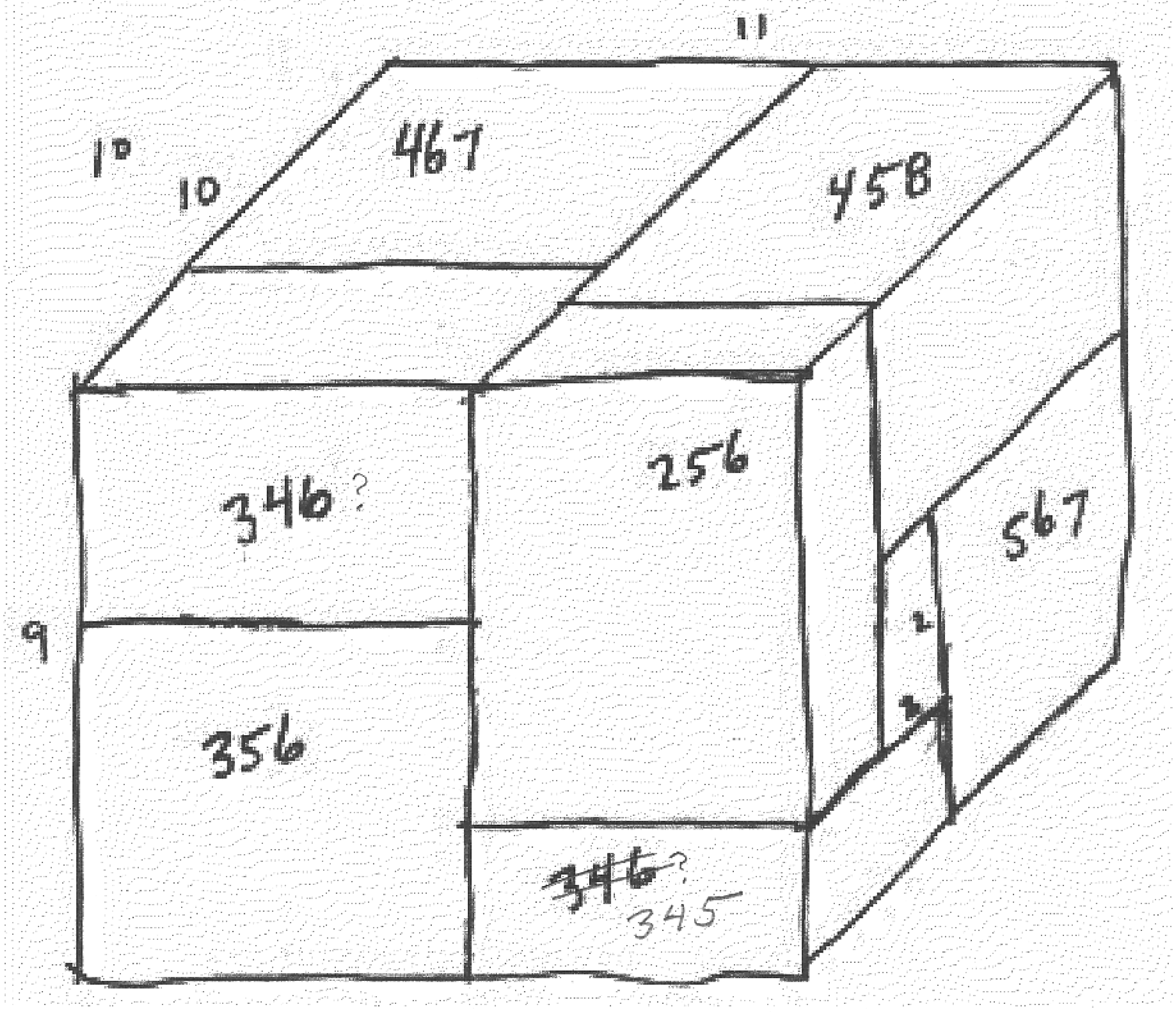


127-A
SOLUTIONS

STC
DEC, 2000

127 A

J. Slocum 12/23/2000



bottom

hidden- 457 ?

AP-ART

The sculptural art that comes apart

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773
781-259-8348

Six of Diamonds

No. 131

This simple little puzzle is but a minor variation of the familiar six-piece diagonal burr. It could be regarded as a combinatorial puzzle of sorts, since all six pieces are dissimilar and non-symmetrical, and assemble one way only.

Examine the pieces and note first of all that they are all made from identical sticks having a rhombic cross-section of 100 and 80 degrees. Two pieces have notches cut at right angles, two pieces have notches which slant by 4 degrees one way, and in the remaining two pieces they slant by 4 degrees the other way. All of the notches are cut with the same 57-43-degree slant, but they are cut in such a way that what may at first glance appear to be identical pieces are actually mirror image pairs because of the plus or minus three degree rotation of each stick about its axis as the notches are cut.

Do not be too discouraged if the puzzle does not slide easily together on the first few tries. There are 10x8x6x4x2 or 3840 different ways to orient the pieces, only one of which is the correct way. In this regard, it somewhat resembles some versions of the standard six-piece burr such as my Burr No. 305. But that is where the similarity ends. When (and if) you find the correct way, they will slide together with no force whatsoever and in fact with a slight looseness.

The wood is mahogany and the finish is lacquer.

Some fairly high powered calculations and analysis went into the design of this rather sophisticated puzzle. The angles described above are by no means arbitrary. I experimented with several different versions before arriving at this one. I look forward to your comments.

S.T.C.
Dec. 1997

#132 **Tectonic**

the IPP-18 exchange puzzle
of Tom Rodgers

My exchange puzzle this year is just a standard six-piece burr, and a poorly made one at that. It was made by Eileen Daly of Kodiak, Alaska, and she apologizes for the misshapen notches. It seems that her workshop is situated directly over an active earthquake fault. Consequently her workbench is forever leaning this way or that, and it is impossible to get things squarely aligned. Sorry. Good luck on this one!

Castle Creations

Stewart Coffin
29 Brookfield Road
Andover, MA 01810

Outhouse

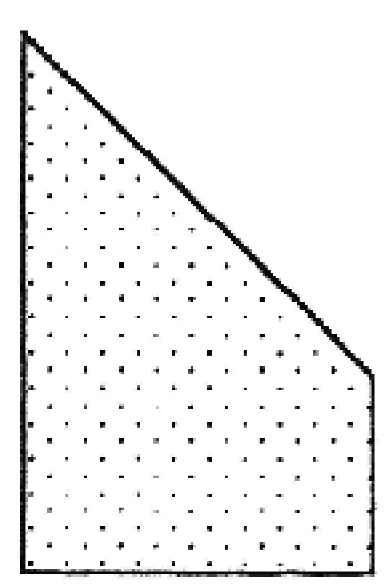
No. 134

My old friend Bill Trong was once a landscape architect. He no longer is, and you are about to discover why. One time he was responsible for laying out a cluster of four houses on a square plot, represented here by these blocks and tray. After the houses were all built, it was discovered that Bill had overlooked any provision for sanitary facilities.

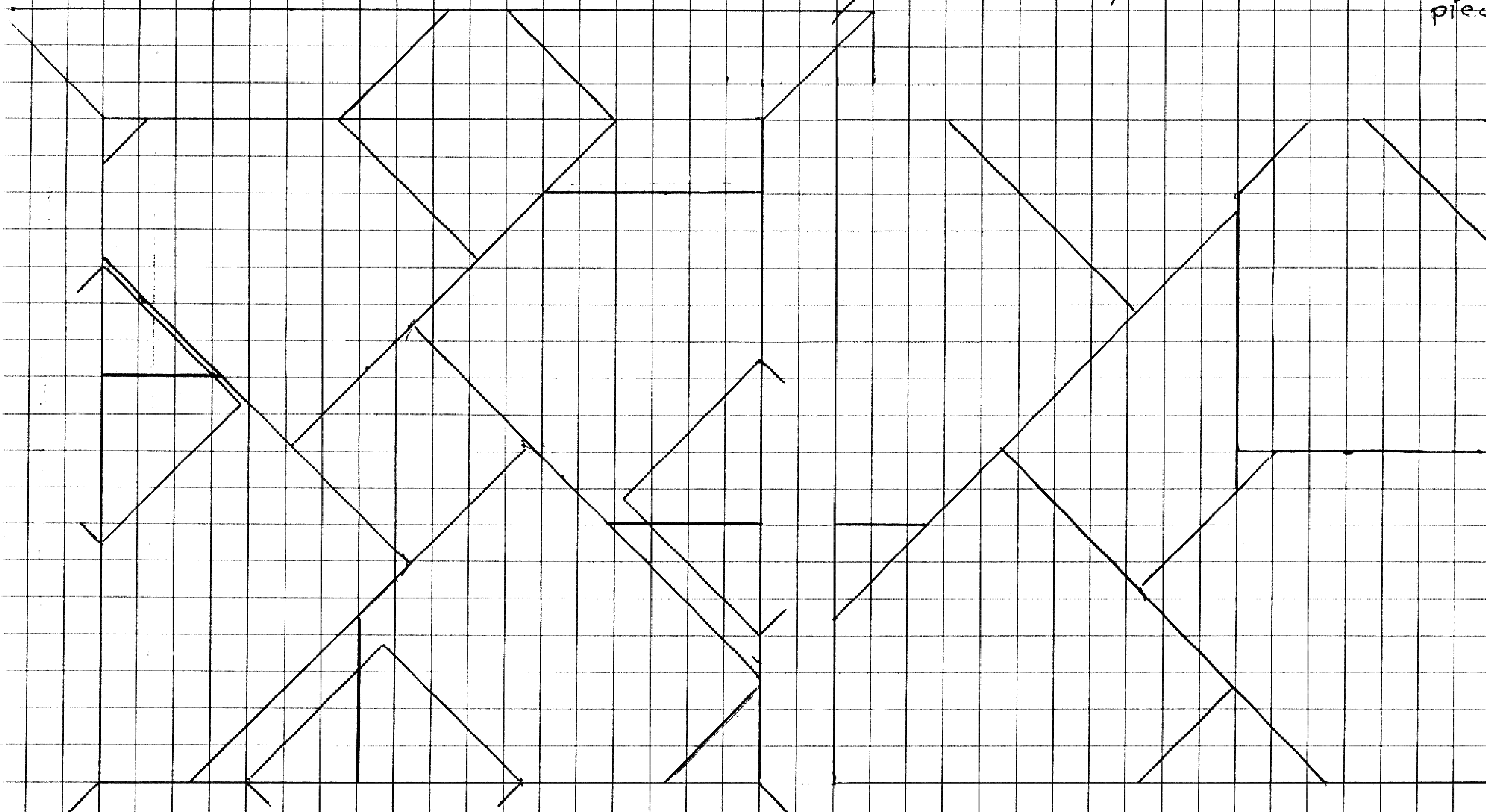
So then, at great expense, Bill had the houses rearranged so as to make room for an outhouse in one corner of the plot. But soon, more complaints. Residents wanted the outhouse centrally located rather than in one corner. Alas, in the meantime, landscaping has been added around the border, represented by the four immovable squarish blocks, which somewhat restricts how the houses can be moved.

Can the houses still be rearranged so as to accommodate the outhouse **in the center**? Bill swears that it is impossible. But, as I said, he is no longer employed in this profession, and for good reason. Use your imagination. The solution is sure to amaze you!

S.T.C.
Dec. 1998



The Outhouse



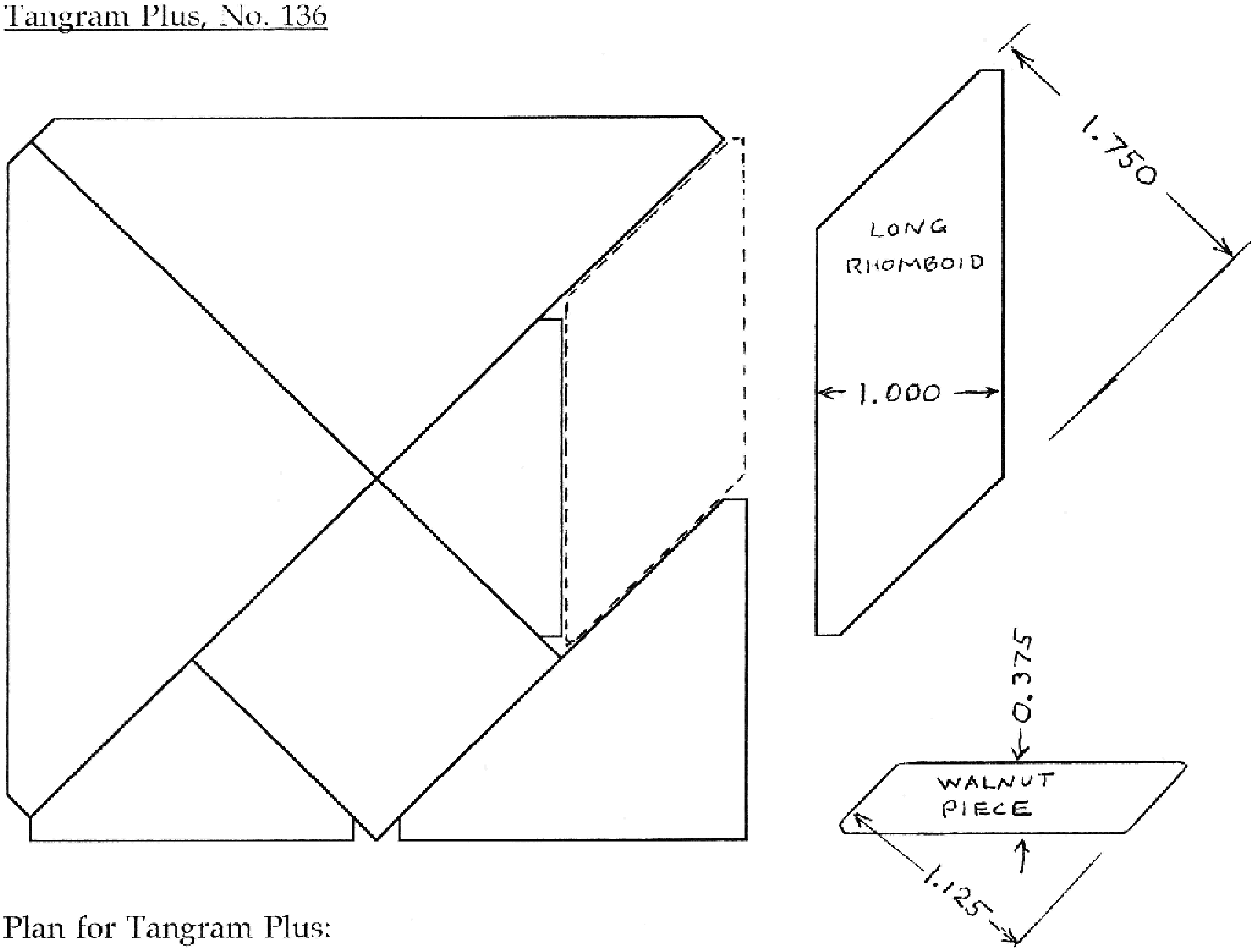
PLAN FOR OUTHOUSE #134 FULL SCALE

Pieces 3/8" BALTIC BIRCH, but 1/2" even better

Cover blocks 1/4" BALTIC BIRCH, but 3/8" even better

STC
21 DEC 1998

Tangram Plus, No. 136



Plan for Tangram Plus:

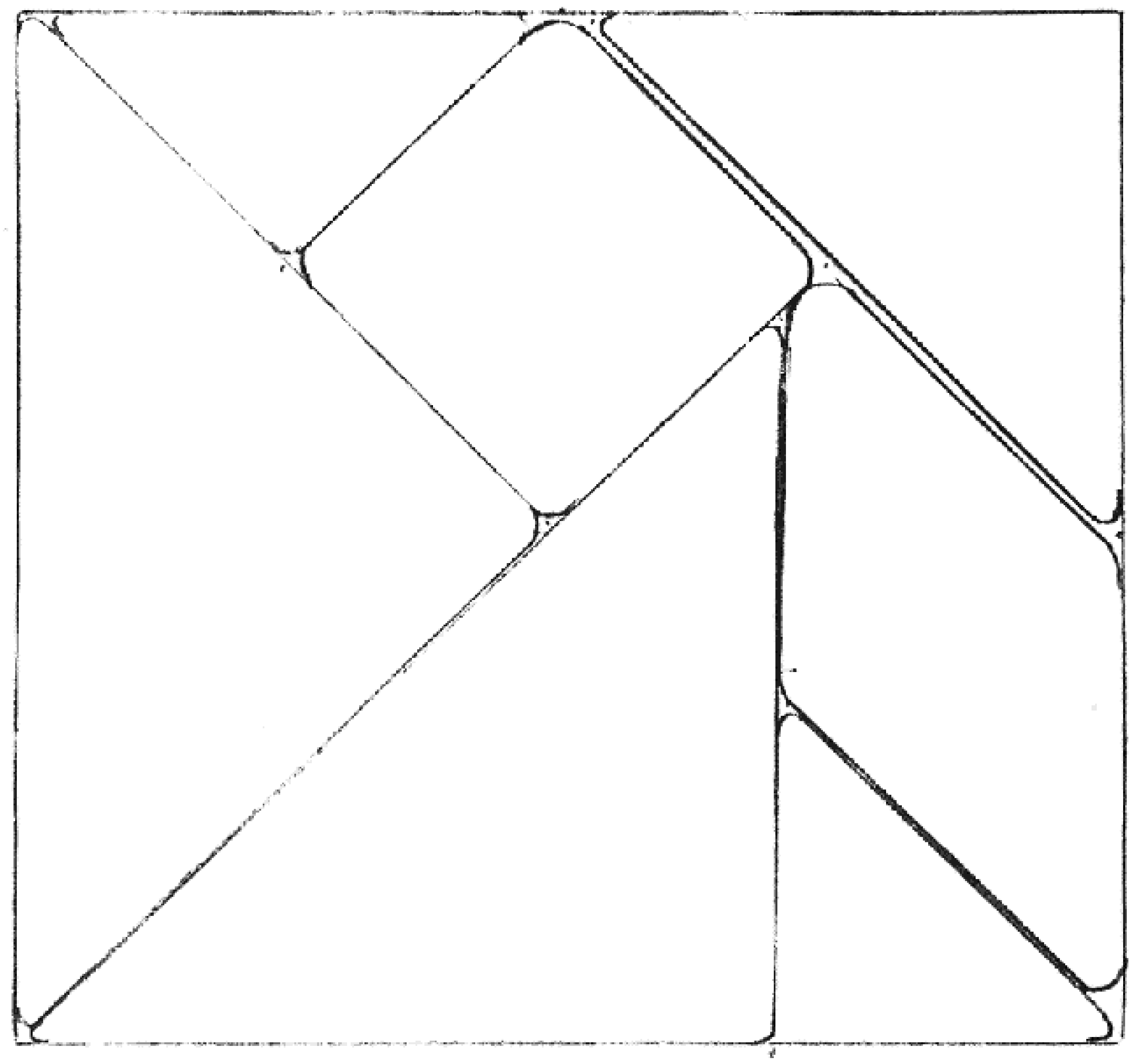
All of the pieces except the rhomboid are laid out in the conventional manner in a square grid measuring 4.000 inches. The rhomboid dimensions are shown above. The corner bevels are shown approximately to scale. The square tray measures 4.100 inches. The problem - fit all seven pieces into the tray.

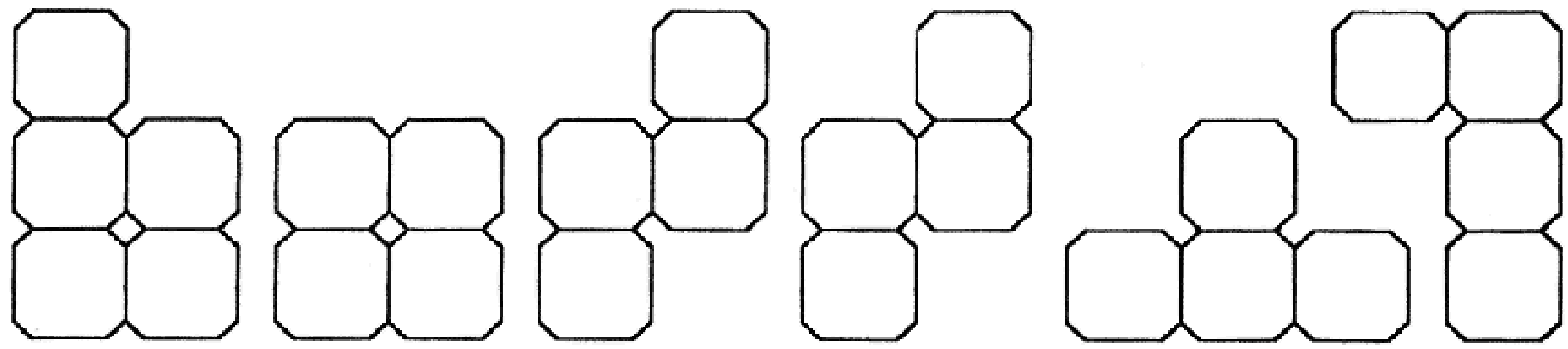
My latest version of this Tangram derivative comes with all seven conventional pieces assembled in the usual square tray. You are asked to replace the regular rhomboid piece by the longer one shown above and still fit all seven pieces into the tray. As an alternative amusement, retain the original set of seven pieces but also include the small walnut rhomboid piece in the solution.

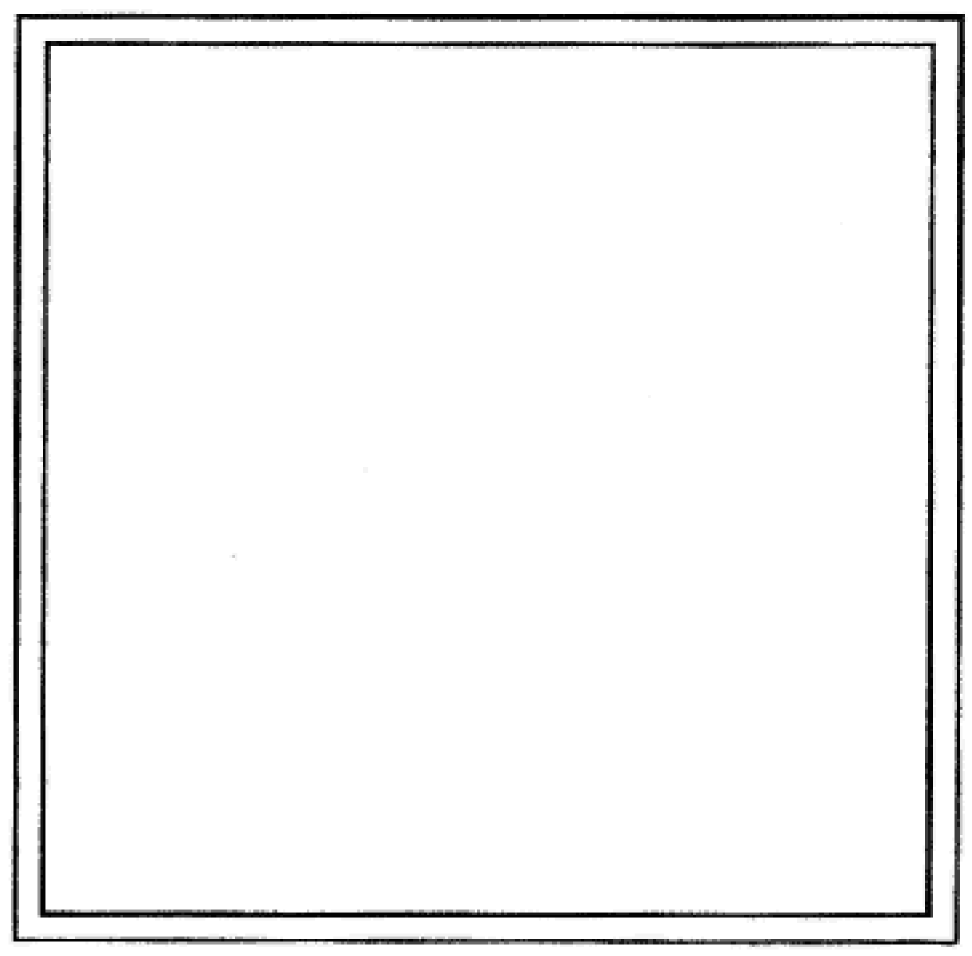
Another *"Castle Creation"* from

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810 Dec. 1998

No. 136-A Tangram Plus (Alternate Version)







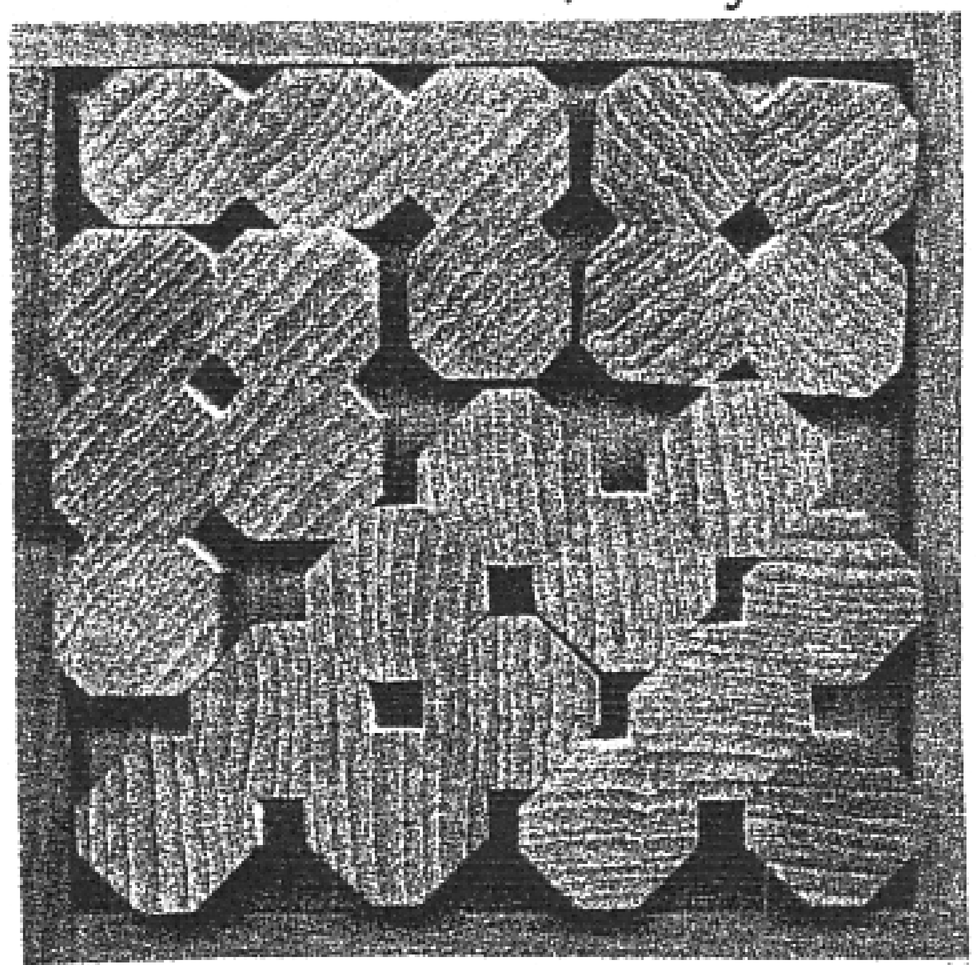
Plan for Castle Creations No. 137 **Engelberg Square**

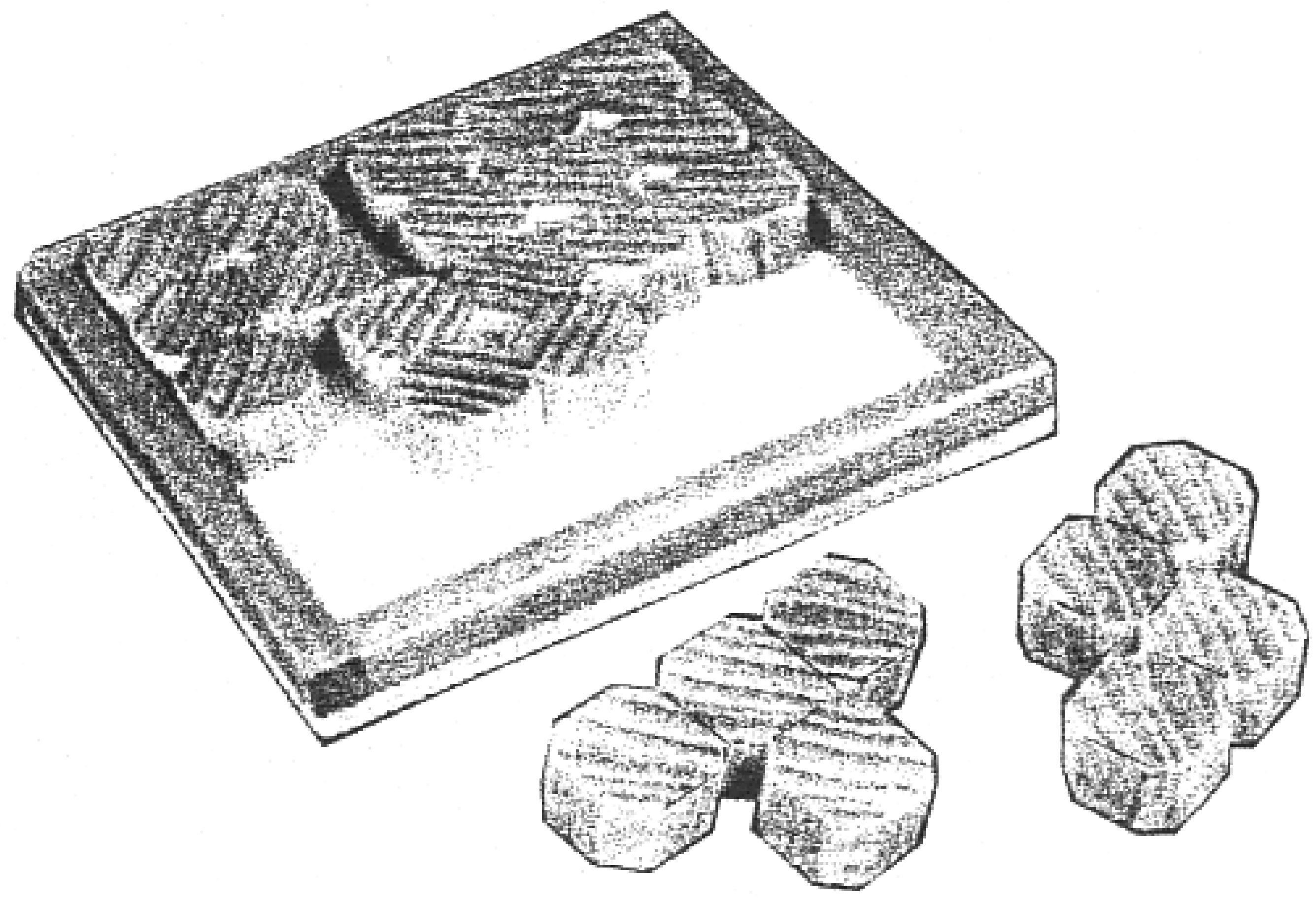
Fit the six polyominoes into the square tray.

Note: This might have possibilities as an exchange puzzle. It would be easy and inexpensive to make. Obviously very simple. Cut the pieces out and see for yourself! I have made four models which are available, as well as detailed plans, as the pieces and tray need to be accurately made for best effect or to work at all.

137. <u>Engelberg Square</u>.

Six polyomino-type pieces, made up of 25 square blocks with corners beveled to slightly octagonal, fit into a square tray. So named because the final version was arrived at while on a hiking trip in Engelberg, Switzerland, assisted by one of our fellow Elderhostelers, Betty Anthony. Six made of teak in 1998.





An modified version of the Engelberg Square was designed by Nick Baxter and used in the IPP-19 puzzle exchange.

Castle Creations

Piggy Box Kit, No. 138

The Piggy Box consists of a rectangular box with a slot in the top, plus a number of puzzle pieces which are essentially 24 cubic blocks joined together different ways. The object is simply to fit all the pieces into the box.

This is an interactive pastime. I supply the design concept, the parts kit, and a few suggested puzzling combinations. You can amuse yourself with them, but better still is for you to discover new and better combinations of your own and pass them along for others to enjoy. Perhaps we can accumulate a catalog of them.

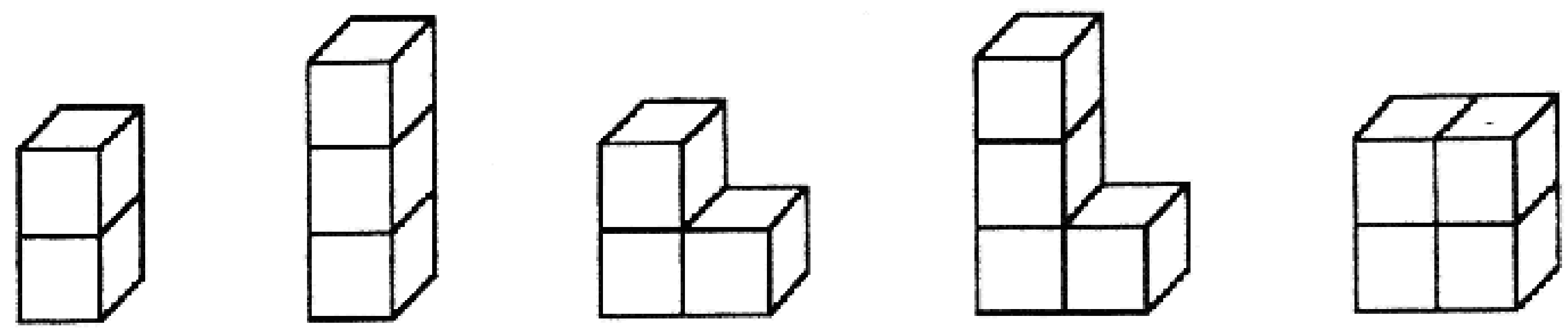
This is not an entirely new concept. There was, for instance, all the interest in the six-piece burr and its many combinations, as promulgated and compiled by Bill Cutler. Then there was the publication of sliding block puzzles by Ed Hordern. The Piggy Box is essentially a three-dimensional sliding block puzzle.

Similar to the six-piece burr, the best Piggy Box combinations could be considered those requiring the most moves to assemble, but with one added complication. Not all moves are obvious or straightforward. Some are trickier than others. Many require rotation, and some even involve coordinate movement of pairs of pieces. Furthermore, for a given combination, the challenge is not only to solve but to do so with the fewest moves.

The basic building block of this puzzle is a 3/4-inch cube. The five possible larger pieces are shown on the next page, together with a few suggestions of mine for puzzling combinations. Perhaps you can improve on them.

Should you need additional pieces to play with and want to make your own, note the following: The unit cube measures 0.750 inches. As for the box, the inside measures 3.050 by 2.345 by 1.600 and the slot is 1.575 by 0.825. Furthermore, the edges of all pieces are rounded slightly to permit certain maneuvers while excluding others.

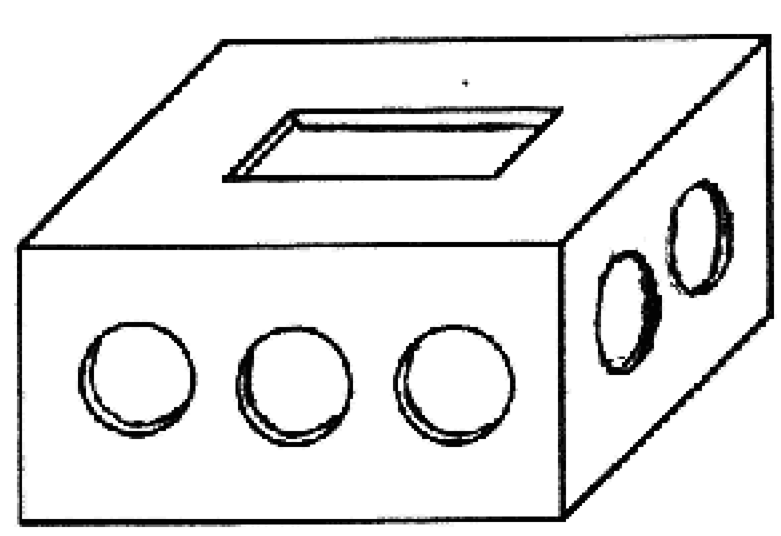
Incidentally, this is the first of our so-called "Castle Creations," so named because of my recent good fortune to move into Mary's hilltop home in Andover. With the limited workshop space here, my future plans are to engage in hobby inventing and model making only, not production. Expect more to follow.



Combinations	PIN	BAR	VEE	EL	SQUARE
No. 1, Slipper	-	1	3	2	1
No. 2, Slider	1	1	1	2	2
No. 3, Stuffer	-	3	1	1	2
No. 4, Twister	-	-	4	2	1
No. 5, Packer	-	2	2	2	1
pieces supplied with kit	1	3	4	2	2

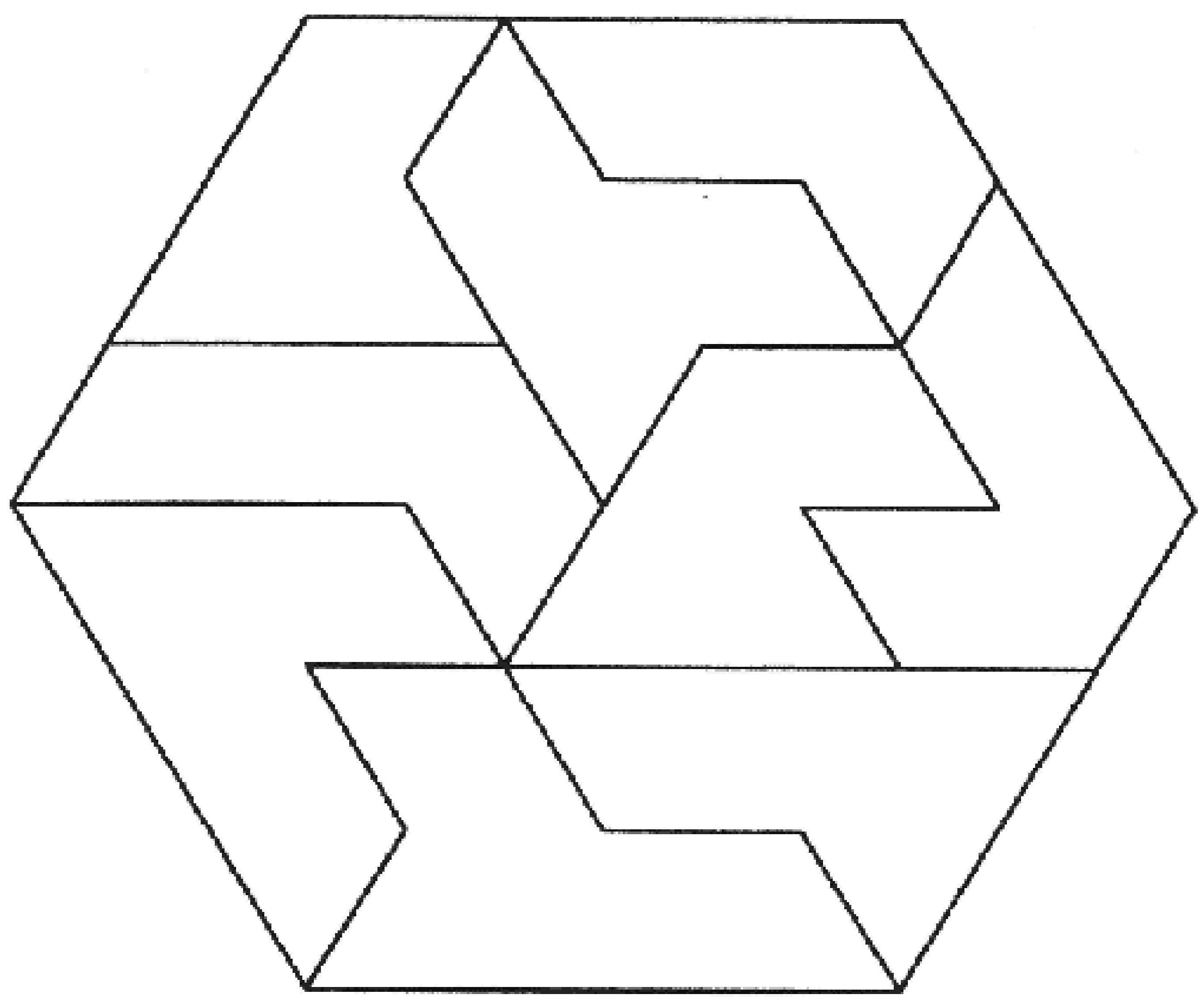
After a few hours of tinkering, I arrived at the five combinations shown above. I have tried to arrange them in order of difficulty, from say moderate to somewhat more confusing. What others can you discover? If you need additional pieces you can request them, or you may be able to make your own, they are so simple. Note however that if the pieces are very much undersized, or the box oversized, it will permit illegal rotations which violate the parameters of the design. Contrarily, if the pieces are even slightly too large, they will not fit as intended.

The holes in the sides of the box facilitate moving the pieces about inside. The eraser-end of a pencil makes a handy tool for maneuvering the pieces.



Stewart Coffin, 29 Brookfield Road, Andover, MA 01810 Dec. 1998

No. 139 No Name



These nine puzzle pieces are made up of 54 triangular units joined together different ways. They represent all possible non-symmetrical physical puzzle pieces through size six, plus two non-symmetrical pieces of size seven chosen randomly to complete the hexagonal tray pattern. How many other solutions exist, I wonder? I have not discovered any, but the only way to be sure is by computer, which capability I lack. I would like to make a few of these in wood, but preferably with a set which has a unique solution. If this set has multiple solutions, then perhaps there are other pairs of size-seven pieces which would satisfy these requirements. To the first computer whiz who responds to this query with a proven unique solution, I will send a set made of fancy woods.

(Or has someone already done this?)

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810

(146 Solutions)

Castle Creations

Stewart Coffin
29 Brookfield Road
Andover, MA 01810

Sticky Sticks, No. 140

This is a new version of the familiar old Hexsticks puzzle. As AP-ART puzzles go, I would not rate the Hexsticks as being especially difficult. But there will always be a few who will find anything of non-Cartesian geometry to be confusing or even intimidating. So, in this new version, some of the pieces have been subassembled by bonding in pairs to make the puzzle even easier (perhaps).

Note that the four dissimilar bonded pairs are identified by the letters A, B, C, and D. The four remaining pieces are called Standard pieces, marked with the letter S.

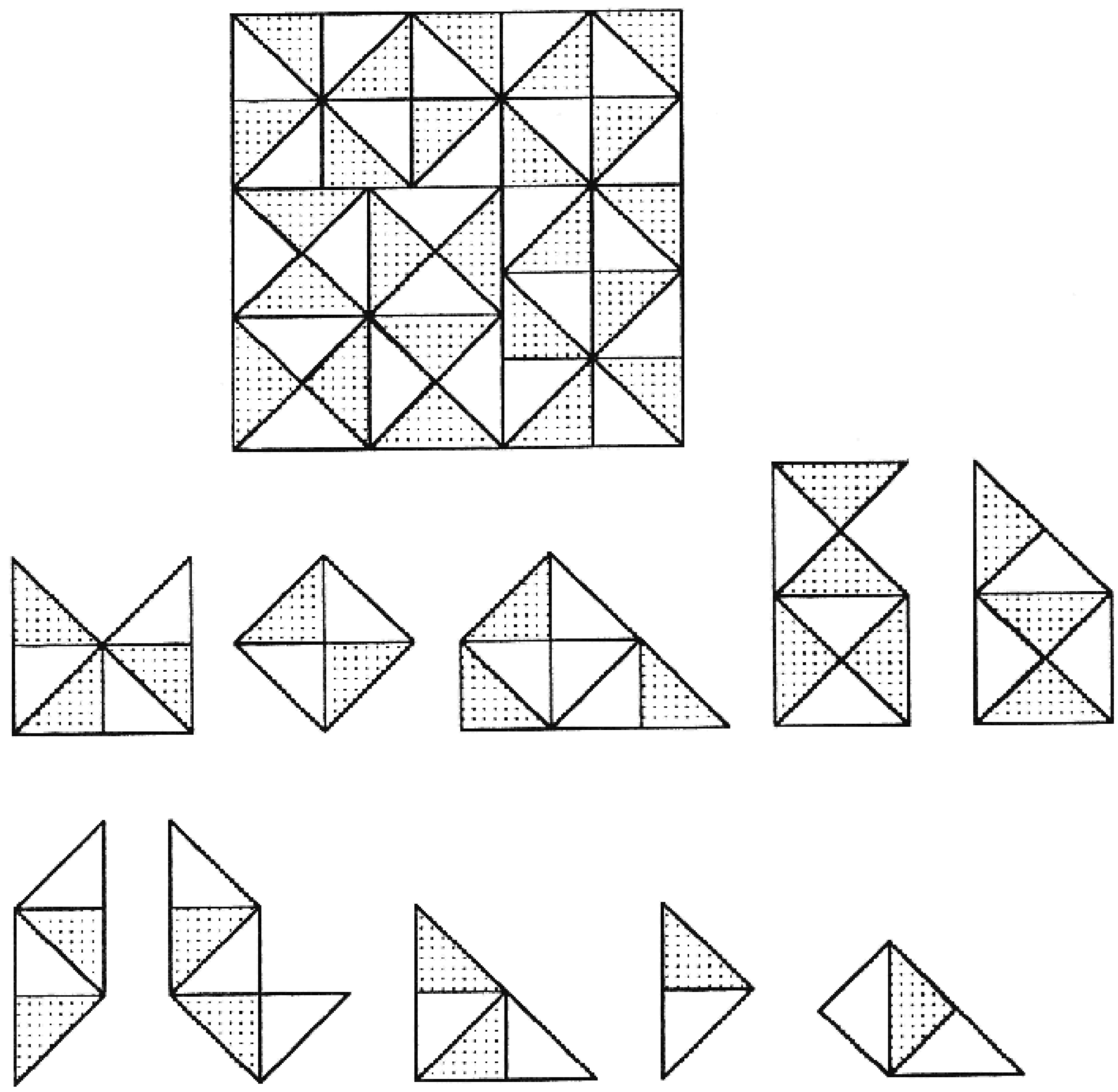
The original 12-piece Hexsticks (or plastic version Hectix) had three distinctly different solutions, which were:
#1 - three key pieces go in last, the most familiar solution
#2 - the mating of two subassemblies
#3 - sliding key piece goes in last
Furthermore, some of these solutions also had minor variations.

This set of pieces can be assembled in either Solution #2 or #3. See if you can discover both of them. For more of a challenge, if you prefer to work with a set that has only one unique solution, then join two of the Standard pieces together to make another D piece, so the new set is A-B-C-D-D-S-S.

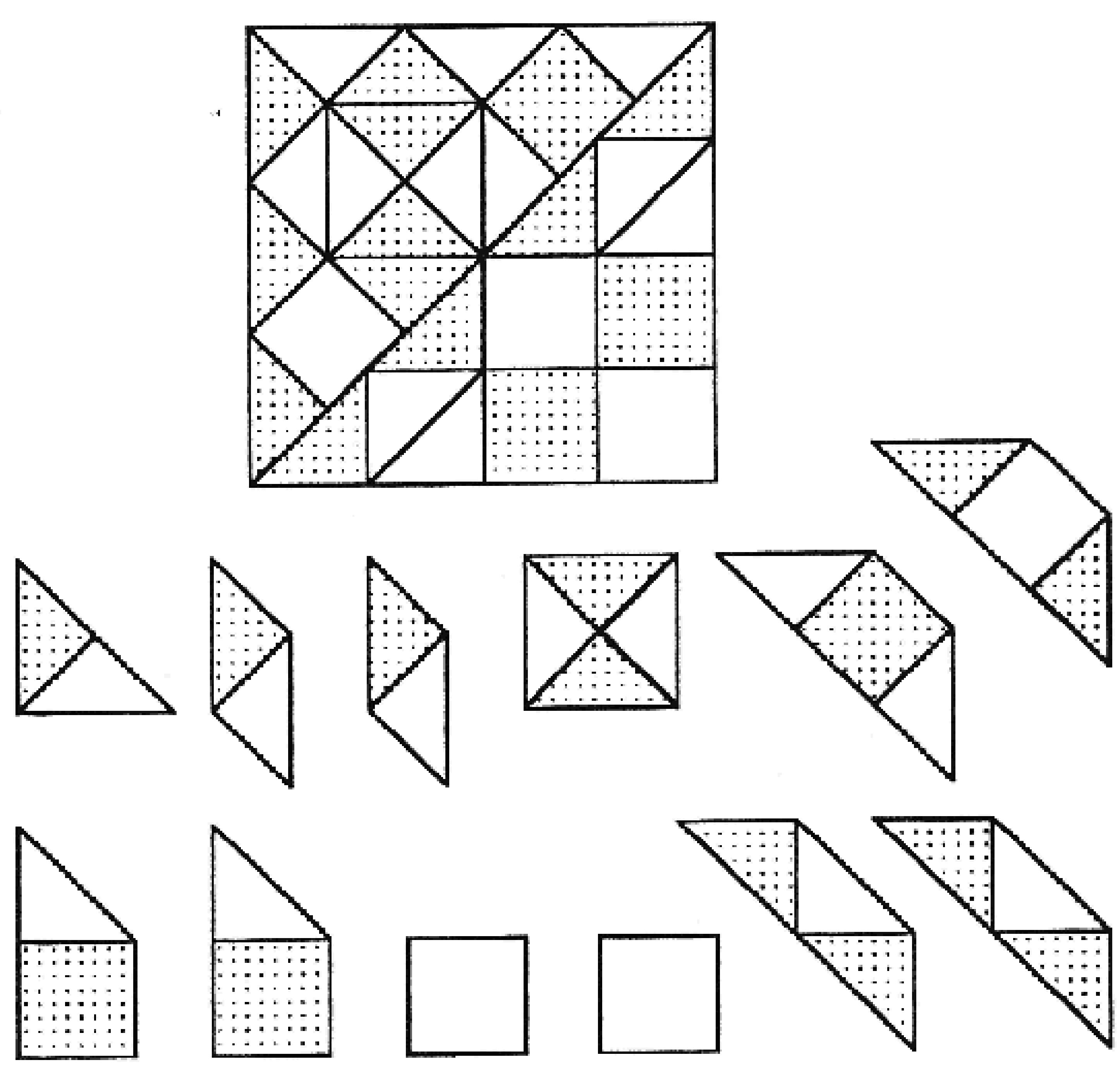
This is just the beginning. Many other combinations are possible, some of which might make challenging variations. I leave this for others to discover. From among the dozens of possible combinations that I have investigated recently, I chose this one because of the possibilities described in the previous paragraph plus the fact that all four bonded pairs are dissimilar. Among the more interesting combinations are those which involve coordinate motion of several pieces to assemble. Some may even require slight looseness or rounding, which does not appear to be a requirement with this set.

STC
Dec. 1998

Plan for Isosceles, No. 141

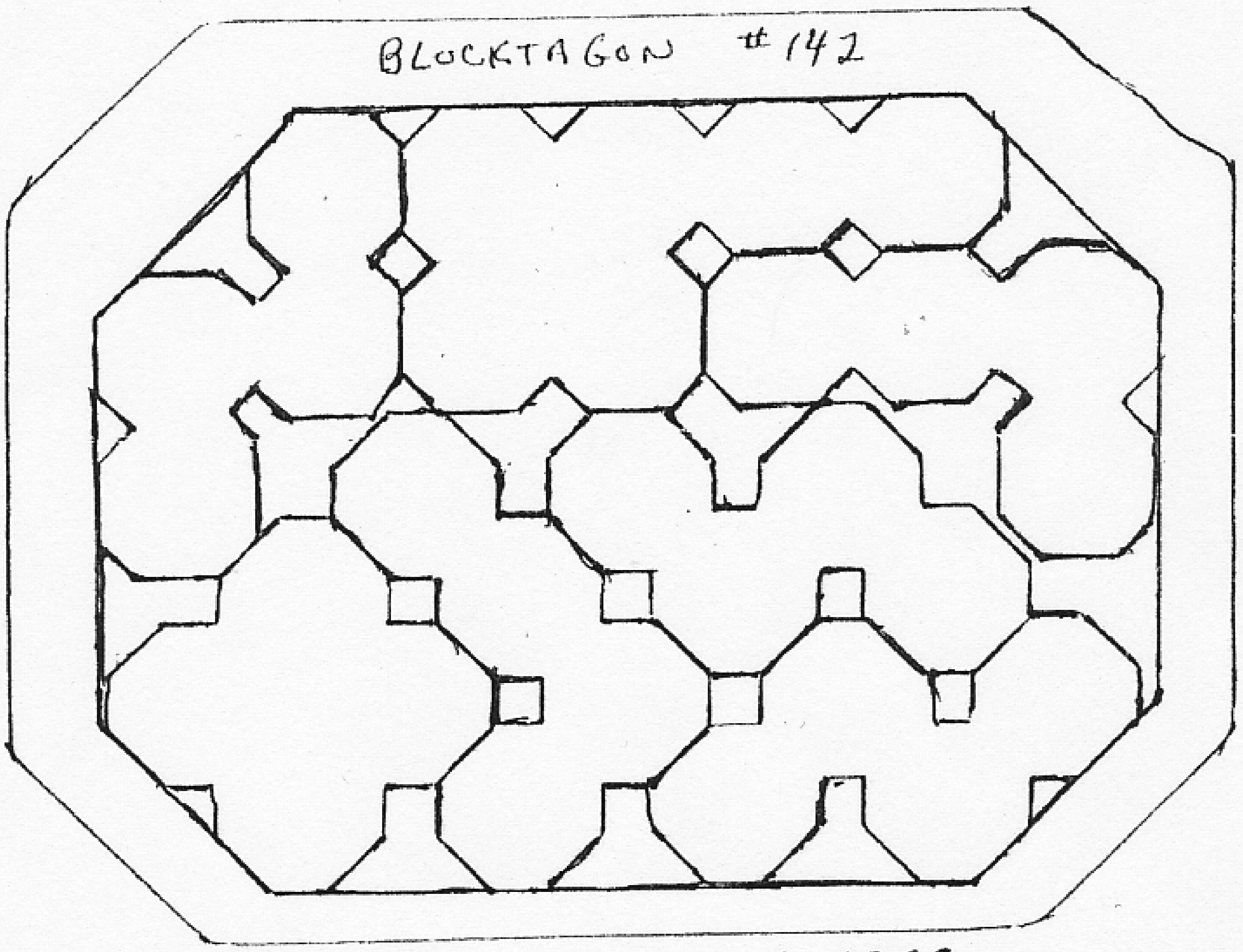


Plan for Checkout, No. 143

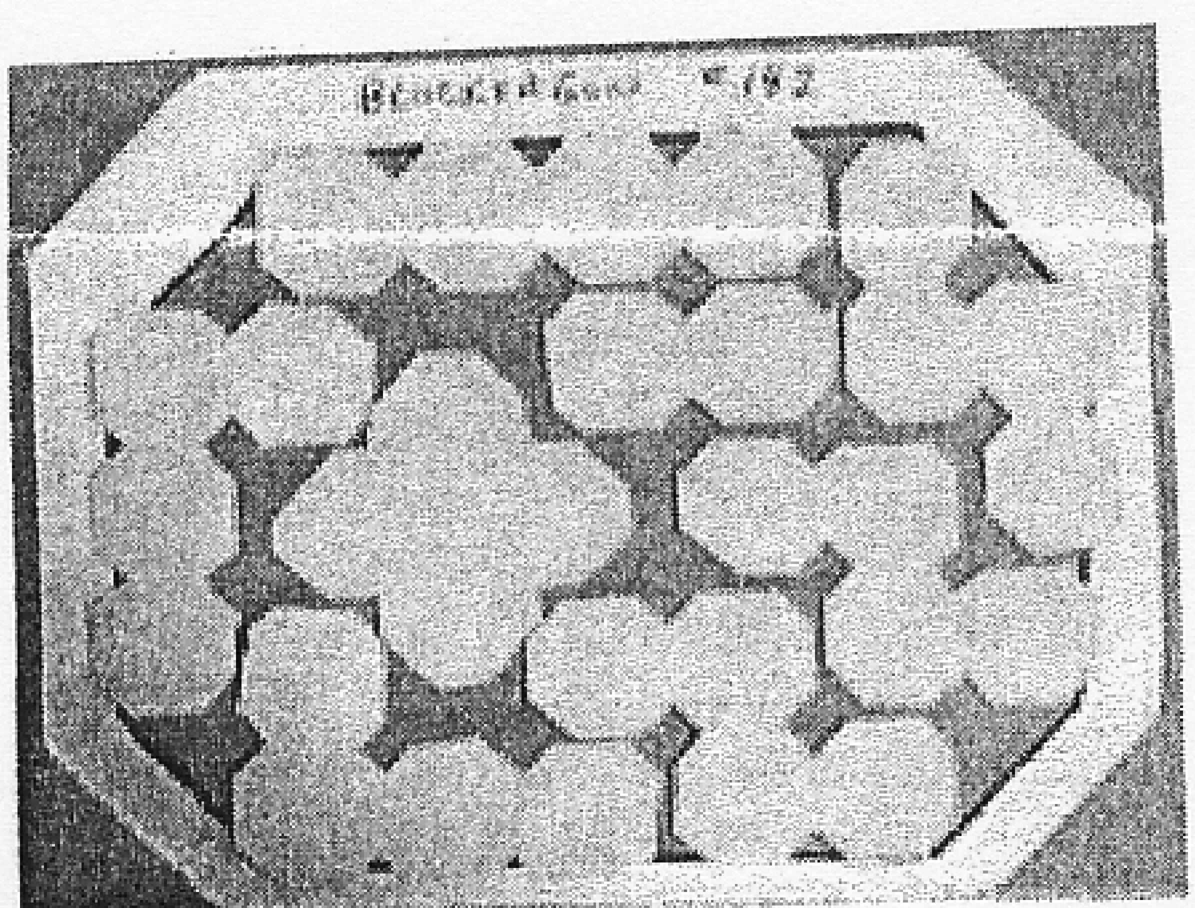


PUZZLES JERRY SLOCUM

CASTLE CREATIONS BY S. T. COFFIN
BLOCKTAGON #142

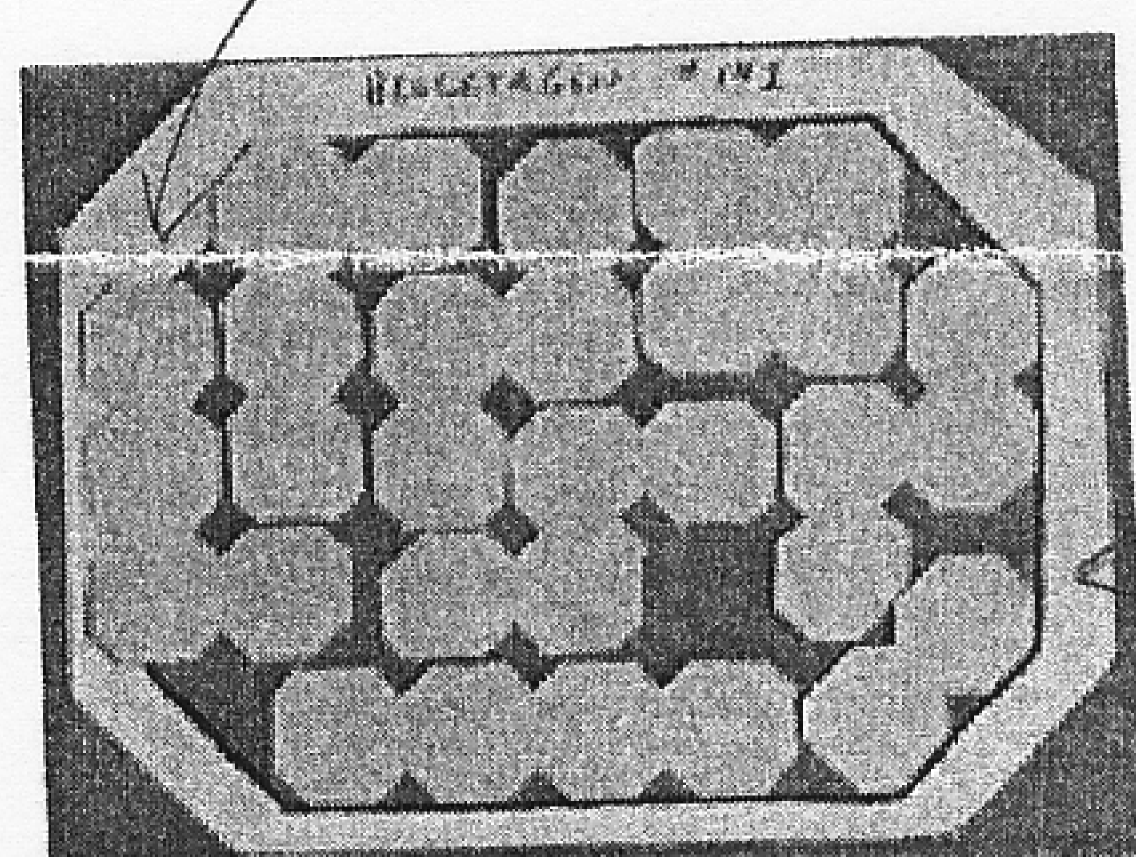


SLOCUM 3 JUNE 1999
"A" + "B" PIECES CAN BE REVERSED FOR DIFFERENT SOLUTIONS



HESS 22 FEB. 1999

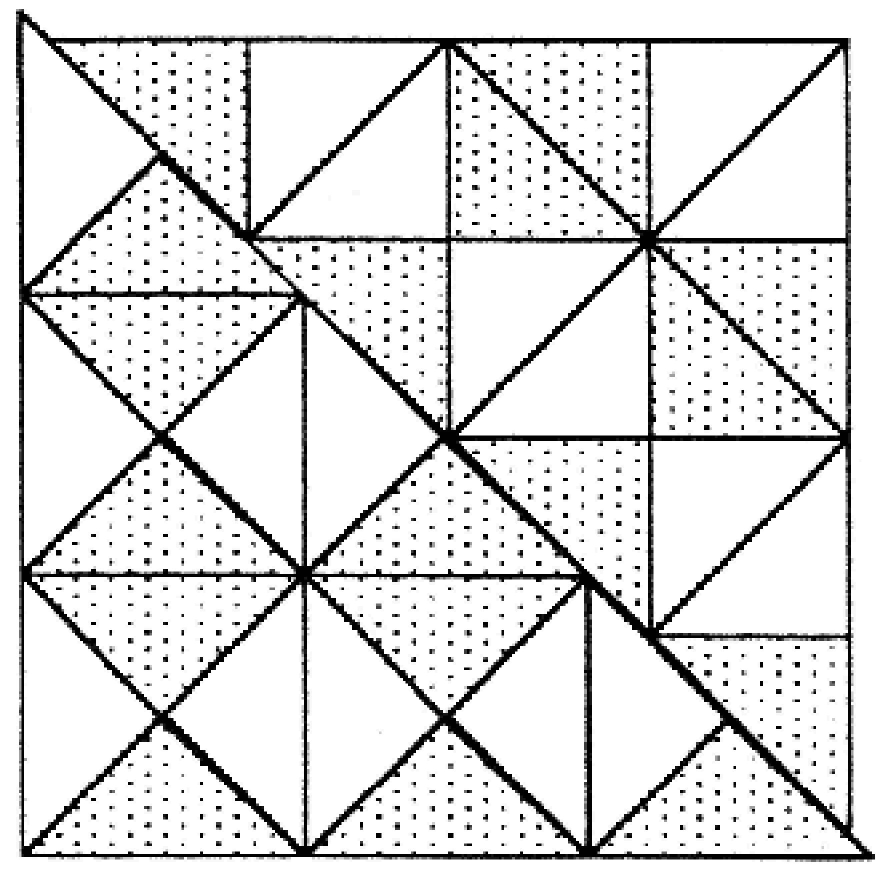
doesn't fit

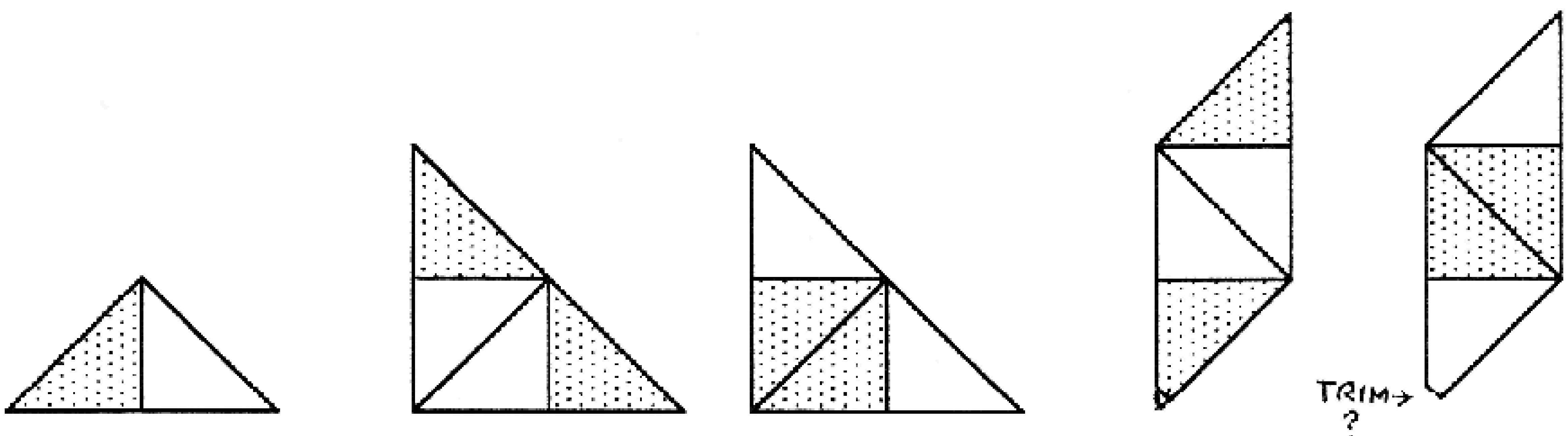


HESS 16 FEB. 1999

257 South Palm Drive Beverly Hills, California 90212 USA Phone 310-273-2270
Fax 310-274-3644 Email JSlocum@EarthLink.net

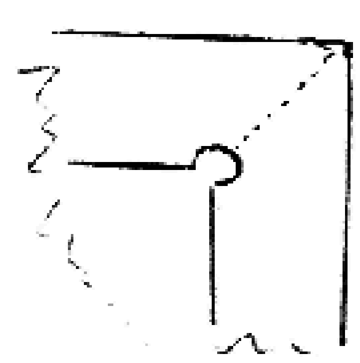
Plans for Checker, No. 143-A



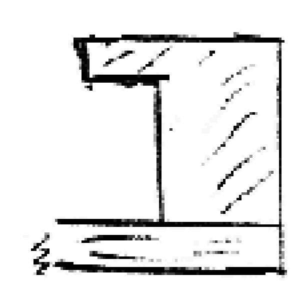


qty: 1 3 1 3 1

(an uncheckered version is also a possibility)



ONE POSSIBILITY-
DRILL HOLE IN
ALL 4 CORNERS



TRAY WITH LIP
TO HIDE CORNERS

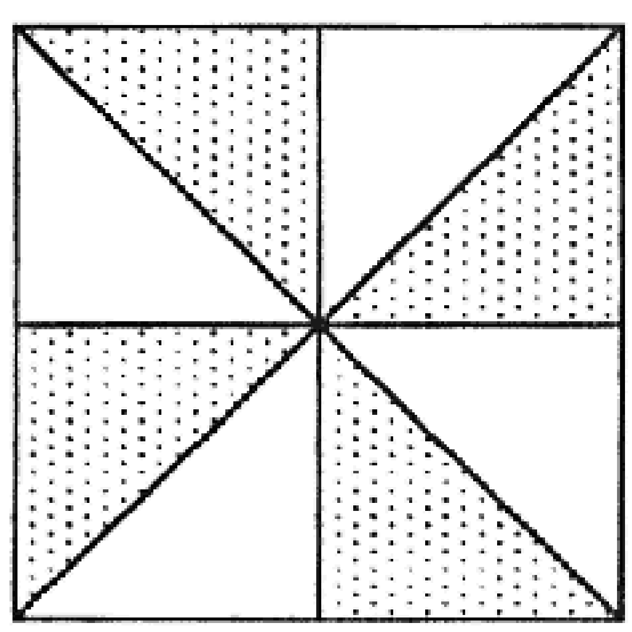
STC
24 Feb 1999

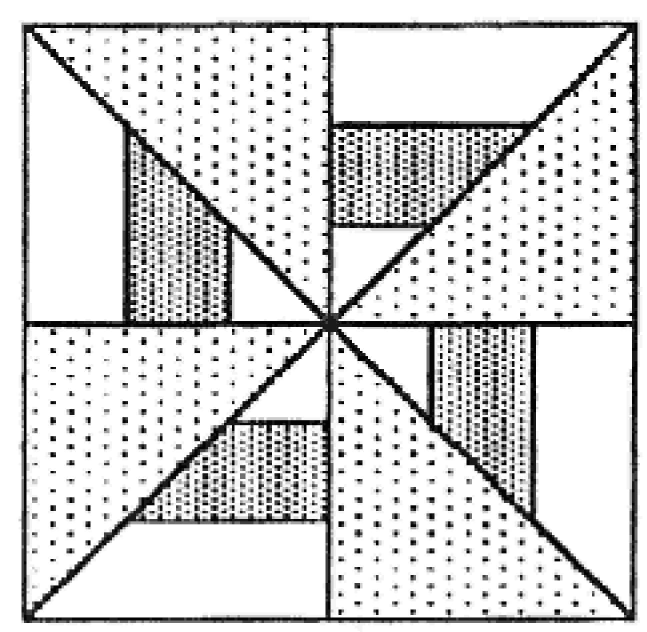
Castle Creations

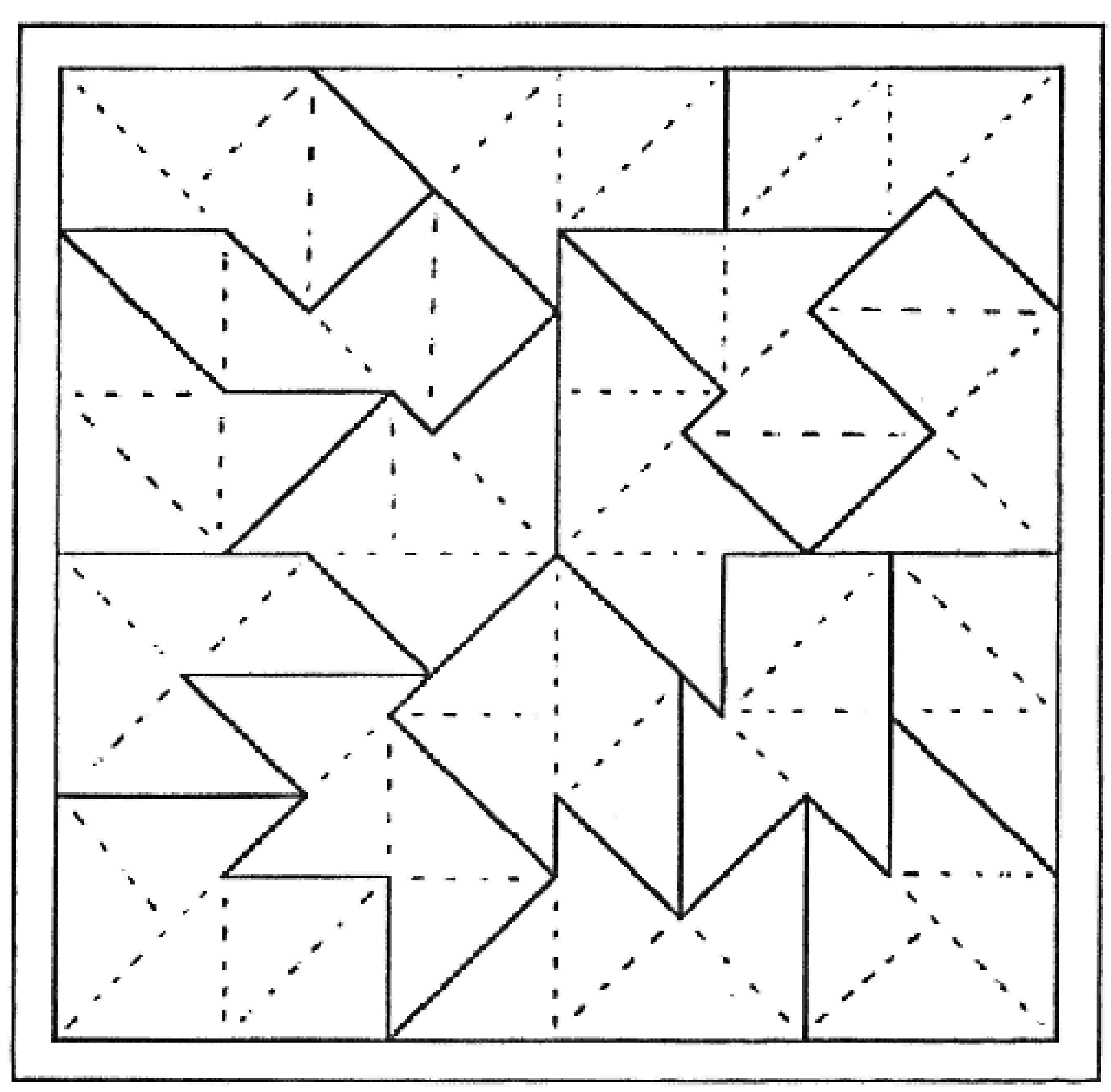
Stewart Coffin
29 Brookfield Road
Andover, MA 01810

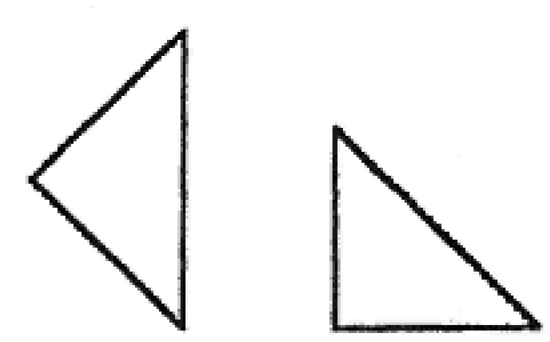
Windmill, No. 144

The object is to fit the pieces into the square tray. Only one solution is known. The 17 pieces are made up of 68 isosceles right triangular blocks joined together different ways to make all the pieces dissimilar and non-symmetrical. There are two sizes of triangular blocks used - 32 of the larger and 36 of the smaller, and they differ in area by the ratio of 9 to 8. If two dissimilar woods are used for the two sizes, the windmill pattern below left is obtained. By using additional colors of blocks, other patterns are possible, such as shown below right. Yet another option would be to make each piece of a different wood.







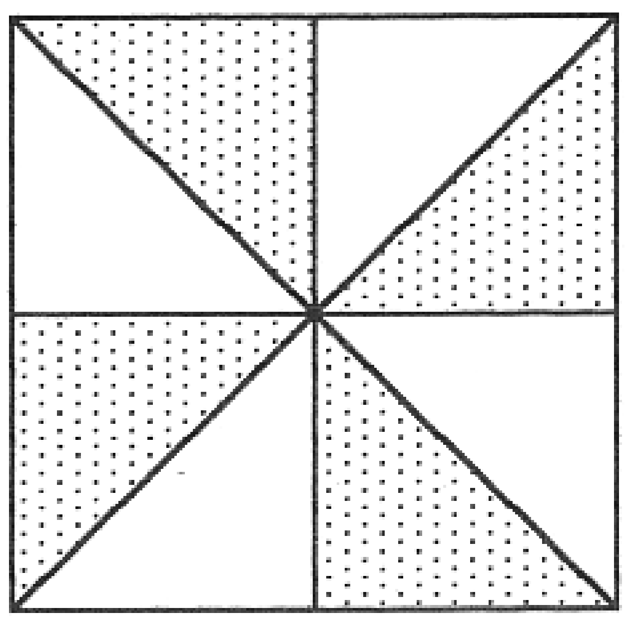


Castle Creations

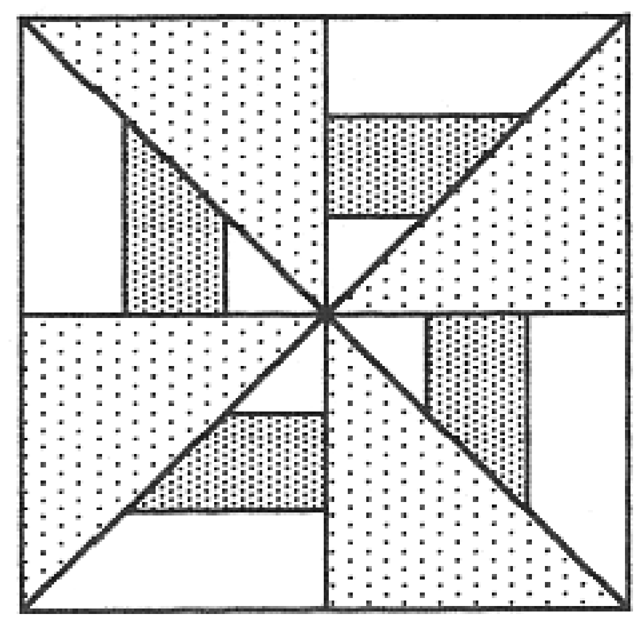
Stewart Coffin
29 Brookfield Road
Andover, MA 01810

Solution to Windmill, No. 144

The solution to this challenging puzzle is given in two stages. For those puzzle solvers with infinite patience and determination, we first offer only a helpful hint. This puzzle is made in either two or three colorful woods arranged in a symmetrical geometric pattern. The two corresponding patterns are shown below.

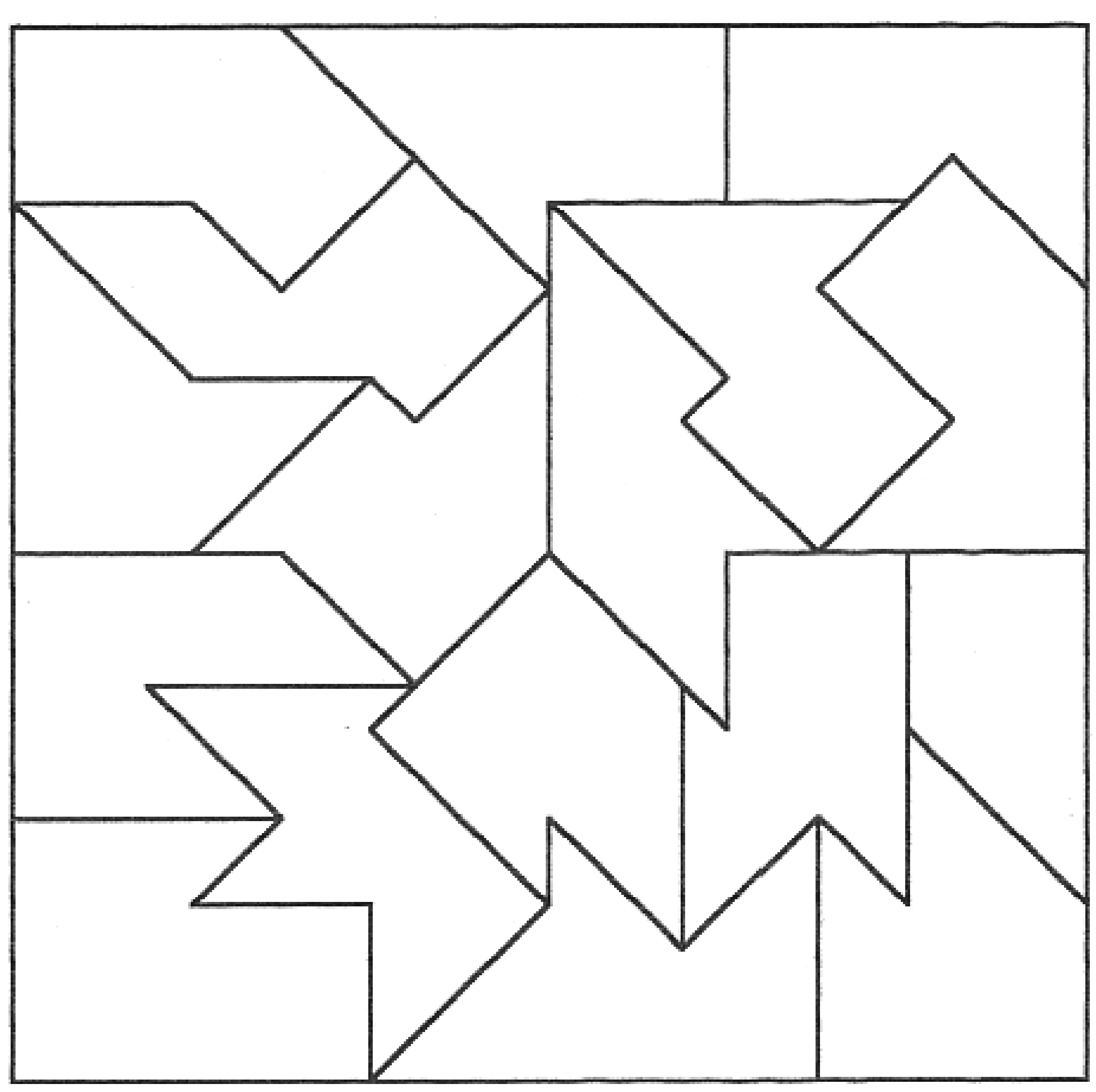


Two color version



Three color version

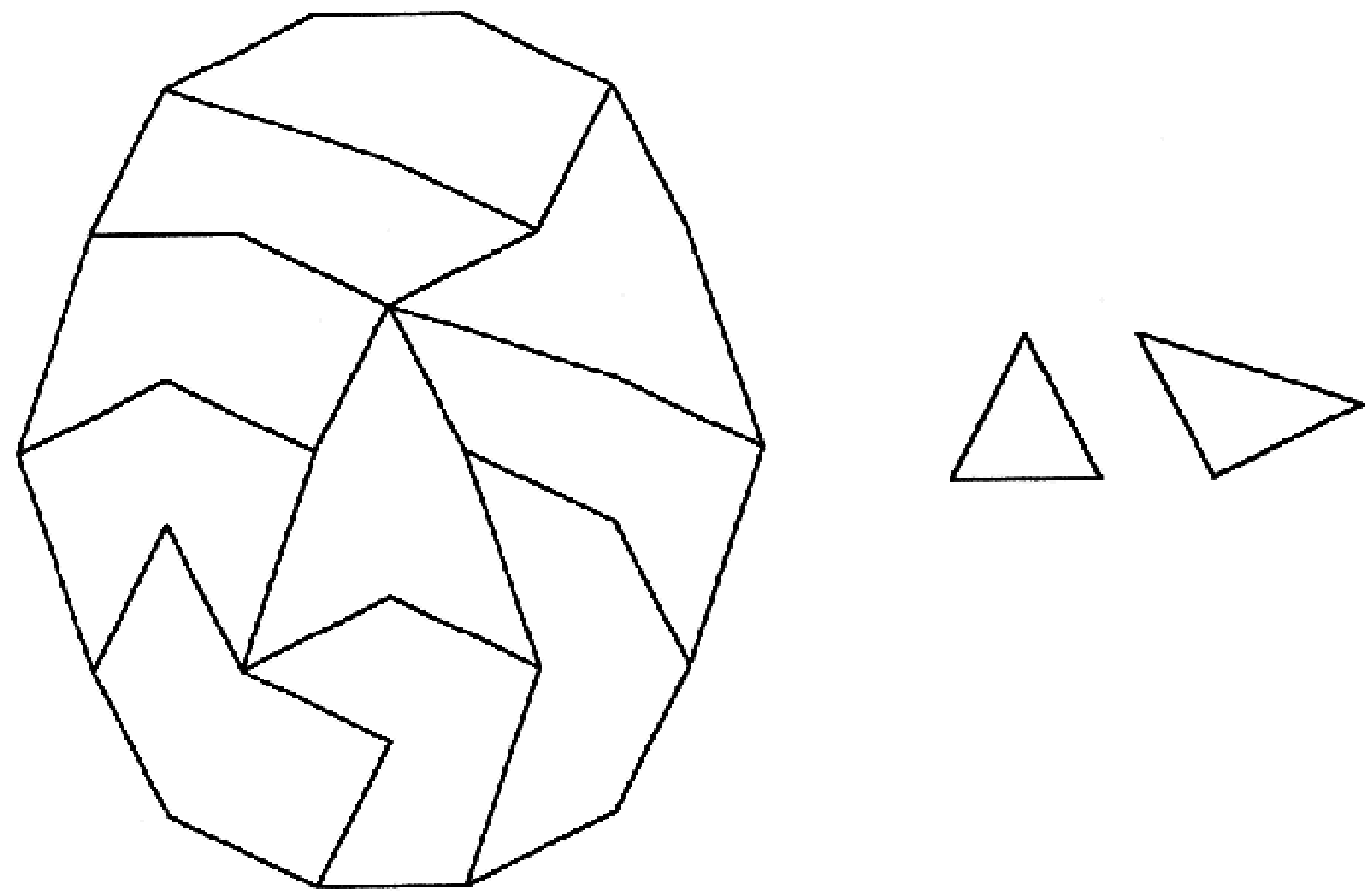
The complete solution is shown in the sealed envelope.



Plan for Lemon, No. 145

The 10 puzzle pieces are made up of two kinds of blocks, equilateral triangles and isosceles right triangles, 20 of each.

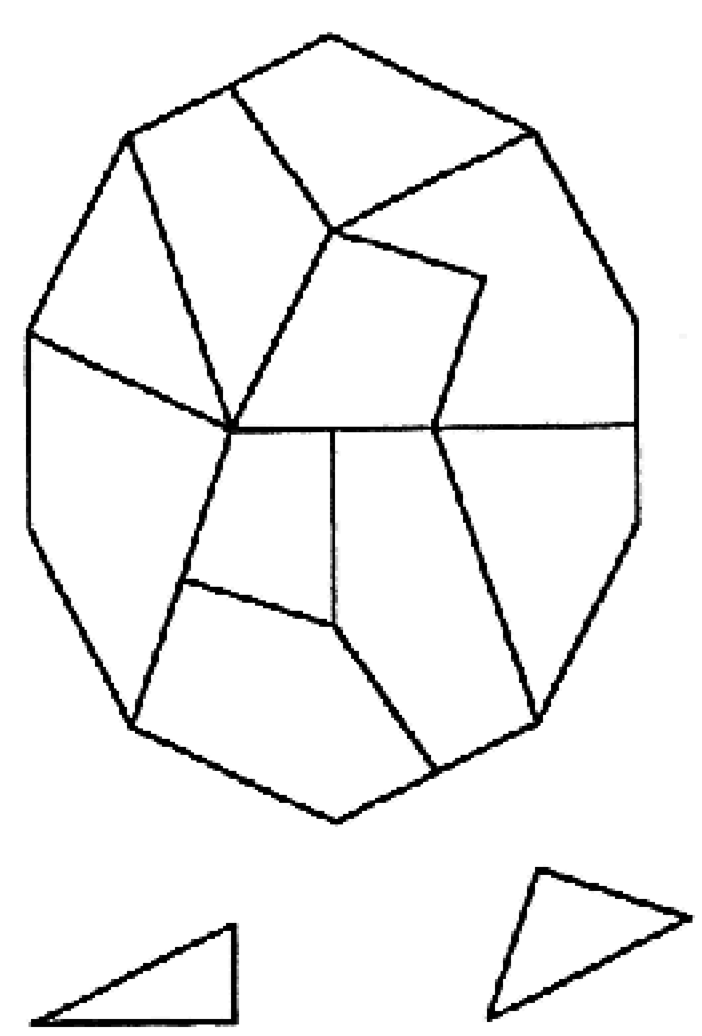
There are at least 2 solutions.



Plan for Lime, No. 146

The 10 puzzle pieces are made up of two kinds of blocks, equilateral triangles and 30-60-90 triangles.

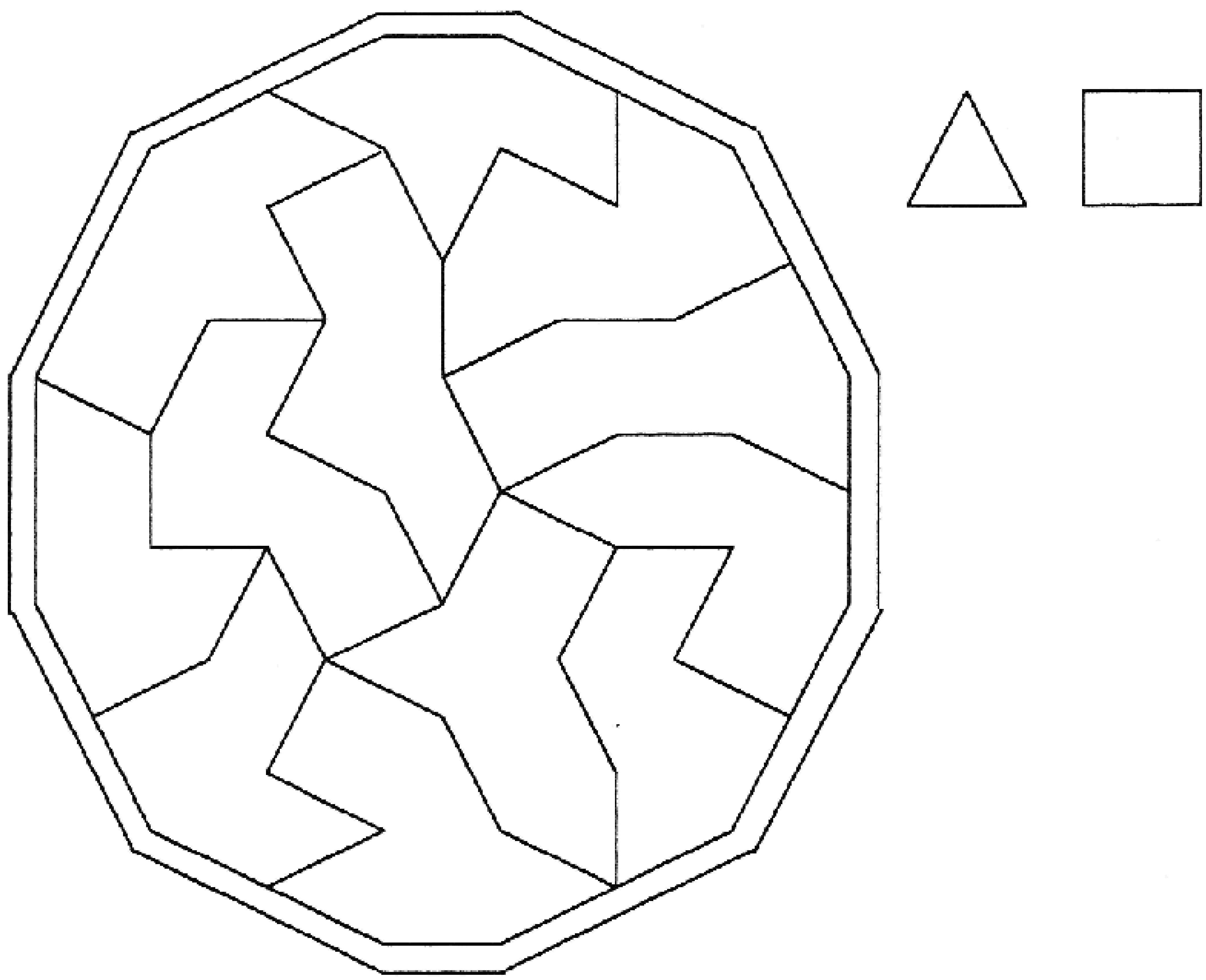
There are several solutions.



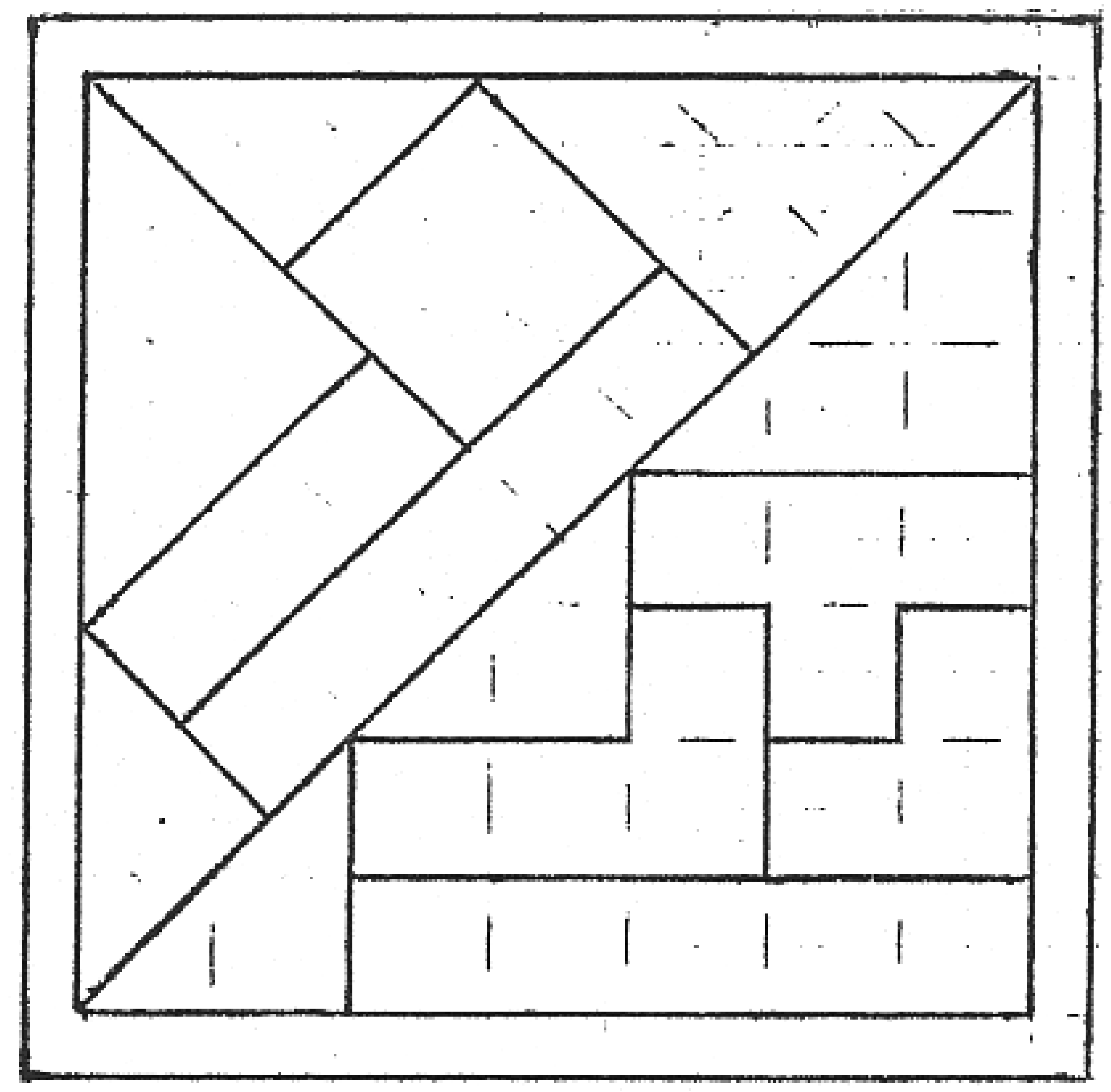
Plan for Pineapple, No. 147

These 13 puzzle pieces are made up of two sorts of blocks, 20 squares and 40 equilateral triangles. (They may not appear perfectly equilateral in this illustration because of limitations in my computer graphics.) All the pieces are dissimilar and non-symmetrical. I do not know if there is more than this one solution, and it will probably require a computer expert to find out. I have not actually made one of these yet.

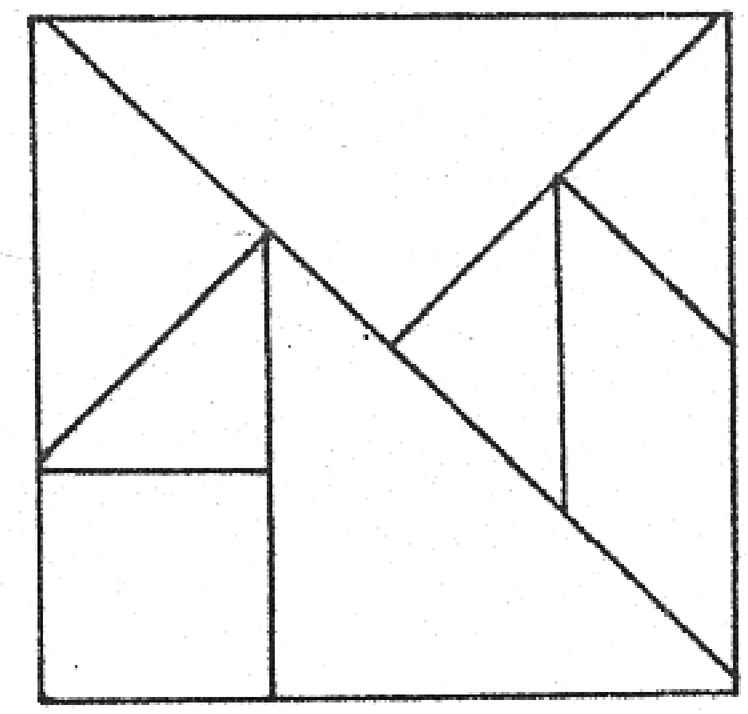
S.T.C.
Jan 1999



148. Fourteen-Piece Square.
This little novelty, shown here full scale, was made in mahogany as a handout for an Elderhostel puzzle workshop in Lenox, MA, April 1999. About 40 made. It was intended to have essentially one solution, but unless very accurately made there tended to be multiple solutions.



155. Eight-Piece Tangram.
This could be considered an improved version of Tangram Plus #136. The idea is simple enough. Everyone is familiar with the seven-piece Tangram. So what do you do with the extra small triangle? A reproduction laser-cut by Walter Hoppe was used as an IPP-20 exchange puzzle.



No. 156

Sphinx

(One-wood version)

The Sphinx family of designs could be considered a revised and hopefully improved version of a puzzle I first produced in 1978 called Saturn. The Saturn puzzle had six kinds of pieces, two of each, and was normally made in one kind of wood. It was supposed to have only one solution, but Stan Isaacs discovered a second. For a long time I looked for a design with twelve dissimilar, non-symmetrical pieces and only one solution. In my 1990 book *Puzzling World...* I even questioned if such a design were possible. Well here is one at last. I will assume it has only one solution until someone reports finding another.

There are several different perversions of the Sphinx, depending upon the wood combinations used and their arrangement. This version uses just one kind of wood instead of multiple woods arranged in color symmetry. Consequently it is by far the most difficult to assemble. For the present at least the solution unpublished, but if you are totally baffled you are permitted to humbly request helpful hints.

To disassemble the Sphinx, first look for the usual pair of pencil dots that identify the one sliding axis. Then you must squeeze with thumb and forefinger of both hands in just the right places, which can be found by trial and error. In humid conditions, it may require more effort.

The joints in the Sphinx are all doweled for extra strength and stability. Even so, I do not recommend leaving it disassembled for long periods of time, as all woods tend to warp with time, especially with seasonal changes in humidity. Also avoid excessive heat and direct sunlight.

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810 July 2000

No. 156-A

Sphinx

(Five-wood version)

The Sphinx family of designs could be considered a revised and hopefully improved version of a puzzle I first produced in 1978 called Saturn. The Saturn puzzle had six kinds of pieces, two of each, and was normally made in one kind of wood. It was supposed to have only one solution, but Stan Isaacs discovered a second. For a long time I looked for a design with twelve dissimilar, non-symmetrical pieces and only one solution. In my 1990 book *Puzzling World...* I even questioned if such a design were possible. Well here is one at last. I will assume it has only one solution until someone reports finding another.

There are several different versions of the Sphinx, depending upon the wood combinations used and their arrangement. This version uses five different woods, and their symmetrical arrangement facilitates the solution which otherwise might border on the practically impossible. The woods are identified inside.

Before disassembling the Sphinx, note that the like woods are all arranged in matched pairs, and furthermore the like pairs are arranged in what I call cubic symmetry. To disassemble the Sphinx, first look for the usual pair of pencil dots that identify the one sliding axis. Then you must squeeze with thumb and forefinger of both hands in just the right places, which can be found by trial and error. In humid conditions, it may require some effort.

The joints in the Sphinx are all doweled for extra strength and stability. Even so, I do not recommend leaving it disassembled for long periods of time, as all woods tend to warp with time, especially with seasonal changes in humidity. To preserve the brilliant colors of the fine hardwoods, keep away from strong UV light such as sunlight or fluorescent light.

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810 July 2000

No. 156-B

Sphinx

(Fifteen-wood version)

The Sphinx family of designs could be considered a revised and hopefully improved version of a puzzle I first produced in 1978 called Saturn. The Saturn puzzle had six kinds of pieces, two of each, and was normally made in one kind of wood. It was supposed to have only one solution, but Stan Isaacs discovered a second. For a long time I looked for a design with twelve dissimilar, non-symmetrical pieces and only one solution. In my 1990 book *Puzzling World...* I even questioned if such a design were possible. Well here is one at last. I will assume it has only one solution until someone reports finding another.

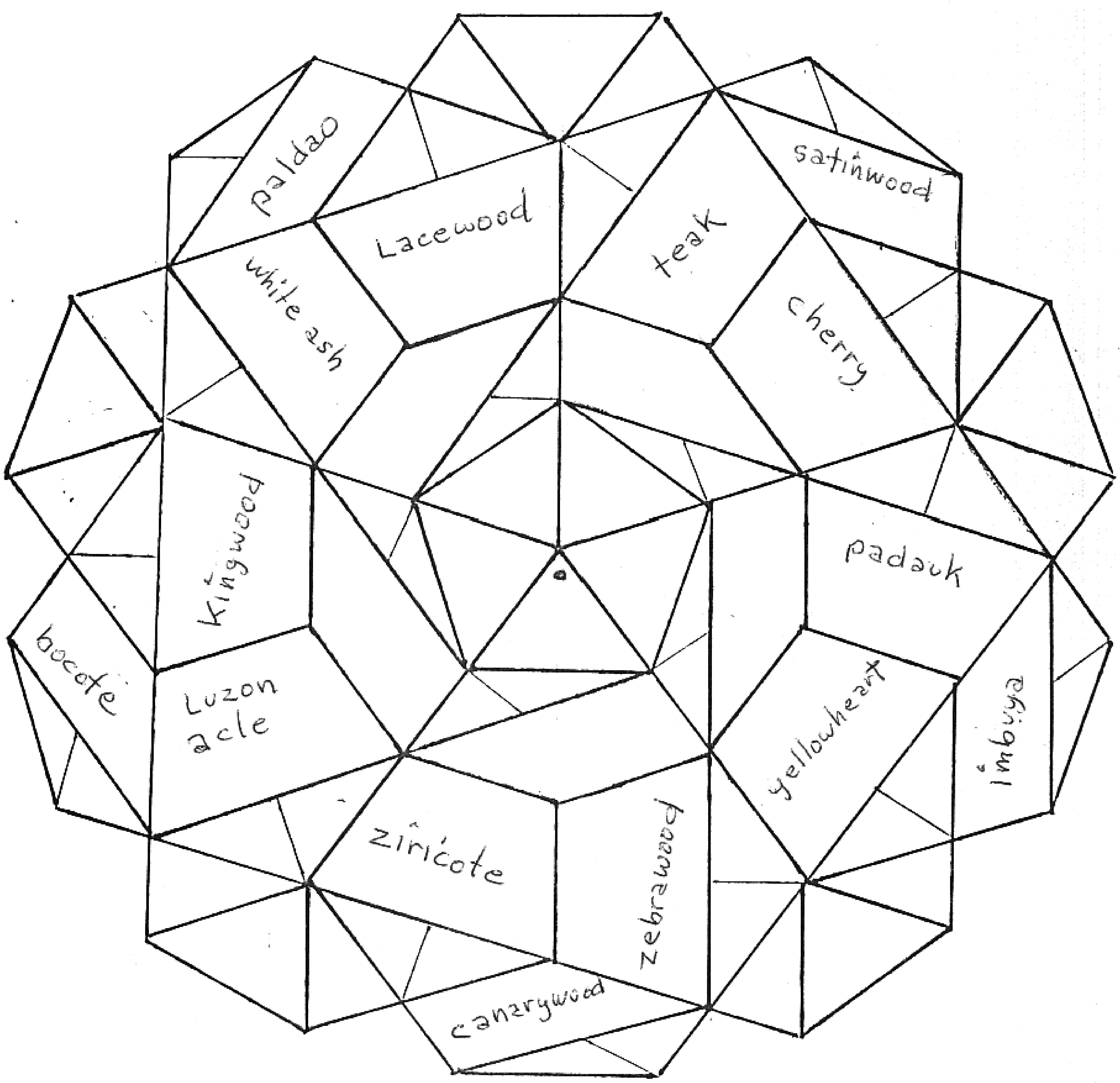
There are several different versions of the Sphinx, depending upon the wood combinations used and their arrangement. This version uses fifteen different woods, and their symmetrical arrangement facilitates the solution which otherwise might border on the practically impossible. The woods are identified inside.

Before disassembling the Sphinx, note that the like woods are all arranged in matched pairs, and furthermore the two like pairs are arranged diametrically opposite each other. That arrangement makes this version the easiest of all to reassemble. To disassemble the Sphinx, first look for the usual pair of pencil dots that identify the one sliding axis. Then you must squeeze with thumb and forefinger of both hands in just the right places, which can be found by trial and error. In humid conditions, it may require some effort.

The joints in the Sphinx are all doweled for extra strength and stability. Even so, I do not recommend leaving it disassembled for long periods of time, as all woods tend to warp with time, especially with seasonal changes in humidity. To preserve the brilliant colors of the fine hardwoods, keep away from strong UV light such as sunlight or fluorescent light.

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810 July 2000

156-B Sphinx, in 15 woods
#4



No. 156-X

Sphinx

(Special 30-wood version)

Three different versions of the **Sphinx** are shown in my numerical listing of designs, depending upon the number of different woods used. The No. 156-B used 15 different woods, which was until now the most different woods I had used in one puzzle. I made a few of these a year ago to sell at IPP-20 last August. At that time it occurred to me that it might be possible to make a few with 30 different woods, and I began setting aside a few remaining bits of my fast dwindling supply of rare woods for that purpose. As of December 2000 I have made six of these, three of which went to my three daughters, with the other three being set aside. The suffix X indicates that this is a special edition not included in my numerical listing. For more information on the evolution of this design, see page 64 of my new **AP-ART** notebook.

Some of these woods are ones I have used for many years, while others I acquired just recently. Like clothing fashions, some tropical hardwoods will come on the market and be popular, then disappear to be replaced by others. Acle is probably the rarest. This also uses my last scrap of blue maho, never to be replaced. One of my favorites is tulipwood, now hard to find. I had to use some common hardwoods like maple and oak to come up with 30 kinds. The sumac came from the woodlot in New Boston. All the woods are identified in the accompanying diagrams. All the joints are doweled for greater strength.

The original version of the Sphinx in just one wood is very difficult. As the number of woods increases, the difficulty decreases. This is the easiest version possible, as it involves just finding the two like woods and mating them. But then there is the order of assembly to deal with. Like all others of this type, it goes together in two identical halves, and the axis of assembly is marked by a pair of pencil dots.

The first half uses pieces 1-6. First mate pieces 4 and 5. Then add pieces 2 and 6 to this assembly. Then add piece 1, and lastly piece 3 to complete this half.

For the second half, first mate pieces 7 and 8. Then separately mate pieces 9 and 10 - this is tricky and requires **no force**! Now join these two subassemblies. Next mate pieces 11 and 12 and insert them as a unit to complete the other half. Join the two halves.

To preserve the colors of these woods, do not store in sunlight or fluorescent light. To maintain the accuracy, always store the puzzle fully assembled.

STC
Dec. 2000

To Abbie, Tammis, and Margie

Instructions for the **Special Sphinx, No. 156-X**

Three different versions of the **Sphinx** are shown in my numerical listing of designs, depending upon the number of different woods used. The No. 156-B used 15 different woods, which was until now the most different woods I had used in one puzzle. I made a few of these a year ago to sell at IPP-20 last August. At that time it occurred to me that it might be possible to make a few with 30 different woods, and I began setting aside a few remaining bits of my fast dwindling supply of rare woods for that purpose. I had just enough to make these three exactly alike. The suffix X indicates that this is a special edition not included in my numerical listing. For more information on the evolution of this design, see page 64 of your new **AP-ART** scrapbook.

Some of these woods will be familiar to you from bygone days, and others will not. Like clothing fashions, some tropical hardwoods will come on the market and be popular, then disappear to be replaced by others. Acle is probably the rarest. This also uses my last scrap of blue maho, never to be replaced. One of my favorites is tulipwood, now hard to find. I had to use some common hardwoods like maple and oak to come up with 30 kinds. The sumac came from the woodlot in New Boston. All the woods are identified in the accompanying diagrams. All the joints are doweled for greater strength.

The original version of the Sphinx in just one wood is very difficult. As the number of woods increases, the difficulty decreases. This is the easiest version possible, as it involves just finding the two like woods and mating them. But then there is the order of assembly to deal with. Like all others of this type, it goes together in two identical halves, and the axis of assembly is marked by a pair of pencil dots.

The first half uses pieces 1-6. First mate pieces 4 and 5. Then add pieces 2 and 6 to this assembly. Then add piece 1, and lastly piece 3 to complete this half.

For the second half, first mate pieces 7 and 8. Then separately mate pieces 9 and 10 - this is tricky and requires **no force**! Now join these two subassemblies. Next mate pieces 11 and 12 and insert them as a unit to complete the other half. Join the two halves.

To preserve the colors of these woods, do not store in sunlight or fluorescent light. To maintain the accuracy, always store the puzzle fully assembled.

STC
Dec. 2000

Castle Creations

Stewart Coffin
29 Brookfield Road
Andover, MA 01810

The Recycled Puzzle, No. 157

Background: The origin of this design can be traced all the way back to my old 1970 Spider-Slider, later renamed Scorpius. It consisted of six identical symmetrical pieces, and was so simple as to be more of a geometrical curiosity than a puzzle. It was made in four contrasting woods, and one object was not only to assemble but to do so with color symmetry. A 1974 variation called Dislocated Scorpius used six identical but non-symmetrical pieces and was somewhat more interesting as a puzzle. A vastly improved 1978 variation called Scrambled Scorpius had six confusing dissimilar pieces, and it remains one of my most satisfactory designs. For those who admired the geometrical design but found the Scrambled Scorpius too difficult, my larger 1993 version in oak called Egyptian had pieces marked with a coded solution. I have recycled this same basic idea so many times by now that I have run out of names, hence "Recycled."

This new version of the Egyptian does away with the coded markings and instead uses multi-colored woods as in the original Scorpius.

The standard four-color version, No. 157, is the easiest, since all like-colored arms are assembled in matched pairs and are mutually parallel.

The other four-color version, 157-A, has a more subtile symmetrical color pattern. Consequently it is more difficult, but an aid to solving is knowing that no like colors touch each other.

The 157-B version uses six woods, one for each piece, and it is the most difficult of all.

Equally confusing is the 157-C version in all one wood, which is essentially an Egyptian without the coded solution.

S.T.C.
Jan 2000

Note: Now called Multicolored Egyptian

No. 159

Seven-Piece Hexsticks

The design of the Hexsticks puzzle dates back to 1968 and was what got this whole AP-ART enterprise started. Over the years, the variations on this basic idea have been many, with possibly more yet to come. The first to employ bonded pieces was the eight-piece No. 71, Stucksticks. This new version, Seven-Piece Hexsticks, can be viewed as an improved version, since one of the design objectives was to minimize the number of puzzle pieces. You might think that this would make the puzzle easier. Be prepared to discover otherwise. There is only one solution.

I have made just eight of these from my now depleted stock of Limba, also sometimes known as Korina. Note the distinct musty smell, which never seems to go away. This choice lumber came to me by way of the historic Schwamb Mill in Arlington, Mass., a sort of woodworking craft center. The Mill got it in turn from a wealthy Boston industrialist and philanthropist, who acquired it along with many carloads of other fine hardwoods when the old Irving and Casson Furniture Company of Cambridge was liquidated. The story I heard was that many years ago one of the two partners, I have forgotten which, traveled all over the world collecting wood. Perhaps this was one of them. Limba comes from Africa.

In a departure from the usual, I have chosen to sell each of these in the disassembled state, without any instructions.

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810 July 2000

No's. 160 and 160-A

Venus

The Venus could be considered an improved version of my 1985 design which had the unassuming name of Design No. 72. The Venus likewise has ten pieces, but in this new creation, all pieces are dissimilar in shape. There is essentially only one order of assembly, and we will assume there is only one solution unless someone reports discovering another.

In the No. 160 version, each of the ten pieces is a different kind of wood. In the No. 160-A version, five woods are used so there are two pieces of each wood. These instructions apply to both. (There are also easier versions -B and -C in which color symmetry aids the solution; and version -D, the most difficult, which is all one wood.)

The first step of disassembly is unusual. Find the piece made up of only three blocks, and note that the center block has a slight gap that allows it to be pried loose. The next piece to be removed is the one with only four blocks. The puzzle then comes apart into two hemispheres. As usual, the sliding axis is marked with a pair of pencil dots. The individual pieces then come readily apart. By the way, disassemble at your own risk, because the solution to this puzzle is presently unpublished.

To maintain the brilliant colors of these beautiful hardwoods, do not keep in strong UV light such as sunlight or fluorescent light.

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810 July 2000

No's. 160-B, C, and D

Venus

The Venus could be considered an improved version of my 1985 design which had the unassuming name of Design No. 72. The Venus likewise has ten pieces, but in this new creation, all pieces are dissimilar in shape. There is essentially only one order of assembly, and we will assume there is only one solution unless someone reports discovering another.

In the No. 160-B version, five different kind of wood are used, and they are arranged such that when assembled, each face of the triacontahedron is one kind of wood, with the matched pairs arranged in cubic symmetry. This is a big help in assembling the puzzle. In the No. 160-C version, six woods are used, and they too are arranged in color symmetry but of a more subtile form that I call double pinwheel, which helps only if you can recognize it. (Hint, no like woods touch each other.) The No. 160-D version uses just one kind of wood, consequently it is the most difficult of all. These instructions apply to all three.

The first step of disassembly is unusual. Find the piece made up of only three blocks, and note that the center block has a slight gap that allows it to be pried loose. The next piece to be removed is the one with only four blocks. The puzzle then comes apart into two hemispheres. As usual, the sliding axis is marked with a pair of pencil dots. The individual pieces then come readily apart. By the way, disassemble at your own risk, because the solution to this puzzle is presently unpublished.

To maintain the brilliant colors of these beautiful hardwoods, do not keep in strong UV light such as sunlight or fluorescent light.

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810 July 2000

No. 161

Garnet

This an improved version of the Garnet Puzzle, No. 60, that I first produced in 1984. This model is 20% larger and more accurately made. Six fine hardwoods in contrasting colors are used in the construction, one wood for each puzzle piece.

The first step of disassembly is to separate the puzzle into two halves. The sliding axis is marked as usual by a pair of pencil dots, but the axis can also be deduced by examining the way the pieces interlock. You need to grasp in exactly the right places. The six individual pieces then come readily apart. Assembly is the opposite. It may take a bit of trial and error. There is only one solution, and essentially only one order of assembly.

To maintain the brilliant colors of these fine hardwoods, do not store in strong UV light, such as sunlight or fluorescent light. The outside surfaces can be restored by buffing with wax.

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810 July 2000

No. 164

Scrambled Scorpius

This is a reissue of the Scrambled Scorpius, a puzzle that I first made in 1978 and that has reappeared many times in various forms ever since. I have always considered it to be one of my most satisfactory designs. It is described in both *Puzzle Craft 1985* and *The Puzzling World of Polyhedral Dissections.*

The six dissimilar, non-symmetrical pieces of this puzzle go together one way only, and in essentially only one order. The first step of disassembly is to separate the puzzle into two identical halves, and the axis of separation is marked in my standard way with a pair of pencil dots.

Unlike the original Scrambled Scorpius, which was made of all one wood, this version uses four woods arranged in color symmetry. This helps with the solution, provided you can figure out the type of symmetry used, which I refer to as "double pinwheel." Hint: No like colors touch each other.

There is also a version 164-A which uses six woods, one for each piece. It is more difficult, since the colors offer no clue. Finally there is 164-B, which uses six woods arranged in an unusual sort of symmetry (and which presently exists only on paper).

To maintain the brilliant colors of these fine hardwoods, keep the puzzle away from strong UV light, such as sunlight or fluorescent light.

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810 July 2000

No. 166

Shoulder-Spider-Slider

The S-S-S is a variation on the first wooden puzzle that I produced, the old Spider-Slider back in 1970. There are three slightly different versions of this new design.

In the No. 166 version, there are three kinds of pieces, two of each. The first step of disassembly is to separate the puzzle into two identical halves, and there is only one sliding axis along which this can occur. The three pieces in each half are dissimilar and can go together one way only and in only one order.

In the No. 166-A version, all the pieces are identical but non-symmetrical. This slight modification produces interesting complications. The puzzle is both difficult to disassemble and most frustrating to reassemble. This is a coordinate motion puzzle, and bits of adhesive tape may be useful as an aid to assembly.

In the No. 166-B version, all the piece are identical and symmetrical. It is easy to take apart, <u>once you know how</u>. Putting it back together again is another matter altogether. Like the above, this is a coordinate motion puzzle and adhesive tape may be useful.

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810

July 2000, revised December 2000

Notes to accompany Castle Creations Design No. 169, Five-Piece Square Root

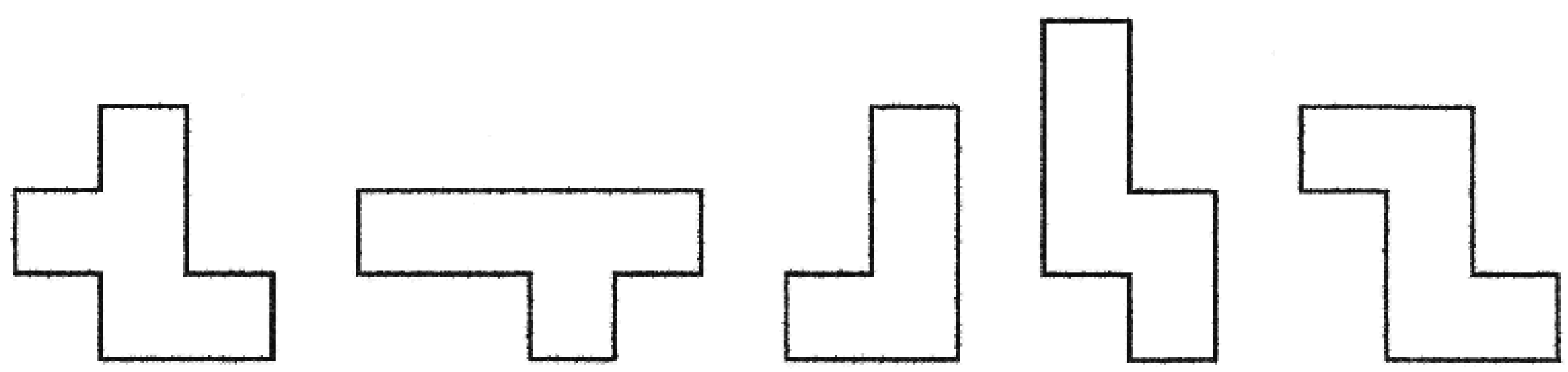
The object of this puzzle is to fit these five polyomino-type pieces into a square tray. There is only one solution.

If the size of the square building blocks is one unit of length, then the square tray theoretically measures 5.692 units of length.

If the tray is made 0.122 larger, then there are 7 additional solutions. Therefore the tray should be made a close fit to prevent this. As a practical matter, if made by Walter Hoppe using his laser process, then all corners could have a slight radius and the tray reduced slightly in size accordingly for a snug fit.

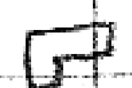
STC

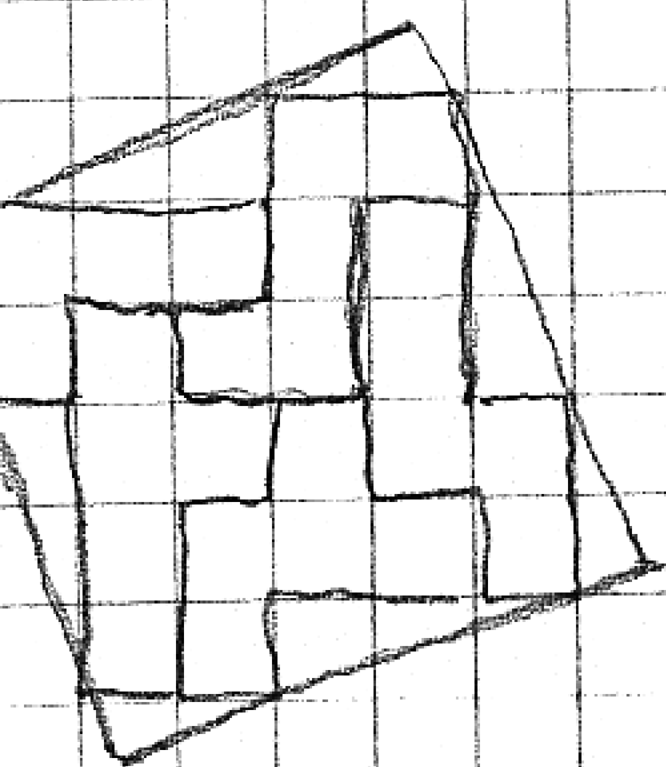
Feb. 2001

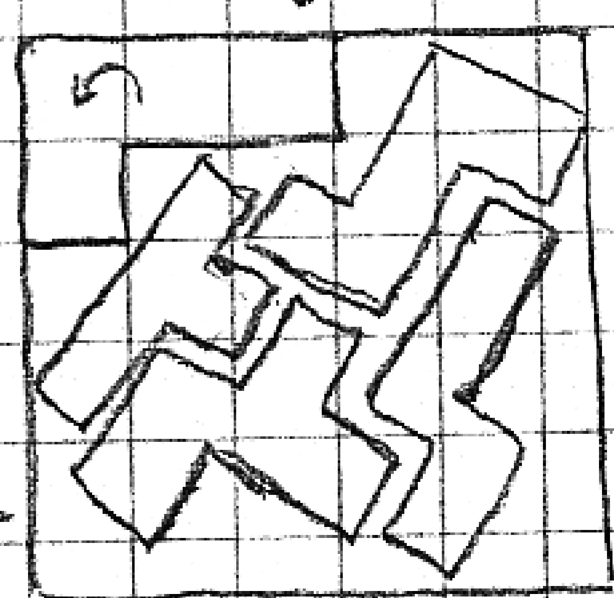


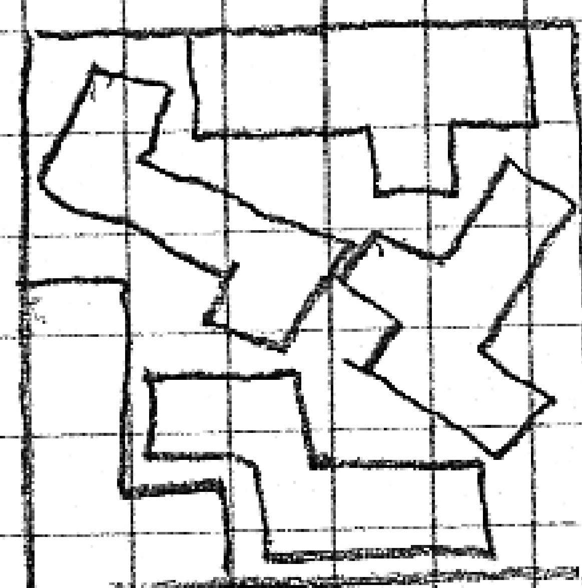
169 + 169-A

169

This one definitely, but this one is just the proper solution with  turned.





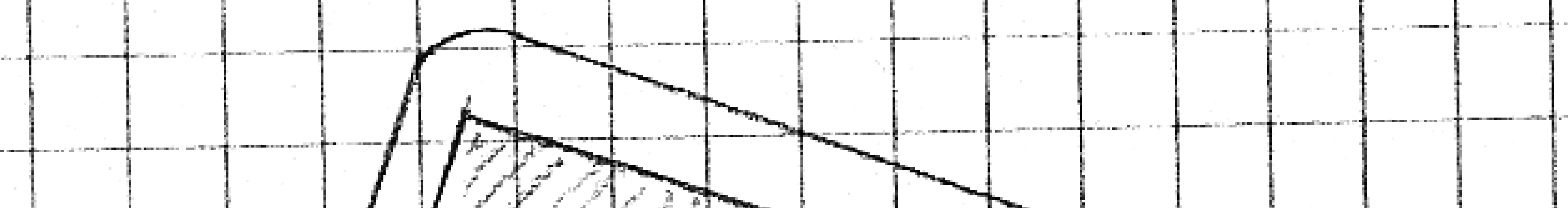


This one ~~does~~, almost fits

This one used in CMJ article

169 - N.G. two incongruous solutions reported by Nick Baxter in May 2001

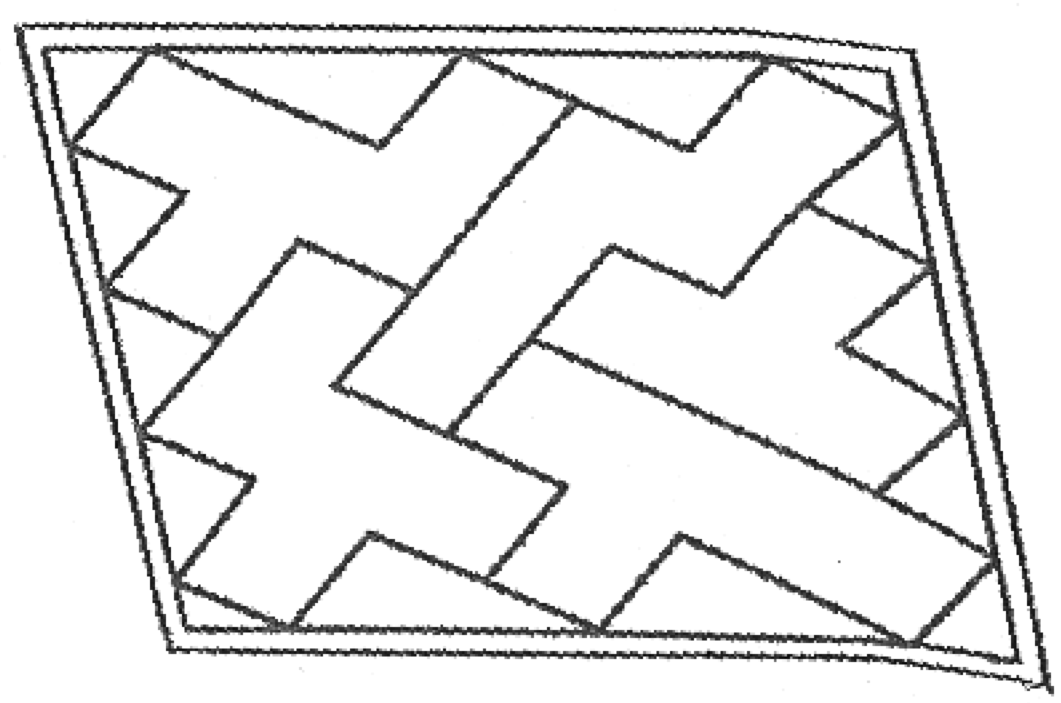
169 + 169-A



169-A

Used by Nick Baxter for IPP-21

170. This unusual 2001 design was proposed as a possible exchange puzzle but never used. The building blocks are rhombic. The angle of the blocks and tray is critical and must be 75.5 degrees. It must also be accurately made or there will be false solutions. Only a few were made in poplar and luan.

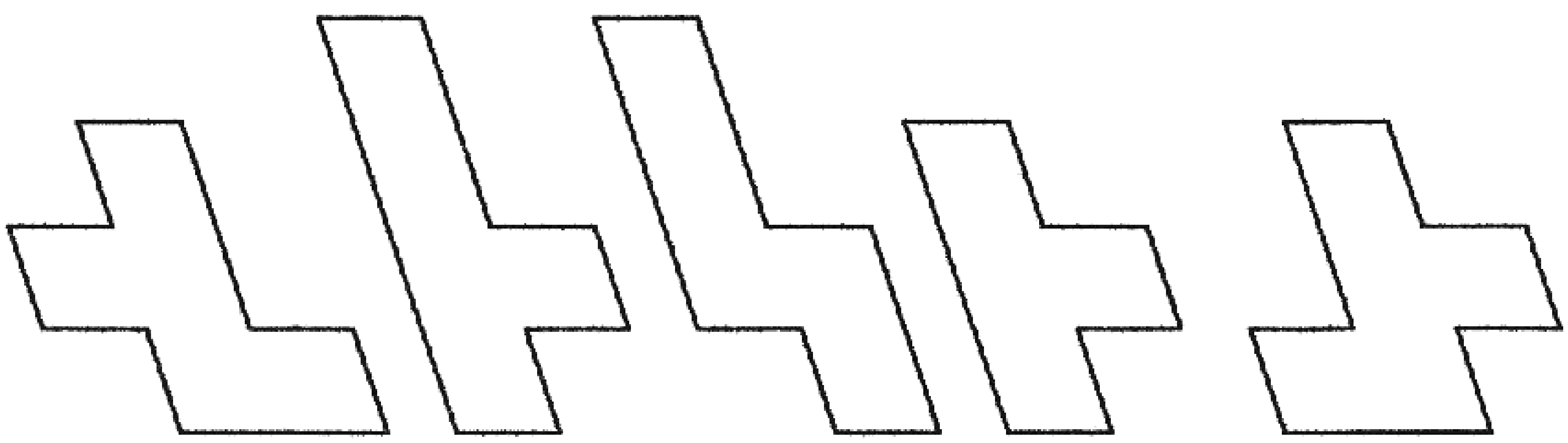


Notes to accompany Castle Creations Design No. 170, Four by Six Rhomboid

The object of this puzzle is to fit the five skewed polyomino-type pieces into a rhomboid shaped tray. There is only one known solution.

The building blocks are rhombic. Both the blocks and the tray necessarily have a theoretical angle of 75.5 degrees. The dimensions of the tray will become obvious when the solution is discovered. As a practical matter, if made by Walter Hoppe using his laser process, the corners of the pieces could have a slight radius. The tray could then be reduced slightly in size to fit, although this is not critical. There is at least one known incongruous solution if the tray is about 0.150 oversize.

STC
Feb. 2001

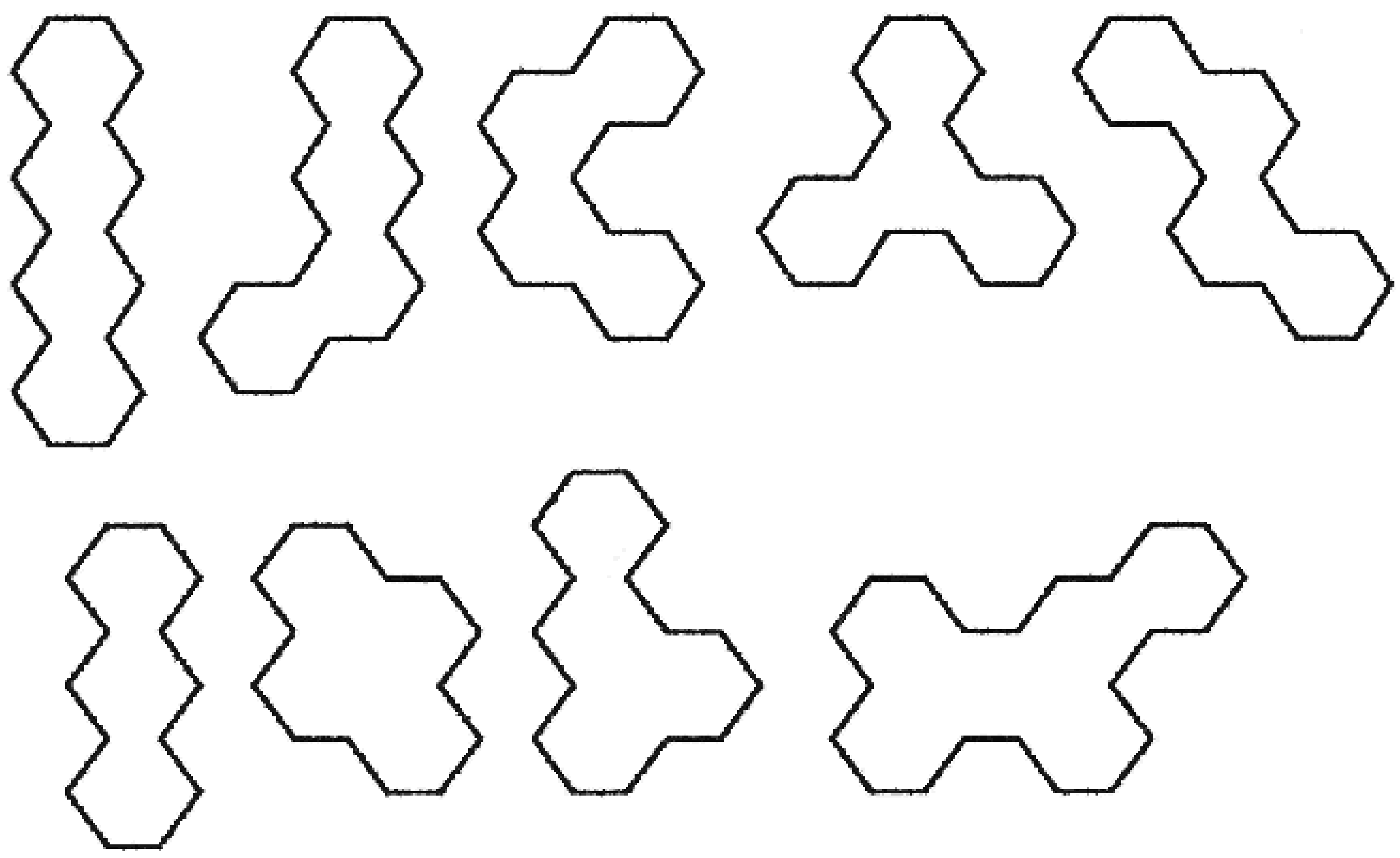


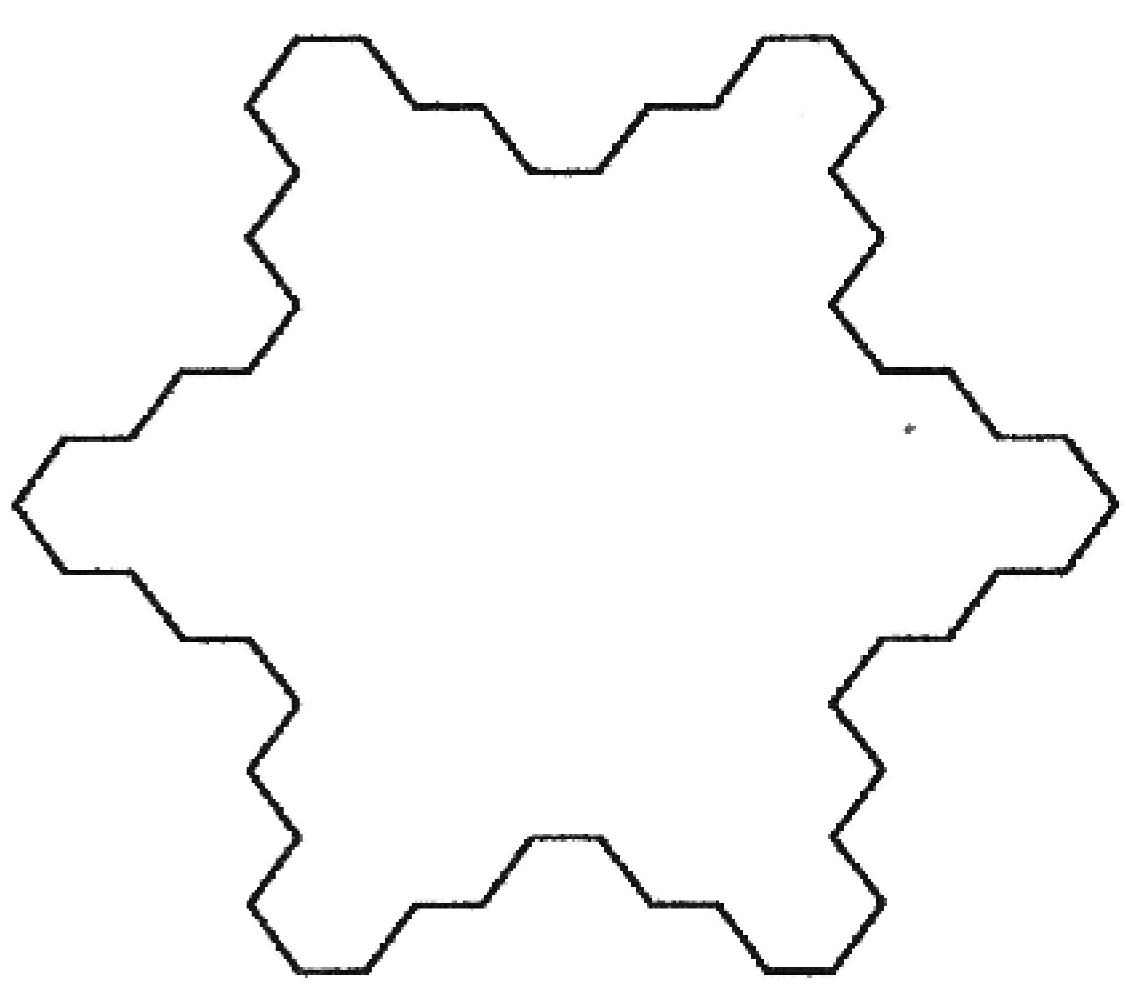
Description of Castle Creations Design No. 171, Simplified Snowflake

My original Snowflake Puzzle had two basic tray patterns - the Hex and the Snowflake. According to a computer analysis by Mike Beeler, the Hex pattern has 12,290 solutions; thus making it quite easy to find one. The Snowflake pattern, on the other hand, has only 167 solutions, making it much more difficult.

This new design again uses the Snowflake pattern. However, in order to simplify the task, two of the small puzzle pieces have been combined into one, so that there are now only nine pieces rather than the original ten. Furthermore, this new combination of pieces has multiple solutions, making it even that much easier.

STC
Feb. 2001





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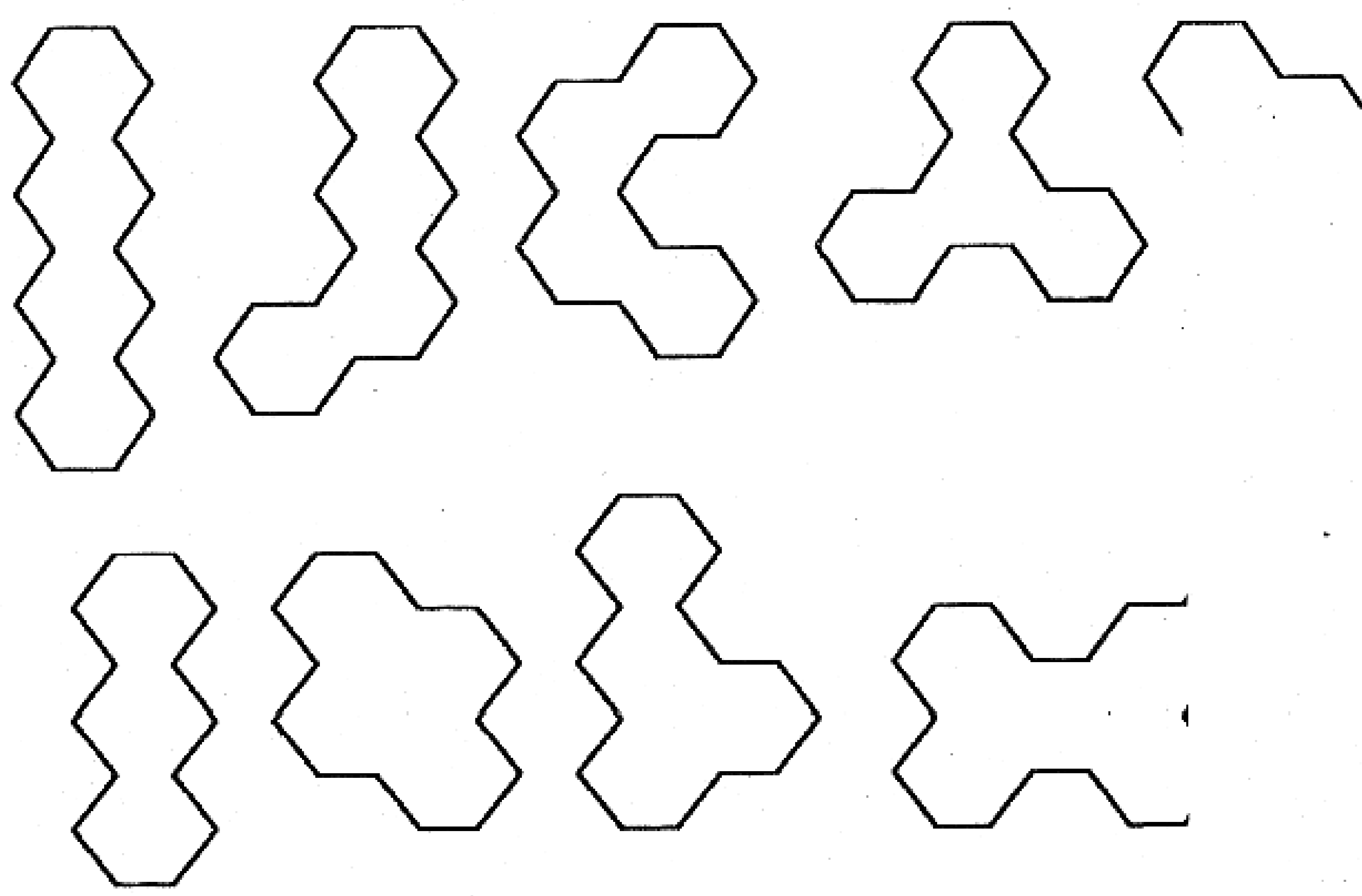
This new design again uses the Snowflake pattern. However, in order to simplify the task, two of the small puzzle pieces have been combined into one, so that there are now only nine pieces rather than the original ten. Furthermore, this new combination of pieces has multiple solutions, making it even that much easier.

my idea of a joke!

STC
Feb, 2001



6 UNIQUE SNOWFLAKE SOLUTIONS

7 ★ X

~~18~~

20 ★ best

~~#~~ 31

~~#~~

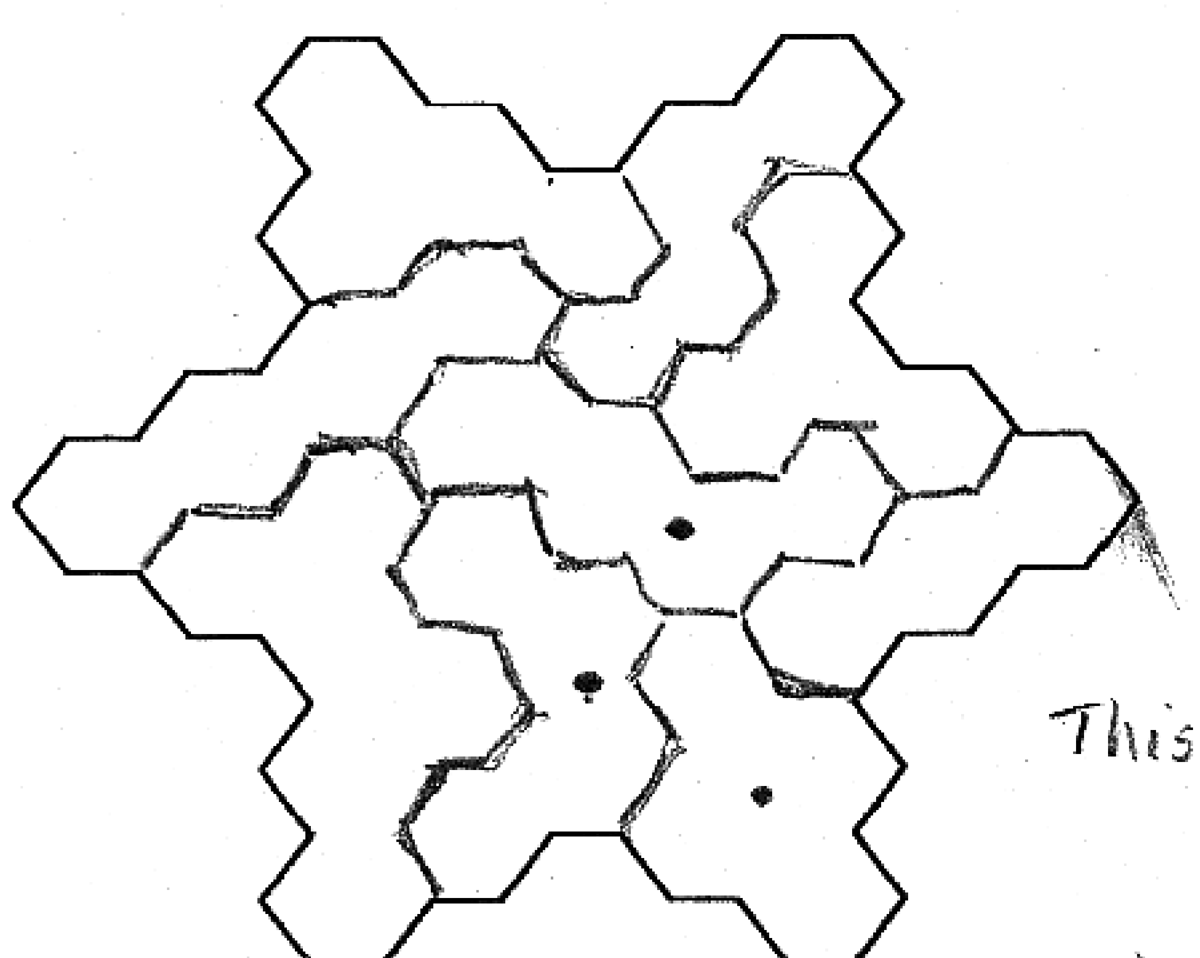
~~31~~

35 ★ X

42 ★ X

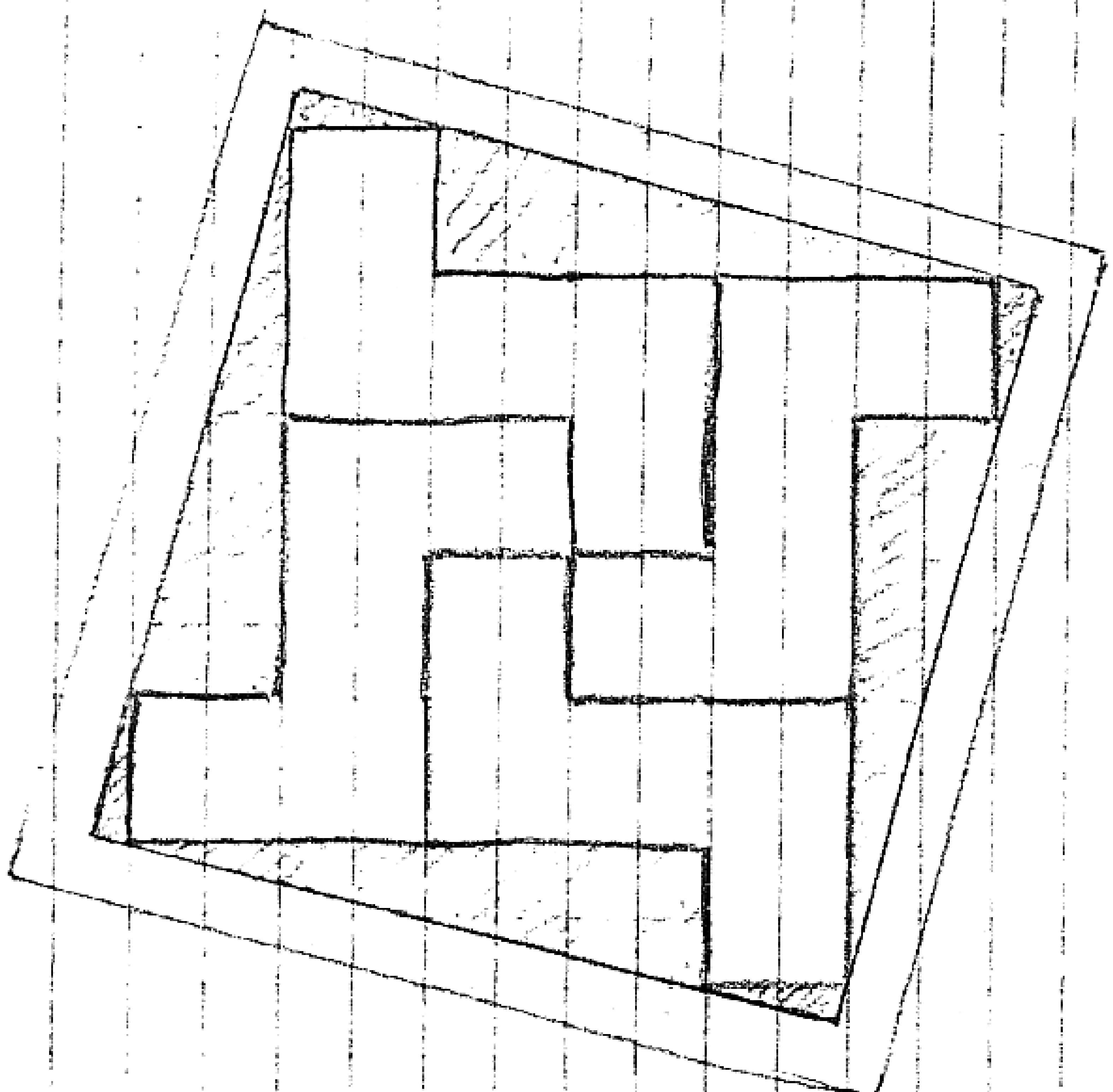
~~21~~ 45

68 , 80, 60 Y in ctr. has 3 solutions



This is one of two solutions.

For the other, rearrange only the three pieces marked with dots.



reported by Nick Baxter to have been discovered by some one else and published, possibly Binary Arts

STC, 2001

Notes to accompany Castle Creations Designs 172 - X and 173 - X

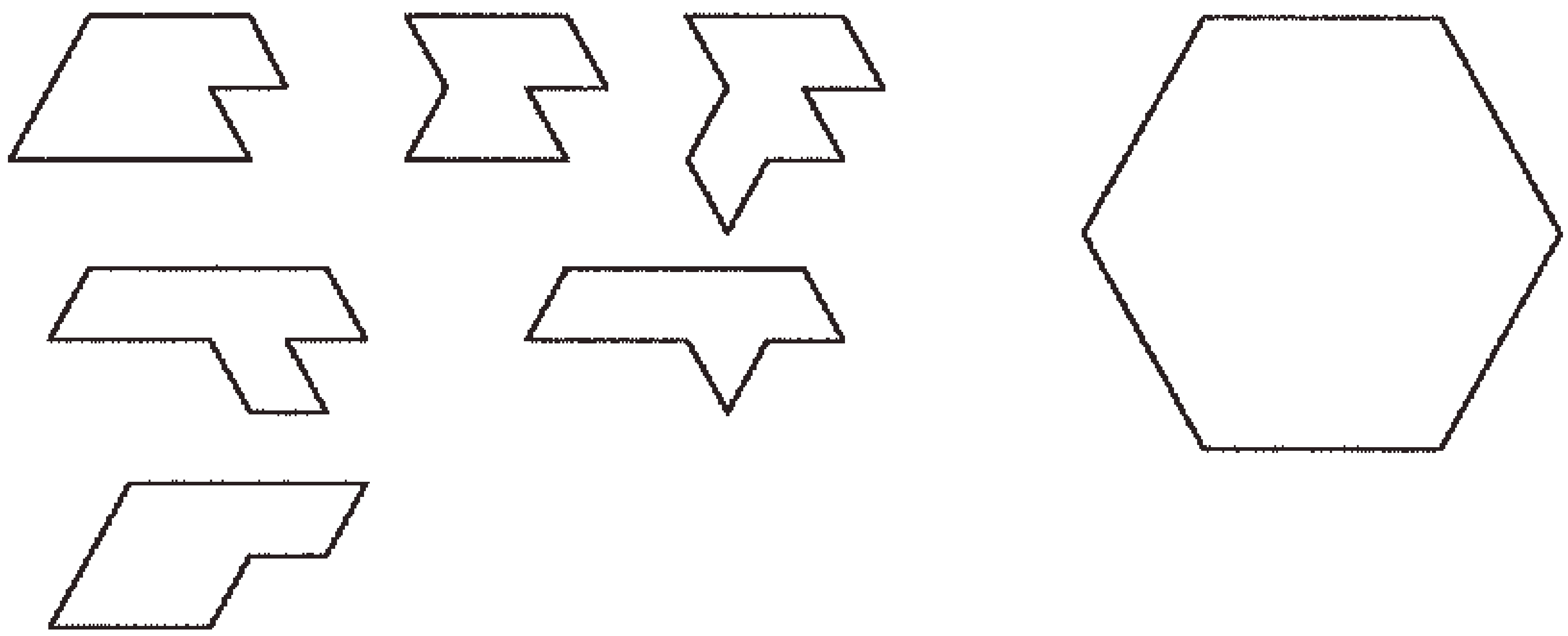
The object of design 172 is simply to fit the four pentomino pieces into the rectangular tray. Using the usual nomenclature, the four pieces are identified as **F-P-T-T**. If the building block squares have dimensions of one, then the tray is 4.919 x 5.814.

Besides being only a rough prototype model, the main reason for the designation X is that I am never sure if my intended solution is unique. All too often, when I am convinced that no other solutions could possibly exist, someone eventually reports finding one, or several. I fervently request that all those who solve this puzzle send me a sketch of their solution, or solutions, so that we may know if my intended solution is unique. Equally useful is knowing if there would be additional solutions if the tray were slightly larger, although I do not think there are. This is important to know to prevent the possibility of persons trying to force pieces into place in ways that were not intended, especially if not made to sufficiently close tolerances.

Design 173 is more unusual, at least in my creative efforts. The object is to fit the five pentomino pieces into the rhomboid tray. The width of the tray is 5.814 in one direction and 5.657 in the other. Thus it departs from a rhombus by 0.157. Big hint: the angle of the tray is 71.6 degrees, which just happens to be arctan 3. Again I ask your help in checking for unintended solutions by sending me a sketch of your discoveries.

I assume that either of these could be made beautifully and accurately by Walter Hoppe with laser. As a practical matter, perhaps the pieces would be cut with slightly rounded corners, in which case the tray dimensions I have given might or might not apply.

Stewart Coffin
Feb. 10, 2001



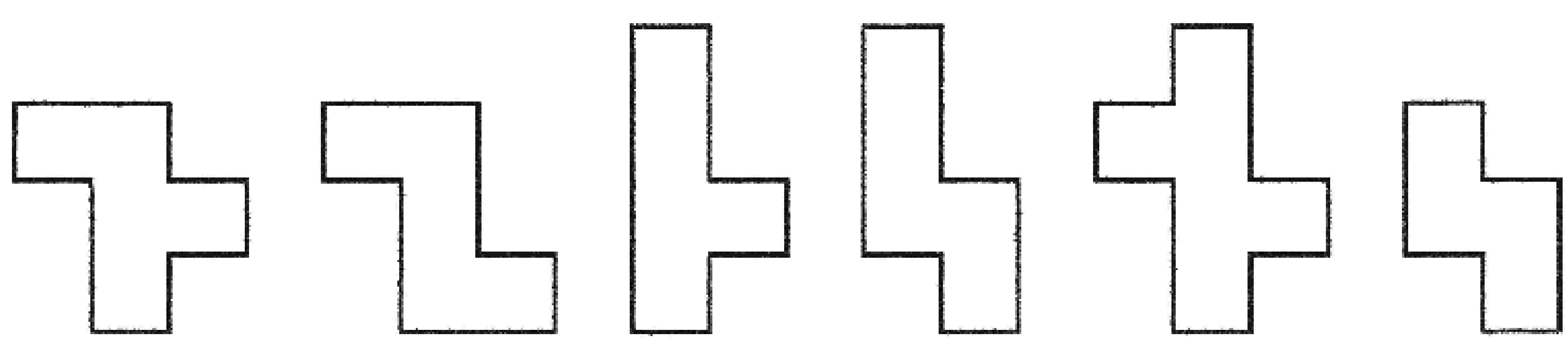
Stewart T. Coffin
29 Brookfield Road
Andover, MA 01810
978-475-1903
MSDSTC@AOL.COM

Surprise

No. 175

Fit the six polyominoes shown below into a rectangular tray.

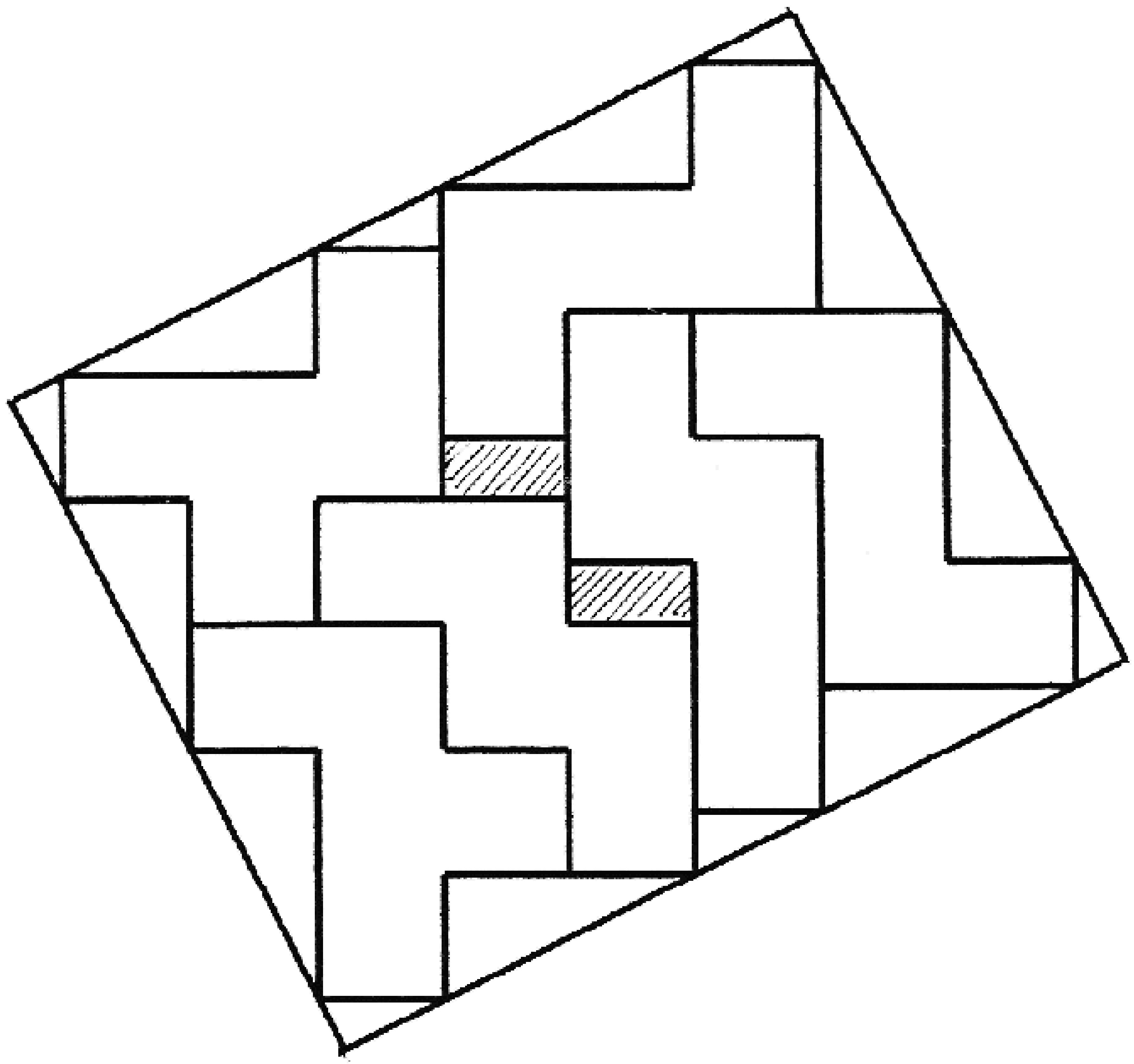
In my version of this puzzle, the blocks measure 0.750 inches, and the tray measures theoretically 4.361 x 5.200 inches minimum.



Note: This puzzle is now known as Nice Try

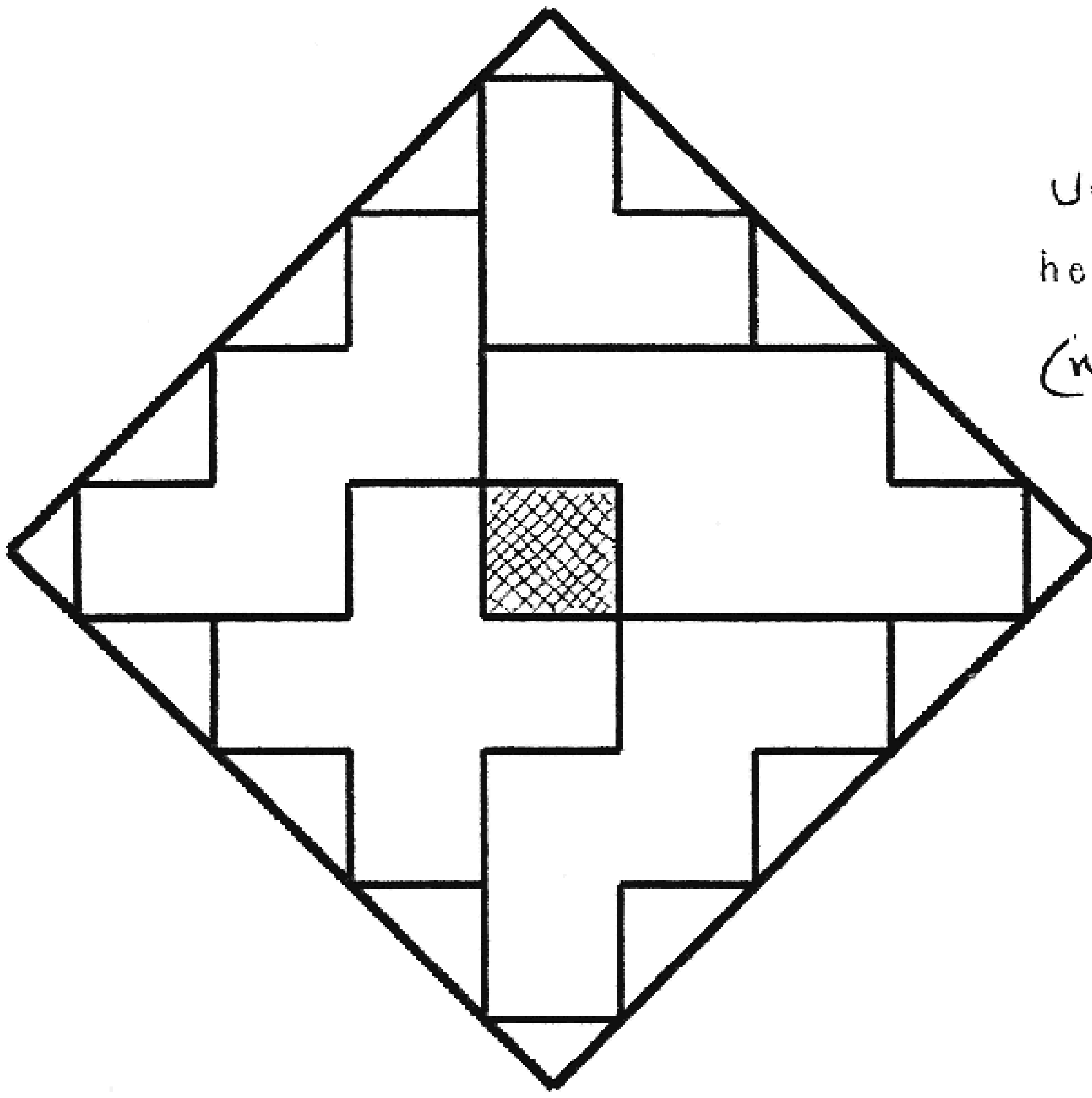
STC
Oct 2001

Design 175-A



In my "square root" system of nomenclature, tray is 13 x $15\frac{1}{2}$, or 5.814 x 6.933. I have standardized on 0.750-inch wooden blocks, so to convert the tray dimensions to inches, multiply by 0.750.

I call this type "offset grid."

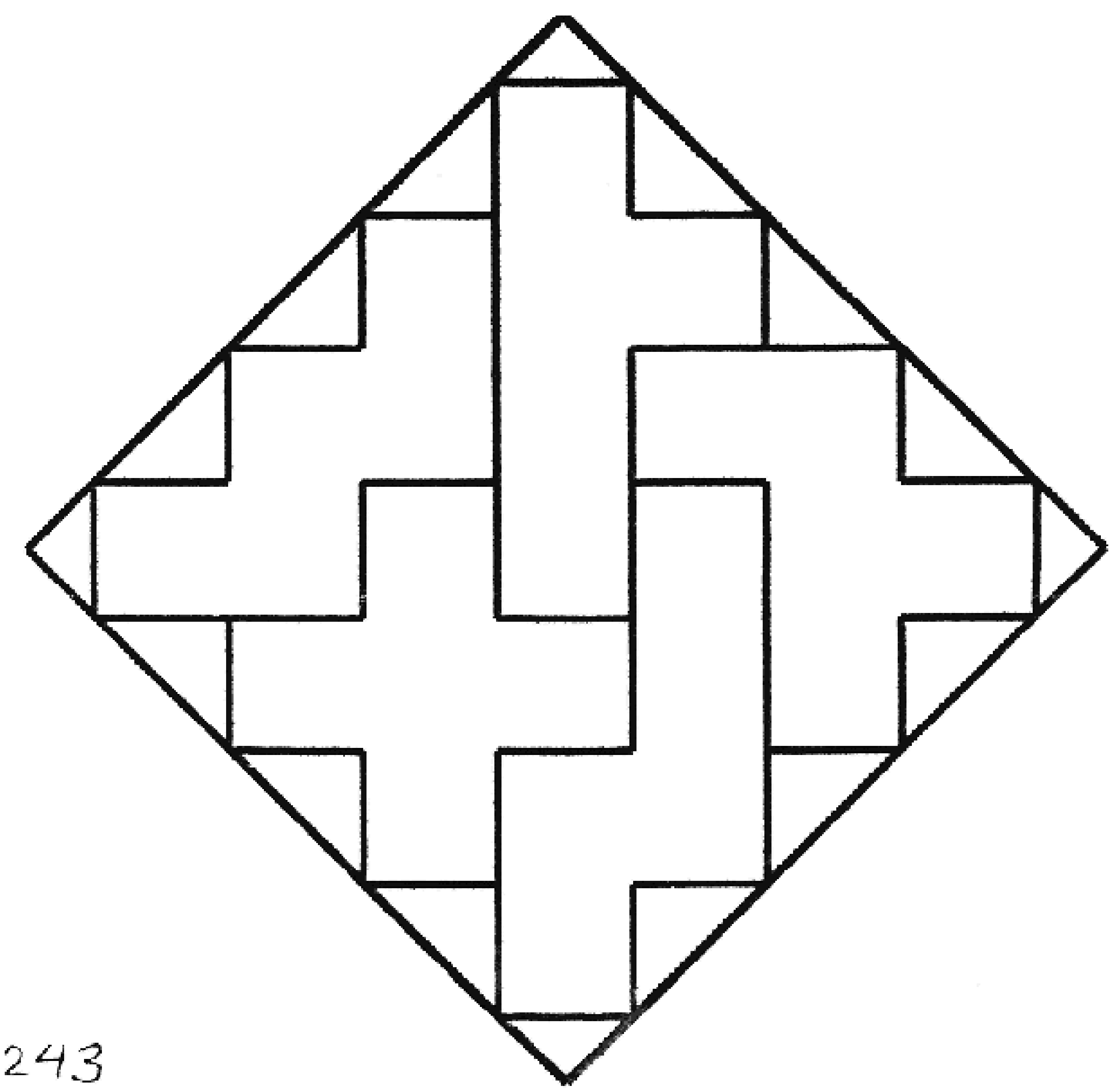


Design 176

Unique solution and hole appears in center (not very exciting)

Design 176-A

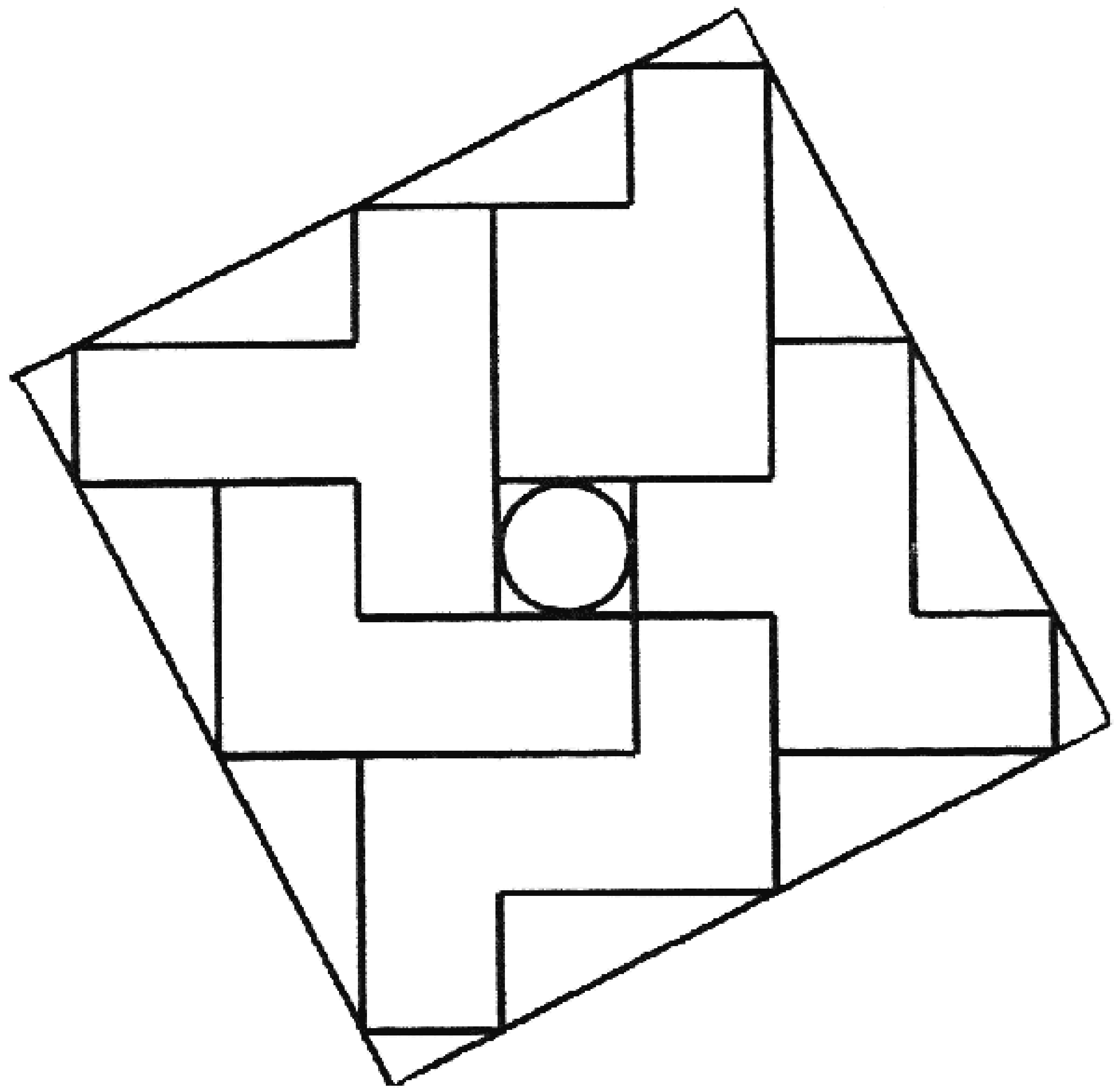
Unique solution (not great)



tray: $4\sqrt{2} = 4.243$

Design 176-B

has 3/4-inch round dowel fixed in center of tray

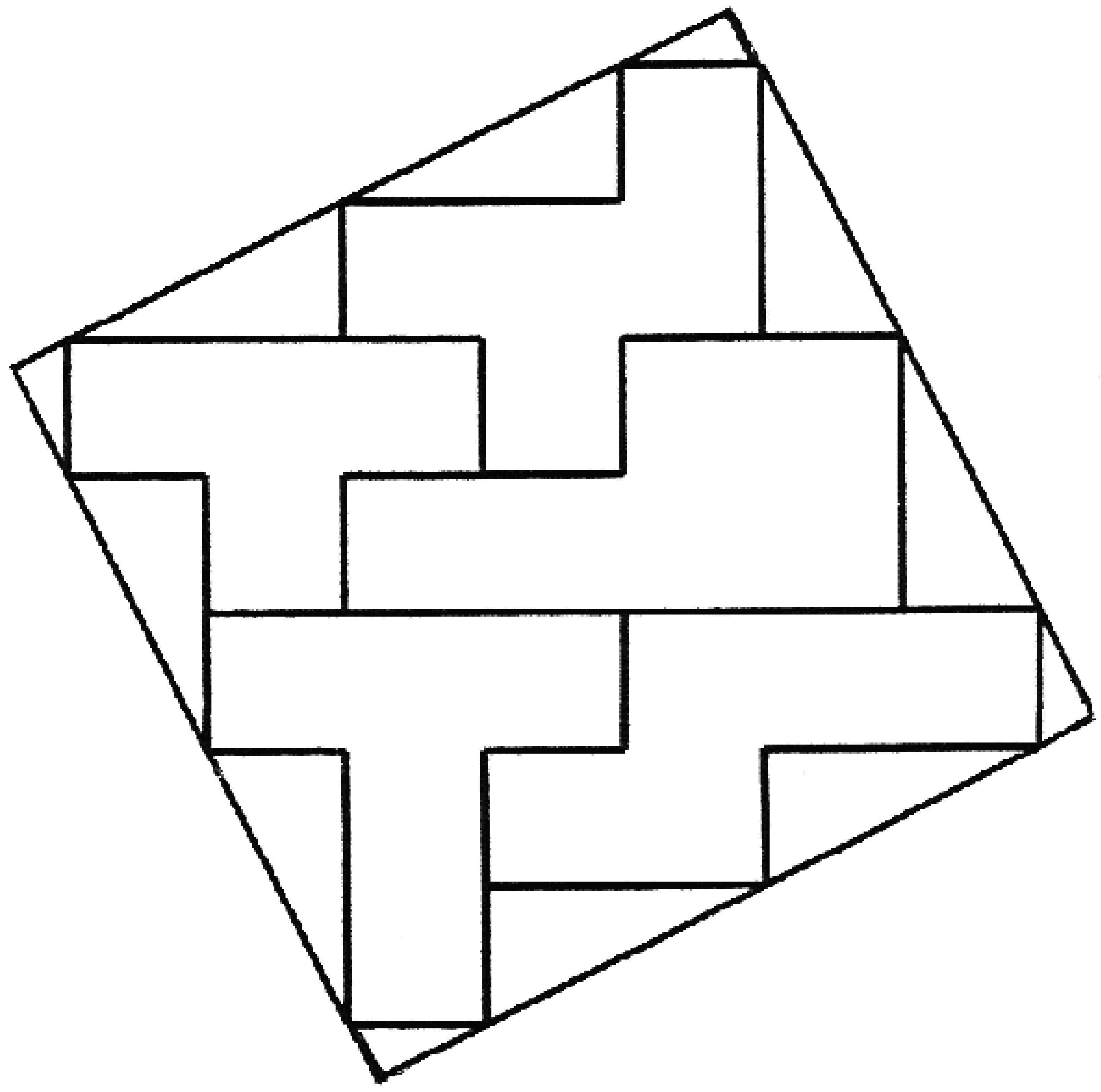


with the center occupied by the fixed round block, the solution is believed to be unique.

tray, same as 177

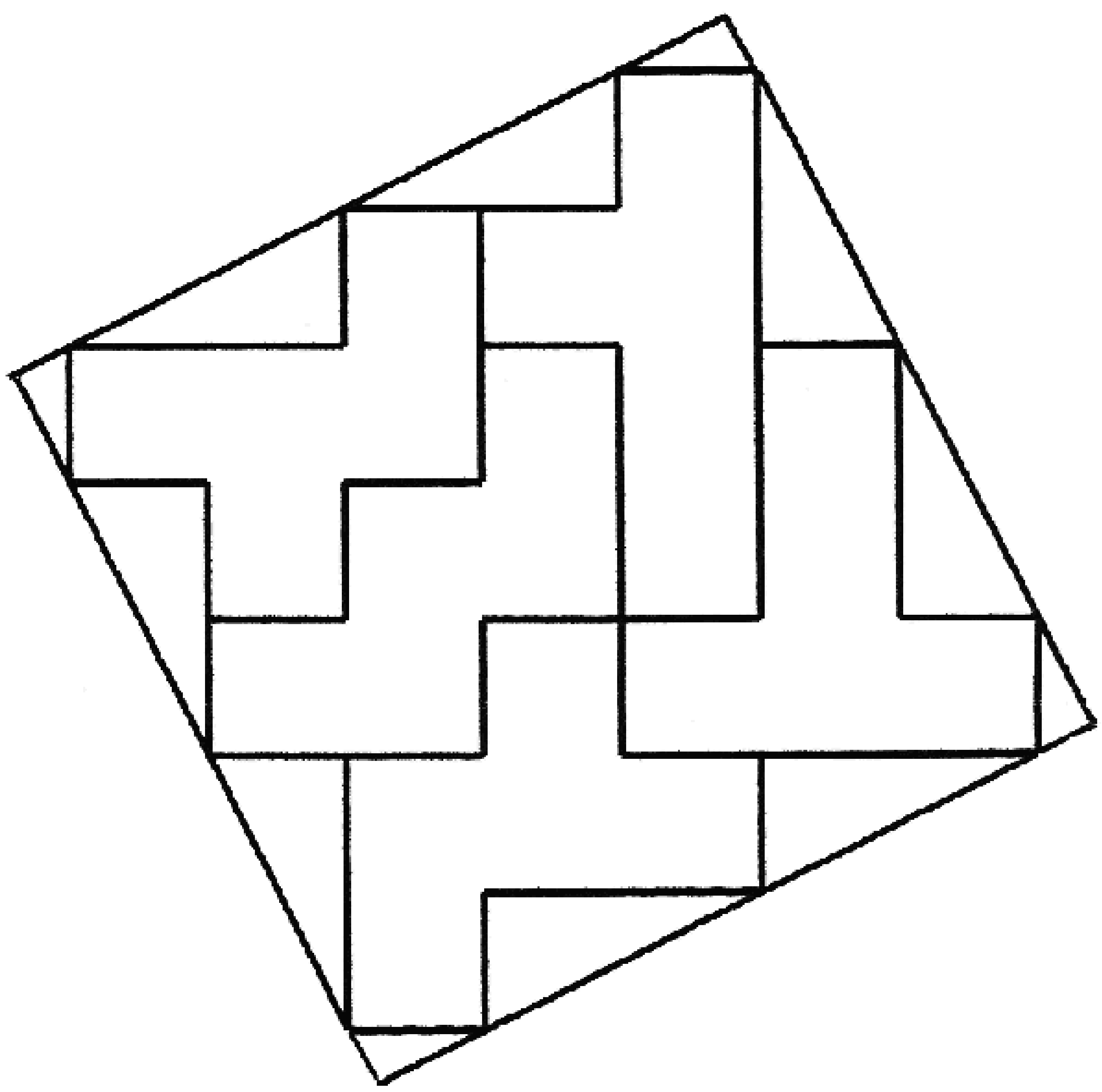
Design 177

Only two made before finding some almost false solutions. Replaced by design 177-A.



Design 177-A

Contains some minor faults, but hard to improve upon. Have tried a great many different combinations, trying to eliminate duplicate pair and symmetrical pieces.

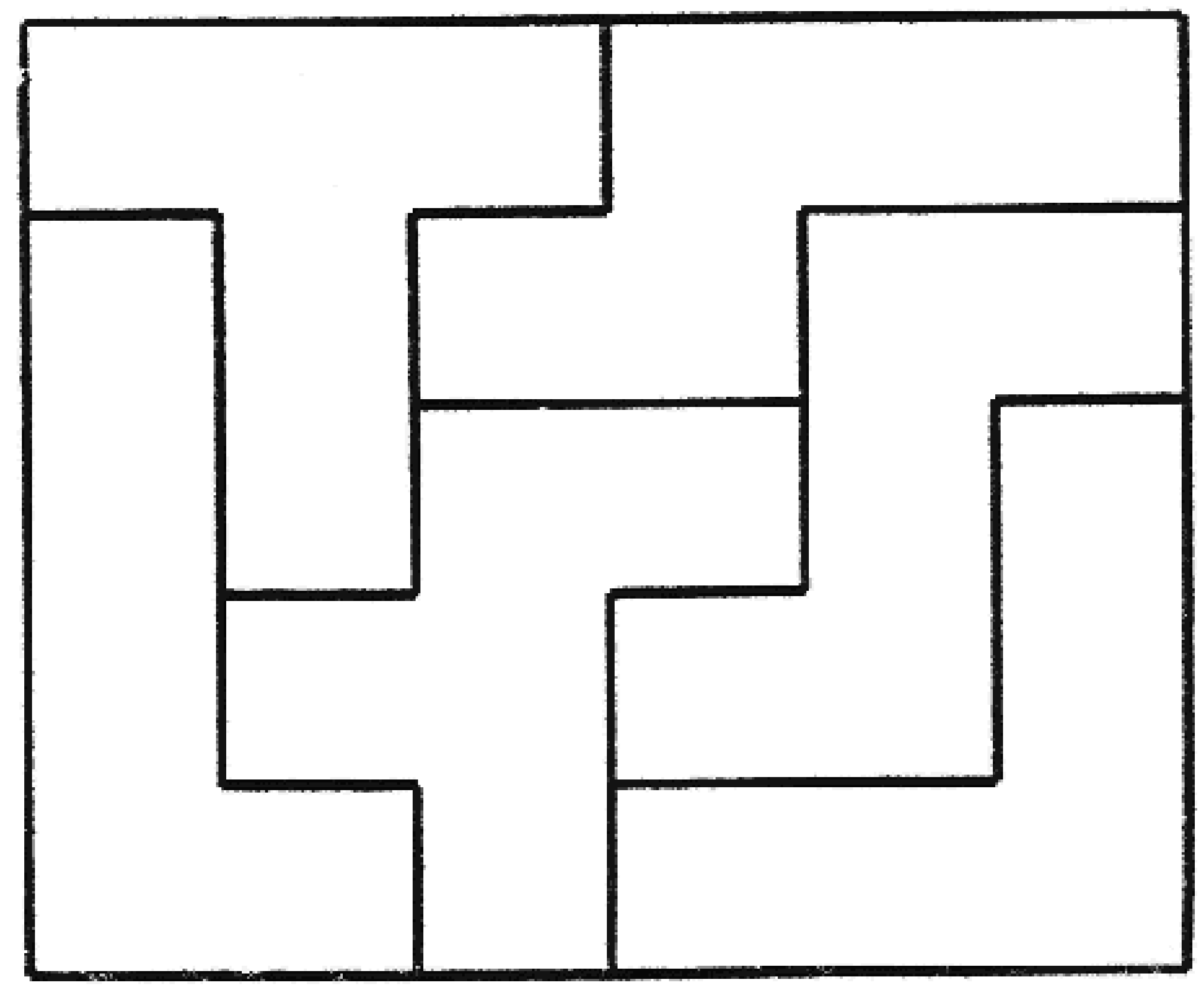


tray: 13 × 13, or

5.814 × .75 = 4.361 inches

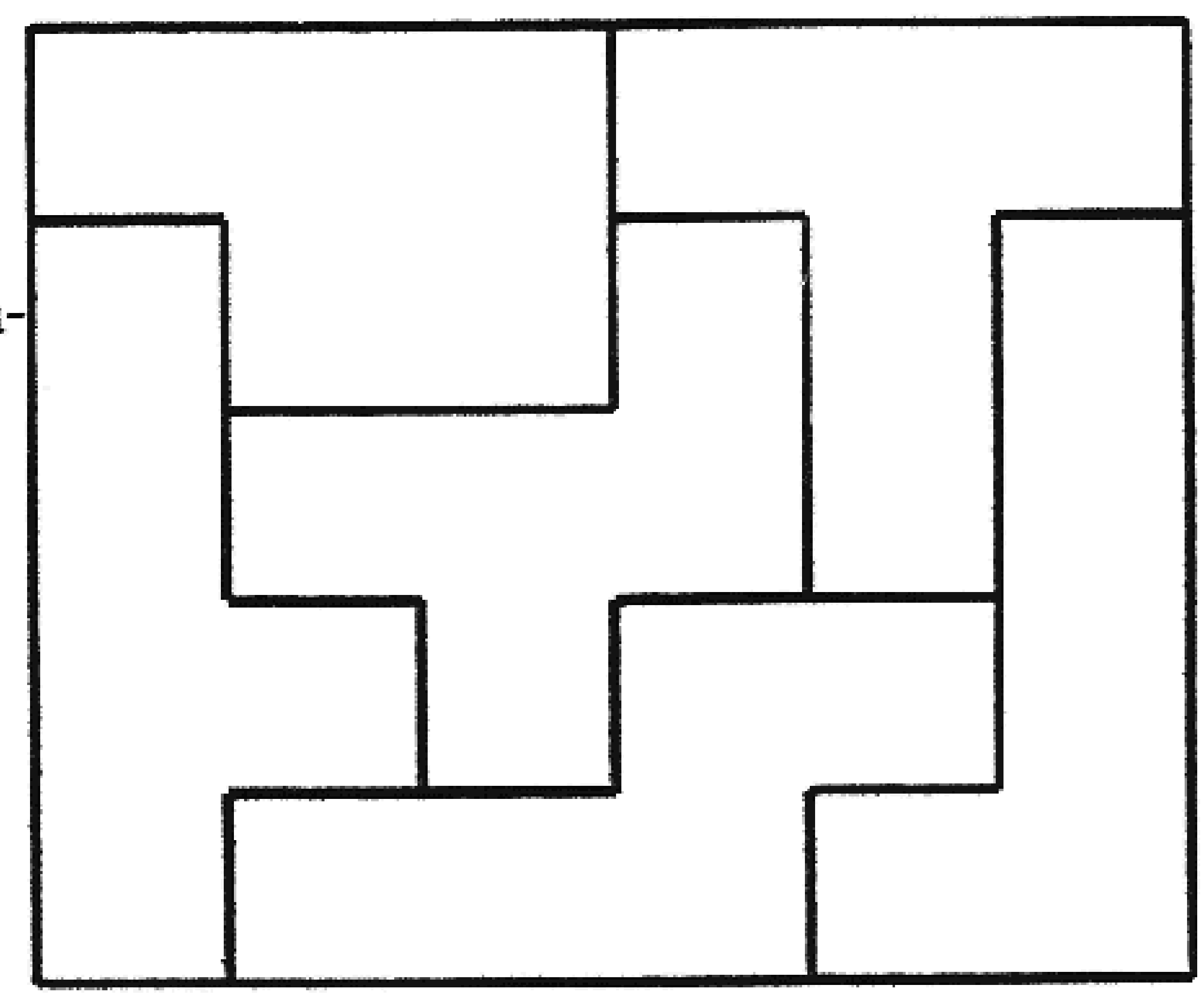
Design 178

Only two of these were made before being replaced by the improved version - 178-A.

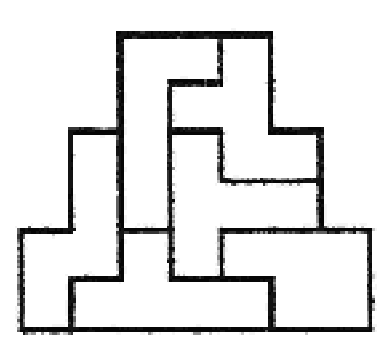


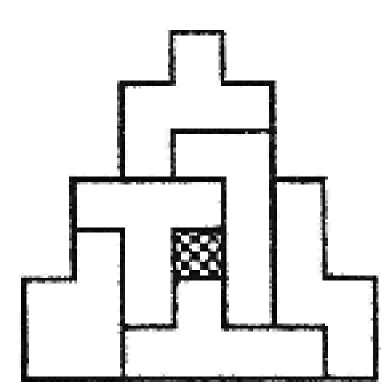
Design 178-A

Looks like just another pentomino puzzle, but consider this. It uses all five of the non-symmetrical pentominos, and an exhaustive computer search has revealed that it is the only such set of six that has a unique 5x6 solution, the other six possible sets having none or multiple.



Two other outlines with unique solutions are shown below. I also have catalogued numerous other problem shapes, most with multiple solutions.





sol.

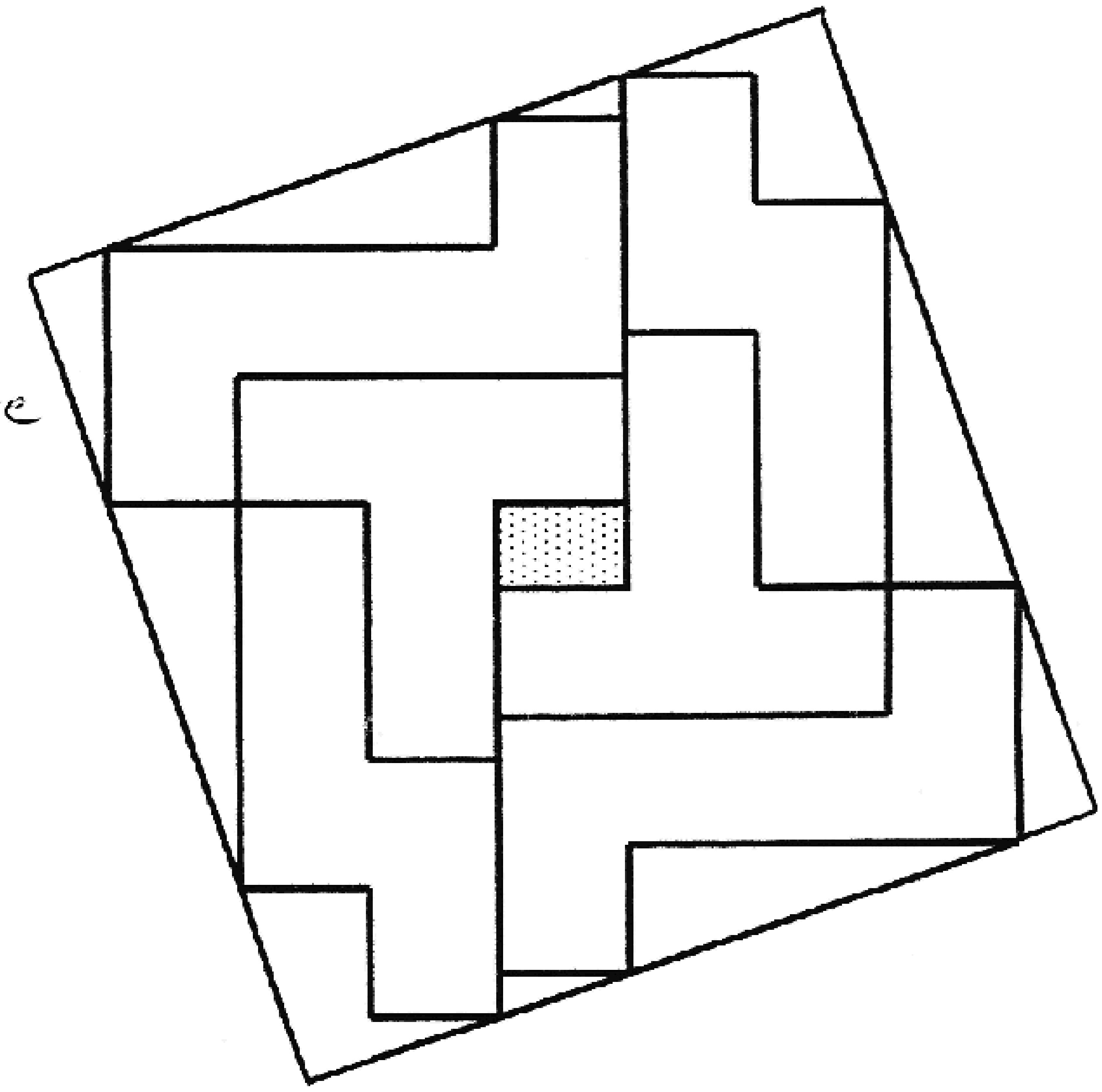
FLNPY + C - 10
" I - 0
" T - 1 ← ★
" V - 5
" W - 0
" X - 0
" Z - 0

Design 179

The symmetrical version

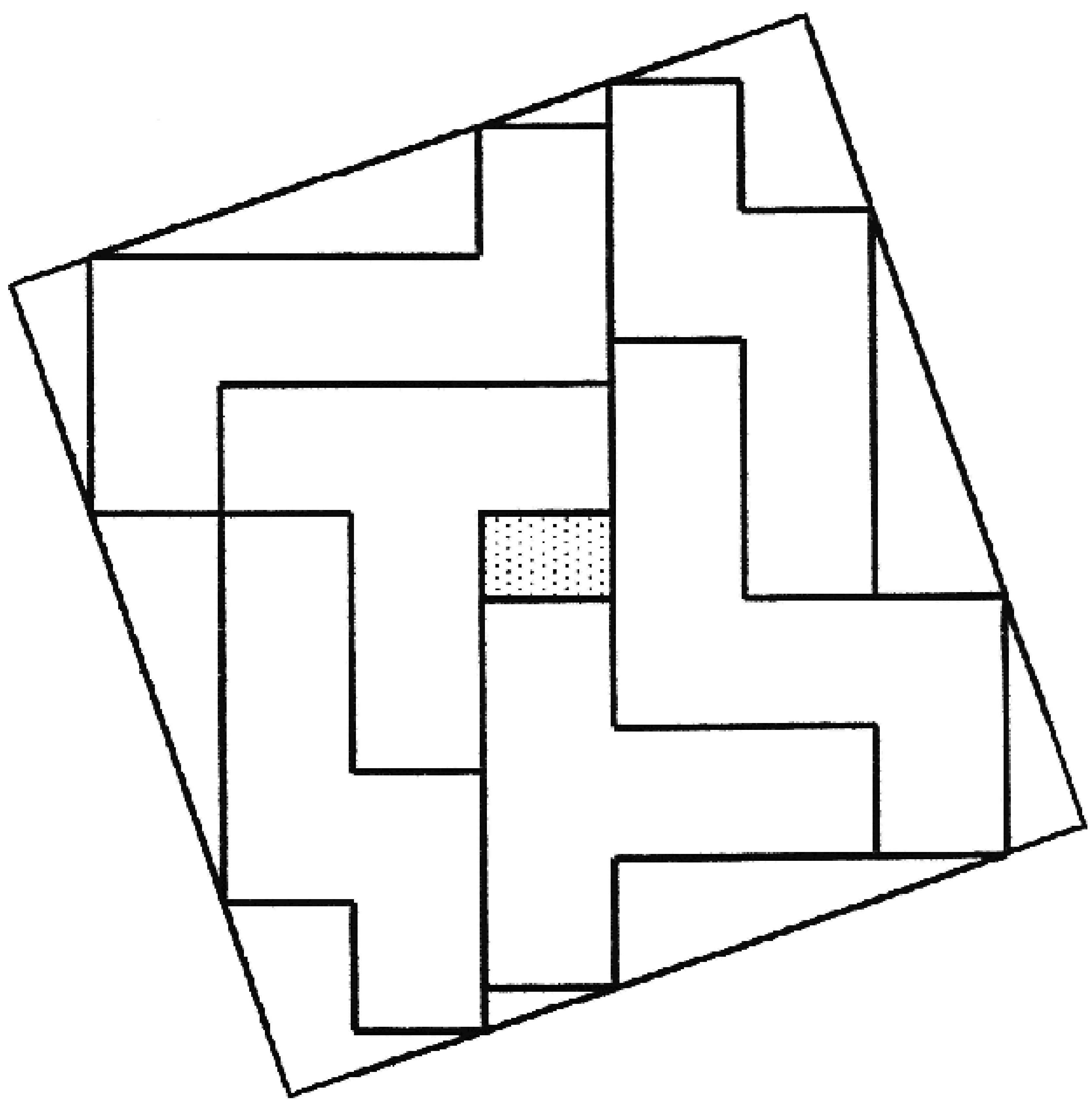
another offset grid type

I like 175-A better



Design 179-A

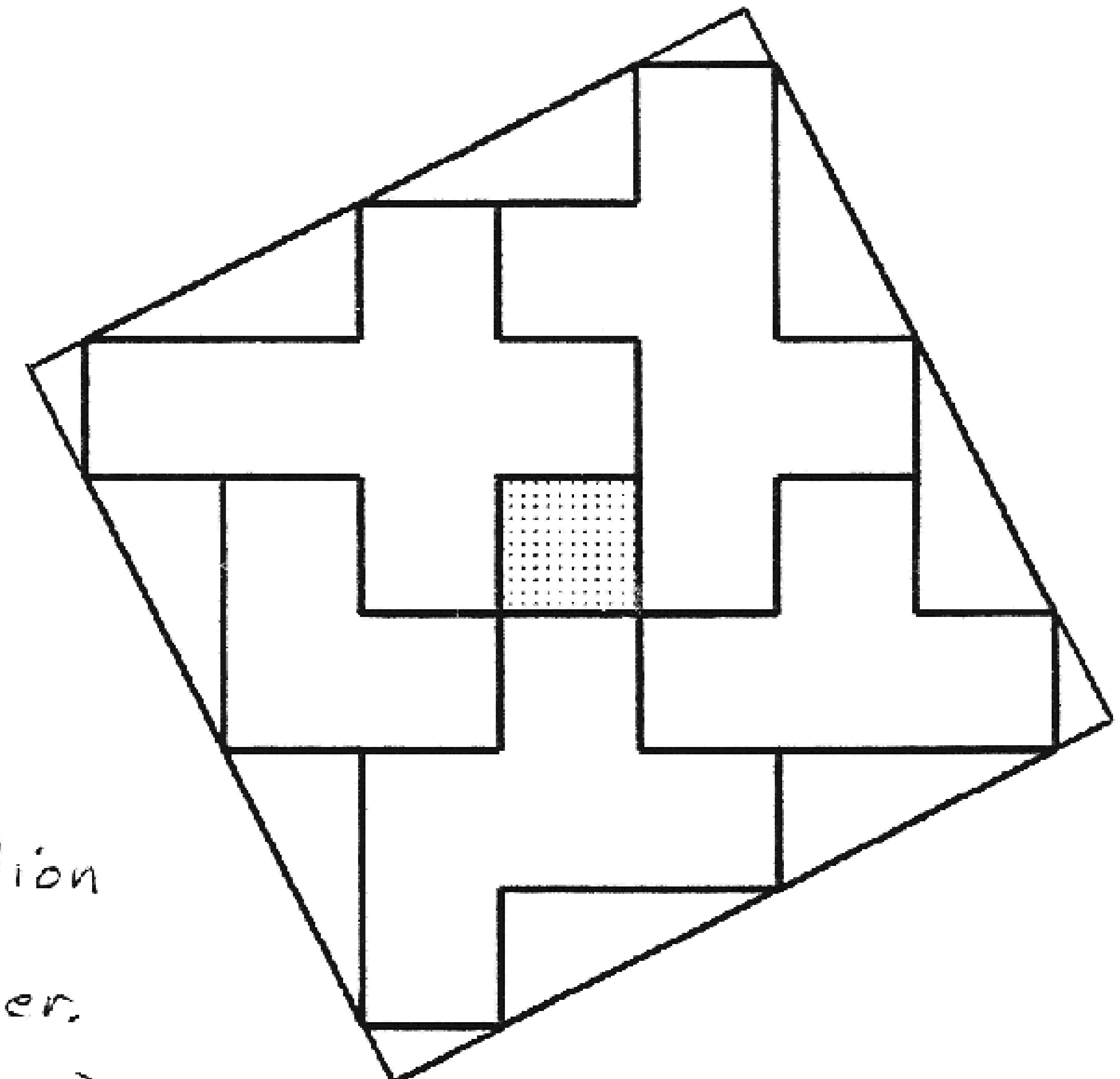
The non-symmetrical version



tray: $20\frac{1}{3}$ x 21 or

6.430 x 6.641

Design 180



Unique solution

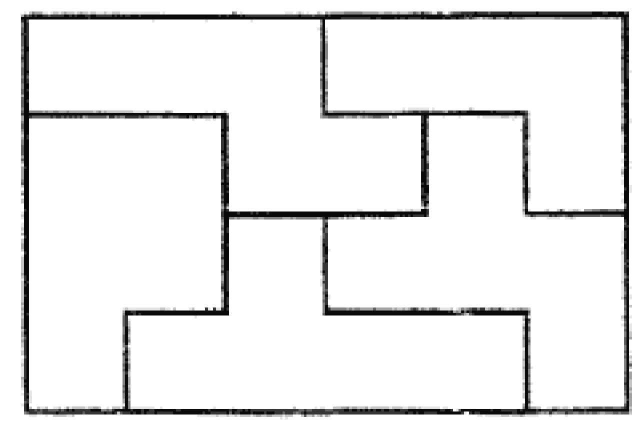
Hole in center

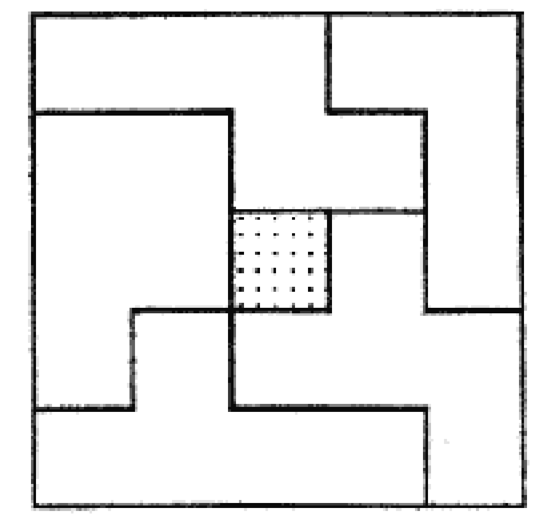
(just a curiosity)

tray: 13 x 13, or 5.814 x .75 = 4.361 inches

Design 181

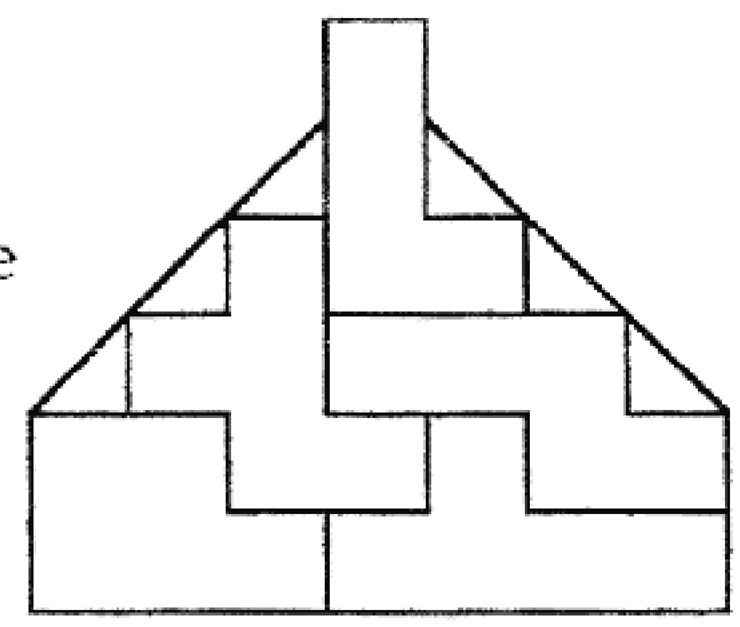
The original 181 consisted of these five pieces in the 4x6 tray, together with printed sheets showing a large number of puzzle problems. The improved version has a two-sided tray with the 5x5 and fixed center block on the other side. Both solutions are unique.

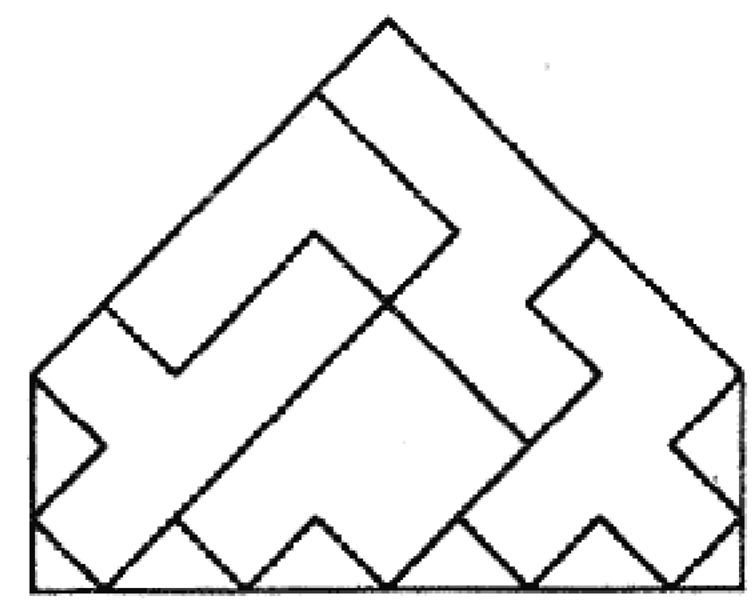




Design 181-A (The Castle Puzzle)

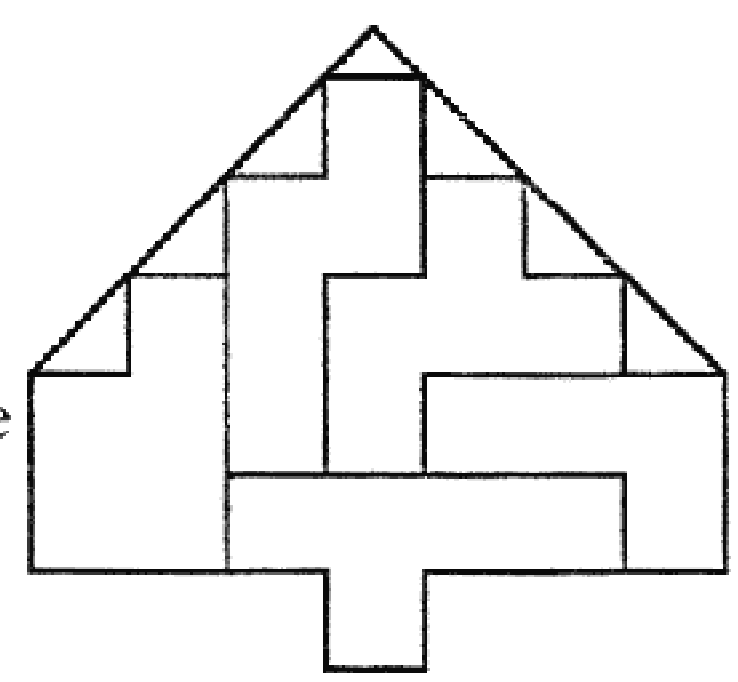
This version also comes with a two-sided tray. One side is the castle with chimney, which has 3 solutions. On the other side the chimney has disappeared, and that solution is unique. All of this would have been impossible without the amazing <u>Puzzlesolver3D</u> computer program.

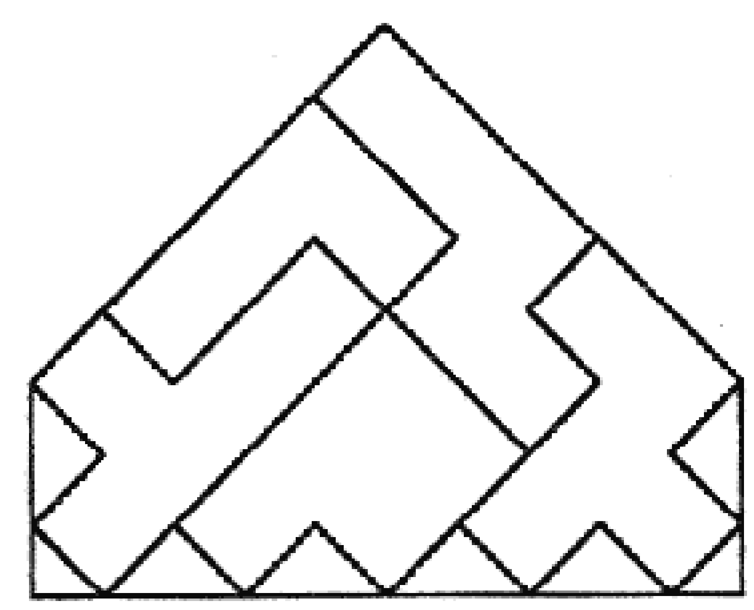




Design 181-B (The Vanishing Trunk)

In this slight variation of the above, the first side of the tray has been changed from "Castle" to "Tree" (2 solutions), the object now being to make the tree trunk disappear.

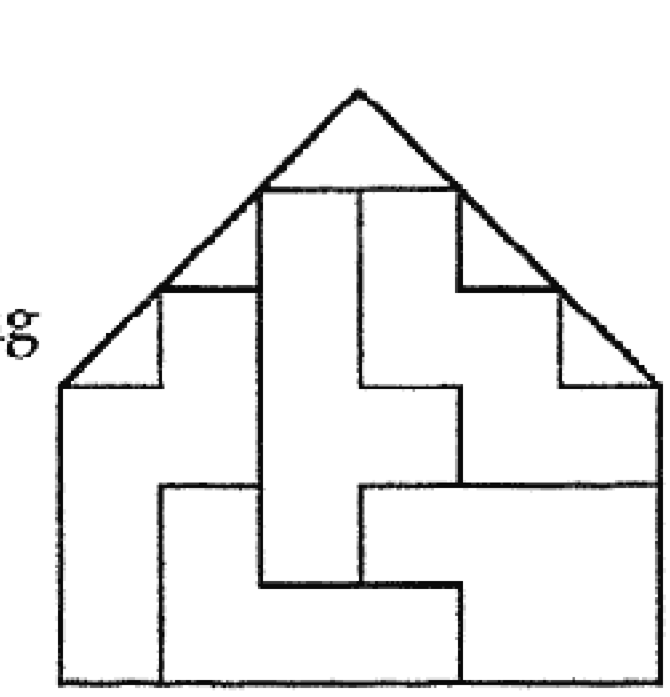


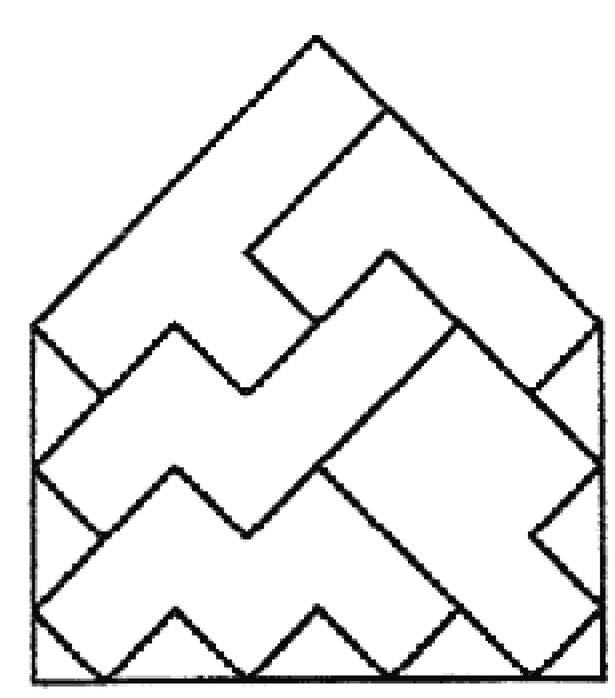


I have compiled a large assortment of puzzle problem outlines for this amazingly versatile set of puzzle pieces. Note that it uses four of the five non-symmetrical pentominoes and the only non-symmetrical tetromino.

Design 181-C

This one uses a slightly different set of pieces, again with two-sided tray, with the two sides being nearly identical house outlines. Both solutions are unique. I have also compiled a large assortment of other problem shapes for this set.

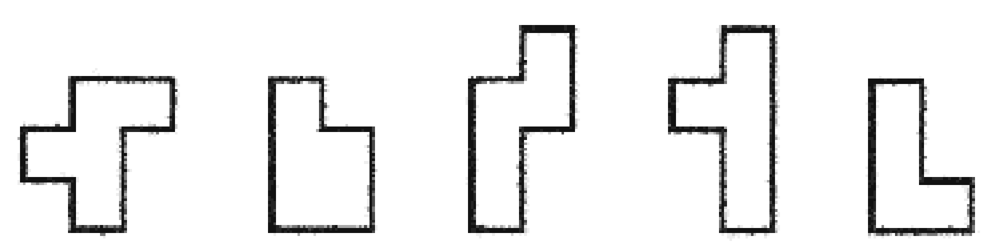




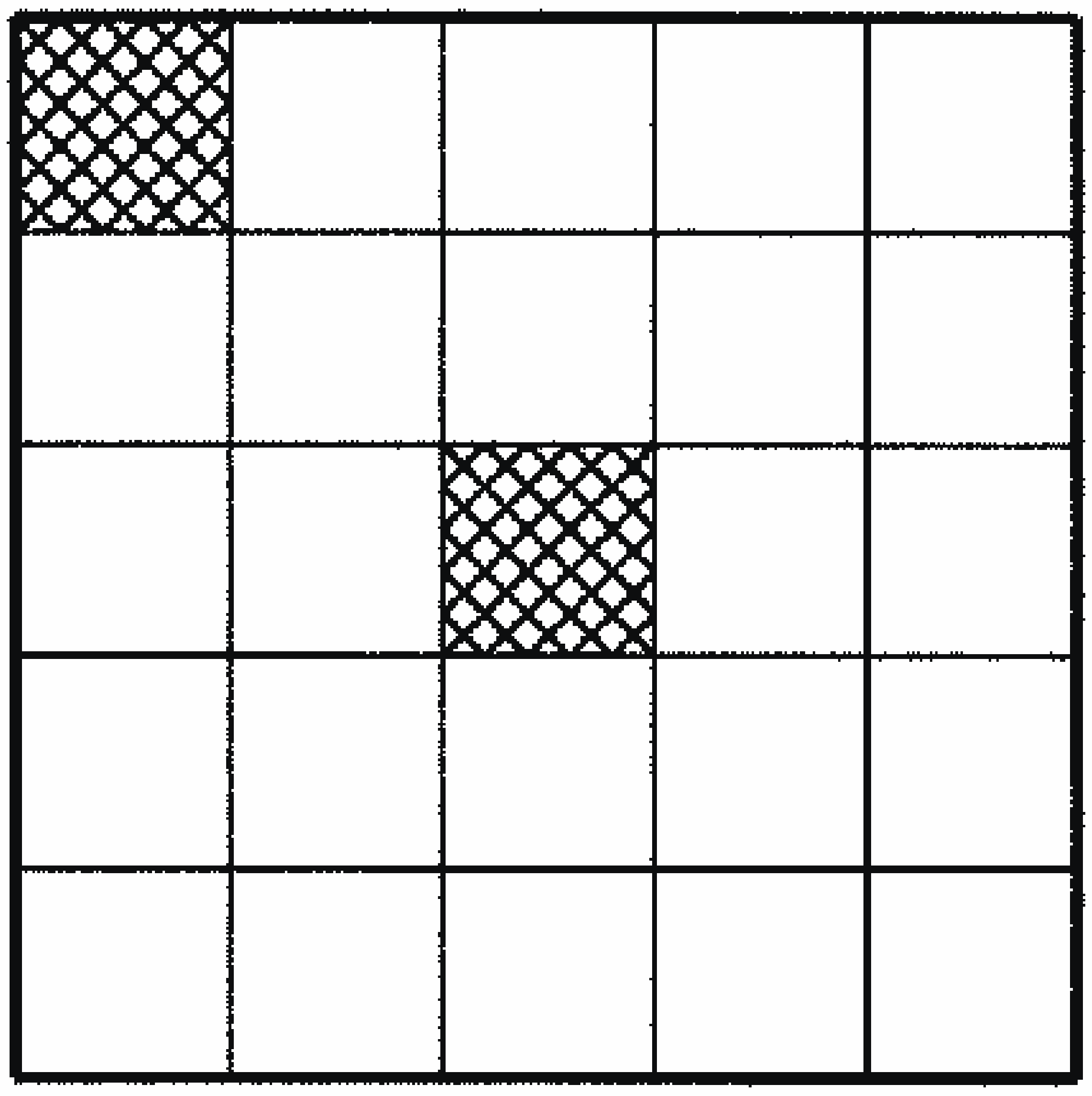
Castle Creations design no. 181

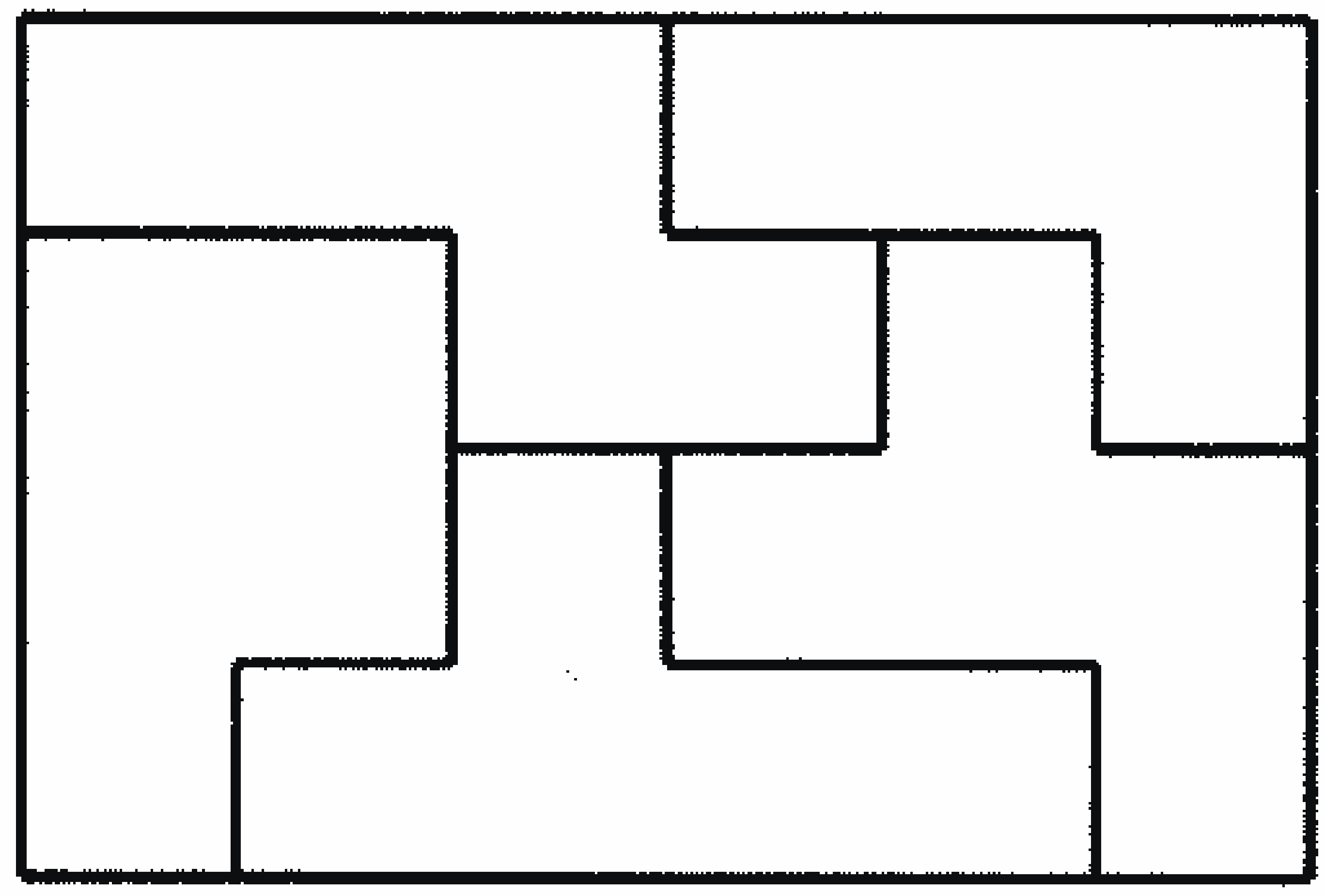
The Bull's Eye Puzzle

This puzzle consists of five puzzle pieces and a two sided tray. One side is a 4x6 rectangle and the other side is a 5x5 square with a center block fixed. The object is to dump the five puzzle pieces out of the tray, whichever side they happen to be in, turn the tray over, and assemble them on the other side. Then repeat the process back on first side. Both sides have only one solution. After you have mastered that, you can try other challenging puzzle patterns shown on the supplementary sheets.

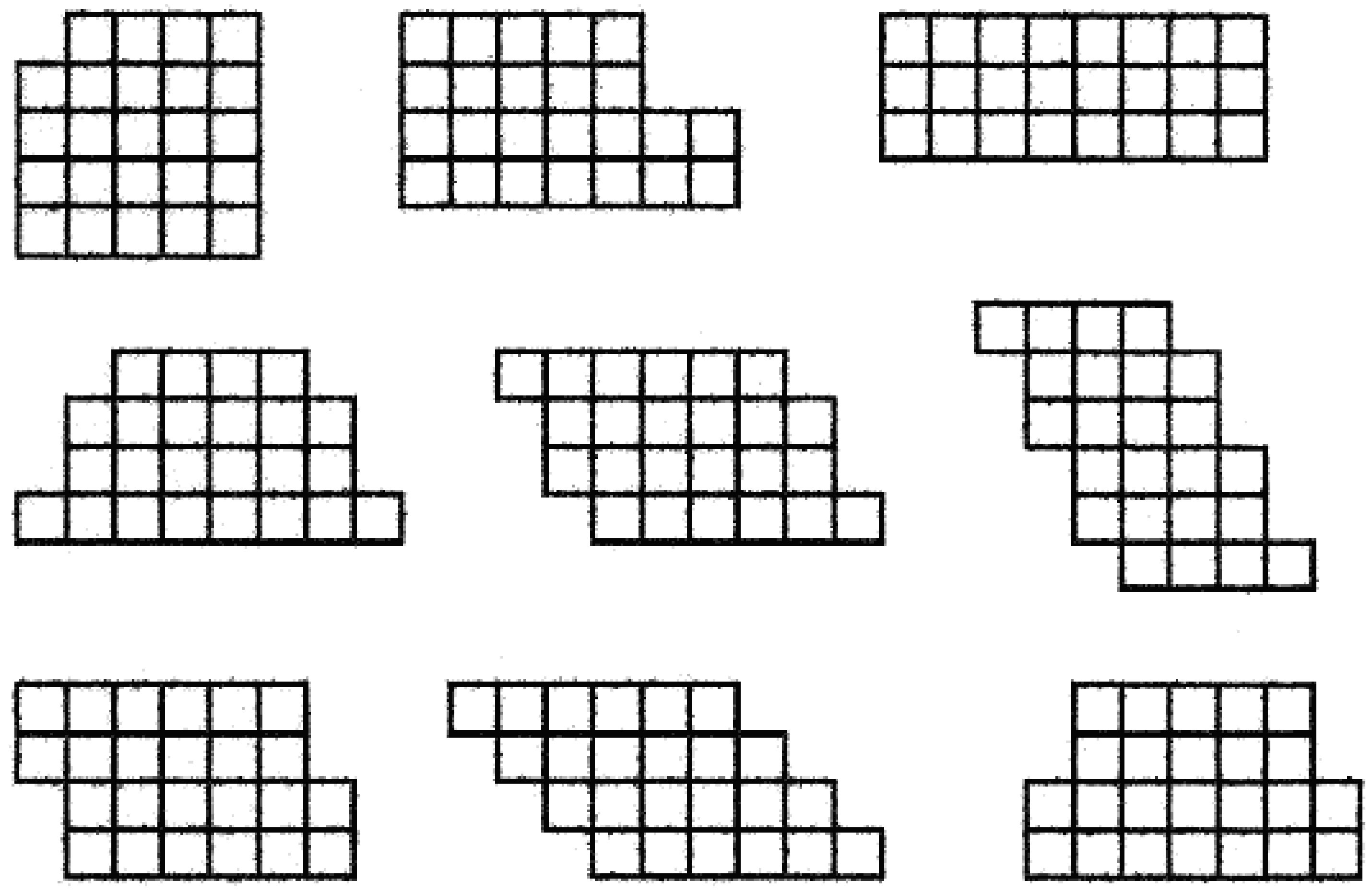


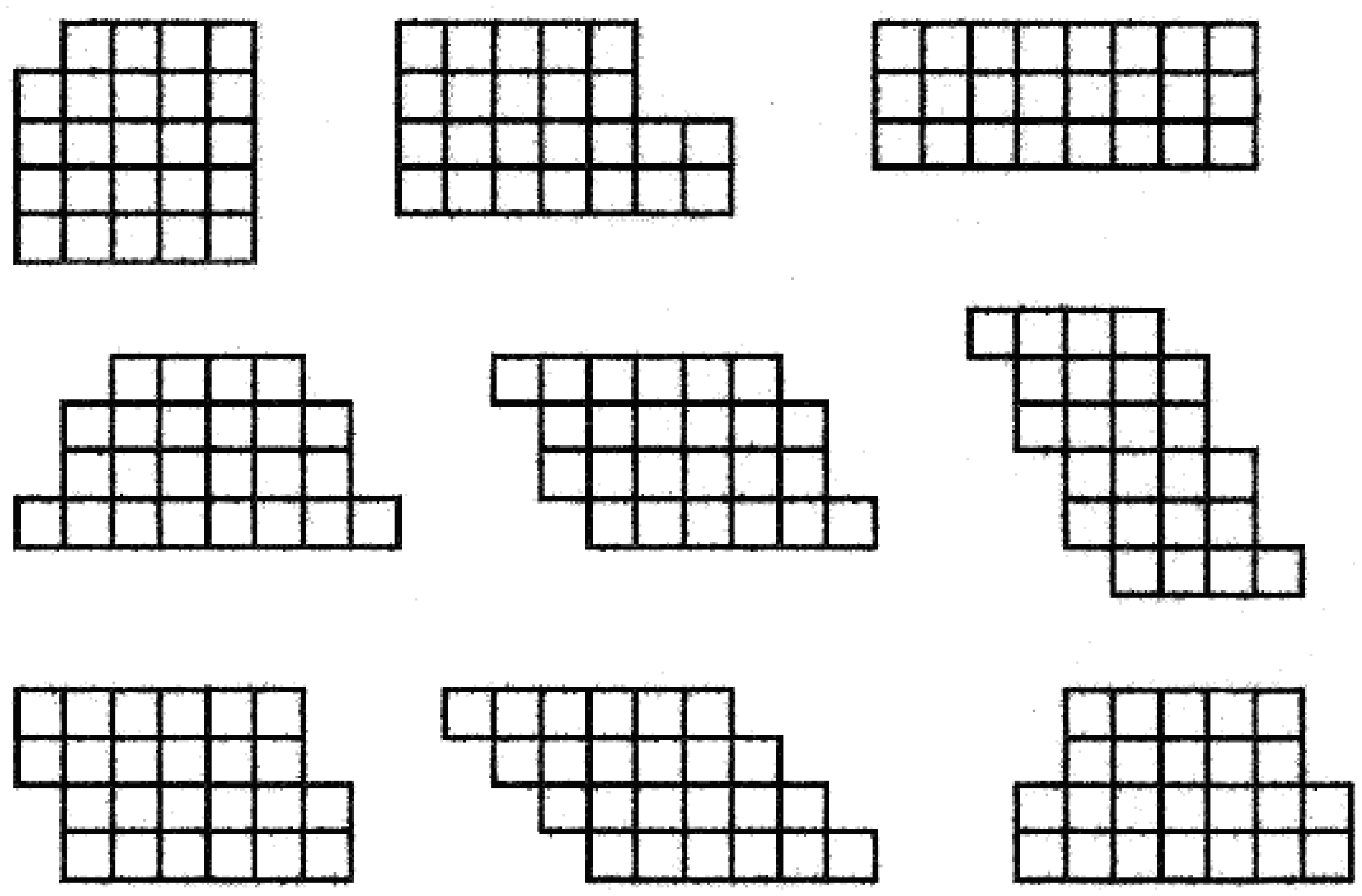
For your information, this is by no means just another set of puzzle pieces chosen at random. A great many different combinations were analysed by computer before finally discovering this one uniquely entertaining set. It uses four of the five non-symmetrical pentominoes and the only non-symmetrical tetromino.





For your entertainment, here is another amazing puzzle from Castle Creations.
Directions Cut out the five puzzle pieces, as outlined above, being careful to cut exactly along the lines. First problem: Assemble the five pieces inside the 5 x 5 square. This is easy. There are eleven ways (not counting rotations or reflections), and there will always be one empty square. Second problem: Have the empty square be in the corner (shown shaded). This is somewhat harder - there are three ways. Third problem: Have the empty square be in the center. This is still harder, as there is only one way. Fourth problem: Assemble them back into the 4 x 6 rectangle, likewise one way only.





The Castle Puzzle

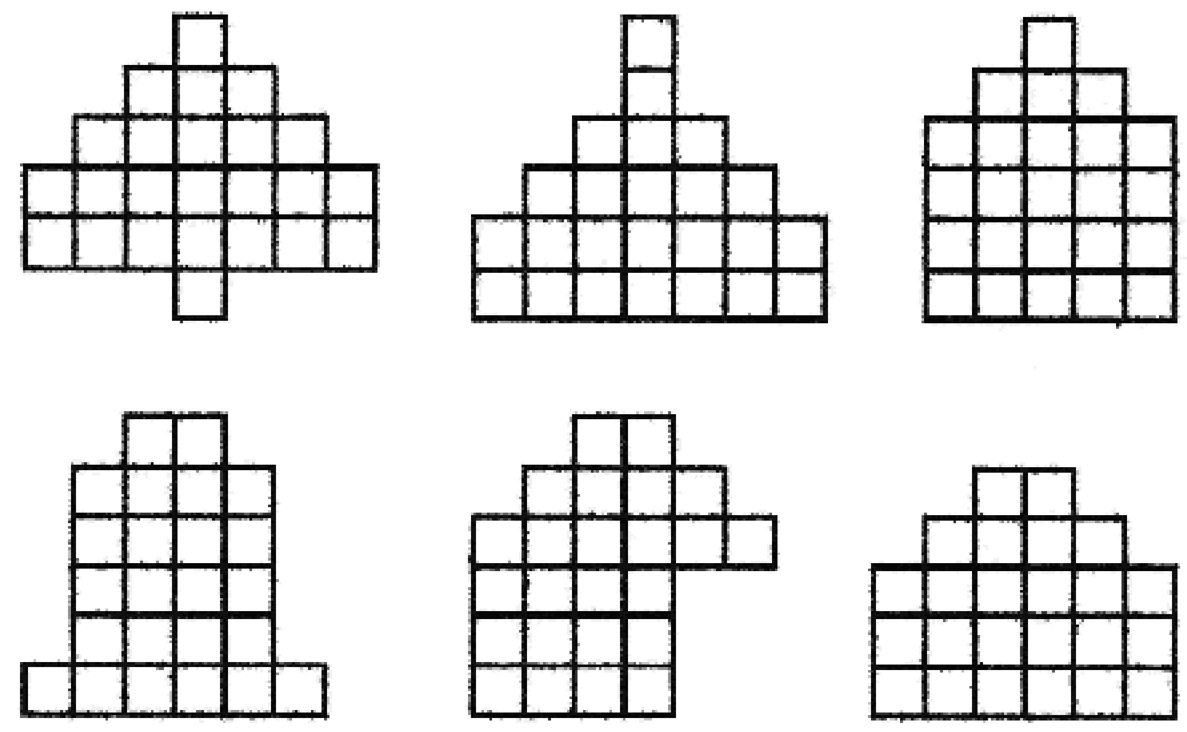
No. 181-A

The first problem is to fit the five puzzle pieces into the tray on this side to make the Castle with chimney, as indicated by the diagram. There are three solutions.

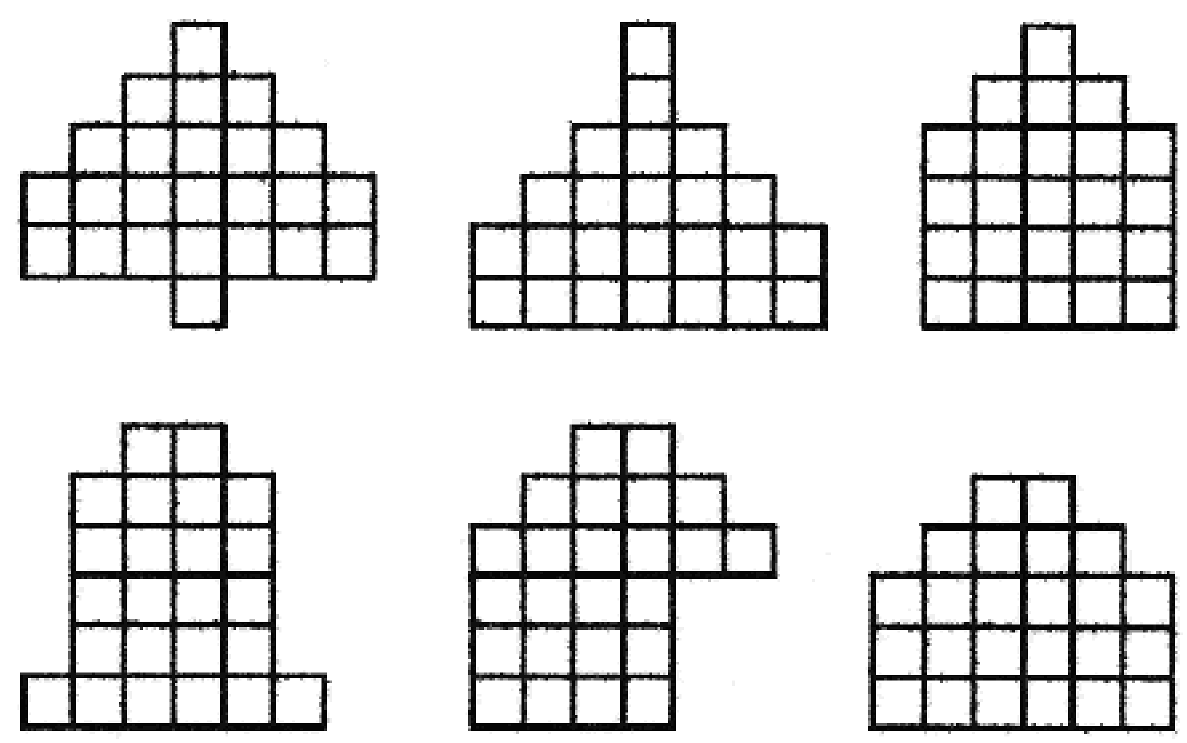
The second problem is to fit the five pieces into the tray on the other side, i.e. without the chimney. This is harder. There is only one way.

After you have mastered these, see numerous entertaining problems diagramed on the supplementary sheets.

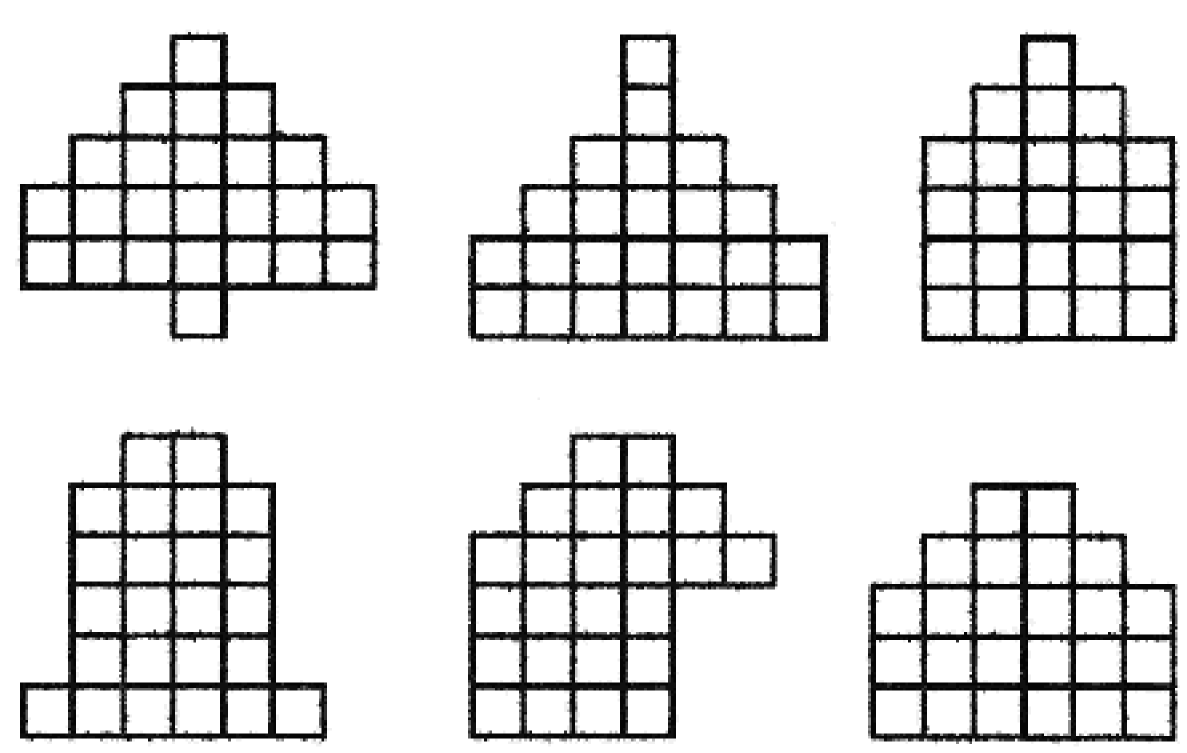
another Castle Creation by Stewart Coffin, December 2001



The number of solutions for each is indicated

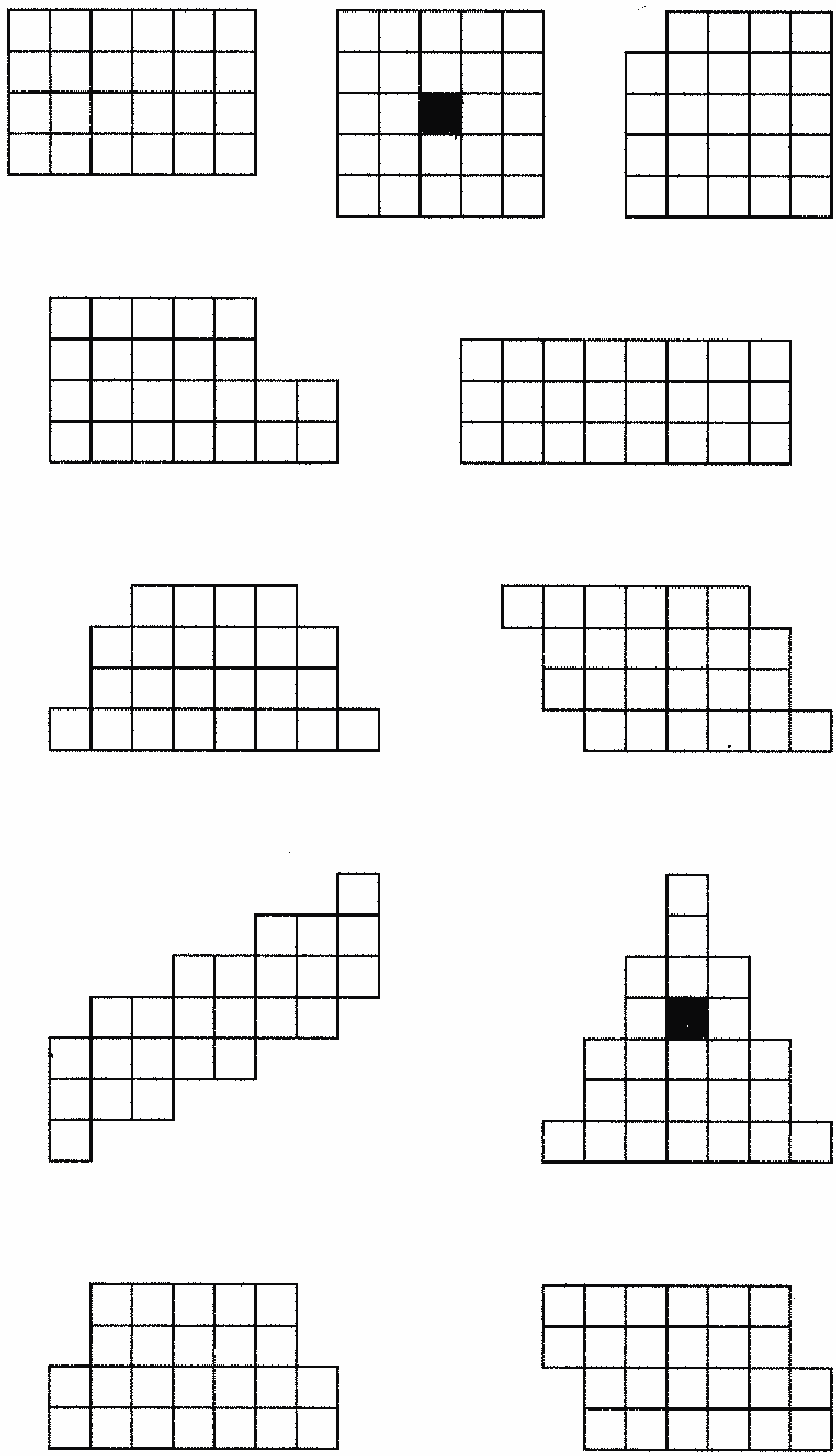


The number of solutions for each is indicated

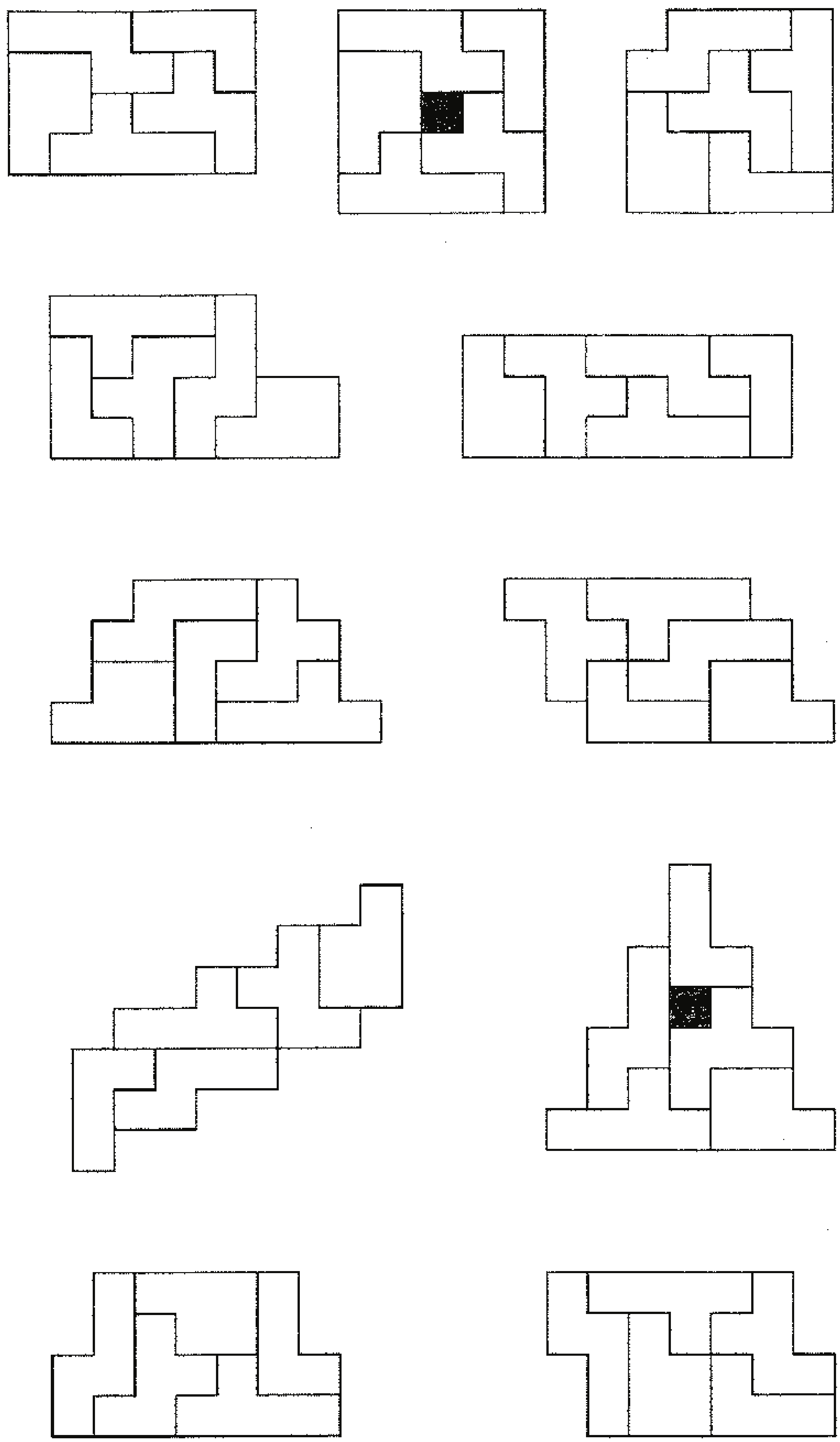


The number of solutions for each is indicated

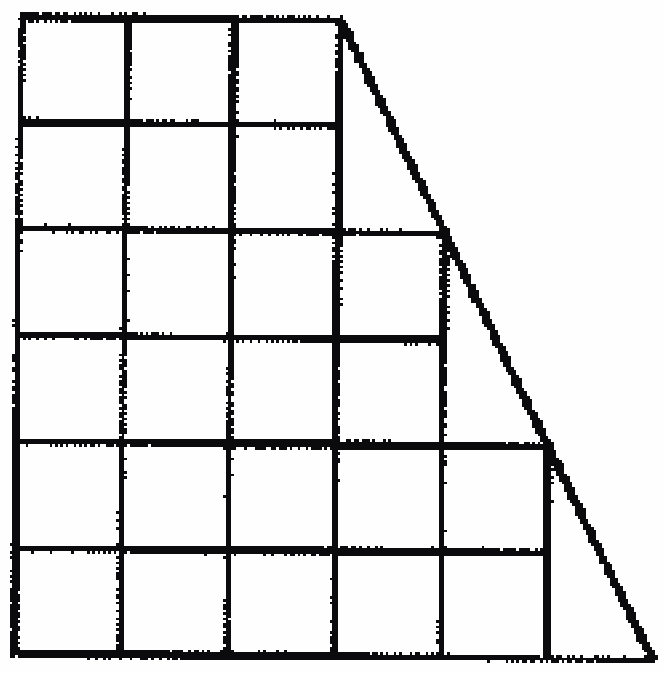
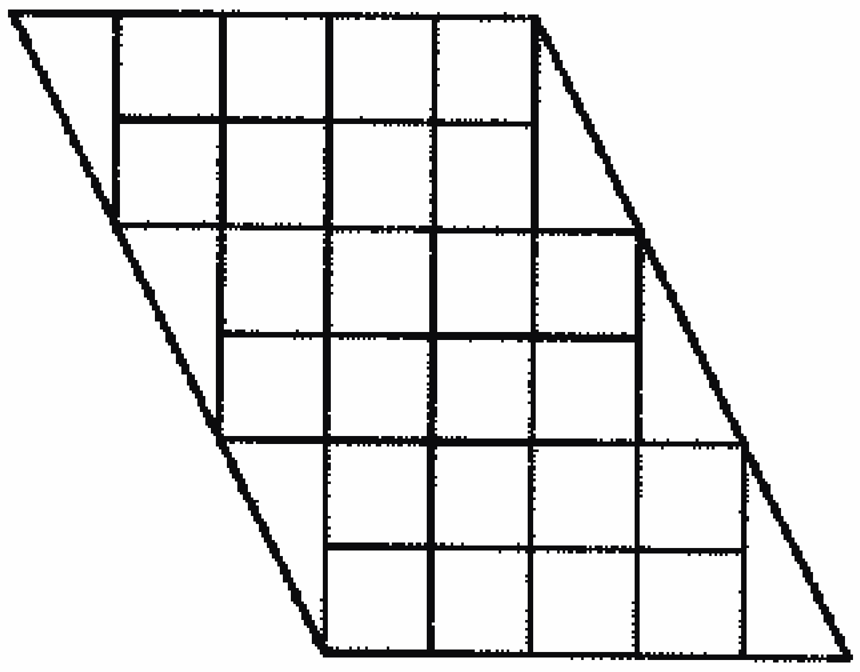
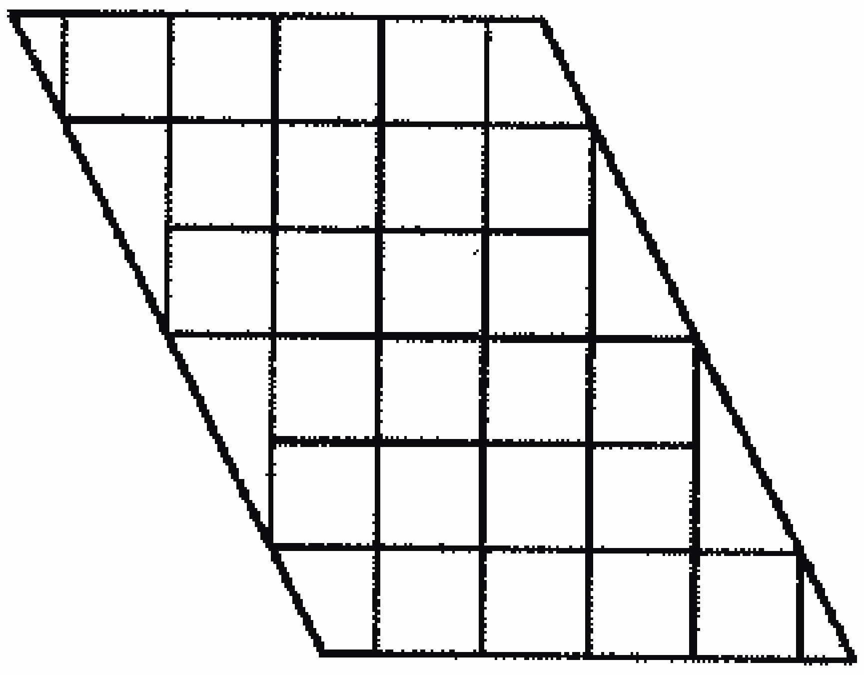
181-A

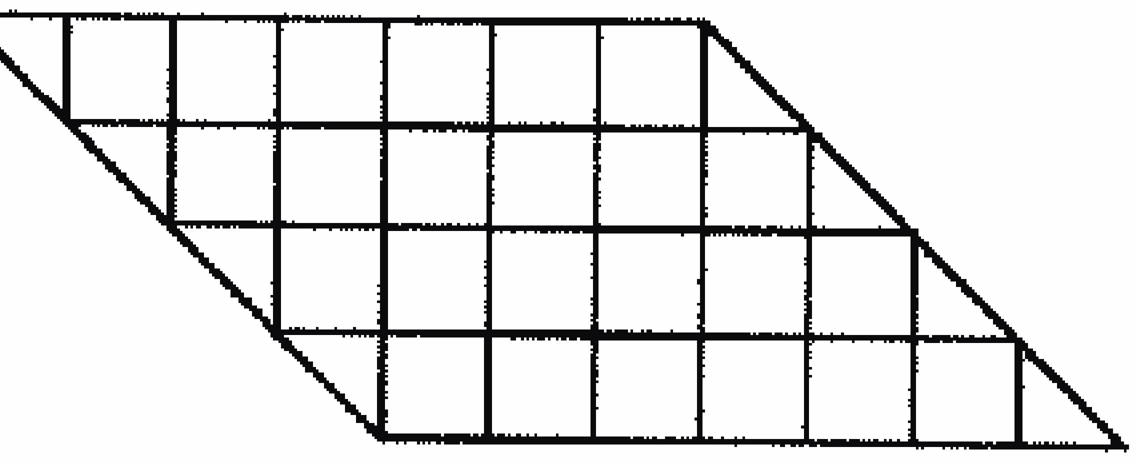
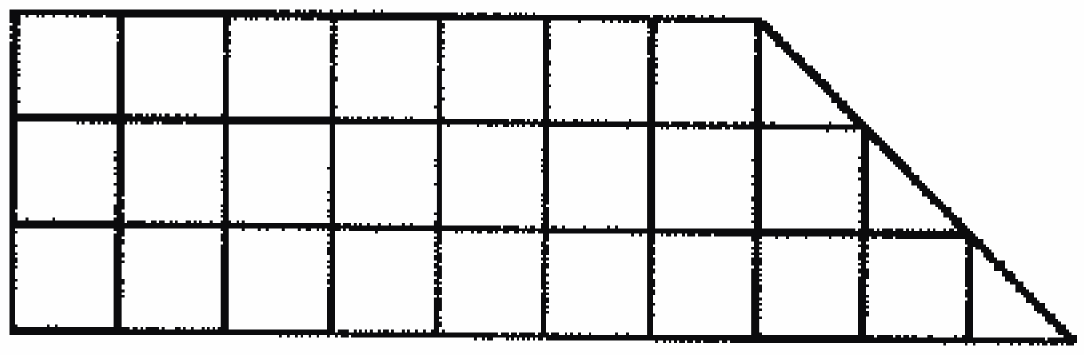
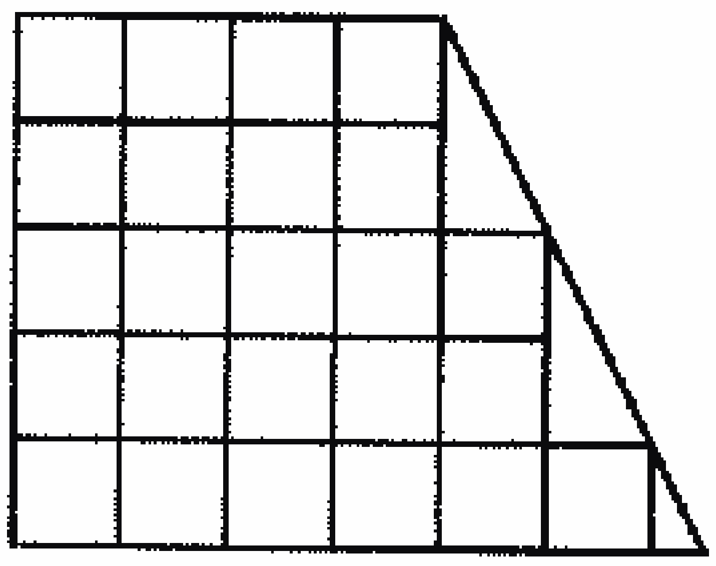
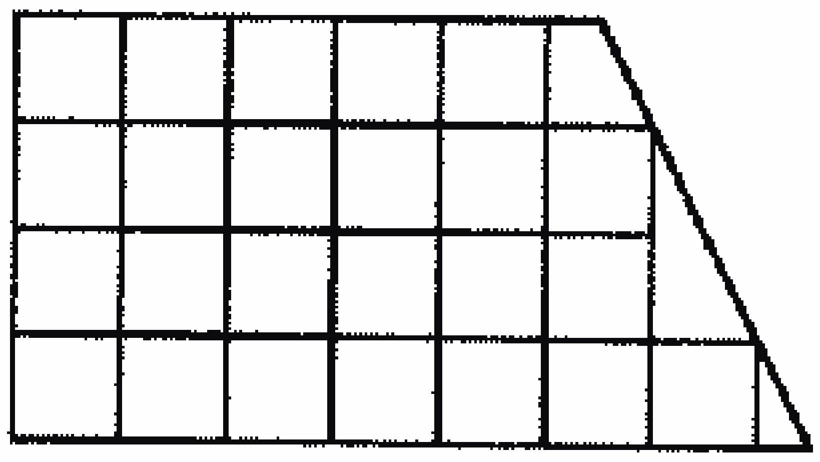


Castle Puzzle solutions

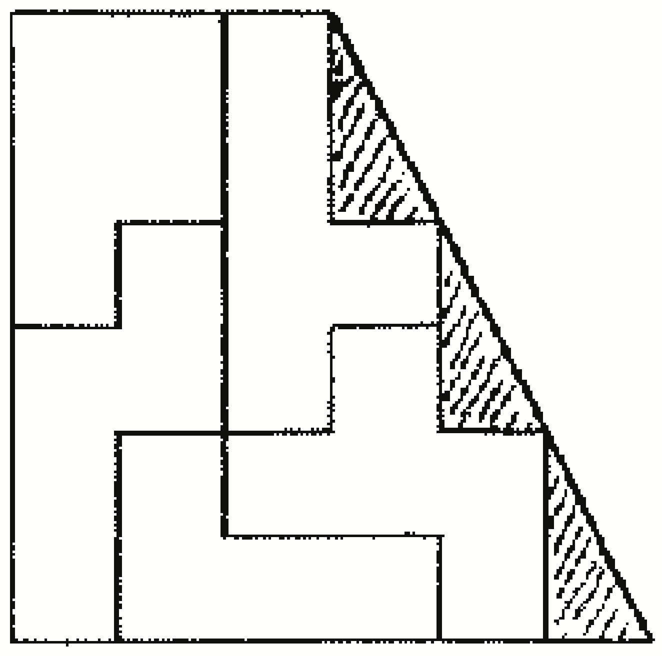


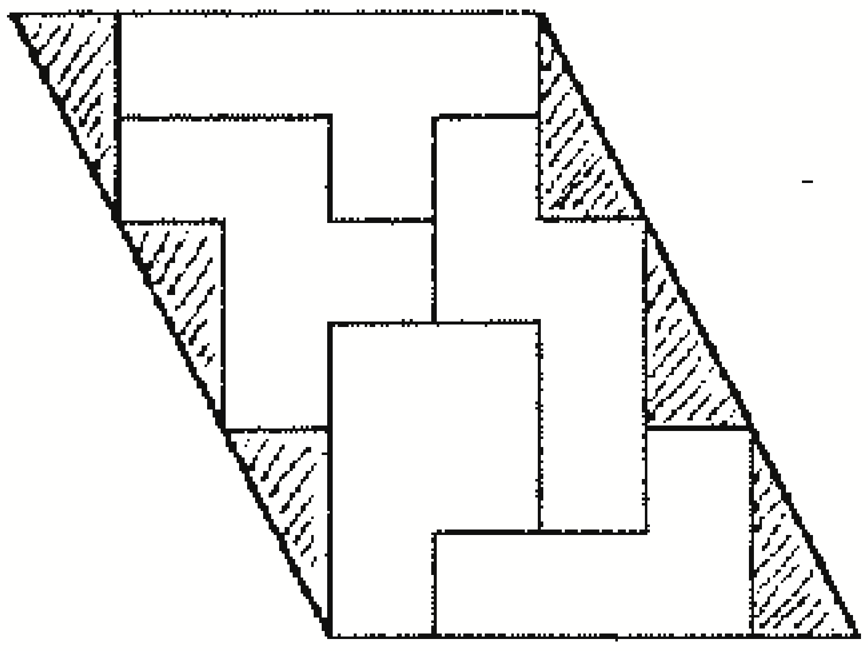
181-A

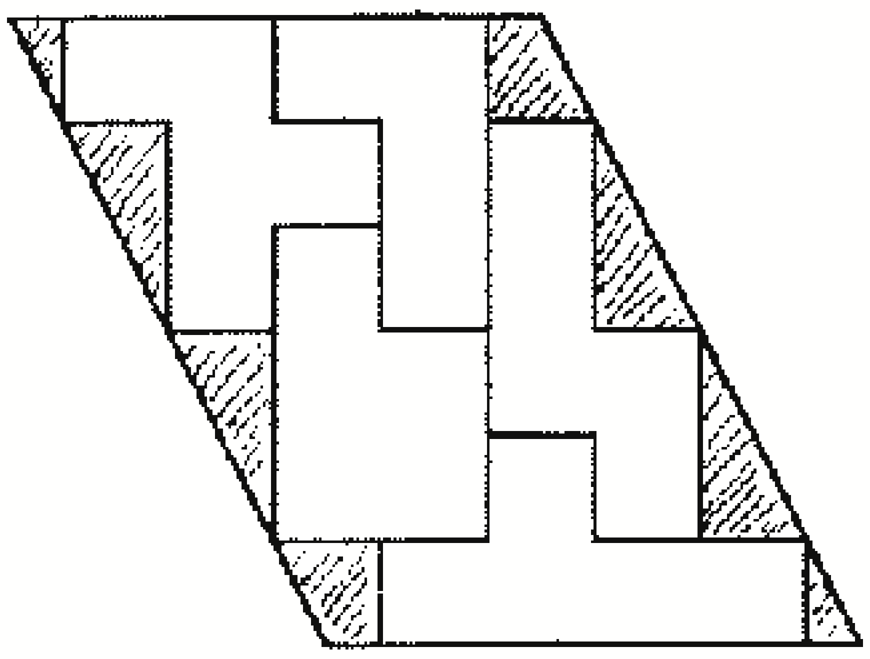




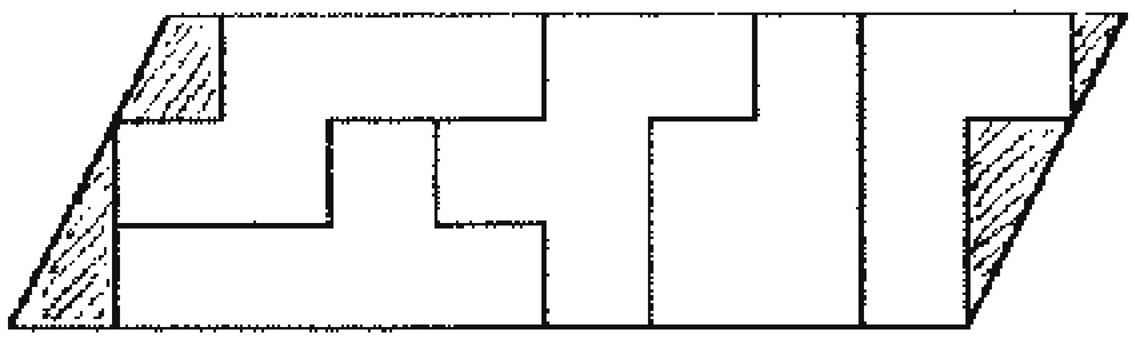





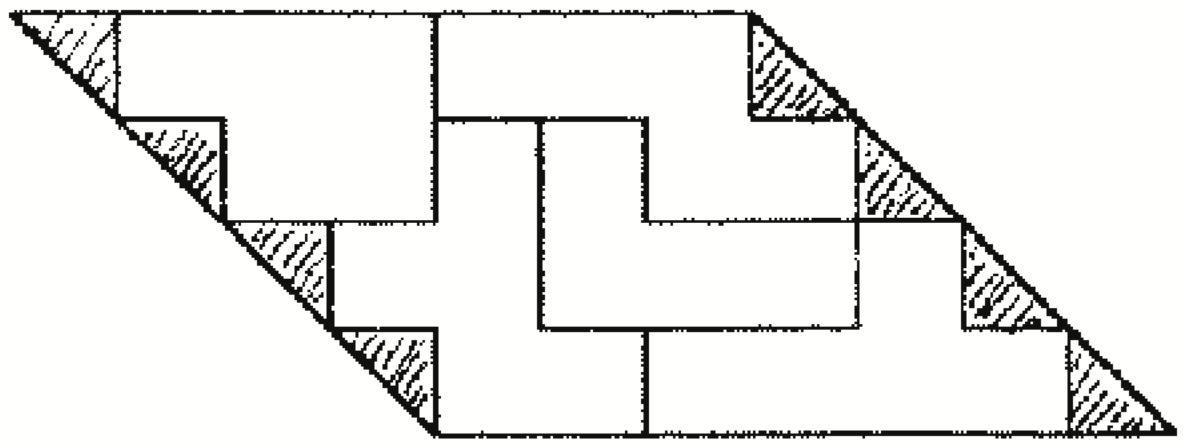
Castle Puzzle solutions

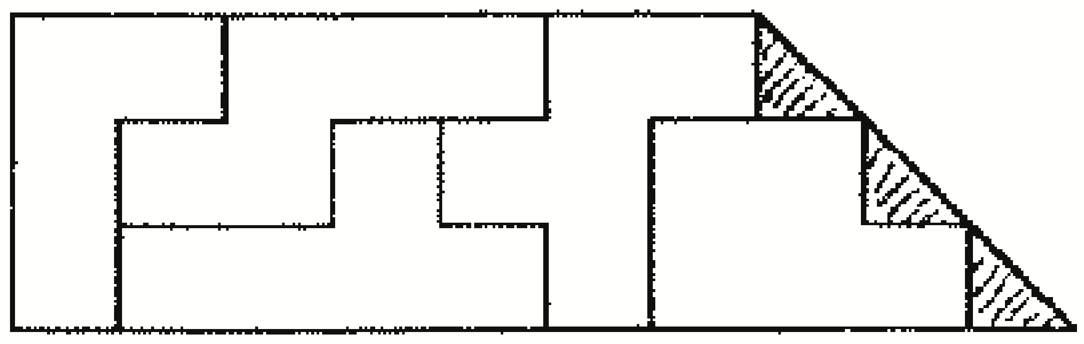


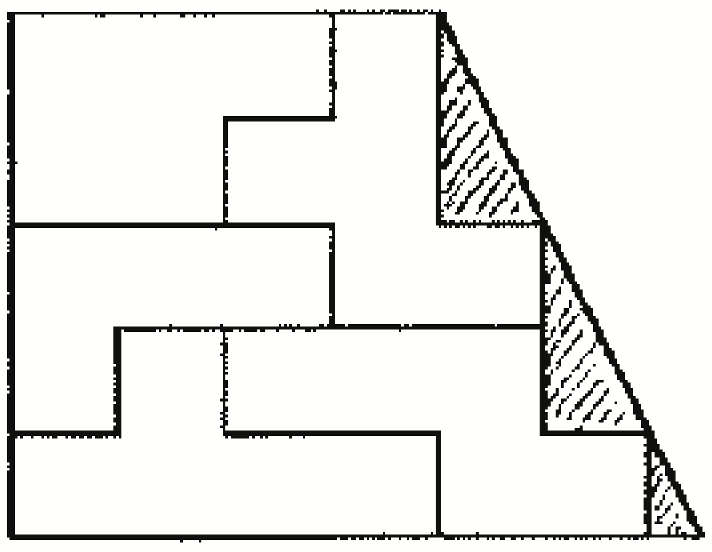


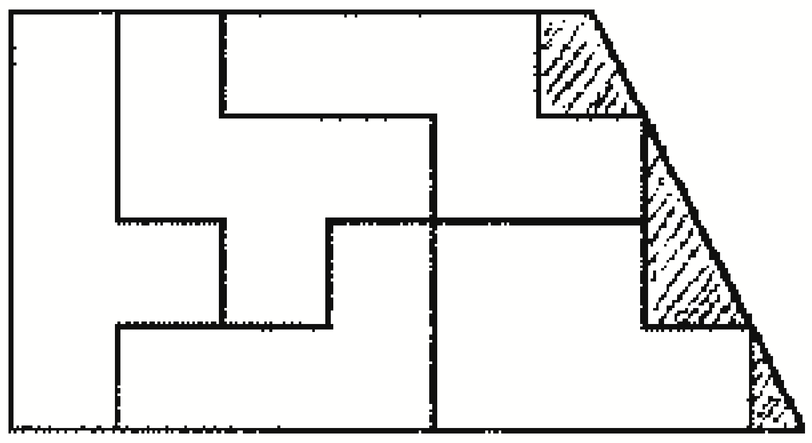


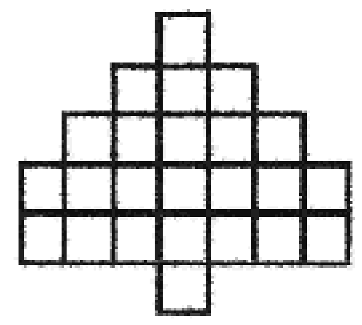












The Vanishing Trunk Puzzle

No. 181-B

The first problem is to fit the five puzzle piece into the tray on the notched side to make the tree, as shown by the diagram above. There are two solutions.

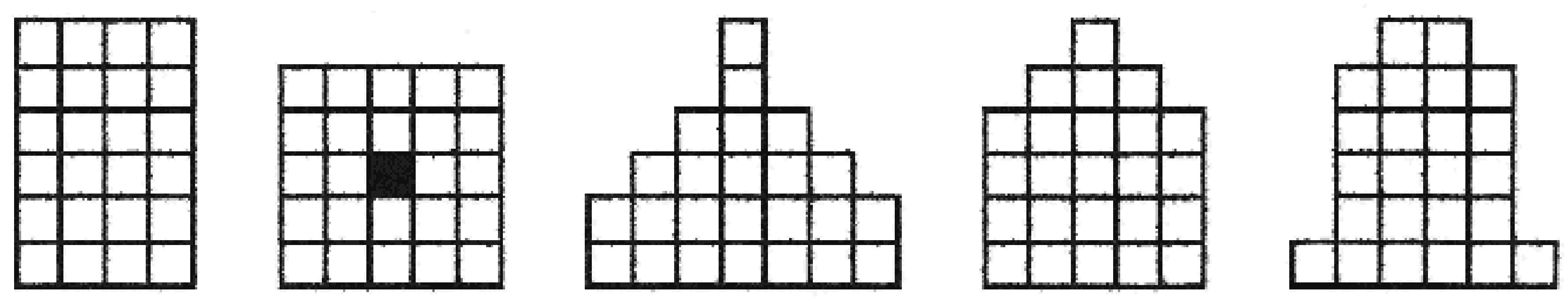
Now make the tree trunk disappear by flipping the tray over and fitting the five pieces on the other side.

Numerous other entertaining puzzle problems are diagramed on the supplementary pages.

another Castle Creation by Stewart Coffin, 2001

181-13

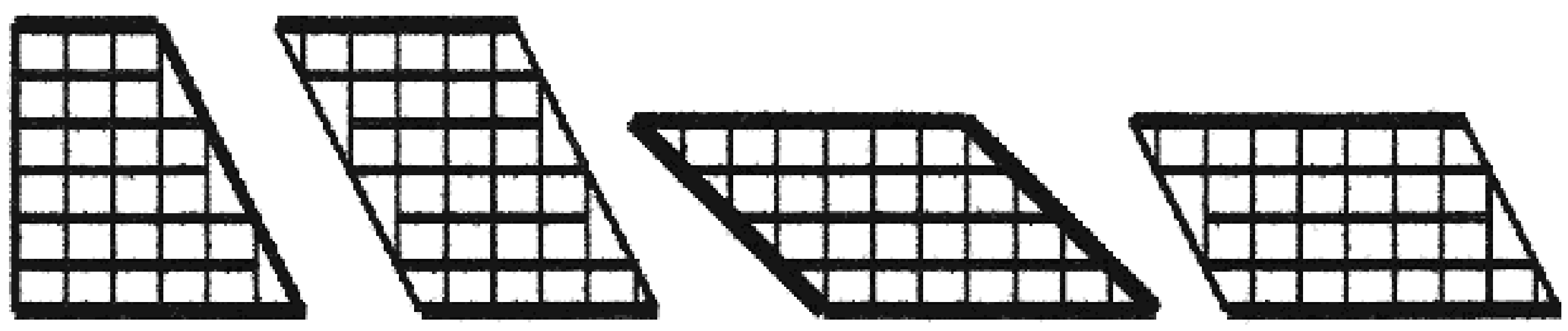
The puzzle problems
shown here are solved without
the two-sided tray. You may find it
convenient to mark the outline of a problem
on graph paper, especially quadrille paper with
four lines per inch. This paper is also useful for recording
solutions. The number of solutions for each problem is indicated.
Those with the fewer solutions tend to be the more difficult.



Grid - 1 Holey - 1 Church - 3 House - 5 Bell - 3

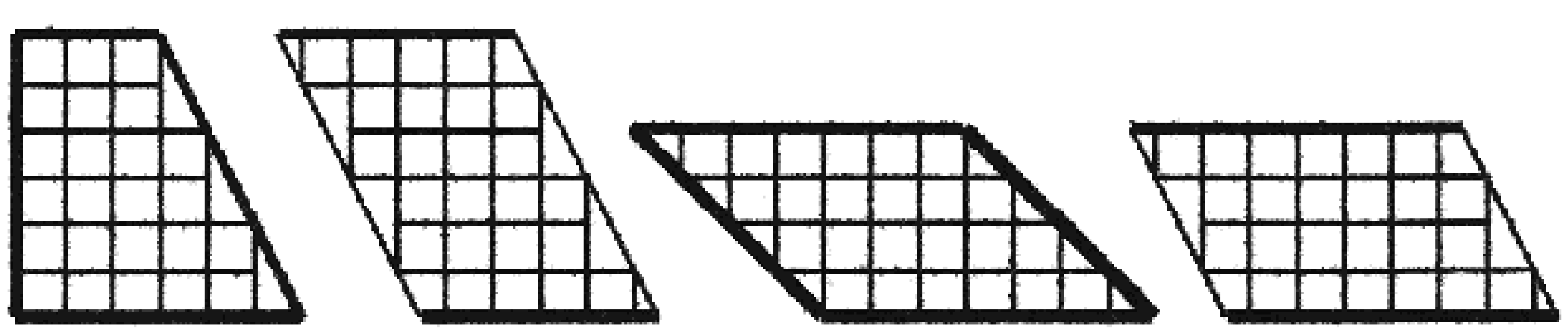
181-B

The problems
for the Vanishing Trunk
Puzzle shown on this sheet all have
diagonal borders. For maximum entertainment,
draw a layout of the puzzle on graph paper and
then transfer the outline of the border to plain paper.
Even better would be to construct the various trays of cardboard.



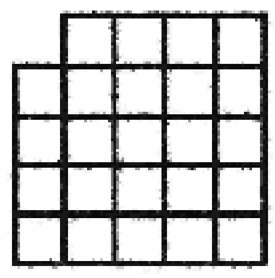
See how many solutions to each you can discover.

The problems
for the Vanishing Trunk
Puzzle shown on this sheet all have
diagonal borders. For maximum entertainment,
draw a layout of the puzzle on graph paper and
then transfer the outline of the border to plain paper.
Even better would be to construct the various trays of cardboard.

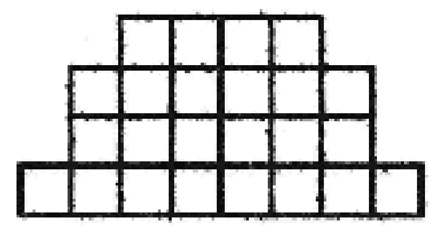


See how many solutions to each you can discover.

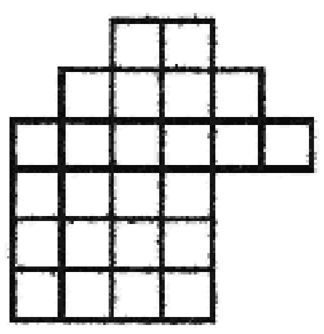
181-B



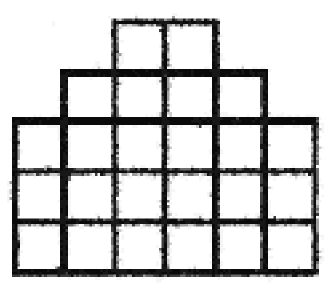
Notch - 3



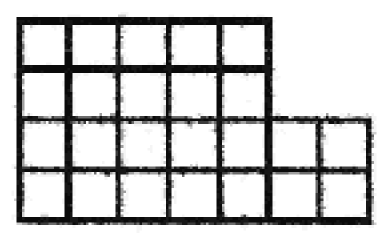
Factory - 1



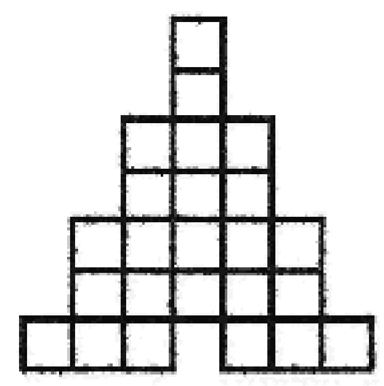
Leanto - 2



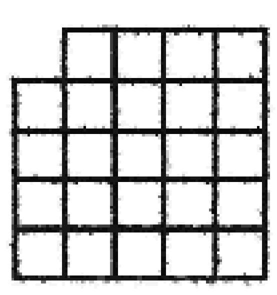
Building - 7



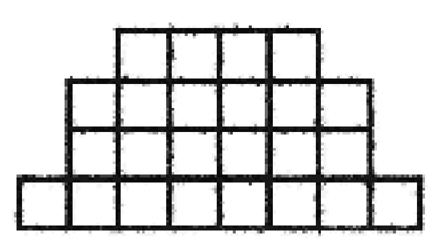
Truck - 3



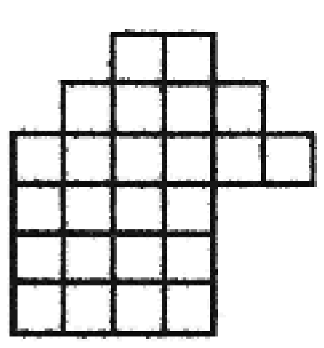
Tower - 2



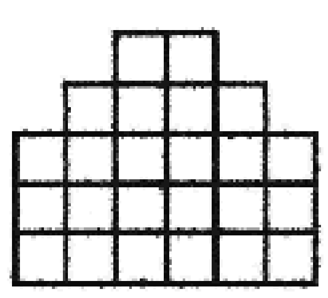
Notch - 3



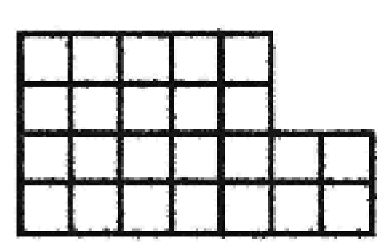
Factory - 1



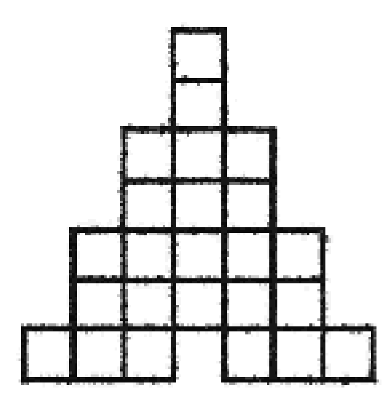
Leanto - 2



Building - 7



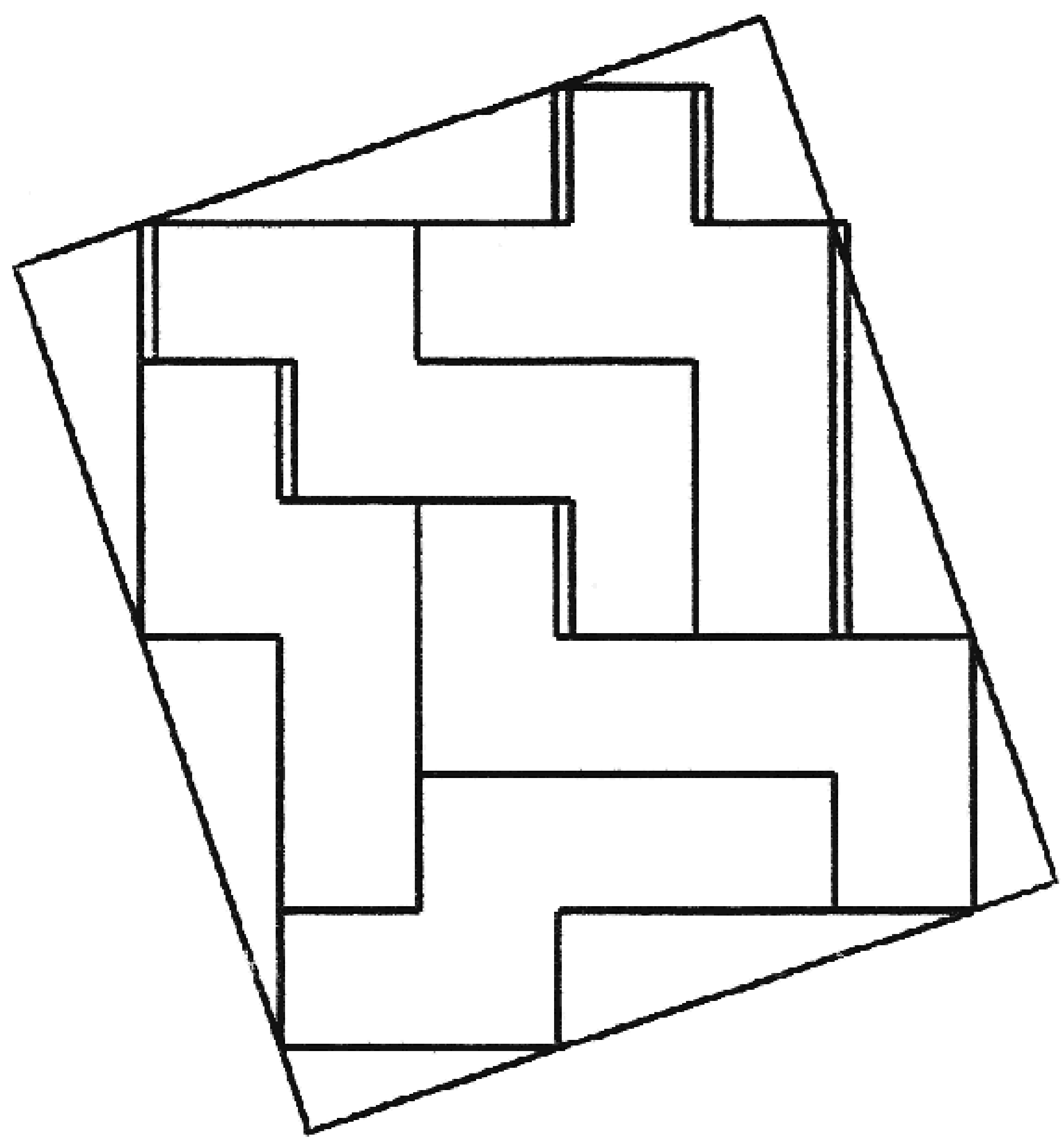
Truck - 3



Tower - 2

Design 182 Christmas 2000

A printed version of this diabolical puzzle was included in some of our Christmas cards recently. The solution is unique. In my "square root of 10" publications, this configuration is listed as 18 x 21, making the tray dimensions 5.682 x 6.641. However, the top two pieces can be shifted in unison to the right by an arbitrary amount, as indicated by the double lines. This changes both tray dimensions, and I did so in a manner so as to confuse anyone who tried to solve it by computer using my "Square Root" worksheets. The new tray dimensions were 5.814 x 6.600. It should also be equally confusing to solve the old fashioned way. I made only one in wood, mostly to check for incongruous solutions, and have no plans to make any more. I have not yet received any feedback from the printed versions sent out last month.

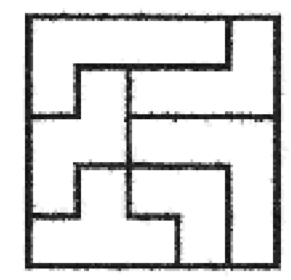


Window Pain

design 186

This puzzle consists of six polyomino pieces and a two-sided tray.

Problem 1: Assemble the pieces on this side to form a 5x5 square. There are 12 solutions. How many can you discover? One is shown:



Problem 2: Now turn the tray over and assemble any or all of these solutions on the other side, making use of both the top opening and the side slot. All 12 are possible. For a starter, try the one shown above.

Problem 3: Assemble without using the side slot. Difficult - there is only one way.

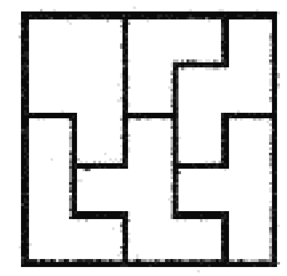
Problem 4: Assemble using **only** the side slot. Most difficult - again there is only one way.

STC - 2002

Double Play

design 187

Practice exercise: Assemble the six pieces on this side to form a 5 x 5 square. One solution is shown. Eleven others are possible. How many can you discover?



Now turn the tray over and assemble on the other side. There are two solutions. In the first, the key moves require only rectilinear shifting of the pieces. The second is more complicated, involving coordinate motion, and is why the corners of the pieces are slightly rounded. Can you discover both solutions?

STC - 2002

The Decoy

design 187-A

Practice exercise: Assemble the six pieces on this side to form a 5 x 5 square. There are nine solutions possible. How many can you discover?

Now turn the tray over and try to assemble on the other side. There is only one solution. It involves much shifting and rotation of various pieces and can be quite confusing.

Or, if the puzzle is already assembled, try to take it apart. This task can be equally entertaining.

STC - 2002

Fourteen Steps

design 187-B

Practice exercise: Assemble the six pieces on this side to form a 5 x 5 square. There are 12 solutions possible. How many can you discover?

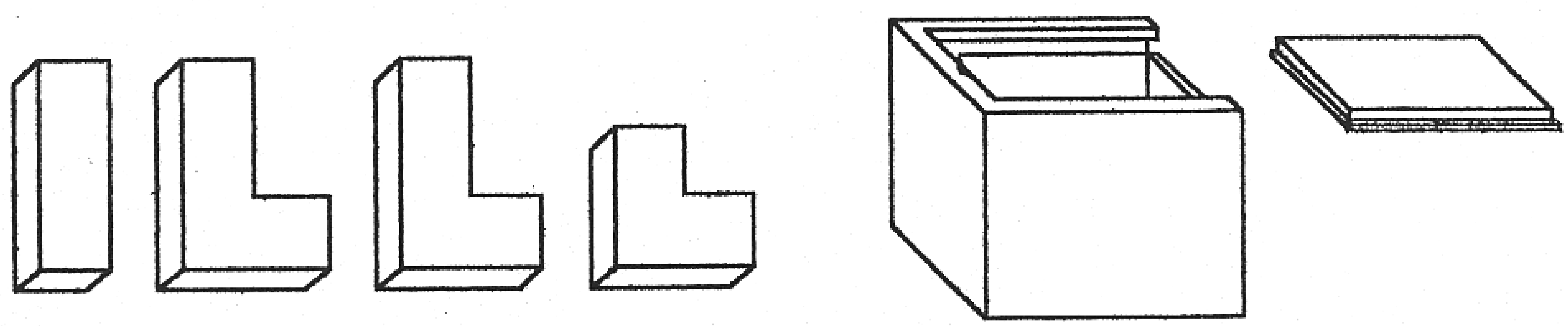
Now turn the tray over and try to assemble on the other side. There is only one solution. It involves some shifting around of various pieces, but is not as perplexing as the other puzzles in this family of designs.

Or, if the puzzle is already assembled, try to take it apart. This task can be equally entertaining.

STC - 2002

189. <u>Four Blocks in a Box</u>.

As the name suggests, four simple solid polyomino pieces pack into a rectangular box essentially one way only. There are other ways that they almost fit, but the cover on the accurately made box will not slide shut except with the correct solution. This puzzle employs the trick of multiple grids, used by me before in flat puzzles but this is the first time in a 3D packing puzzle. This puzzle is expected to be used as an exchange puzzle in IPP-23 and will likely be renamed.



Computer Killer, No. 193

Fit these five puzzle pieces into the cubic box. **Caution:** Do not attempt to solve this puzzle with PuzzleSolver 3D, Cutler's puzzle program, or any other. It exploits a subtle weakness in your computer and could lead to total meltdown.

AP-ART 2003
teak and Baltic birch

Triple Play
194

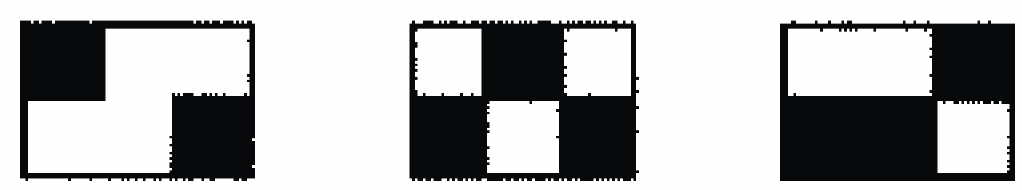
Fit the four pieces inside the box.There are three distinct solutions. Can you discover all three?

STC - Sept. 2003

Triple Play Plus, No. 194-A

This version is mechanically identical to the original Triple Play No. 194. The difference is the addition of checkering to the pieces, which allows the three distinct mechanical solutions to be uniquely defined by the light and dark pattern that appears on the top of the assembly. The three patterns are shown below. Because of symmetry, the coloring can be reversed, light for dark.

For further amusement, if you want to play around with the three other patterns that are possible, they are shown below. Only the checker pattern (center) can be achieved with all three solutions.



STC, Sept. 2003

TRAY BIEN

design number 196

The seven pieces of this puzzle could be considered a variation of my Quadrilateral puzzle, designed in 1989 and for a while produced by Trench Enterprises. The idea of using a two-sided tray goes back to my Two-Sided Tray puzzle, No. 87. Several AP-ART designs created around 2001, such as Housing Project, also used a two-sided tray. The inspiration for a new design combining these features with multiple trays came to me while Mary and I were biking through the Loire Valley last spring, hence the name.

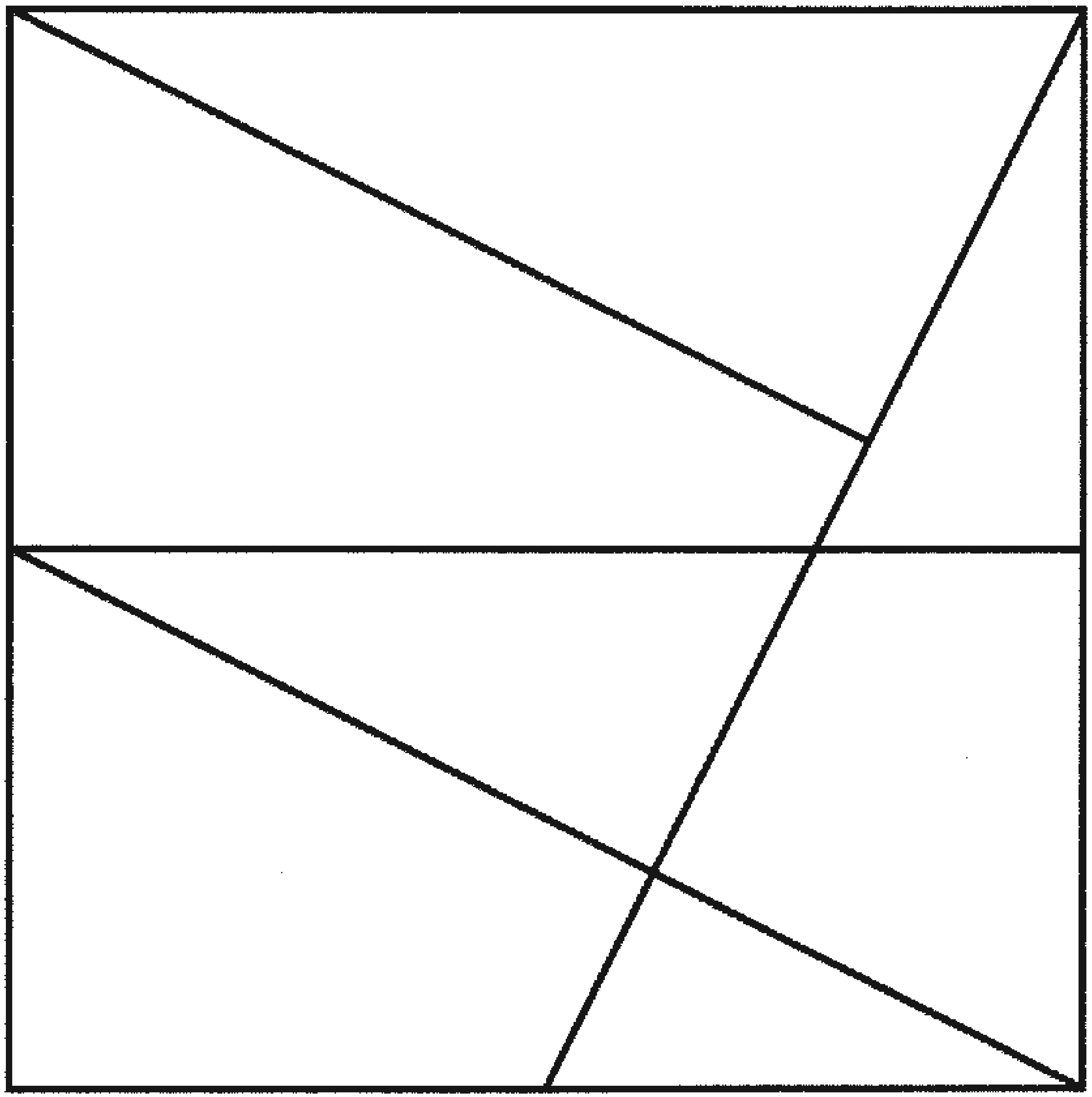
If my analysis is correct and I did not overlook any, using all seven pieces, one may construct 26 different quadrilaterals. Eight of these are constructed using the four two-sided trays. All but one of the other 18 are outlined on the cards. By the way, most of the problem shapes have multiple solutions.

For the enterprising puzzle solver, here are some additional problems to challenge you. All of the 25 problem shapes shown can be classified as a square, rectangle, parallelogram, or trapezoid. In other words, all shapes have four sides, with at least two opposite sides parallel. The one additional shape, not shown, is also a quadrilateral but does not fit into any of these categories. Can you discover it?

Only one triangular shape is possible, which you should be able to solve with no great difficulty.

If fewer than seven pieces are allowed, many other interesting problems are possible. For example, one could compile a large catalog of puzzle shapes that can be constructed using any six pieces, or any five pieces, and so on. Then there are five-sided and six-sided shapes that have not been considered. But I leave those problems to others.

Stewart Coffin
Castle Creations
Andover, Massachusetts
October 2003



Tray Bien

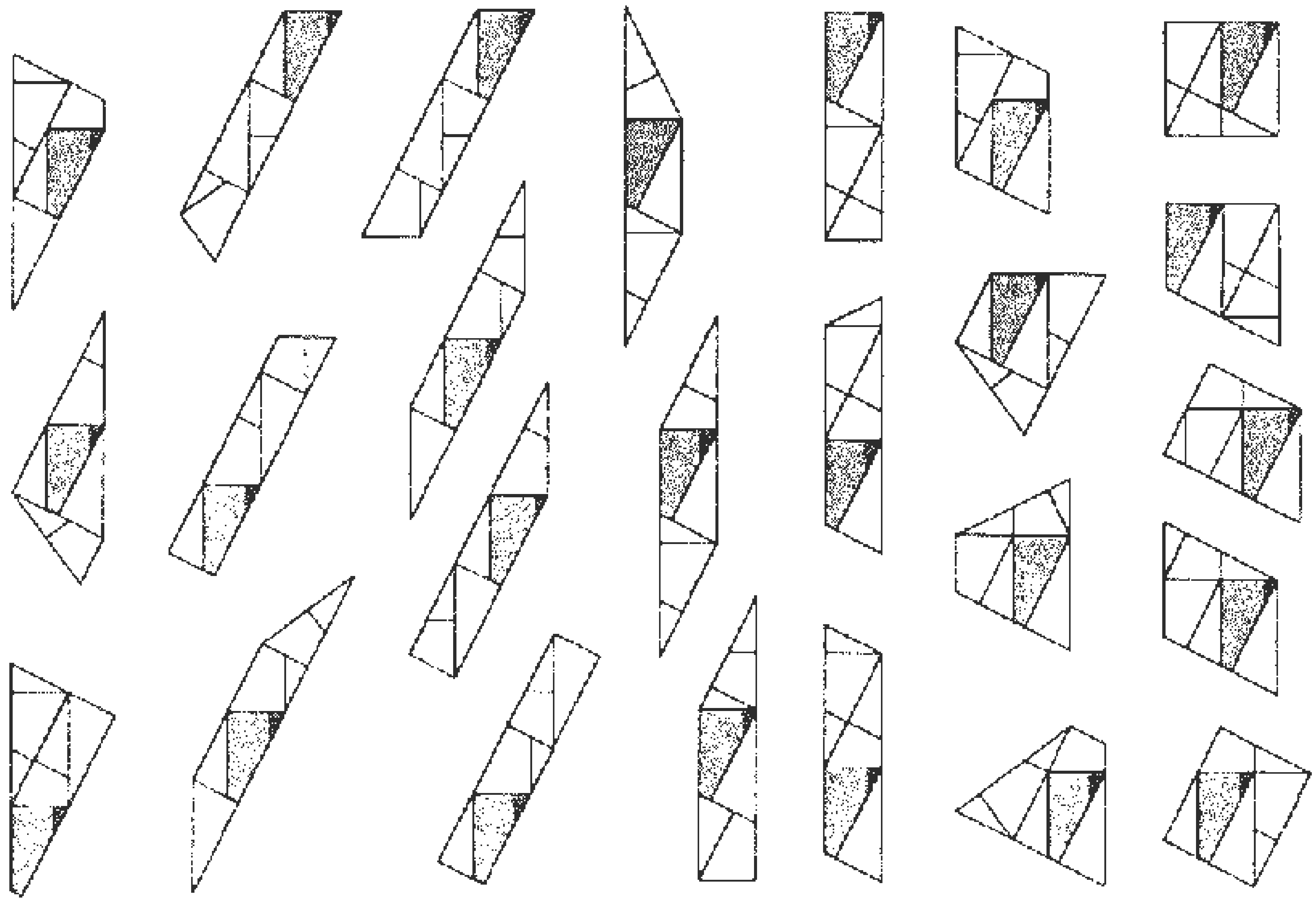
Design 196 by Stewart Coffin
G4G6 Exchange from Nick Baxter
March, 2004

The recent publications of *The Tangram Book* by Jerry Slocum and the widely-publicized combinatorial and computer analyses of Archimedes' *Stomachion* reaffirm the enduring popularity of tile assembly puzzles.

Earlier last year, Stewart Coffin, perhaps best known for his stunning polyhedral dissection puzzles, created a design reminiscent of the classic Tangram shapes, but with a sharply non-traditional, left-brain set of challenges:

Cut out the seven pieces on the left, and construct as many essentially different quadrilateral shapes as you can: one square, three rectangles, six parallelograms, 15 trapezoids, and four trapeziums (to add to the challenge, the latter group is not shown in the legend on the opposite side).

Note: pieces can be rotated and reflected, and that most shapes will have multiple solutions.



Under Cover
No. 197

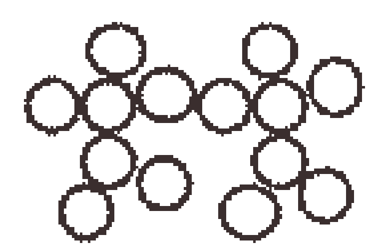
Problem no. 1: Dump the four puzzle pieces out of the box and fit them into the square cover to form a pyramidal pile. There is only one solution.

Problem no. 2: Using three of the pieces, form a tetrahedral pile and fit it inside the box. There is only one solution.

Problem no 3: Fit all four pieces back into the box. There are three solutions.

Castle Creations, Dec. 2003

Ball Room
No. 197-A



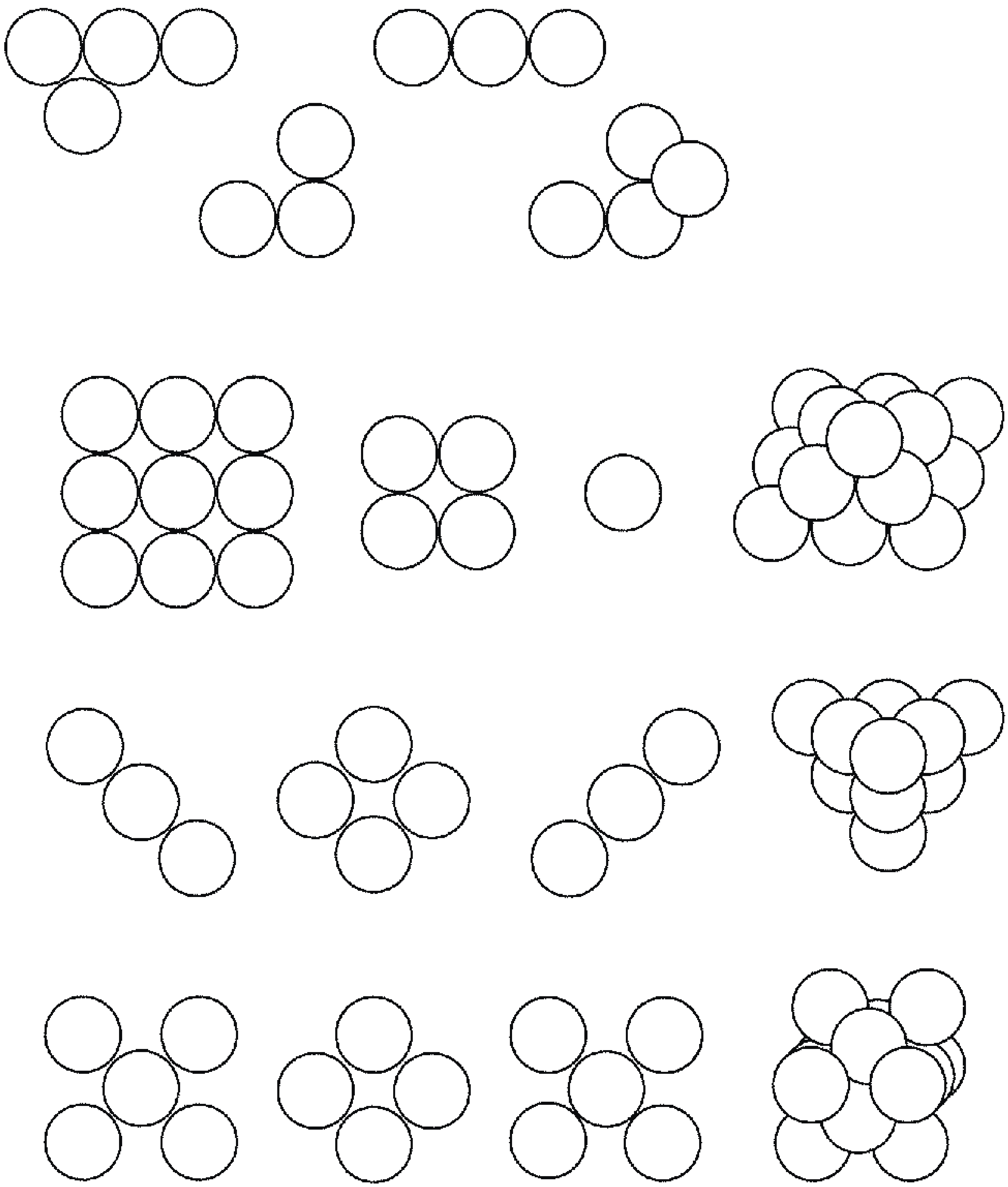
Problem no. 1: Dump the four puzzle pieces out of the box and fit them into the square cover to form a square pyramid pile. There are two solutions.

Problem no. 2: Using three of the pieces, form a tetrahedral pile and fit it inside the box. There is only one solution.

Problem no 3: Fit all four pieces back into the box. There are three solutions.

Castle Creations, Dec. 2003

Solutions for Ball Room, No. 197-A



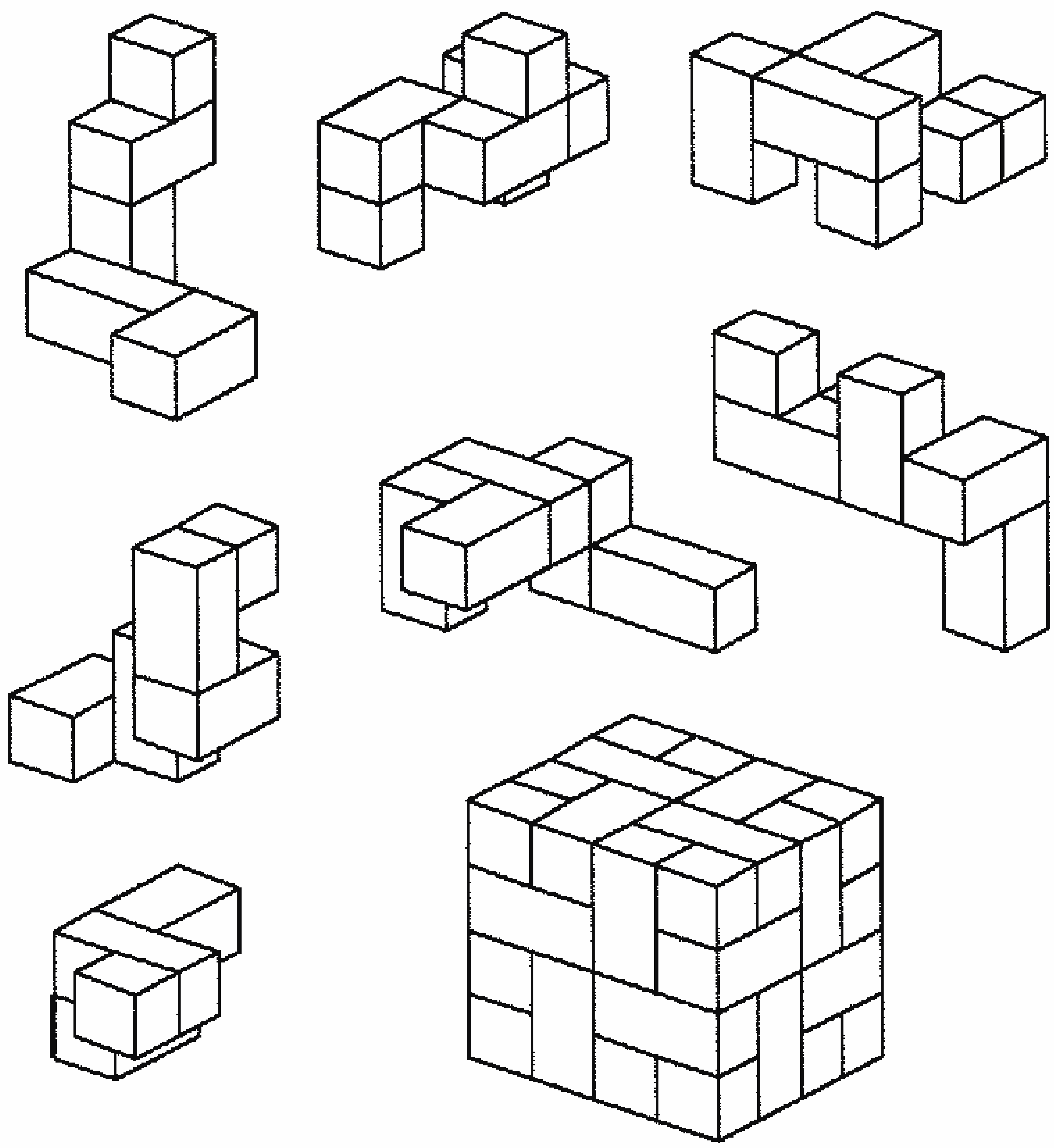
Castle Creations Design No. 198

Involution

STC, Sept. 2004

This puzzle is a redesign of No. 30, Convolution. It is likewise serially interlocking, with all seven pieces dissimilar and non-symmetrical. The pieces are numbered in order of assembly. Insertion of pieces 4 and 5 involves both coordinate motion and rotation. Insertion of piece 6 involves shifting piece 5. Key piece 7 has a slight ridge that prevents it from coming out without deliberate effort; as shown below it must be forced to the right and then up and out.

(in·vo·lu′tion, a retrograde development, degeneration, as occurring with old age)

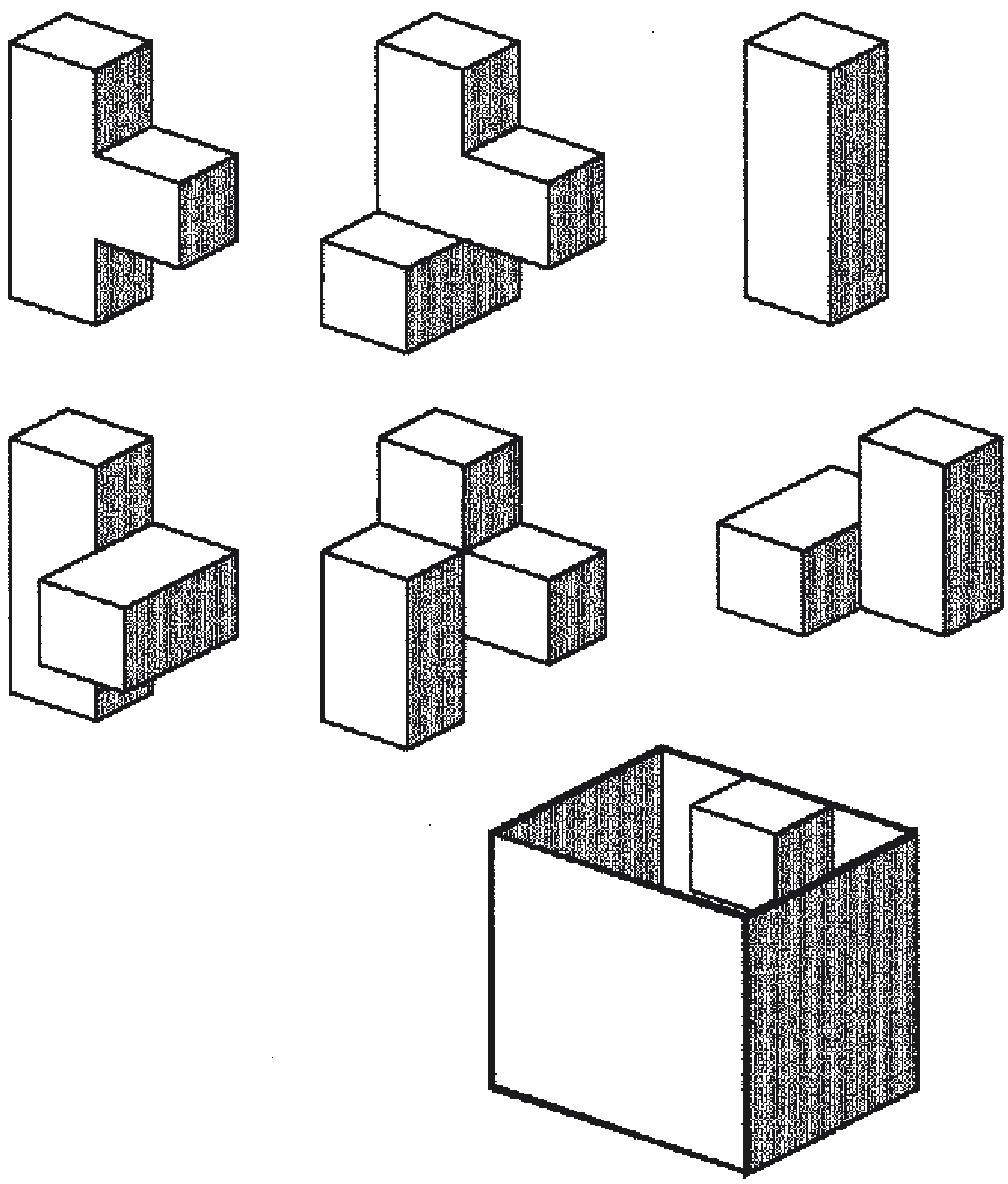


Castle Creations No. 199-x
Blocked Box

Fit the six polyomino puzzle pieces into the box. The cubic box has a cubic block fastened at the top midpoint of one side.

The reason for the -x in the designation is that I have not yet determined if only one solution exists. If there is more than one, then it is back to the drawing board. I am finding it very arduous to analyze for multiple solutions the old fashioned way. I have Puzzlesolver3D on my computer, but it does not appear to be working correctly, as it indicated 148 solutions.

STC, Sept. 24, 2004



Instructions for #201 and #201-A, Victor

The design for this pair of puzzles is derived from my old design #128, Combination Lock. Six dissimilar and non-symmetrical pieces assemble one way only with coordinate motion. Whereas the Combination Lock had an axis of symmetry, the shapes of these two designs have polyhedral symmetry with no uniquely defined axis of symmetry. This makes disassembly slightly more confusing unless you know the clue that I provide below. Another difference is that the arms of the pieces are longer. Design #201 has the same shape as my old Design #115, Fancy This! In Design #201-A, the arms are farther extended, so that the puzzle has the shape of the third stellation of the rhombic dodecahedron. These instructions apply to both designs; however, #201-A is the more difficult of the two.

Disassembly is relatively easy. Examine the direction of the grain in each of the eight triangular depressions until an opposite pair of triplets is found with symmetrical grain direction, one clockwise and the other counter-clockwise. This defines the axis of disassembly. Squeeze on the ends of these pieces with three fingers of each hand, and the puzzle expands and comes apart.

This puzzle is quite difficult to assemble, even with these directions. The easiest way that I have found is as follows: The pieces are lettered R E D S O X, and are most easily assembled in that order. Form a subassembly of three that reads R E D clockwise. Next drop piece S into place opposite piece D. Insert piece O into the only space possible (opposite piece R). All these steps are easy. Now comes the tricky part. Carefully expand the whole assembly until it is nearly to the point of collapse, with no more than 1/16 inch of contact remaining on the bottom triplets. I use a weak circumferential rubber band to hold everything together. You might also now tape the bottom triplets into this position, although with practice it can be done without tape. Using extreme patience and dexterity, now carefully work piece X into place and compress everything together.

Since Design #201-A is the more difficult of the two, I have judiciously removed wood from a few edges and corners to make it within reason.

Since each puzzle must be assembled and disassembled several times during fabrication, I have tried to make an assembly jig like that for Rosebud and a few others, as an aid for my own use, but I was unable to devise one that worked. (Ed Hordern always claimed that all these assembly jigs were unnecessary, and he shunned them.)

STC, Nov. 2004

Drop Out

Castle Creations design No. 202

Drop the round disk in through a hole in the plexiglass cover and drop it out through the hole in the bottom of the tray.

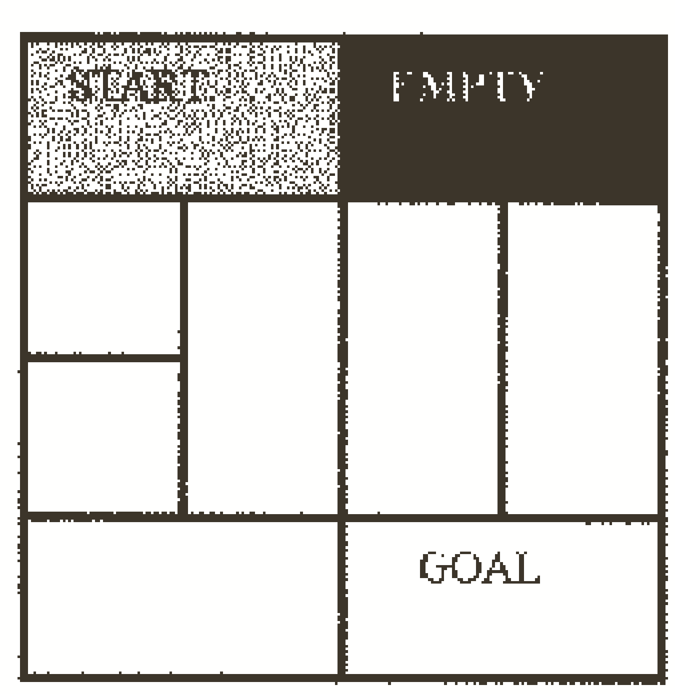
STC, Dec. 2004

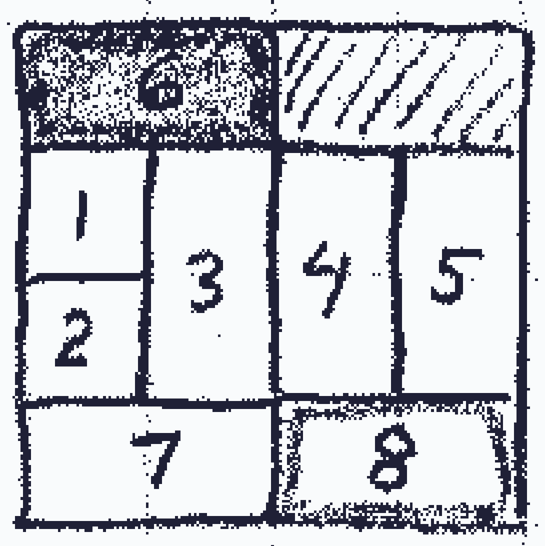
Castle Creations Design No. 203

Square Route

With the eight blocks initially positioned as shown, the object of this puzzle is to move the colored block from upper left to lower right, but only by sliding. No less than 82 moves are required. Or, if you prefer, you can invent your own puzzle using a different initial arrangement, or by choosing a different goal. Most such variations will require fewer moves, but some may require more or may even be impossible.

STC, Dec. 2004





NO. 203

Improved version, Dec 12, 2004.

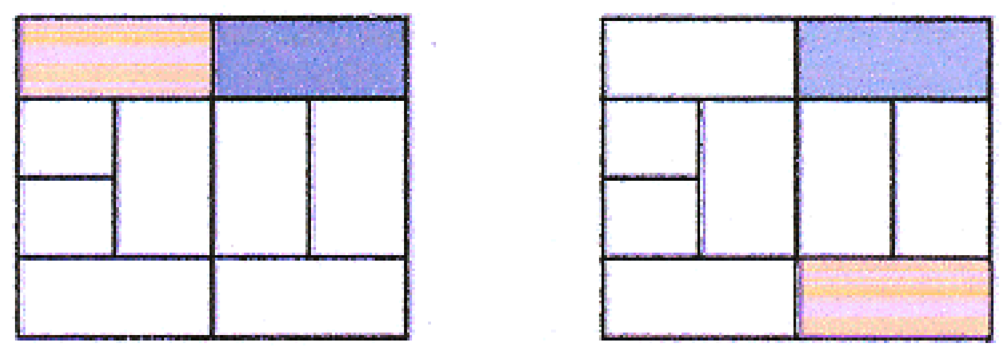
Move block #6 from upper left to lower right in 82 moves.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
$4\uparrow$	$5\uparrow$	$8\uparrow$	$\overrightarrow{7}$	$3\downarrow$	$\overrightarrow{1}$	$2\uparrow$	$\overleftarrow{3}$	$\overleftarrow{7}$	$\overleftarrow{8}$	$5\downarrow$	$\overrightarrow{4}$	$\overrightarrow{1}$	$\overrightarrow{2}$	$\overrightarrow{6}$	$3\uparrow$	$\overleftarrow{7}$	$\overleftarrow{8}$	$1\downarrow$	$\overrightarrow{8}$	$3\downarrow$	$\overleftarrow{6}$	$\underrightarrow{2}\uparrow$	$8\uparrow$	$\overleftarrow{1}\uparrow$
26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
$\overrightarrow{7}$	$3\downarrow$	$\overleftarrow{8}$	$2\downarrow$	$\overrightarrow{6}$	$\overrightarrow{8}$	$3\uparrow$	$\overleftarrow{1}$	$\overleftarrow{2}$	$\overleftarrow{7}$	$\overleftarrow{5}$	$4\downarrow$	$\overrightarrow{8}$	$2\uparrow$	$\overrightarrow{1}$	$3\downarrow$	$\overleftarrow{6}$	$8\uparrow$	$4\uparrow$	$5\uparrow$	$\overrightarrow{7}$	$1\downarrow$	$2\downarrow$	$3\downarrow$	$6\downarrow$
51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
$\overleftarrow{8}$	$5\uparrow$	$\overrightarrow{2}$	$1\uparrow$	$\overleftarrow{7}$	$4\downarrow$	$\overrightarrow{5}$	$2\uparrow$	$\overrightarrow{6}$	$3\uparrow$	$\overleftarrow{7}$	$\overrightarrow{1}\downarrow$	$6\downarrow$	$2\downarrow\underleftarrow{}$	$\overrightarrow{8}$	$3\uparrow$	$\overleftarrow{6}$	$1\uparrow$	$\overrightarrow{6}$	$\overrightarrow{7}$	$3\downarrow$	$\overleftarrow{2}$	$\overleftarrow{1}$	$\overleftarrow{8}$	$\overleftarrow{5}$
76	77	78	79	80	81	82																		
$4\uparrow$	$\overrightarrow{6}$	$1\downarrow$	$\overrightarrow{2}$	$3\uparrow$	$\overleftarrow{7}$	$6\downarrow$																		

Castle Creations Design No. 203-A

Multiple Choice

Problem number 1: Starting with the blocks arranged as shown below left, with the colored block in the upper left corner and empty space in upper right, shift the blocks around until the colored block ends up in the lower right. It will require at least 82 moves. For more interesting recreations, see the accompanying three pages of ideas and suggestions.

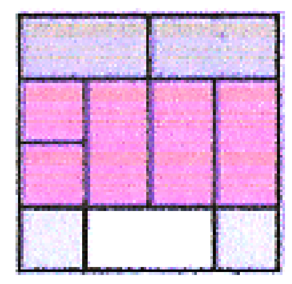


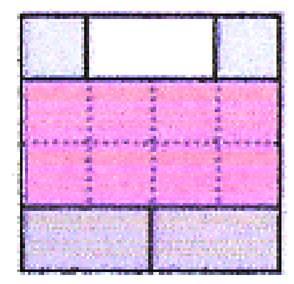
STC, Dec 2004

Castle Creations Design No. 203-B

Sunrise

The starting position of this sliding block puzzle is with the two horizontal dark blocks at the top, the three vertical reddish blocks and two small ones in the center, and the one light horizontal block at the bottom. The object is, by shifting the blocks about, to reverse the colors so that light is on top and dark on the bottom. The five reddish center blocks may end up in any order.

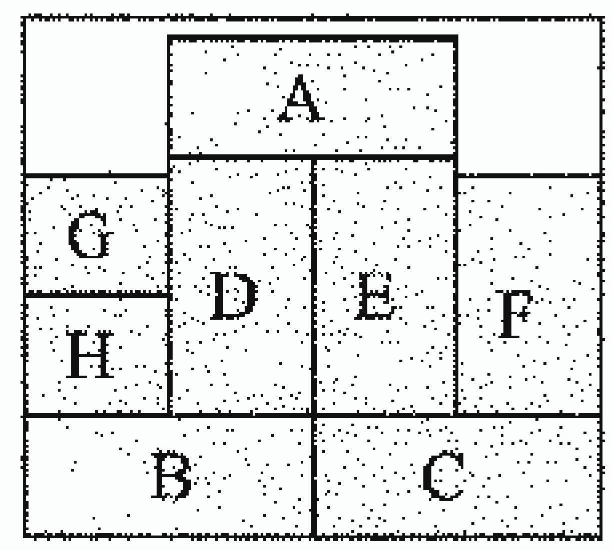


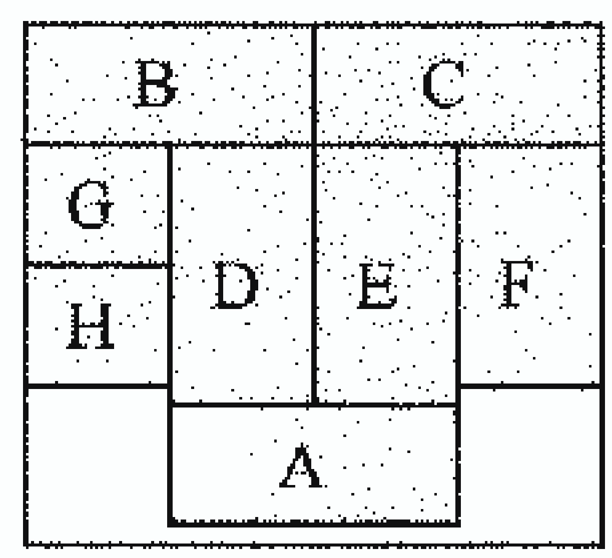


STC
Dec. 2004 DAWN SUNRISE!

Solution to 203-B, STC, Dec. 29, 2004

1.	A	41.	E	81.	F	121.	E
2.	G	42.	F	82.	B	122.	A
3.	H	43.	C	83.	H	123.	F
4.	D	44.	G	84.	G	124.	
5.	G	45.	H	85.	D		
6.	H	46.	D	86.	C		
7.	D	47.	A	87.	A		
8.	B	48.	B	88.	E		
9.	C	49.	E	89.	G		
10.	E	50.	H	90.	H		
11.	G	51.	G	91.	B		
12.	H	52.	C	92.	F		
13.	A	53.	F	93.	E		
14.	F	54.	E	94.	G		
15.	E	55.	H	95.	C		
16.	G	56.	A	96.	D		
17.	B	57.	D	97.	B		
18.	D	58.	C	98.	H		
19.	A	59.	G	99.	C		
20.	H	60.	A	100.	G		
21.	B	61.	H	101.	A		
22.	G	62.	B	102.	D		
23.	C	63.	D	103.	C		
24.	D	64.	B	104.	H		
25.	B	65.	G	105.	B		
26.	H	66.	A	106.	C		
27.	A	67.	C	107.	D		
28.	B	68.	D	108.	A		
29.	D	69.	B	109.	G		
30.	C	70.	H	110.	H		
31.	G	71.	G	111.	E		
32.	H	72.	E	112.	F		
33.	E	73.	F	113.	B		
34.	F	74.	A	114.	C		
35.	B	75.	G	115.	D		
36.	H	76.	H	116.	G		
37.	G	77.	D	117.	H		
38.	D	78.	C	118.	D		
39.	A	79.	A	119.	B		
40.	B	80.	E	120.	C		

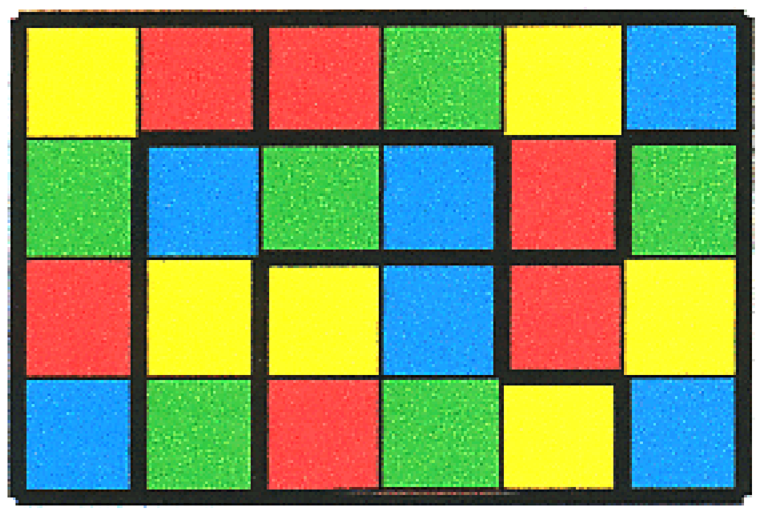




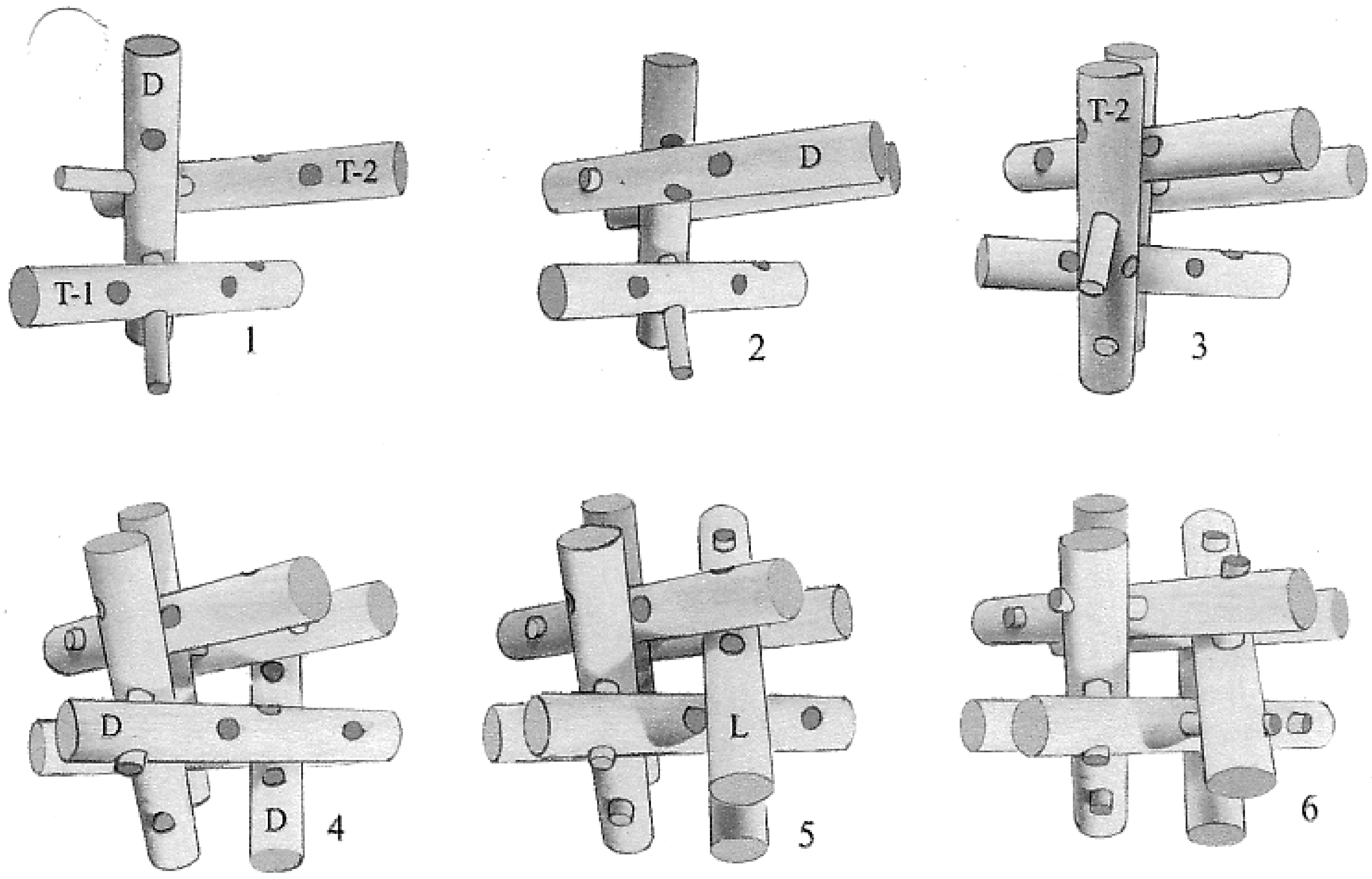
204

Looking for puzzle ideas? Here is a little novelty that I have just come up with. Rearrange the five polyomino pieces into a rectangle such that no like colors border each other edge to edge. Pieces may be turned over. They would be made of blocks of multicolored fancy woods glued together, so same color on both sides.

Stewart Coffin, Jan. 22, 2005. Castle Creations Design Number 204.



204



Assembly instructions for Quadrille, design No. 238

This puzzle is made up of eight identical dowels and eight pins. Note that the four holes in each pin are arranged such that the dowels are non-symmetrical. One dowel and pin are joined to form an elbow piece **L**. Three dowels and pins are joined to form T pieces. The one odd T piece is identified **T-1**, and the two identical T pieces are **T-2**. The four plain dowels are marked **D.**

1. Join a **T-2** and a **D**, and then pin both of them together with **T-1**. At all times pay close attention to the hole locations in the diagrams.

2. Place the next **D** in position as shown.

3. The second **T-2** pins both **D**s together.

4. The two remaining **D**s are placed on pins as shown.

5. Elbow piece **L** is inserted and rotated into position.

6. The four pins are inserted to complete the assembly.

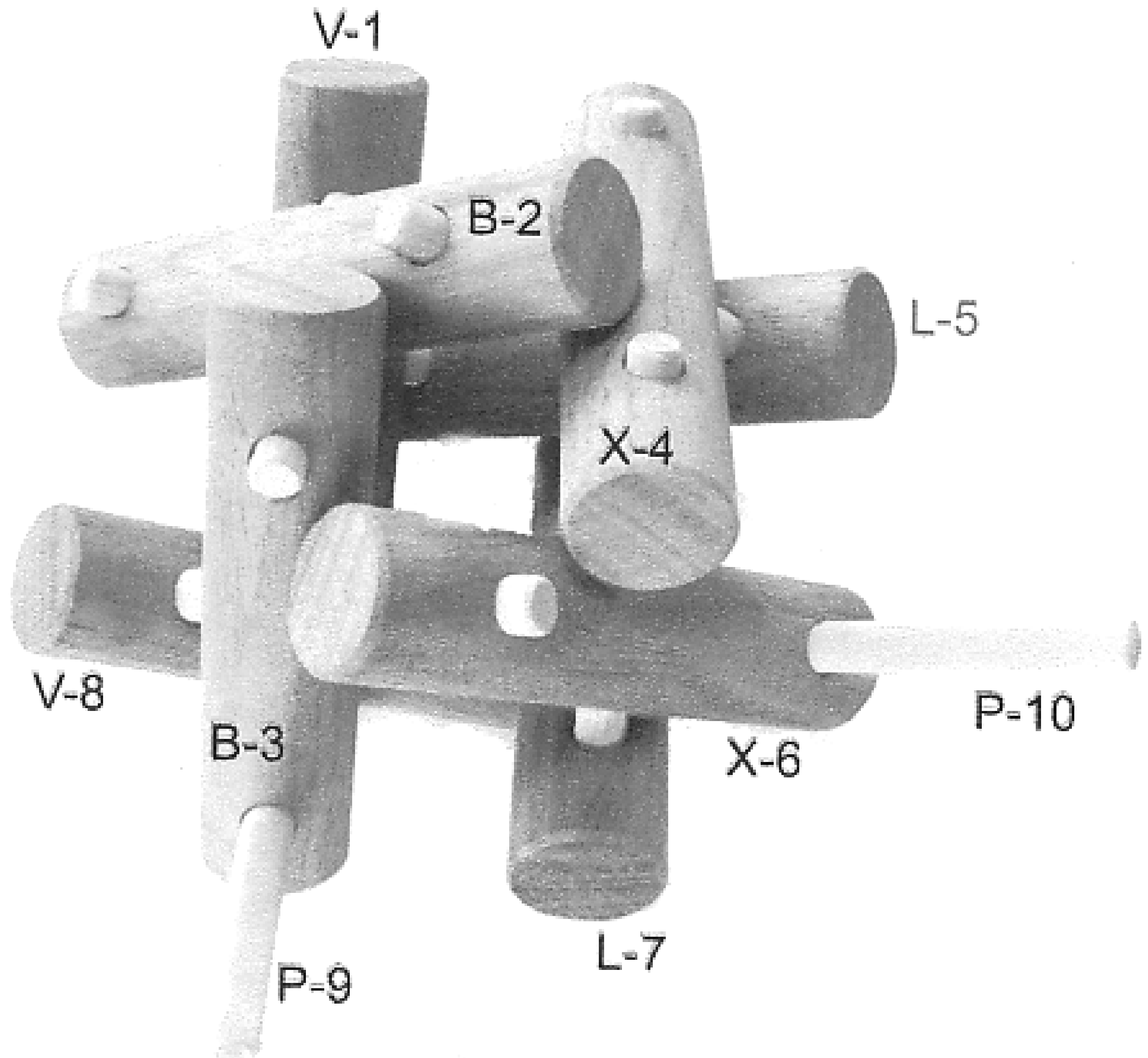
STC, 2009

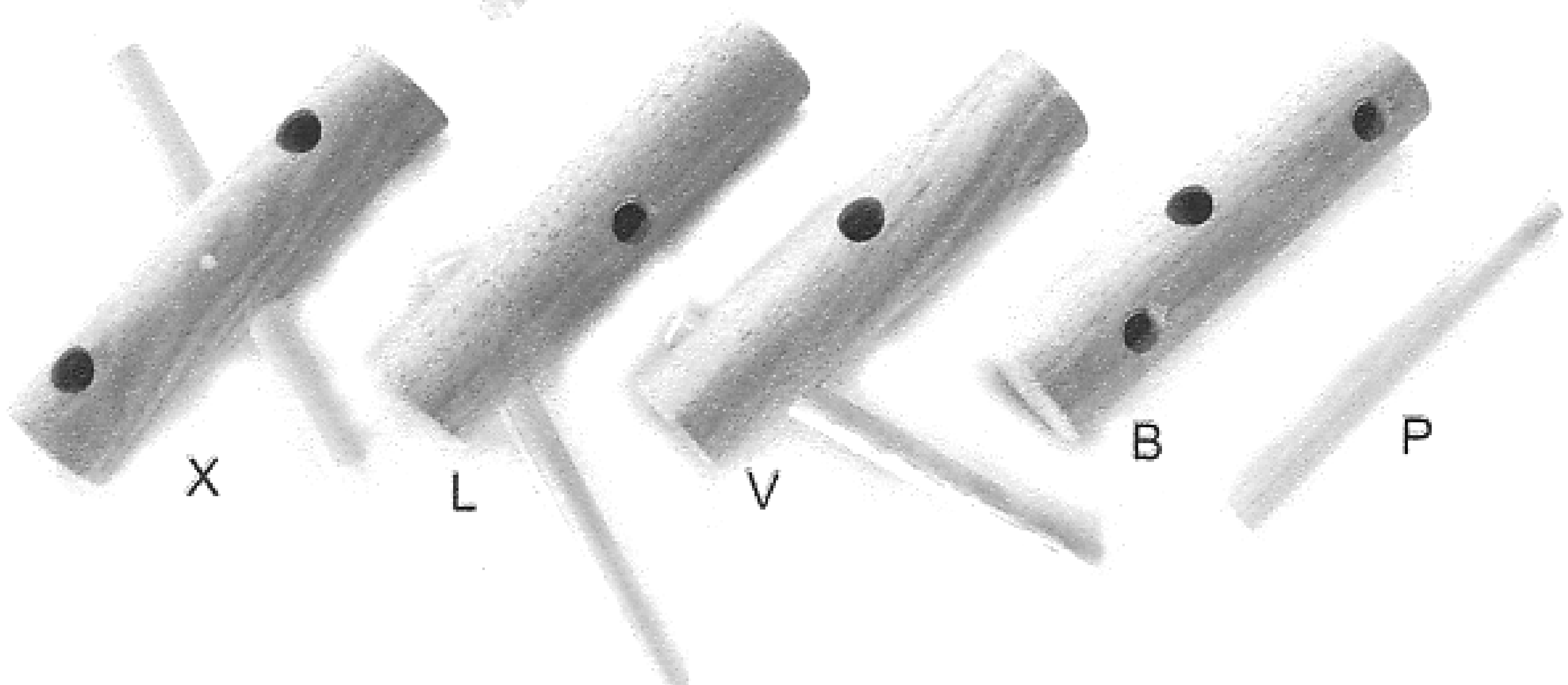
Instructions for Design #239: Assemble as shown.

Designing puzzles of this sort is simple. One starts with the 12 dowels and pins assembled but not joined together and judiciously removes then bit by bit. Nothing to it. To make it into more of a creative process, I tried to minimize the number locking pins (4) and maximize the number of crosses (5). I have found only one solution but there may be others.

STC, March 2010

Solution to Design 242





Nick's solution. Pieces are numbered in order of assembly.

When I designed this puzzle, I thought it had only one solution, but Nick found several others including this one. For added amusement, you can look for other solutions. In particular, look for my original one which has internal symmetry and is assembled my mating two identical halves.

STC, March 2010

Supersymmetry

An IPP30 exchange puzzle
from Tom Rodgers

designed and made by
Stewart Coffin, #247

This puzzle has 8 symmetrical
solutions, but only one that
fits easily inside the jar.

STEWART T. COFFIN

Puzzles

OLD SUDBURY RD. RFD I LINCOLN, MASS. 01773

INSTRUCTIONS FOR VARIOUS AP-ART PUZZLES

This instruction sheet is intended to cover a large assortment of AP-ART puzzles, including custom designs, limited production models, and variations of standard designs, which are becoming so numerous that it would be quite impractical to prepare an illustrated instruction sheet for each one.

Six-Piece Symmetrical Polyhedral Puzzles These include VEGA, SUPERSTAR, CLUSTER BUSTER, and variations of STAR, FOUR CORNERS, NOVA, and SEVEN WOODS. They have six identical or nearly identical pieces arranged in opposite pairs. VEGA is the simplest of these, having identical pieces usually made of two contrasting woods, and the trick is to find an easy way to hold and manipulate the parts for assembly and disassembly. The CLUSTER BUSTER is slightly more complicated, in that the individual pieces are asymmetrical. Unlike most of the other puzzles in this family, which slide apart along any one of four axes, the CLUSTER BUSTER has only one axis, which is not immediately obvious. Usually six different woods are used, the object being to match them so that the assembled puzzle has the appearance of six clustered rhombic dodecahedrons, each of one kind of wood. The TRUNCATED CLUSTER BUSTER is similar, but with the six outside vertices flattened off. The SUPERSTAR has six identical pieces, usually all one kind of wood, and the assembled puzzle has the shape of the most fully stellated form of the rhombic dodecahedron. The LITTLE SUPERSTAR is a smaller version of same, in which the pieces have been reduced slightly, so that the assembled puzzle is the intermediate form of the stellated rhombic dodecahedron, (identical in external shape to the NOVA puzzle). The SUPER NOVA has pieces which are identical in shape to those of the LITTLE SUPERSTAR, but they are made in a different manner, so that when correctly assembled, the eight different woods will all be grouped into solid hexagonal triplets, one for each wood. There are several other puzzle designs in this family, many of which have no names. It is interesting to note that many of these puzzles are made to the same scale, and have pieces which may be interchanged with each other to create new hybrid designs. Most of these puzzles will be found to have little rubber bumpers on the inside surfaces of some of the pieces, the purpose of which is to accommodate the universal tendency of woods to expand non-uniformly with humidity, and to prevent them from being too loose when very dry. If in spite of this, a puzzle is found to be too tight to work without using excessive force, it should return to normal with a decrease in humidity.

PENNYHEDRON-Type Two Piece Puzzles The SUPER PENNYHEDRON is made up of 24 pieces glued together, rather than the usual 12, and the joints are beveled to hide the parting line. It is made in two different forms which separate in surprisingly different ways, but which are indistinguishable externally. Sometimes the two are made as a matched set. A piano wire spring is used to hold the two halves together. The PRICKERHEDRON, more of a novelty than a puzzle, comes apart into two non-identical halves.

The Dislocated Spider-Sliders These are similar to the SCORPIUS and JUPITER puzzles, except that one arm of each piece has been dislocated so that effectively it is exchanged with one of its neighbors, making the pieces non-symmetrical and decidedly more difficult to assemble and disassemble. The DISLOCATED SCORPIUS has two distinct solutions, both axially symmetrical. The DISLOCATED JUPITER has several solutions, the number and nature of which are still under investigation.

Note: These puzzles are crafted of the choicest woods, all in their natural state, with no stains of any kind. They are usually impregnated with a special sealer, waxed and buffed to bring out their beautiful color and grain.

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

February 1, 1983

Directions for Making Jupiter-Saturn Type Puzzles

1. Make 60 triangular sticks exactly the size and shape of the sample enclosed.

2. To make a Jupiter-type puzzle (all pieces identical and symmetrical, glue the sticks together in fives, using the gluing jig enclosed. After the puzzle is assembled, you may if you wish trim the ends of all the sticks flush with a table saw, using a jig which you supply.

3. To make the true Jupiter Puzzle, with multi-colored wood, you will need six different kinds of wood with contrasting color or grain, to make ten sticks of each type. You then glue them according to a pattern which you can work out yourself, so that when assembled all like woods are parallel. (I used 12 different jigs for this, of which this is one, hence the numbering on it.)

4. To make a Dislocated Jupiter, Saturn, or any other type you wish to devise, with non-symmetrical pieces, first make a Jupiter Puzzle as described above, except omit one stick from one of the pieces, so that when it is assembled, there will be one empty space. You may now use the assembled puzzle as a gluing jig ~~xx~~, together with the regular gluing jig, to create almost any sort of puzzle piece you wish. This is slow work, so if you plan to make many puzzles this way, you will want to make up a set of special gluing jigs. This is easily done, once you have one accutate set of puzzle pieces, using various materials such as plaster, wood, and epoxy. As you can see, the original jig was made of plywood, which served as a back-up for the top which was cast in epoxy, with wooden parts then glued on.

Suggestions:

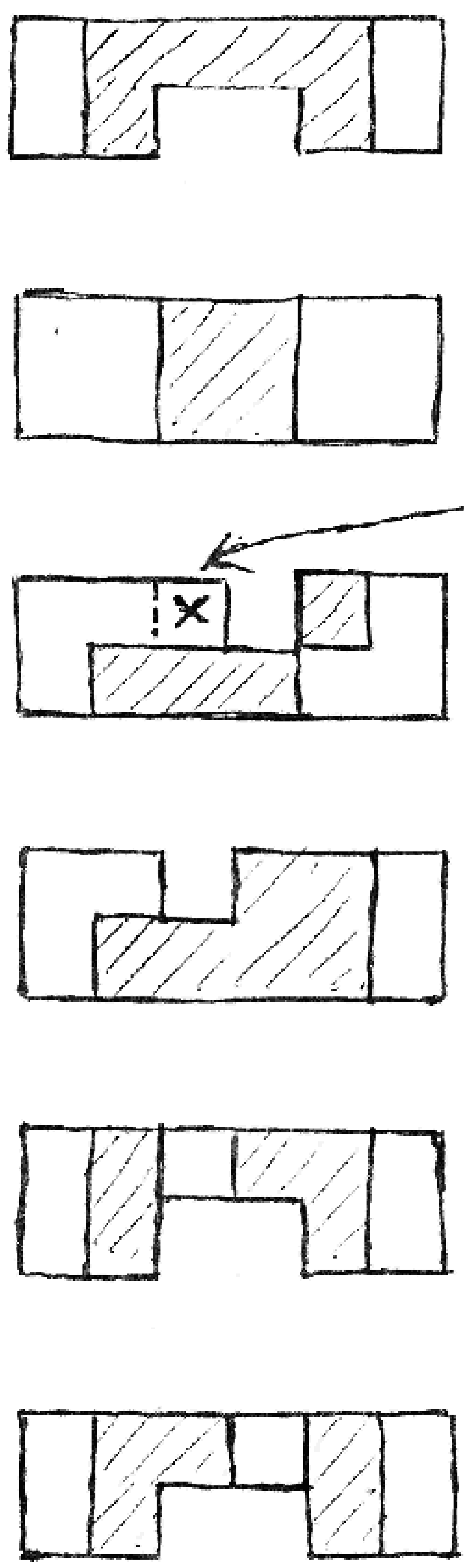
Use a type of glue which sets slowly, or is slightly plastic when heated. After the puzzle is assembled very tightly together, as soon as possible, hold it tight with string or rubber bands, and set it in a warm place for several days, to relieve any slight inaccuracies. This is not necessary if it is perfectly accurate to begin with, but it almost never is. Likewise, it is best to leave the puzzle assembled when not in use, rather than disassembled, when it may warp.

Try to invent an improved design, similar to Saturn, where all the pieces are dissimilar, all have five sticks, with one and only one solution.

BILL CUTLER PUZZLES 3-D INTERLOCKING & BOX-FILLING WOODEN PUZZLES

1020 Augusta Ave • 715/845-7054 • Wausau, WI 54401

BILL'S BAFFLING BURR



Cube underneath removed

These pieces can be assembled into the usual 6-piece burr shape.

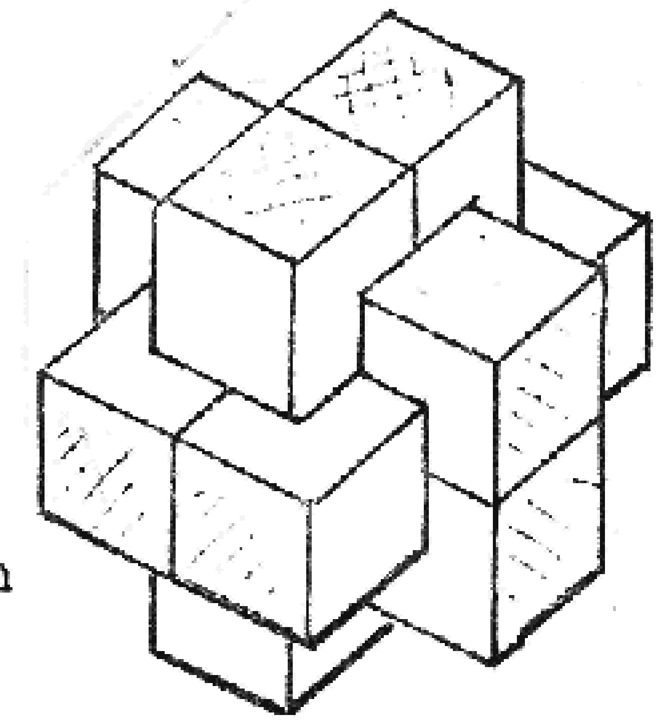
On my 1981 general instruction sheet for burr puzzles, I proposed a contest to see who could come up with the most interesting design for a standard six-piece burr. At long last, we have an entry, and winner! It was designed by Bill Cutler, with the aid of a computer.

I have produced just twelve of these in cherry, numbered serially 1-12, and I do not expect to make any more. They are being made available to a select list of individuals on my mailing list who have expressed a particular interest in such puzzles, and who do not object to receiving them disassembled with no instructions, now or forthcoming.

It took me two hours to solve. See if you can do better. I never was particularly good at these. When you have solved it, note what a clever and unusual puzzle it is - a clear winner in the contest.

Stewart Coffin, 79 Old Sudbury Road, Lincoln MA 01773 Oct 1984

BILL'S BAFFLING BURR



The standard six-piece burr is one of the oldest and most familiar of all three-dimensional interlocking puzzles. We will probably never know when, where, or by whom the first one was made. The puzzle consists of six notched square sticks arranged in three mutually perpendicular intersecting pairs. If the sticks are, say, one-inch square, then all notches are one-half-inch deep and one-half-inch wide or some exact multiple thereof.

Although the basic idea of this puzzle has been known for well over 100 years, and many different versions of it have been invented, patented, published, and manufactured, only recently has it received much attention from mathematicians and puzzle analysts.

The notched burr pieces are of two types - those which can be notched with a dado saw, and those which cannot because they have blind corners which must be chiseled out or made by gluing in blocks. The assembled burrs can also be divided into two types - those which are solid, and those which have one or more internal voids. When both types of pieces and both types of assemblies are taken into account, it is now known that there are well over 100,000 different possible design combinations, and probably well over a million. All that the burr puzzle designer of the future need do is sort all of these out and determine which are the most satisfactory. Some of the most entertaining ones are those which do not come directly apart or go directly together, but rather require the shifting back and forth of pieces in the partially assembled burr. These types always have internal voids, and they usually involve some unnotchable pieces.

Bill's Baffling Burr was designed by Bill Cutler, who is a foremost authority on the six-piece burr and expert analyst. His objective was to find a combination of pieces which had only one solution and which required several tricky shifts to assemble. He uses a computer to tell him, among other things, how many solutions exist for any given combination of pieces. This can be done by hand with pencil and paper, but the computer does in seconds what otherwise might take hours.

Within the past few years, there has been much interest in the six-piece burr, and many clever new designs have been published. One of them requires seven shifts before the first piece can be removed, and some designers are now looking for one which requires eight. Bill's Baffling Burr requires five moves to extract the first piece. I think it is the best design I have seen so far, and when you try to assemble it, you will soon discover that it is very appropriately named! We have chosen not to publish the solution.

There is an article on burrs in the January 1978 issue of Scientific American. Bill's Baffling Burr is mentioned in the October 1985 issue of Scientific American and the July 1986 issue of Games. More information on burrs and puzzles in general may be found in my book Puzzle Craft, available for $12.00 postpaid from the address below.

Stewart T. Coffin
79 Old Sudbury Rd.
Lincoln, MA 01773

May 1986

STEWART T. COFFIN

79 OLD SUDBURY RD.
LINCOLN, MASS. 01773
259-8348

The Blue Mahoe Story

Back in 1971 when I first started making puzzles of exotic woods, I necessarily became a wood collector as well, with the emphasis on woods with bright contrasting colors. The Jupiter puzzle presented the greatest challenge, since it used no less than six different woods. Eventually I ended up with woods just about every color of the rainbow except blue.

I had heard of a wood called Blue Mahoe which was reported to grow commercially on Jamaica, but evidently not many other places. In response to my inquiry, the Jamaica Department of Commerce advised me that since the wood was scarce and needed for crafts in Jamaica, export was no longer allowed.

Then one time around 1975, while poking around dusty dimly lit corners of Marshall's warehouse in Brooklyn, I stumbled upon a large bundle of unidentified bluish sawn veneer. I took a sample home with me and was pleased to discover that it was Blue Mahoe. So I immediately negotiated the purchase of the entire bundle, for around $1,000, and had it shipped to me. Alas, practically all of it turned out to be either English Brown Oak or Holly, and only about one-tenth was Blue Mahoe. Even so, I considered it a lucky purchase.

Most of the English Brown Oak was later sold through a notice in the I.W.C.S. journal — enough in fact to recover my original investment. I kept some, but just about the only use I found for it was occasional use in puzzles requiring boxes (see the cover of Puzzle Craft). The Holly sat around for years, and I couldn't even give it away. Now at last a use has been found for it in the tray for the Cornucopia puzzle.

The Blue Mahoe was all quarter-inch sawn veneer. After I stopped making laminated wooden jewelry, I didn't have much further use for it, and sold most of it to other craftsmen. Recently I have been using up what little remains for boxes, in particular for fancy versions of the Half-Hour and Pyracube puzzles. The last three remaining good pieces (which are book-matched) I have laminated together to make a ¾-inch board, which is sufficiently thick to be used in making the Jupiter puzzle. The laminations are barely visible, and will probably become even less so with age, as the wood turns more bluish with exposure to air.

The International Wood Collectors Society

Persons interested in knowing more about the fascinating world of wood might consider joining the International Wood Collectors Society and receiving their monthly journal *World of Wood*. For more information:

Bill & Myrtle Cockrell, IWCS Secretary-Treasurer
2300 West Rangeline Road
Greencastle, IN 46135-7875 U.S.A.
Telephone: (765) 653-6483
Email: cockrell@indy.tds.net
www.woodcollectors.org

The Third Stellation

This family of puzzles came about because I thought that "The Third Stellation" would be a nifty title for a new book I am working on. The book is a revised version of Puzzle Craft intended for commercial publication, with more emphasis on geometrical recreations and less on woodcraft. It may seem strange to first select the title for a book, secondly to adjust the contents to suit the title, and thirdly to finally get around to actually designing the appropriate puzzles, but that is indeed the case. Anything goes in the weird world of AP-ART!

Listed below are some puzzle designs, mostly new, all having the shape of the third stellation of the rhombic dodecahedron:

1. Six identical pieces having 2-fold symmetry. This simple puzzle is shown at the top of page 93 of Puzzle Craft as #51 - Superstar.

    1-A. Plain version. All of the Superstars made were of solid mahogany.

    1-B. Four woods with color symmetry. Would have been an interesting variation, but evidently never occurred to me until now.

2. Permutated arms. Functionally identical to the Second Stellation puzzle (Puzzle Craft - page 43), made by extending all 24 end blocks.

3. Seven pieces, as shown on page 60 of Puzzle Craft. It has many possible variations, not necessarily all with seven pieces.

4. Augmented Scorpii. Based on the same geometry as the Scorpius family (Puzzle Craft - page 51), made simply by extending the arms.

    4-A. Six identical pieces having 4-fold symmetry.

        4-A-1. Plain version.

        4-A-2. Version with 4-color symmetry similar to the Scorpius puzzle.

    4-B. Six identical but not symmetrical pieces.

        4-B-1. Plain version corresponding to the Dislocated Scorpius puzzle.

        4-B-2. Four-color version having two solutions with color symmetry.

    4-C. Six dissimilar pieces, corresponding to the Scrambled Scorpius puzzle, a very satisfactory and difficult puzzle in one wood.

    4-D. Internal Disorder. Imagine design 4-A (above) with a Garnet puzzle (Puzzle Craft - page 58) fully occupying its hollow interior. Break the Garnet into 24 individual blocks and attach them to adjacent outer arms in such a way as to produce three pairs of non-symmetrical pieces.

        4-D-1. Plain version, having only one solution.

        4-D-2. Four-color version, having only one solution with color symmetry. Unfortunately, this very intriguing puzzle is quite difficult to make, requiring stable woods and close tolerances.

    4-E. The Split Superstar. I will not attempt to describe this one except to say that it is analogous to the Split Star (Puzzle Craft - page 60). It would be difficult to make and extremely confusing to solve.

        4-E-1. The Broken Piece puzzle. A variation of the above in which one internal block appears to have broken off and become lost. Extremely confusing, especially a 4-color version. I have not actually made either of these yet.

There are probably many others not yet discovered. I just started in on this last month.

Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773 April 1986

AP-ART
The sculptural art that comes apart

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773
617-259-8348

Use of multi-colored fancy woods in AP-ART puzzles

When I began producing AP-ART polyhedral puzzles in the early 1970's, typically they were mechanically simple, using combinations of fancy woods in contrasting colors, arranged in color symmetry, such as Four Corners and Seven Woods. I sometimes wondered to what extent this extra feature of color symmetry was appreciated. When I see my Jupiter puzzle displayed in someone's collection, or even illustrated in a book, the chances are better than even that it will be assembled randomly.

Gradually I shifted to more mechanically complicated designs, which typically did not involve color symmetry, sometimes necessarily so. Also, to be entirely satisfactory, many of my more recent designs, such as Star-of-David or the Egyptian, require a very accurate fit, so I prefer to use woods that are easy to work. Many of the so-called exotic woods are more difficult.

I put in a good supply of fancy woods years ago, when they were much easier to find than they are now. I still have some set aside, waiting for the right project. As time permits, I am now using them up in special limited editions of certain puzzles, often at no increase in price. I have finally converted my saws entirely to carbide, which makes this somewhat more feasible than it was before.

In some combinatorial AP-ART puzzles, such as Scrambled Scorpius or Second Stellation, depending upon the way it is used, the addition of multi-color symmetry tends to make the solution easier, which may be an advantage or disadvantage, depending upon your point of view. In others, it has no effect other than to accentuate some geometrical feature (when assembled properly!), and these are the puzzles in which I am more inclined to experiment now with fancy woods. I hope you like this little extra feature.

S.T.C., March 1995

Serial listing of AP-ART puzzles produced and sold, 1970-1994

* good, ** better, *** best ‡ not my original design ? unknown

ranking mine	ranking yours	number	name and description	years produced	approx. number sold
		1	Ortho-Cube, 12-piece birch cube	1970	20
		1-A	The Cube, the above in 3/4-inch fancy wood	1971-1972	100
		"	Later made by Pentangle as their Wookey Hole	?	?
		2 ‡	Pentablock, set of 12 solid pentominoes in box	1970	20
		2-A ‡	Pentablock (improved), in Plexiglas box	1975	10
		2-B ‡	Pentacube, the above in 12 fancy woods, maho box	1977	20
		3	Snowflake, cast epoxy or polyester version	1970	50
		"	" cast polyester version produced by Span-Atwater	1972-1973	500
		"	" cast Hydrastone version, plastic base	1978-1985	100
**		"	" fancy wooden version with tray and cover	1986	10
		"	" plywood version cut by Jim Ayer	1990	30
		4 ‡	Sirius, familiar 6-pc.first stell. of R-D in 3 woods	1971-1972	100
		4-A ‡	Star, the above in three 1.25-inch fancy woods	1974-1974	400
		5	Scorpius (the Spider Slider), stained basswood	1970	10
		"	" improved version in four woods	1971-1974	200
		6	Four Corners, four contrasting fancy woods	1971-1975	200
		6-A	Aries, plastic version of above made by Skor-Mor	?	?
*	***	7	Jupiter, in six contrasting fancy woods	1971-1977	400
		8	Nova, six identical pieces, second stellation of R-D	1972-1974	100
		8-A	" plastic version made by Skor-Mor	?	?
		8-B	" version in four contrasting woods	1987	3
		9 ‡	Square Knot, (Altekruse) in three contrasting woods	1974-1975	40
		9-A	Frantix, variation of Altekruse with pins and holes	?	3
		"	" , plastic version made by 3M	1974 ?	?
		10	Giant Steps, pagoda-like variation of Altekruse	1974-1976	20
*	*	11	Hexagonal Prism	1974-1985	60
***	***	12	Triangular Prism, standard version, great shape	1974-1983	100
		12-A	" ", elongate version	?	2
		13	The General, more complicated star prism	1974-1976	20
		14	Super Nova, in eight woods, six dissimilar pieces	1974-1975	20
		14-A	Second Stellation, version of above in mahogany	1981-1983	50
*	*	"	further improved, made with triangular mahogany	1983-1985	50
		14-B	Augmented Second Stellation, with different shape	1990	2
	*	15	Triumph, first to make multiple polyhedral shapes	1974-1985	50
***	?	15-A	Fusion-Confusion, improved four-piece version	1990	30
		16	Dislocated Scorpius	1974-1976	20
		17	Dislocated Jupiter	1974-1976	10
		18 ‡	Abbie's Waffle	1975	10
		18-A ‡	Joined Pairs (see *Puzzle Craft 1992*, page 22)	1990	1
		19	Pyracube, joined R-D blocks pack in box, etc.	1975-1976	20
		20	Pin-Hole family	1977-1980	50 sets
		20-A	King Pin, variation using blind holes and free pins	1975	1
		20-B	Goose, variation of King Pin, animated figures	1986	1
		21	Cuckoo Nest	1977-1983	100
*	*	22	Locked Nest, some had 5 elbows, some 6 (harder)	1977-1981	50
		22-A	three-hole variation of Locked Nest, smaller	1990	1
		22-B	Siamese Locked Nests (see *Puzzling World*, p. 113)	1989	1
***	**	23	Scrambled Scorpius, neat and surprisingly difficult	1978-1987	200
***		23-A	Egyptian, newer, larger, improved version of 23	1993	12
		24	Saturn, more complicated than Jupiter	1978-1983	60

*	**	24	Saturn in 6 contrasting fancy woods, doweled joints	1985-1987	3
*	*	25	Hectix, plastic version made by 3M	1972-1976	100k
**	*	25-A	Hexsticks, wooden version	1979-1985	150
		"	" , Presently licensed to J. McFarland but not being produced. (Unlicensed copies have been made in Japan, France, and Australia.)		
***		25-B	Giant Hectix, double-sized in laminated wood	1993	4
		26	Four-Piece Pyramid, edge-beveled rosewood cubes	1976	12
		"	" " ", made of one-inch R-D blocks	1979	30
**	**	"	" " ", larger edge-beveled cubes	1981-1985	25
*	*	27	Three Pairs, surprising coordinate motion	1979-1985	150
**	**	"	" " , in rosewood with doweled joints	1986	10
		28	Truncated Octahedra, five pieces pack into box, etc.	1979-1983	50
		29	Half-Hour, 3x3x3 cube with unique solution	1980-1983	50
		"	" " , in six fancy woods, with blue maho box	1984-1985	20
	*	30	Convolution, seven-piece interlocking 4x4x4 cube	1980-1983	50
		31	Octahedral Cluster, four pieces, confusing	1980-1983	40
		32	Broken Sticks, six dissimilar pieces, difficult	1980-1983	50
**	*	33	Twelve Point, six dissimilar pieces make neat shape	1981-1986	50
**	**	34	Augmented Four Corners, unique solution, one axis	1981-1985	60
**		35 ‡	Burr #305, my favorite burr, notchable	1981-1985	60
		36	Coffin's Improved Burr, higher level, not notchable	1981-1985	50
		37	Star-of-David, orig. version, six dissimilar pieces	1981-1983	50
***	***	37-A	" " , improved version, simpler	1990	10
		38	Three-Piece Block, made of cherry for Citibank	1980	300
*	***	"	" " " , made for my puzzle friends	1981-1983	50
**	***	39	Rosebud, my hardest coordinate motion puzzle	1982-1983	40
		39-A	Rosebud assembly jig	1983-1991	30
		40	Interrupted Slide burr, in golden bilinga, 2 solutions	1982	28
		41	Unhappy Childhood, checkered cubes in 5x5x2 box	1983-1984	50
		42	Seven Woods, six identically shaped pieces, simple	1971	20
		43	Sleeper-Stopper, string and bead	1972-1974	100
		44	Super Sleeper-Stopper, has extra hole	1972-1974	100
		45 ‡	Buttonhole	1972-1976	500
		46	Vega, simple 12-pointed polyhedron in fancy woods	1972-1975	30
		47	Cluster-Buster, version with six identical pieces	1973	5
		48	Truncated Cluster-Buster, minor variation of above	1973	5
		49	Improved Cluster-Buster, dissimilar pairs of pieces	?	10
		50	Superstar, 6 identical pieces make 3rd stell. of R-D	1972-1975	10
		50-A	" , variation shown in *Puzzling World*, p-89	1990	1
		50-B	Third Stellation, 4-color version of above	-	0
		51	Little Superstar, truncated version of Superstar	?	1 ?
*	*	52	Pennyhedron, with var. too numerous to mention	1971-1985	150
		53	Little Giant Steps, truncated Giant Steps, No. 10	1973	3 ?
		54	Defiant Giant, more complicated than Giant Steps	1973	1
		55	Pagoda, Little Giant Steps plus 8 corner blocks	?	?
		56	Giant Pagoda, Giant Steps plus 8 corner blocks	1973	1
		57	14-piece version of Square Knot	1973-1975	20
**	**	58	Diagonal Cube, 6 confusing pieces make fancy cube	1971-1985	20
		59	Corner Block, variation of Pin-Hole	1980-1984	30
*	*	"	" " , improved version, see *Puzzling World*	1985-1986	15
*	*	60	Garnet, there are three slightly different versions	1984-1988	30
		61	Setting Hen, four pieces pack into cubic box, etc.	1984-1985	30
*	?	61-A	Distorted Cube, shown in *Puzzle Craft - 1992*, p-45	1988	3
		62	Nine Bars, complicated variation of Cuckoo Nest	1983-1984	10
		63	Pseudo-Notched Sticks, 6 identical pieces, a novelty	1985	25
		64	Expanding, six-piece coordinate motion toy	1971	1

		65	Thirty Notched Sticks, rhombic version	?	2
		"	" " " , pentagonal version	-	0
		66	Crystal Blocks, originally cast in epoxy	?	1 ?
**	***	67	Peanut, six polyhedral pieces connect together	1986-1989	30
		67-A	Shatterblock, more complicated version of 67-B	-	0
	*	67-B	Pennydoodle, 4 dissimilar pieces connect together	1989-1990	30
***		68	Confessional, var. of Altekruse, rhombic sticks	1994	58
		69	distorted variations of Scorpius and Jupiter, never made		0
		70	improved Saturn, see *Puzzle Craft - 1985*, page 96	-	0
		71	variation of Hexsticks with bonded pieces, never made		0
	*	72	Design No. 72 (triacontahedron), several versions	1985	3
		72-A	" " ", two-tiered version	1990	1
		73	Third Stellation, the 7-piece serial version	?	10 ?
		74	Square Face, variation of six-piece diagonal burr	1987-1988	20
		74-A	variation of above, involves coordinate motion	1987	1 ?
*		75	Split Star, neat, but proved hard to make	1985	4
		75-A	Two Tiers, see *Puzzling World*, page 157, never made		0
*		76	Cornucopia, M.B. and I had lots of fun with this one	1985-1987	100
**		76-A	Cornucopia 105747 in 10 fancy woods	1986-1987	30
	*	77	Pieces-of-Eight	1986-1988	25
**	*	77-A	" " " , improved version, grain symmetry	1989-1990	10
	*	"	" " " , a few made with multi-woods	1990	5
		78	Pillars of Hercules, 3x3x3 with two jointed pieces	1990	2
		78-A	six-piece version of above with three joints	-	0
		79	larger sets of Pieces-of-Eight pieces, triple pieces	-	0
*		80	Thirty Pinned Pentagonal Sticks, my largest puzzle	1987-1988	20
		80-A	five-hole version of above, see *Puzzling World*	1988	1
		80-B	three-hole version of above	1988	1
		81	Nest Construction Set, see *Puzzling World*, page 113	-	0
		81-A	Two-Three, see *Puzzling World*, page 114, fig. 131	1987-1988	5
		81-B1	Four-Legged Stand, four pinned hexagonal sticks	1987-1988	20
		81-C1	Double Four-Legged, eight pinned hexagonal sticks	1987-1988	10
		82	Patio Block (or Split Cube), see *Puzzle Craft - 1992*	1988	3
		83	Pentagonal Stand, five pinned pentagonal sticks	1990	?
*		83-A	" " , improved, with two elbows	1990	20
		84	Obstructed Pins, 12 pinned hexagonal sticks	1990	2
		84-A	" " , 30-stick pentagonal version, never made		0
***	?	85	Twelve-Piece Separation, triangular stick burr	1988-1992	30
***		85-A	Geodynamics, distorted No. 85	1994	5
		86	Four-Piece Separation	?	?
		86-A	Three-Piece Separation, with coordinate motion	?	?
		87	Two-Sided Tray, one made for Atlanta hands-on	1992	1
		87-A	Quadrilateral, made by Trench Enterprises	1991	?
		88	Little Rocket, six pieces form R-D on stand	1989-1990	10
		89	Cylindrix, Hexsticks with round dowels, made crude model only		0
		90	Permutated Four Corners, ?	1990	1
		91	Pinned Triangular Sticks (never finished)	-	0
		92	Queer Gear, see *Puzzling World*, page 131	?	3
		93	Five-Piece Interlocking 3x3x3	1990	2
		93-A	Four-Piece Serially Interlocking 3x3x3	1992	2
*	?	94	Fourth Dimension , intriguing but tough to make	1991	1
**	?	95	All Star, makes five stellated polyhedra	1990	5
*		96	Teddy Burr, burr with rhombic sticks	1993	8
**		96-A	Grizzly Burr, all 3 pairs rotated 5 degrees	1994	20
*		97	Tom's Burr, diagonal 6-pc. with rect. sticks	1994	100
*		98	Yogi Burr, 3/4-in. square sticks tilted 5 degrees	1994	20

**	98-A	Slant Six, symmetrical variation of No. 98	1994	25
	99	Disinclination, like No.42 Seven Woods but tilted	1994	10
*	100	a 12-piece stellated burr, crude model only	1994	
*	101	Isosceles, 12-piece distorted burr, triangular sticks	1994	20
***	101-A	Iso-Prism, augmented variation of No. 101	1994	8

That completes the listing of AP-ART puzzles produced up to the present, July 1994. I began this serial numbering of designs shortly after I began in 1968, simply as a means of identification, since names can be confusing (especially mine!). Many of my early designs were intended for mass production, primarily in plastic, almost none of which materialized. Others were simply not very good. Consequently, in 1985 I began this new list with new numbers, weeding out those of little significance and listing only puzzles made in wood, or likely to be made. Some puzzles sold before 1985 may have the old obsolete numbers. I can send a copy of the old list of 100-odd designs to those who may have a need for it, but I do not include it here as it might only create confusion.

In addition to those listed, there have been hundreds sold that were one-of-a-kind experiments, never recorded and long since forgotten - for example, that shown on page 66 of *Creative Puzzles of the World*. When they are but a slight variation of an existing design, sometimes I will assign the suffix X. Thus, for example, 26-X was a Four-Piece Pyramid sanded down on all four faces to a tetrahedron, and there may be other different 26-Xs out there which I did not record.

Most of the puzzles in this list, except the most recent, can be found somewhere in one of my three books - *Puzzle Craft 1985*, *Puzzle Craft 1992*, or *The Puzzling World of Polyhedral Dissections*.. Some are too trivial to warrant book space, such as numbers 86 and 88. In the case of a puzzle such as number 90, it was a satisfactory design as I recall, but never recorded. I suppose it is stored somewhere in my brain and could be retrieved should I wish to make the effort. The most recent puzzle designs may be the subject of another book yet to come.

A few years ago, I conducted a survey of my regular puzzle customers to find out which kinds you liked best, and least. The column of ranking reflects some of the responses. As expected, you prefer puzzles with intriguing polyhedral shapes made with exotic woods, such as Jupiter, and puzzles that make many different shapes, such as Star-of-David and Peanut. One surprise choice was the simple but utterly confusing Three Piece Block. The unusual and baffling Rosebud was ranked high. At the bottom of your list were topological (string and bead) puzzles, followed by tedious patience-type combinatorial exercises such as Pentominoes and Cornucopia.

Note the many differences between your ranking and mine. Some, such as the All Star, were too recent to be included in the survey; others such as Distorted Cube made in too few numbers. Much of the difference is explained by the fact that the designing of puzzles can be an end in itself, and an extremely satisfying one when everything goes right, or frustrating when otherwise. Sometimes what appears to be invention is just routine application of known principles plus painstaking workmanship, as was the case with Jupiter. On the other hand, among my luckiest and most satisfying discoveries were the Prism family, Scrambled Scorpius, Fusion-Confusion, and Twelve-Piece Separation, plus at least a few that you haven't seen yet!

Serial listing of AP-ART creations, 1970-1998

*	good	IPP	International Puzzle Collector's Party exchange puzzle
**	better	‡	not my original design
***	best		

ranking	number		name and description	years produced	approx. number made
	1		Ortho-Cube, 12-piece birch cube	1970	20
	1-A		The Cube, the above in 3/4-inch fancy wood	1971-1972	100
	1-A		Later made by Pentangle as their Wookey Hole	?	?
	2	‡	Pentablock, set of 12 solid pentominoes in box	1970	20
	2-A	‡	" , (improved), in Plexiglas box	1975	10
*	2-B	‡	Pentacube, the above in 12 fancy woods, maho box	1977	20
	3		Snowflake, cast epoxy or polyester version	1970	50
	3		" , polyester version produced by Span-Atwater	1972-1973	500
*	3		" , cast Hydrastone version, plastic base	1978-1985	100
**	3		" , fancy wooden version with tray and cover	1986	10
	3		" , plywood version cut by Jim Ayer	1990	30
	3		" , plastic foam version made by Binary Arts	1993	?
	4	‡	Sirius, familiar 6-pc.first stellation of R-D in 3 woods	1971-1972	100
	4-A	‡	Star, the above in three 1.25-inch fancy woods	1974-1974	400
	5		Scorpius (the Spider Slider), stained basswood	1970	10
	5		" , improved version in four woods	1971-1974	200
	6		Four Corners, in four contrasting fancy woods	1971-1975	200
IPP14	6		(2-wood version made by R.R.)	1994	
	6-A		Aries, plastic version of above made by Skor-Mor	1973 ?	?
*	7		Jupiter, in six contrasting fancy woods	1971-1977	400
	8		Nova, six identical pieces, second stellation of R-D	1972-1974	100
	8-A		" , plastic version made by Skor-Mor	1973 ?	?
	8-B		" , version in four contrasting woods	1987	3
	9	‡	Square Knot (Altekruse), in three contrasting woods	1974-1975	40
	9-A		Frantix, variation of Altekruse with pins and holes	1973	4
IPP18	9-A		" , (fancy version made by W.D.)	1998	
	9-B		" , plastic version made by 3M	1974 ?	?
	9-C		" , wooden version with extra holes	1973 ?	4
	10		Giant Steps, pagoda-like variation of Altekruse	1974-1976	20
*	11		Hexagonal Prism	1974-1985	60
***	12		Triangular Prism, standard version, intriguing shape	1974-1983	100
IPP18	12		" " (used by N.B., made by W.D.)	1998	105
	12-A		" " , elongate version	1974 ?	2
	13		The General, more complicated star prism	1974-1976	20
	13-A		" " , elongate version	1974 ?	1
**	13-B		Ring of Diamonds, made of rhombic sticks (orig.1973)	1995	4
	14		Super Nova, in eight woods, six dissimilar pieces	1974-1975	20
*	14-A		Second Stellation, version of above in mahogany	1981-1983	50
**	14-A		" " , made with triangular mahogany	1983-1985	50
	14-B		Augmented Second Stellation, with different shape	1990	2
*	14-B		Aug. Second Stellation, reissue in .800" fancy woods	1996	2
	15		Triumph, first to make multiple polyhedral shapes	1974-1985	50
**	15-A		Fusion-Confusion, improved four-piece version	1990, 1997	36
	16		Dislocated Scorpius	1974-1976	20
	17		Dislocated Jupiter	1974-1976	10
	18	‡	Abbie's Waffle	1975	10
	18-A	‡	Joined Pairs (see *Puzzle Craft 1992*, page 22)	1990	1
	19		Pyracube, joined R-D blocks pack in box, etc.	1975-1976	20
	20		Pin-Hole family	1977-1980	50 sets
	20-A		King Pin, variation using blind holes and free pins	1975	1
	20-B		Goose, variation of King Pin, animated figures	1986	1

	21	Cuckoo Nest	1977-1983	100
**	22	Locked Nest, some had 5 elbows, some 6 (harder)	1977-1981	50
	22-A	three-hole variation of Locked Nest, smaller	1990	1
	22-B	Siamese Locked Nests (see *Puzzling World*, p. 113)	1989	2
***	23	Scrambled Scorpius, neat and surprisingly difficult	1978-1987	200
***	23-A	Egyptian, newer, larger, improved version of 23	1993-1995	22
	24	Saturn, more complicated than Jupiter	1978-1983	60
*	24	" , in 6 contrasting fancy woods, doweled joints	1985-1987	3
*	25	Hectix, plastic version made by 3M	1972-1976	100k
**	25-A	Hexsticks, wooden version	1979-1985	150
	25-A	(Unlicensed copies have been made in Japan, France, and Australia.)		?
**	25-B	Giant Hectix, double-sized in laminated wood	1993	4
***	25-C	Four-color Hexsticks	1995	4
*	26	Four-Piece Pyramid, edge-beveled rosewood cubes	1976	12
*	26	" " " , made of one-inch R-D blocks	1979	30
**	26	" " " , larger edge-beveled cubes	1981-1985	25
***	26	Four-Piece Pyramid, reissue in 4 colorful woods	1997	4
*	27	Three Pairs, surprising coordinate motion	1979-1985	150
**	27	" " , in rosewood with doweled joints	1986	10
**	27-A	" " , in form of 2nd stellation, birch model	?	1
	28	Truncated Octahedra, five pieces pack into box, etc.	1979-1983	50
	29	Half-Hour, 3x3x3 cube with unique solution	1980-1983	50
*	29	" " , in six fancy woods, with blue maho box	1984-1985	20
	30	Convolution, seven-piece interlocking 4x4x4 cube	1980-1983	50
*	31	Octahedral Cluster, four pieces, confusing	1980-1983	40
*	31-A	Five-Piece Octahedral Cluster, more confusing	1994	3
**	31-A	Five-Piece Octahedral Cluster, in fancy woods	1997	3
*	32	Broken Sticks, six dissimilar pieces, difficult	1980-1983	50
**	33	Twelve Point, six dissimilar pieces make neat shape	1981-1986	50
**	33-A	Twelve Point, reissue, fancy woods, 20% smaller	1996	2
**	34	Augmented Four Corners, unique solution, one axis	1981-1985	60
*	34-A	No. 34 with faces sanded to tetrahedral, two versions	1973 ?	2
**	35 ‡	Burr #305, my favorite burr, notchable	1981-1985	60
	36	Coffin's Improved Burr, higher level, not notchable	1981-1985	50
*	37	Star-of-David, original version, six dissimilar pieces	1981-1983	50
***	37-A	" " , improved version, simpler	1990, 1997	13
	38	Three-Piece Block, made of cherry for Citibank	1980	300
*	38	" " " , made for my puzzle friends	1981-1983	50
**	39	Rosebud, perplexing polyhedron, coordinate motion	1982-1997	42
	39-A	Rosebud assembly jig	1983-1997	32
	40	Interrupted Slide burr, in golden bilinga, 2 solutions	1982	28
	41	Unhappy Childhood, checkered cubes in 5x5x2 box	1983-1984	50
	42	Seven Woods, six identically shaped pieces, simple	1971	20
	42-A	Brickyard, distorted version of Seven Woods	1995	1
	43	Sleeper-Stopper, string and bead	1972-1974	100
	44	Super Sleeper-Stopper, has extra hole	1972-1974	100
	45 ‡	Buttonhole	1972-1976	500
	46	Vega, simple 12-pointed polyhedron in fancy woods	1972-1975	30
	46-A	Vega II, same shape as 46, but made by truncating No. 50	1972	1
	47	Cluster-Buster, version with six identical pieces	1973	5
	48	Truncated Cluster-Buster, minor variation of above	1973	5
*	49	Improved Cluster-Buster, dissimilar pairs of pieces	1973	10
	50	Superstar, 6 identical pieces make 3rd stell. of R-D	1972-1975	10
	50-A	" , variation shown in *Puzzling World*, p-89	1990	1
	50-B	Third Stellation, 4-color version of above	-	-
	51	Little Superstar, truncated version of Superstar	?	1 ?
*	52	Pennyhedron, with variations too numerous to mention	1971-1985	150
	52-A	Hole-in-One, simple 3-pc. coordinate motion with pin	1995	4

IPP16	52-B	Button Box, distorted Pennyhedron, for J.D.	1995	108
	52-C	Pennyhedron tricky pair, see *Puzzling World*, page 127	?	1
	53	Little Giant Steps, truncated Giant Steps, No. 10	1973	3 ?
	54	Defiant Giant, more complicated than Giant Steps	1973	1
	55	Pagoda, Little Giant Steps plus 8 corner blocks	1973	?
	56	Giant Pagoda, Giant Steps plus 8 corner blocks	1973	1
	57	Plus 2, 14-piece version of (Altekruse)Square Knot	1973-1975	20
**	58	Diagonal Cube, 6 confusing pieces make fancy cube	1971-1985	20
	59	Corner Block, variation of Pin-Hole	1980-1984	30
*	59	" " , improved version, see *Puzzling World*	1985-1986	15
	59	" " , (made by Wayne Daniel for IBM)	1994	40
*	60	Garnet, 6-pc R-D dissection (including several variations)	1984-1988	30
	61	Setting Hen, four pieces pack into cubic box, etc.	1984-1985	30
*	61-A	Distorted Cube, shown in *Puzzle Craft - 1992*, p-45	1988, 1996	20
*	62	Nine Bars, complicated variation of Cuckoo Nest	1983-1984	10
	63	Pseudo-Notched Sticks, 6 identical pieces, a novelty	1985	25
	64	Expanding, six-piece coordinate motion toy	1971	2
	65	Thirty Notched Sticks, rhombic version	?	2
	65	" " " , pentagonal version	-	-
	66	Crystal Blocks, originally cast in epoxy	1971	3 sets
**	67	Peanut, six polyhedral pieces join together many ways	1986-1989	30
	67-A	Shatterblock, more complicated version of 67-B	-	-
	67-B	Pennydoodle, 4 dissimilar pieces connect together	1989-1990	30
**	68	Confessional, var. of Altekruse, rhombic sticks	1994	58
IPP15	68-A	Leaning Tower of Altekruse, for E.H.	1995	80
***	68-B	Confessional, modified long version, harder	1995	10
	69	distorted variations of Scorpius and Jupiter, never made	-	-
	70	improved Saturn, see *Puzzle Craft - 1985*, page 96	-	-
**	71	Stucksticks, a Hexsticks with bonded pieces	1995	3
	72	Design No. 72, (triacontahedron), several versions	1985	6
	72-A	" " " , two-tiered version	1990	1
	73	Third Stellation, the 7-piece serial version	1985	5
**	73-A	Seven-Piece Third Stellation,modified,4 fancy woods	1996	10
	74	Square Face, variation of six-piece diagonal burr	1987-1988	20
	74-A	variation of above, involves coordinate motion	1987	4
*	75	Split Star, two-tiered, neat, but proved hard to make	1985	4
	75-A	Two Tiers, see *Puzzling World*, page 157		-
*	76	Cornucopia, M.B. and I had lots of fun with this one	1985-1987	100
**	76-A	Cornucopia 105747 in 10 fancy woods	1986-1987	30
IPP-16	76-B	(version 107715 laser-cut by W.H.)	1996	
*	77	Pieces-of-Eight, eight dissimilar pieces join together	1986-1988	25
**	77-A	" " " , improved version, grain symmetry	1989-1990	10
**	77-A	" " " , a few made with multi-woods	1990	5
	78	Pillars of Hercules, 3x3x3 with two jointed pieces	1990	2
	78-A	six-piece version of above with three joints	1990	3
	78-B	five-piece 3x3x3 with 2 swivel joints, hard!	1990	2
	78-C	five-piece interlocking 3x3x3, see *Puzzle Craft-1992*	1990	2
	78-D	Pretty Puzzle, five-piece 3x3x3 with symmetry	1990	1
	79	larger sets of Pieces-of-Eight pieces, triple pieces	1973	2
*	80	Thirty Pinned Pentagonal Sticks, my largest puzzle	1987-1988	20
	80-A	five-hole version of above, see *Puzzling World*	1988	1
	80-B	three-hole version of above	1988	1
	81	Nest Construction Set, see *Puzzling World*, page 113	-	-
	81-A	Two-Three, see *Puzzling World*, page 114, fig. 131	1987-1988	5
*	81-B1	Four-Legged Stand, four pinned hexagonal sticks	1987-1988	20
	81-C1	Double Four-Legged, eight pinned hexagonal sticks	1987-1988	3
	82	Patio Block (or Split Cube), see *Puzzle Craft - 1992*	1988	4
	83	Pentagonal Stand, five pinned pentagonal sticks	1990	?

*	83-A	" " , improved, with two elbows	1990	20
	84	Obstructed Pins, 12 pinned hexagonal sticks	1990	2
	84-A	" " , 30-stick pentagonal version, never made	-	-
**	85	Twelve-Piece Separation, triangular stick burr	1988-1992	30
***	85	Twelve-Piece Separation, new edition, 10% smaller	1997	5
***	85-A	Geodynamics, distorted No. 85	1994	13
	86	Four-Piece Separation, simple	1988	4
	86-A	Three-Piece Separation, with coordinate motion, simple	1988	1
	87	Two-Sided Tray, one made for Atlanta hands-on, lost	1992	1
	87-A	Quadrilateral, made by Trench Enterprises	1991	?
	88	Little Rocket, six pieces form R-D on stand	1989-1990	10
	89	Cylindrix, Hexsticks with round dowels, made crude model only		-
	90	Permutated Four Corners (design lost)	1990	2
	91	Pinned Triangular Sticks (never finished)	-	-
*	92	Queer Gear, see *Puzzling World*, page 131	1985?	3?
**	92-A	Second Gear, 6-piece gear, fancy woods, beveled, harder	1996	8
	93	Four-Piece Serially Interlocking 3x3x3	1992	3
*	94	Fourth Dimension , intriguing but tough to make	1991	4
**	95	All Star, makes five stellated polyhedra	1990, 1997	10
*	96	Teddy Burr, burr with rhombic sticks	1993	8
**	96-A	Grizzly Burr, 6-pc. burr, all 3 pairs rotated 5 degrees	1994	30
IPP16	96-B	Double Notch, like 96-A but higher level, for T.B.	1996	2
IPP14	97	Crooked Notches, diag. 6-pc. with rectangular sticks	1994	110
	97-A	Rectangular Faces, combines No's. 74 and 97	1994	2
*	98	Yogi Burr, 3/4-in. square sticks tilted 5 degrees	1994	20
**	98-A	Slant Six, symmetrical variation of No. 98	1994	45
	99	Disinclination, like No.42 Seven Woods but distorted	1994	10
**	100	Meteor, 12-piece stellated burr, crude model only	1994	1
**	101	Isosceles, 12-piece distorted burr, triangular sticks	1994	20
**	101-A	Iso-Prism, augmented variation of No. 101	1994	8
IPP15	102	Incongruous, bizarre var. of 6-pc. diag. burr, for T.R.	1995	80
	102-A	Redemption, variation of No. 102	1995	1
IPP16	103	Missing Piece!, pentagonal pinned dowels, for T.R.	1995	80
**	104	Tech-Sticks, distorted Hexsticks	1995	7
***	104-A	Tech-Sticks, in four contrasting woods	1995	2
IPP16	105	Lock Nut, 6-pc. diag.burr, for E.H.	1995	90
IPP17	106	Burr Noodle, 6-pc. diag. burr, rhombic sticks, for E.H.	1995, 1997	100
	106-A	Reluctance, non-symmetrical version of No. 106	1995	1
IPP16	107	Trillium, 6-pc. compressed polyhedron, for B.F.	1995	90
	107-A	Augatron, augmented version of 107	1995	4
	108	Nonesuch, distorted Four Corners	1995	2
IPP16	109	Slokum-Pokum, slanted version of Pin-Hole, for J.S.	1995	100
	109-A	Foul Dowel, same as 109 but made with round dowels	1995	1
IPP17	110	Octo Burr, 8 notched square sticks, for T.B.	1995, 1997	100
*	111	Lost & Found, 6 identical pc., coord. motion (orig.1973)	1995	5
*	111-A	Lucky Star, functionally like No.111, shaped like No. 46	1995	6
**	111-B	Star Dust, functionally like No. 111, shape of 3rd stell.	1995	2
**	111-C	A-B-C, like 111-B but 3 kinds of pieces, two of each	1995, 1997	4
	111-D	like 111, but 2 kinds of pieces, 3 of each	1995	1
***	112	Burr Muda, same shape as No. 12, but coord. motion	1995	10
IPP17	113	Sliparoo, like 112 but square ends, even harder, for B.F.	1995, 1997	104
***	114	Cluster Plus, like No. 49 but coordinate motion, baffling	1996	5
	114	(used as special token to IPP17 helpers: NB, TB, AG, SI, and HN)		6
***	115	Fancy This!, 7 pc. serial interlocking, 4 fancy woods	1996	8
IPP17	115-A	" " , in plain wood, harder (used by N.B., made by W.D.)		
	116	Burr Circus, 6 pc. diag. burr, square sticks, skewed	1995	6
**	117	Overdrive, 6-piece coordinate motion gear, with ass'y jig	1996	5
IPP17	118	Three Bunnies, 3-piece triangular R-D cluster, for J.S.	1996, 1997	100

**	119	Cluster's Last Stand, 6 pieces, variation of No.47	1996, 1997	18
	120	Nine-Piece Pentagon, flat combinatorial in tray, easy	1996	6
IPP17	120	(laser-cut version made by W.H.)	1997	
*	121	Pentagonal Star, 13 dissimilar pieces in tray, harder	1996	4
	122	Rhombic Blocks, 9 pc. fancy woods in tray, many sol.	1996	10
	123	Abel's Chimney, 8 blocks in box make chimney	1997	4
	124	R-D-16, 16 R-D blocks make 4 serially interlocking pieces	1997	4
	125	Archimedes' Tile, 7 flat pieces fit into square tray	1997	1
IPP17	126	Stew's Scrap Pile, semi-diagonal 6-piece burr, for T.R.	1997	112
	127	Make Room, 8 or 9 rectangular blocks fit into 7x9x11 box	1997	1
	127-A	larger variation of above, in 9x10x11 box	1997	1
**	128	Combination Lock, 6 dissim. pc., serial + coord. mot.	1997	6
***	129	Dudd, std. 6-pc burr but with diag. notches, several var.	1997	6
IPP18	129-A	Missing Notches Burr, 6-pc. coord. motion, for J.S.	1998	100
**	130	Slider, rhombic 6-pc. diag. burr with coord. motion	1997	5
IPP18	131	Six of Diamonds, like 130 but dissim. pieces, for E.H.	1997	100
IPP18	132	six-piece burr, for T.R Tectonic	1997	100
IPP18	133	Few Tile, 4 quadrilateral tiles fit into tray, for T.B	1998	100
**	134	Outhouse, five blocks fit into constricted square tray	1998	5
	135	seven hexagons fit into hex. tray, unfinished	1998	-
	136	Tangram Plus, Tangram that doesn't fit into tray	1998	6
	137	Engelberg Square, six polyominoes fit onto 5x5 tray	1998	6
	138	Piggy Box, solid rectangular shifting block	1998	8
	139	54 triangular blocks make nine pieces in hexagonal tray	1998	-
	140	Sticky Sticks, Hexsticks with 4 bonded pairs	1998	5
	141	Isosceles, 10 dissimilar pieces fit into square tray	1998	6
	142	Octahedron, dissimilar pieces fit into octagonal tray	1998	-

That completes the listing of AP-ART creations up to the present, December 1998. I began this serial numbering of designs shortly after I began in 1968, simply as a means of identification, since names can be confusing (especially mine!). Many of my early designs were intended for mass production, primarily in plastic, almost none of which materialized. Others were simply not very good. Consequently, in 1985 I began this new list with new numbers, weeding out those of little significance and listing mostly puzzles made in wood, or likely to be made. Some puzzles made before 1985 may have the old numbers.

In addition to those listed, there have been hundreds that were one-of-a-kind experiments, never recorded and long since forgotten - for example, that shown on page 66 of *Creative Puzzles of the World*. When they are but a slight variation of an existing design, sometimes I will assign the suffix X. Thus, for example, 26-X was a Four-Piece Pyramid sanded down on all four faces to a tetrahedron, and there may be other different 26-X's out there which I did not record.

Most of the puzzles in this list, except for the most recent, can be found somewhere in one of my three books - *Puzzle Craft 1985*, *Puzzle Craft 1992*, or *The Puzzling World of Polyhedral Dissections*., all of which are now on the Internet under www.johnrausch.com. Some are too trivial to warrant book space, such as numbers 86 and 88. In the case of a puzzle such as number 90, it was a satisfactory design as I recall, but never recorded. The most recent puzzle designs may be the subject of another book yet to come.

In 1994 I began designing and making sets of simple but unique puzzles for the puzzle exchange at the annual International Puzzle Collector's Party. There were two sets of these at IPP-14 in Seattle, two at IPP-15 in Tokyo, five at IPP-16 in Luxembourg, five at IPP-17 in San Francisco, and four at IPP-18 in Tokyo. With my permission, several of my puzzle designs are now being made by other puzzle crafters, and some of these make their way into the IPP puzzle exchange each year.

In 1998 I retired to Mary's rustic hilltop cottage in Andover and began a new phase, with the emphasis on artistic creation rather than production. Appropriately, we call this new venture "Castle Creations."

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810. 978-475-1903.

Serial listing of AP-ART creations, 1970-1998

*	good	IPP	International Puzzle Collector's Party exchange puzzle
**	better	‡	not my original design
***	best		**boldface are newest**

ranking	number		name and description	years produced and approx. number made	
	1		Ortho-Cube, 12-piece birch cube	1970	20
	1-A		The Cube, the above in 3/4-inch fancy wood	1971-1972	100
	1-A		Later made by Pentangle as their Wookey Hole	?	?
	2	‡	Pentablock, set of 12 solid pentominoes in box	1970	20
	2-A	‡	" , (improved), in Plexiglas box	1975	10
*	2-B	‡	Pentacube, the above in 12 fancy woods, maho box	1977	20
	3		Snowflake, cast epoxy or polyester version	1970	50
	3		" , polyester version produced by Span-Atwater	1972-1973	500
*	3		" , cast Hydrastone version, plastic base	1978-1985	100
**	3		" , fancy wooden version with tray and cover	1986	10
	3		" , plywood version cut by Jim Ayer	1990	30
	3		" , plastic foam version made by Binary Arts	1993	?
	4	‡	Sirius, familiar 6-pc.first stellation of R-D in 3 woods	1971-1972	100
	4-A	‡	Star, the above in three 1.25-inch fancy woods	1974-1974	400
	5		Scorpius (the Spider Slider), stained basswood	1970	10
	5		" , improved version in four woods	1971-1974	200
	6		Four Corners, in four contrasting fancy woods	1971-1975	200
	6		(2-wood version made by R.R. and used for IPP14 exchange puzzle)		
	6-A		Aries, plastic version of above made by Skor-Mor	1973 ?	?
*	7		Jupiter, in six contrasting fancy woods	1971-1977	400
	8		Nova, six identical pieces, second stellation of R-D	1972-1974	100
	8-A		" , plastic version made by Skor-Mor	1973 ?	?
	8-B		" , version in four contrasting woods	1987	3
	9	‡	Square Knot (Altekruse), in three contrasting woods	1974-1975	40
	9-A		Frantix, variation of Altekruse with pins and holes	1973	4
	9-A		" , (fancy version made by W.D. for IPP-18 puzzle exchange)		
	9-B		" , plastic version made by 3M	1974 ?	?
	9-C		" , wooden version with extra holes	1973 ?	4
	10		Giant Steps, pagoda-like variation of Altekruse	1974-1976	20
*	11		Hexagonal Prism	1974-1985	60
***	12		Triangular Prism, standard version, intriguing shape	1974-1983	100
	12-A		" " , elongate version	1974 ?	2
	13		The General, more complicated star prism	1974-1976	20
	13-A		" " , elongate version	1974 ?	1
**	13-B		Ring of Diamonds, made of rhombic sticks (orig.1973)	1995	4
	14		Super Nova, in eight woods, six dissimilar pieces	1974-1975	20
*	14-A		Second Stellation, version of above in mahogany	1981-1983	50
**	14-A		" " , made with triangular mahogany	1983-1985	50
	14-B		Augmented Second Stellation, with different shape	1990	2
*	14-B		Aug. Second Stellation, reissue in .800" fancy woods	1996	2
	15		Triumph, first to make multiple polyhedral shapes	1974-1985	50
**	15-A		Fusion-Confusion, improved four-piece version	1990, 1997	36
	16		Dislocated Scorpius	1974-1976	20
	17		Dislocated Jupiter	1974-1976	10
	18	‡	Abbie's Waffle	1975	10
	18-A	‡	Joined Pairs (see *Puzzle Craft 1992*, page 22)	1990	1
	19		Pyracube, joined R-D blocks pack in box, etc.	1975-1976	20
	20		Pin-Hole family	1977-1980	50 sets
	20-A		King Pin, variation using blind holes and free pins	1975	1
	20-B		Goose, variation of King Pin, animated figures	1986	1
	21		Cuckoo Nest	1977-1983	100

**	22	Locked Nest, some had 5 elbows, some 6 (harder)	1977-1981	50
	22-A	three-hole variation of Locked Nest, smaller	1990	1
	22-B	Siamese Locked Nests (see *Puzzling World*, p. 113)	1989	2
***	23	Scrambled Scorpius, neat and surprisingly difficult	1978-1987	200
***	23-A	Egyptian, newer, larger, improved version of 23	1993-1995	22
	24	Saturn, more complicated than Jupiter	1978-1983	60
*	24	" , in 6 contrasting fancy woods, doweled joints	1985-1987	3
*	25	Hectix, plastic version made by 3M	1972-1976	100k
**	25-A	Hexsticks, wooden version	1979-1985	150
	25-A	(Unlicensed copies have been made in Japan, France, and Australia.)		?
**	25-B	Giant Hectix, double-sized in laminated wood	1993	4
***	25-C	Four-color Hexsticks	1995	4
*	26	Four-Piece Pyramid, edge-beveled rosewood cubes	1976	12
*	26	" " " , made of one-inch R-D blocks	1979	30
**	26	" " " , larger edge-beveled cubes	1981-1985	25
***	26	Four-Piece Pyramid, reissue in 4 colorful woods	1997	4
*	27	Three Pairs, surprising coordinate motion	1979-1985	150
**	27	" " , in rosewood with doweled joints	1986	10
**	27-A	" " , in form of 2nd stellation, birch model	?	1
	28	Truncated Octahedra, five pieces pack into box, etc.	1979-1983	50
	29	Half-Hour, 3x3x3 cube with unique solution	1980-1983	50
*	29	" " , in six fancy woods, with blue maho box	1984-1985	20
	30	Convolution, seven-piece interlocking 4x4x4 cube	1980-1983	50
*	31	Octahedral Cluster, four pieces, confusing	1980-1983	40
*	31-A	Five-Piece Octahedral Cluster, more confusing	1994	3
**	31-A	Five-Piece Octahedral Cluster, in fancy woods	1997	3
*	32	Broken Sticks, six dissimilar pieces, difficult	1980-1983	50
**	33	Twelve Point, six dissimilar pieces make neat shape	1981-1986	50
**	33-A	Twelve Point, reissue, fancy woods, 20% smaller	1996	2
**	34	Augmented Four Corners, unique solution, one axis	1981-1985	60
*	34-A	No. 34 with faces sanded to tetrahedral, two versions	1973 ?	2
**	35 ‡	Burr #305, my favorite burr, notchable	1981-1985	60
	36	Coffin's Improved Burr, higher level, not notchable	1981-1985	50
*	37	Star-of-David, original version, six dissimilar pieces	1981-1983	50
***	37-A	" " , improved version, simpler	1990, 1997	13
	38	Three-Piece Block, made of cherry for Citibank	1980	300
*	38	" " " , made for my puzzle friends	1981-1983	50
**	39	Rosebud, perplexing polyhedron, coordinate motion	1982-1997	42
	39-A	Rosebud assembly jig	1983-1997	32
	40	Interrupted Slide burr, in golden bilinga, 2 solutions	1982	28
	41	Unhappy Childhood, checkered cubes in 5x5x2 box	1983-1984	50
	42	Seven Woods, six identically shaped pieces, simple	1971	20
	42-A	Brickyard, distorted version of Seven Woods	1995	1
	43	Sleeper-Stopper, string and bead	1972-1974	100
	44	Super Sleeper-Stopper, has extra hole	1972-1974	100
	45 ‡	Buttonhole	1972-1976	500
	46	Vega, simple 12-pointed polyhedron in fancy woods	1972-1975	30
	46-A	Vega II, same shape as 46, but made by truncating No. 50	1972	1
	47	Cluster-Buster, version with six identical pieces	1973	5
	48	Truncated Cluster-Buster, minor variation of above	1973	5
*	49	Improved Cluster-Buster, dissimilar pairs of pieces	1973	10
	50	Superstar, 6 identical pieces make 3rd stell. of R-D	1972-1975	10
	50-A	" , variation shown in *Puzzling World*, p-89	1990	1
	50-B	Third Stellation, 4-color version of above	-	-
	51	Little Superstar, truncated version of Superstar	?	1 ?
*	52	Pennyhedron, with variations too numerous to mention	1971-1985	150
	52-A	Hole-in-One, simple 3-pc. coordinate motion with pin	1995	4
IPP16	52-B	Button Box, distorted Pennyhedron, for J.D.	1995	108

	52-C	Pennyhedron tricky pair, see *Puzzling World*, page 127	?	1
	53	Little Giant Steps, truncated Giant Steps, No. 10	1973	3 ?
	54	Defiant Giant, more complicated than Giant Steps	1973	1
	55	Pagoda, Little Giant Steps plus 8 corner blocks	1973	?
	56	Giant Pagoda, Giant Steps plus 8 corner blocks	1973	1
	57	Plus 2, 14-piece version of (Altekruse)Square Knot	1973-1975	20
**	58	Diagonal Cube, 6 confusing pieces make fancy cube	1971-1985	20
	59	Corner Block, variation of Pin-Hole	1980-1984	30
*	59	" " , improved version, see *Puzzling World*	1985-1986	15
	59	" " , made by Wayne Daniel for IBM	1994	40
*	60	Garnet, 6-pc R-D dissection (including several variations)	1984-1988	30
	61	Setting Hen, four pieces pack into cubic box, etc.	1984-1985	30
*	61-A	Distorted Cube, shown in *Puzzle Craft - 1992*, p-45	1988, 1996	20
*	62	Nine Bars, complicated variation of Cuckoo Nest	1983-1984	10
	63	Pseudo-Notched Sticks, 6 identical pieces, a novelty	1985	25
	64	Expanding, six-piece coordinate motion toy	1971	2
	65	Thirty Notched Sticks, rhombic version	?	2
	65	" " " , pentagonal version	-	-
	66	Crystal Blocks, originally cast in epoxy	1971	3 sets
**	67	Peanut, six polyhedral pieces join together many ways	1986-1989	30
	67-A	Shatterblock, more complicated version of 67-B	-	-
	67-B	Pennydoodle, 4 dissimilar pieces connect together	1989-1990	30
**	68	Confessional, var. of Altekruse, rhombic sticks	1994	58
IPP15	68-A	Leaning Tower of Altekruse, for E.H.	1995	80
***	68-B	Confessional, modified long version, harder 1995	10	
	69	distorted variations of Scorpius and Jupiter, never made	-	-
	70	improved Saturn, see *Puzzle Craft - 1985*, page 96	-	-
**	71	Stucksticks, a Hexsticks with bonded pieces	1995	3
	72	Design No. 72, (triacontahedron), several versions	1985	6
	72-A	" " " , two-tiered version	1990	1
	73	Third Stellation, the 7-piece serial version	1985	5
**	73-A	Seven-Piece Third Stellation,modified,4 fancy woods	1996	10
	74	Square Face, variation of six-piece diagonal burr	1987-1988	20
	74-A	variation of above, involves coordinate motion	1987	4
*	75	Split Star, two-tiered, neat, but proved hard to make	1985	4
	75-A	Two Tiers, see *Puzzling World*, page 157		-
*	76	Cornucopia, M.B. and I had lots of fun with this one	1985-1987	100
**	76-A	Cornucopia 105747 in 10 fancy woods	1986-1987	30
	76-B	(version 107715 laser-cut by W.H. and used for IPP16 exchange puzzle)		
*	77	Pieces-of-Eight, eight dissimilar pieces join together	1986-1988	25
**	77-A	" " " , improved version, grain symmetry	1989-1990	10
**	77-A	" " " , a few made with multi-woods	1990	5
	78	Pillars of Hercules, 3x3x3 with two jointed pieces	1990	2
	78-A	six-piece version of above with three joints	1990	3
	78-B	five-piece 3x3x3 with 2 swivel joints, hard!	1990	2
	78-C	five-piece interlocking 3x3x3, see *Puzzle Craft-1992*	1990	2
	78-D	Pretty Puzzle, five-piece 3x3x3 with symmetry	1990	1
	79	larger sets of Pieces-of-Eight pieces, triple pieces	1973	2
*	80	Thirty Pinned Pentagonal Sticks, my largest puzzle	1987-1988	20
	80-A	five-hole version of above, see *Puzzling World*	1988	1
	80-B	three-hole version of above	1988	1
	81	Nest Construction Set, see *Puzzling World*, page 113	-	-
	81-A	Two-Three, see *Puzzling World*, page 114, fig. 131	1987-1988	5
*	81-B1	Four-Legged Stand, four pinned hexagonal sticks	1987-1988	20
	81-C1	Double Four-Legged, eight pinned hexagonal sticks	1987-1988	3
	82	Patio Block (or Split Cube), see *Puzzle Craft - 1992*	1988	4
	83	Pentagonal Stand, five pinned pentagonal sticks	1990	?
*	83-A	" " , improved, with two elbows	1990	20

	84	Obstructed Pins, 12 pinned hexagonal sticks	1990	2
	84-A	" " , 30-stick pentagonal version, never made	-	-
**	85	Twelve-Piece Separation, triangular stick burr	1988-1992	30
***	85	Twelve-Piece Separation, new edition, 10% smaller	1997	5
***	85-A	Geodynamics, distorted No. 85	1994	13
	86	Four-Piece Separation, simple	1988	4
	86-A	Three-Piece Separation, with coordinate motion, simple	1988	1
	87	Two-Sided Tray, one made for Atlanta hands-on, lost	1992	1
	87-A	Quadrilateral, made by Trench Enterprises	1991	?
	88	Little Rocket, six pieces form R-D on stand	1989-1990	10
	89	Cylindrix, Hexsticks with round dowels, made crude model only		-
	90	Permutated Four Corners (design lost)	1990	2
	91	Pinned Triangular Sticks (never finished)	-	-
*	92	Queer Gear, see *Puzzling World*, page 131	1985?	3?
**	92-A	Second Gear, 6-piece gear, fancy woods, beveled, harder	1996	8
	93	Four-Piece Serially Interlocking 3x3x3	1992	3
*	94	Fourth Dimension , intriguing but tough to make	1991	4
**	95	All Star, makes five stellated polyhedra	1990, 1997	10
*	96	Teddy Burr, burr with rhombic sticks	1993	8
**	96-A	Grizzly Burr, 6-pc. burr, all 3 pairs rotated 5 degrees	1994	30
IPP16	96-B	Double Notch, like 96-A but higher level, for T.B.	1996	2
IPP14	97	Crooked Notches, diag. 6-pc. with rectangular sticks	1994	110
	97-A	Rectangular Faces, combines No's. 74 and 97	1994	2
*	98	Yogi Burr, 3/4-in. square sticks tilted 5 degrees	1994	20
**	98-A	Slant Six, symmetrical variation of No. 98	1994	45
	99	Disinclination, like No.42 Seven Woods but distorted	1994	10
**	100	Meteor, 12-piece stellated burr, crude model only	1994	1
**	101	Isosceles, 12-piece distorted burr, triangular sticks	1994	20
**	101-A	Iso-Prism, augmented variation of No. 101	1994	8
IPP15	102	Incongruous, bizarre var. of 6-pc. diag. burr, for T.R.	1995	80
	102-A	Redemption, variation of No. 102	1995	1
IPP16	103	Missing Piece!, pentagonal pinned dowels, for T.R.	1995	80
**	104	Tech-Sticks, distorted Hexsticks	1995	7
***	104-A	Tech-Sticks, in four contrasting woods	1995	2
IPP16	105	Lock Nut, 6-pc. diag.burr, for E.H.	1995	90
IPP17	106	Burr Noodle, 6-pc. diag. burr, rhombic sticks, for E.H.	1995, 1997	100
	106-A	Reluctance, non-symmetrical version of No. 106	1995	1
IPP16	107	Trillium, 6-pc. compressed polyhedron, for B.F.	1995	90
	107-A	Augatron, augmented version of 107	1995	4
	108	Nonesuch, distorted Four Corners	1995	2
IPP16	109	Slokum-Pokum, slanted version of Pin-Hole, for J.S.	1995	100
	109-A	Foul Dowel, same as 109 but made with round dowels	1995	1
IPP17	110	Octo Burr, 8 notched square sticks, for T.B.	1995, 1997	100
*	111	Lost & Found, 6 identical pc., coord. motion (orig.1973)	1995	5
*	111-A	Lucky Star, functionally like No.111, shaped like No. 46	1995	6
**	111-B	Star Dust, functionally like No. 111, shape of 3rd stell.	1995	2
**	111-C	A-B-C, like 111-B but 3 kinds of pieces, two of each	1995, 1997	4
	111-D	like 111, but 2 kinds of pieces, 3 of each	1995	1
***	112	Burr Muda, same shape as No. 12, but coord. motion	1995	10
IPP17	113	Sliparoo, like 112 but square ends, even harder, for B.F.	1995, 1997	104
***	114	Cluster Plus, like No. 49 but coordinate motion, baffling	1996	5
	114	(used as special token to IPP17 helpers: NB, TB, AG, SI, and HN)		6
***	115	Fancy This!, 7 pc. serial interlocking, 4 fancy woods	1996	8
IPP17	115-A	" " , in plain wood, harder (used by N.B. for IPP17 exchange puzzle, made by W.D.)	-	-
	116	Burr Circus, 6 pc. diag. burr, square sticks, skewed	1995	6
**	117	Overdrive, 6-piece coordinate motion gear, with ass'y jig	1996	5
IPP17	118	Three Bunnies, 3-piece triangular R-D cluster, for J.S.	1996, 1997	100

**	119	Cluster's Last Stand, 6 pieces, variation of No.47	1996, 1997	18
	120	Nine-Piece Pentagon, flat combinatorial in tray, easy	1996	6
	120	(laser-cut version made by W.H. and used for IPP17 exchange puzzle)		
*	121	Pentagonal Star, 13 dissimilar pieces in tray, harder	1996	4
	122	Rhombic Blocks, 9 pc. fancy woods in tray, many sol.	1996	10
	123	Abel's Chimney, 8 blocks in box make chimney	1997	4
	124	R-D-16, 16 R-D blocks make 4 serially interlocking pieces	1997	4
	125	Archimedes' Tile, 7 flat pieces fit into square tray	1997	1
IPP17	126	Stew's Scrap Pile, semi-diagonal 6-piece burr, for T.R.	1997	112
	127	Make Room, 8 or 9 rectangular blocks fit into 7x9x11 box	1997	1
	127-A	larger variation of above, in 9x10x11 box	1997	1
**	128	Combination Lock, 6 dissim. pc., serial + coord. mot.	1997	6
***	129	Dudd, std. 6-pc burr but with diag. notches, several var.	1997	6
IPP18	**129-A**	**Missing Notches Burr**, 6-pc. coord. motion, for J.S.	1998	100
**	**130**	**Slider**, rhombic 6-pc. diag. burr with coord. motion	1997	5
IPP18	**131**	**Six of Diamonds**, like 130 but dissim. pieces, for E.H.	1997	100
IPP18	**132**	**six-piece burr**, for T.R	1997	100
IPP18	**133**	**Few Tile**, 4 quadrilateral tiles fit into tray, for T.B	1998	100
**	**134**	**Outhouse**, five blocks fit into constricted square tray	1998	1
	135	seven hexagons fit into hex. tray, unfinished	1998	-
	136	Tangram that doesn't fit into tray, rough model only	1998	1
	137	six polyominoes fit onto 5x5 tray~~, rough model only~~	1998	4
	138	**Piggy Box**, solid rectangular shifting block	1998	8
	139	54 triangular blocks make nine pieces in hexagonal tray	1998	-
	140	7-piece Hexsticks with 5 bonded pairs, ~~rough~~ model only	1998	1
	141	Supergram 142-Octagon		

That completes the listing of AP-ART creations up to the present, December 1998. I began this serial numbering of designs shortly after I began in 1968, simply as a means of identification, since names can be confusing (especially mine!). Many of my early designs were intended for mass production, primarily in plastic, almost none of which materialized. Others were simply not very good. Consequently, in 1985 I began this new list with new numbers, weeding out those of little significance and listing mostly puzzles made in wood, or likely to be made. Some puzzles made before 1985 may have the old numbers.

In addition to those listed, there have been hundreds that were one-of-a-kind experiments, never recorded and long since forgotten - for example, that shown on page 66 of *Creative Puzzles of the World*. When they are but a slight variation of an existing design, sometimes I will assign the suffix X. Thus, for example, 26-X was a Four-Piece Pyramid sanded down on all four faces to a tetrahedron, and there may be other different 26-X's out there which I did not record.

Most of the puzzles in this list, except for the most recent, can be found somewhere in one of my three books - *Puzzle Craft 1985*, *Puzzle Craft 1992*, or *The Puzzling World of Polyhedral Dissections*., all of which are now on the Internet under www.johnrausch.com. Some are too trivial to warrant book space, such as numbers 86 and 88. In the case of a puzzle such as number 90, it was a satisfactory design as I recall, but never recorded. The most recent puzzle designs may be the subject of another book yet to come.

In 1994 I began designing and making sets of simple but unique puzzles for the puzzle exchange at the annual International Puzzle Collector's Party. There were two sets of these at IPP-14 in Seattle, two at IPP-15 in Tokyo, five at IPP-16 in Luxembourg, five at IPP-17 in San Francisco, and four at IPP-18 in Tokyo. With my permission, several of my puzzle designs are now being made by other puzzle crafters, and some of these make their way into the IPP puzzle exchange each year.

In 1998 I moved to Mary's cozy hilltop cottage in Andover and began a new phase, with the emphasis on artistic creation rather than production. Appropriately, we call this new venture "Castle Creations."

Stewart Coffin, 29 Brookfield Road, Andover, MA 01810.

Serial listing of Castle Creations, 1999-2010

This new listing, starting with January 1999, is a continuation of "Serial listing of AP-ART creations" which began with number 1 in 1970 and went to number 142 in December 1998.

number	name, description, and notes
143	Checkout, 12 checkered pieces made of isosceles right triangles of two slightly different sizes fit into square tray (for T.B., IPP20, made by T.L.).
143-A	Checker, 9 checkered pieces made up of isosceles right triangles fit into square tray with lip to hide corners.
144	Windmill, 17 multicolored pieces made up of isosceles right triangles fit into square tray to form windmill pattern. Confusing. Comes with hints and solution (for T.R., IPP19, laser-cut by W.H.).
145	Lemon, 10 colorful pieces made up of isosceles and equilateral triangles fit into elliptical tray.
146	Lime, same idea as No. 145, 10 pieces in elliptical tray, but made up of isosceles and right-triangles (for T.B., IPP19, laser-cut by W.H.).
147	Pineapple, similar to the two above, but larger and more complicated, with 13 pieces made up of squares and equilateral triangles.
148	Fourteen-piece square, same idea as No. 143 but more complicated.
148-A	Eleven-piece square in maple and mahogany.
149	Five-piece version of Garnet (experimental, original version is better).
150	Five-piece Garnet with coordinate motion (likewise experimental)
151	Two Tiers with Scorpius outer shell (rough model only).
152	Seven-piece version of Scrambled Scorpius (unfinished).
153-A	The Trap - four trapezoidal pieces fit into square tray.
153-B	Please Drop In, the above with plexiglas cover (for S.B., IPP23).

154	Similar to Outhouse No. 134 but with coordinate rotation (unfinished).
155	Eight-piece Tangram (for J. S., IPP20).
156	Sphinx - like Saturn but 12 dissimilar piece, all one wood.
156-A	" with 5 woods arranged in cubic color symmetry.
156-B	" with 15 woods, opposite pairs alike.
157	Multi-colored Egyptian in four colors (see No. 164 instead).
158	Augmented Scorpius with coordinate motion (unfinished).
159	7-piece Hexsticks, unique solution, in Limba.
160	Venus, improved variation of No. 72, 10-woods version.
160-A	" , 5-woods version, two of each wood.
160-B	" , 5 woods in matched pairs, cubic color symmetry.
160-C	" , 6 woods, double pinwheel symmetry.
160-D	" , all one wood, most difficult version.
161	New improved edition of Garnet #60, larger.
162	Scrambled Legs, 3rd stellation, 4 woods in ring pattern.
163	Five rectangular blocks in rectangular tray (unfinished).
164	Scrambled Scorpius in 4 woods, no like colors touch.
164-A	" " 6 woods, one for each piece.
164-B	" " 6 woods, pinwheel pattern, no like colors touch.
165	Split Star, simplified version of #75, easier to make.
165-A	" " diminished, hexagonal column.

165-B	" " " , square column.
165-C	" " " , octahedral.
165-D	" " " , triangular.
165-E	" " " , six-pointed star.
166	Shouldered Spider-Slider, simple version.
166-A	" " , 3+3 version, all pieces identical, coordinate motion.
166-B	" " , symmetrical version, all pieces symmetrical and identical.
167	Four pieces fit into rectangular tray, 2 trapezoidal and 2 triangular (for T.R., IPP20, laser-cut by W.H.).
168	A reissue of the Cornucopia 107715 in ten contrasting fancy woods (originally made by W.H. for the IPP-16 exchange and numbered 76-B).
169-A	Square root type, 4 polyomino pieces fit into square tray.
170	Four by Six Rhomboid, 5 polyomino-type pieces skewed to rhombic fit into rhomboid tray.
171	New 9-piece Snowflake with only 2 solutions.
172	Four Z pentominoes fit into square tray.
173	Six dissimilar triomino pieces fit into hexagonal tray.
174	?
175	Six dissimilar polyominoes fit into rectangular tray in offset grid.
175-A	A variation of 175, but not as good.
176	Five polyominoes fit into square tray at 45 degrees with hole in center.
176-A	Similar to 176, but no hole in center.
177	Oh Dear! Five polyominoes in square tray (square root of 5), but has false solution if not accurately made. Not good.

177-A	Improved version of 177, with no known defects. Many other combinations tried and found to be unsatisfactory.
178	Six pentominoes in 5 x 6 tray.
178-A	Improved version. Only possible combination using all five non-symmetrical pentominoes and unique solution. Sixth piece is T.
179	Six polyominoes in rectangular tray with offset grid and hole in center, three kinds of pieces, two of each, symmetrical.
179-A	Similar to 179, but one piece changed, non-symmetrical solution.
180	Five polyominos fit into square tray with hole in center, sq. rt. of 10.
181	The F, N, P, and Y pentominoes plus L tetromino in 4 x 6 tray. Improved version has two-sided tray with 5 x 5 and block in center on other side. Both solutions unique. Used in 2001 Christmas card. (J.S., IPP22)
181-A	The Castle Puzzle. Two sided tray, House with chimney on one side, without on other side, plus supplementary sheets with other problems.
181-B	Similar to 181-A, but chimney replaced by tree trunk.
181-C	Housing Project, variation of above (for T.R., IPP23).
182	Five polyominoes fit into rectangular tray. Has possibility of confusing variations by slight changes in tray dimensions. A few printed versions circulated with 2001 Christmas card.
183	Four hexominoes fit into square tray in offset grid. Defective design.
184	Through the Looking Glass. Six piece sliding block puzzle in 5x5 tray with plexiglass top.
184-A	Improved version of above, no empty space.
184-B	Improved version of above, two-sided tray, practice on back side.
185	The Slot Machine, sliding block puzzle in 3x3x3 box with 1x2 slot. (H.S., IPP24)

186	Window Pain, with two-sided 5x5 tray.
187	Double Play, 5x5 tray with cut plexiglas window.
187-A	The Decoy, similar to above but harder and better.
187-B	Fourteen Steps, similar to above but easier.
188	Split Box, four polycube pieces in split box, 3 solutions.
188-A	Amelia's Puzzle, five polycube pieces in box
189	Four blocks in a box (for J.S., IPP23).
190	An improved version of #86, more confusing.
191	Chicago, an improved version of #119 with right angle cuts.
191-A	Chicago, a version of the above in six fancy woods.
192	Prism Cell, six dissimilar pieces form a polyhedral solid.
193	Computer Killer, five polycube pieces, one with pegged swivel joint, make a 3x3x3 cube.
194	Triple Play, four L triominoes fit into 2x2x3 box with sliding cover.
194-A	Triple Play, improved version with checkered pieces .
195	Box Rebellion, similar to #194 but with tricky plexiglas sliding top. (J.R. IPP24)
196	Tray Bien, improved variation of #87-A with four double-sided trays.
197	Under Cover, a 4-pc. var. of #19 with dual box and edge-beveled cubes.
197-A	Ball Room, same as #197 except spheres instead of edge-beveled cubes. (J.R. IPP24)
198	Involution, improved version of #30.
199	Blocked Box, 6 polycube pieces in blocked 3x3x3 box.

200 Same external shape as #115 but different and simpler internal mechanics.

200-A Elongated version of above, third stellation shape.

201 Victor, same shape as #200, same principle as #128, but longer arms make it harder to assemble and disassemble.

201-A Elongate version of #201, very difficult to assemble, bordering on the impossible.

202 Drop Out, 5-piece sliding block in 3 x 4 tray. (H.S. IPP?)

203 Square Route, 4x4 sliding block, 82 steps

203-A Multiple Choice, colored sliding blocks in rectangular grid

203-B Sunrise, 8 colored sliding blocks

203-C The Fox, 8 sliding blocks, picture of fox

203-D Helsinki, 39 move sliding block (T.R. IPP25)

203-E The Monarch, 39 moves

203-F Butterfly, entered in 2005 Design Competition

204 Five colored polyominoes in 4x6 tray, made by Tom Lensch

205 Interlocking 5-piece version of Patio Block, (J. S. IPP27?)
206 Improved version of #191, for J. Slocum IPP26

207 The Park, interlocking polyhedron with coded solution: F-E-N-W-A-Y

208 Trip's Puzzle, six polycube pieces in a 2x3x4 box, 8 solutions

208-A Same as 208, except four colors of blocks used, to be assembled so that no like colors are next to each other, only one solution

208-B PuzzleSolver, same as 208, except two colors of blocks used, to be assembled so that symmetrical pattern appears on both top and bottom

209 Six polycube pieces in 2x3x4 box with plexiglass top and L-shaped opening on one end

209-A	Same pieces as 208, same box as 209 but with inverted L opening
210	Six polycube pieces in 2x3x4 box with L-shaped opening in plexiglass cover, two kinds of pieces, 5 of one and one mirror image, one order only
211	Family of experimental interlocking 3x3x3 cubes
212	Same only 3x3x4
213	Same only 4x4x3
214	Same only 4x4x4
215	Square Dance
216	4 pentominoes in rectangular tray, sent to Bob Finn
217	Slocum exchange and Design Competition, IPP27
218	variation of #217
219	variation of above, but 5 pieces rather than 4
220	similar to #219 but symmetrical
221	found to have defects
222	Tom Rodgers exchange, IPP27
223	8 pieces in square tray, 3 sol. But only one s with color symmetry
224	5 hexominoes in rhomboid tray
225	variation of #224 with 6 pieces
227	Basket Case, 5 pieces in trapezoidal tray
228	Computer Killer #2, offset grid, used in CMJ article
229	4 pieces, offset grid
230	6-piece offset grid

231	Half & Half, Bob Finn exchange, IPP29
232	4-piece octahedral cluster with balls
233	Henry Strout exchange, IPP29
234	box with two slots
235	variation of #237, discarded
236	another variation of #237, discarded
237	The Rattle, Henry Strout exchange
238	Recycled, 8 pinned dowels
239	X-Rated, 12 pinned bars
240	Cuckoo #2, Tom Rodgers exchange, IPP29
241	9 Bars with pieced left out
242	Spare Parts, Cuckoo with two pieces left over
243	Three Extra Holes (only one made)
244	Four pinned dowels, Rosemary Howbrigg exchange, IPP29
245	Case Closed, IPP29 Design Competition
246	Total Eclipse, four notched dowels, Slocum exchange IPP30
247	Tom Rodgers exchange, IPP30
248	12 balls in jar, discontinued
249	6 notched dowels in triangular box
250	Two sided 4-piece polyomino, Dave Rossetti exchange, IPP30

Castle Creations

Stewart Coffin
29 Brookfield Road
Andover, MA 01810

Serial listing of Castle Creations, 1999-2000

This new listing, starting with January 1999, is a continuation of "Serial listing of AP-ART creations" which began with number 1 in 1970 and went to number 142 in December 1998.

number	name, description, and notes
143	Checkout, 12 checkered pieces made up of isosceles right triangles fit into square tray.
144	Windmill, 17 multicolored pieces made up of isosceles right triangles fit into square tray to form windmill pattern. Confusing. Comes with hints and solution.
145	Lemon, 10 colorful pieces made up of isosceles and equilateral triangles fit into elliptical tray.
146	Lime, same idea as No. 145, likewise 10 pieces in elliptical tray, but made up of isosceles and right-triangles.
147	Pineapple, similar to the two above, but larger and more complicated, with 13 pieces made up of squares and equilateral triangles.
148	Fourteen-piece square.
149	Five-piece version of Garnet.
150	Five-piece Garnet with coordinate motion.
151	Two Tiers with Scorpius outer shell.
152	Seven-piece version of Scrambled Scorpius
153	The Trap - four trapezoidal pieces.
154	Similar to Outhouse No. 134 but involves coordinate rotation.
155	Eight-piece Tangram, for J. Slocum exchange.

156	Sphinx - like Saturn but 12 dissimilar pieces.
157	Multi-colored Egyptian in four colors.
157-A	Multi-colored Egyptian in three colors.
157-B	Multi-colored Egyptian in two colors.
157-C	Multi-colored Egyptian in six colors.
158	Augmented Scorpius with coordinate motion
159	7-piece Hexsticks, unique solution, in Limba 1999
160	Venus, 10-woods version 2000
160-A	" , 5-woods version, two of each
160-B	" , 5 woods in matched pairs, cubic color symmetry
160-C	" , 6 woods, double pinwheel symmetry
160-D	" , all one wood, most difficult version
161	New edition of Garnet #60, larger
162	Scrambled Legs, 3rd stellation, 4 woods, ring pattern
163	Five rectangular blocks in rectangular tray, for T.R.
164	Scrambled Scorpius in 4 woods, no like colors touch
164-A	" " 6 woods, one for each piece
164-B	" " 6 woods, pinwheel pattern, no like colors touch
165	Split Star, simplified version of #75, easier to make
165-A	" " diminished, hexagonal column
165-B	" " " , square column
165-C	" " " , octahedral
165-D	" " " , triangular

(I have not been idle)

Serial list of AP-ART instructions, descriptions, and other printed matter   Jan. 1998

* indicates explicit assembly directions   **Boldface** are newest

Note: Most of these sheets contain little or no information as to how to make the puzzle. They are offered here only as a service for replacing lost instruction sheets or to indicate subsequently published solutions.

1, The Ortho-Cube Puzzle, 1970, 1 page *
1-A, The Cube Puzzle, 1971, 1 page *
2, The Pentablock Puzzle, 1970, 1 page *
3, Snowflake, 1971, 10 page hex. booklet, $1.00 *
3, Snowflake Puzzle worksheet, 1 page
4, Sirius, The Star Puzzle, 1971 & 1972, 1 page *
5, The Spider-Slider Puzzle, 1970, 1 page
5, Scorpius, 1971, 1 page
6, The Four Corners Puzzle, 1971, 1 page *
7, Jupiter, 1971, 1 page *
7, The Jupiter Puzzle, 1985, 1 page *
8, The Nova Puzzle, 1972, 1 page
8-B, Four-Color 2nd Stellation, 1986, 1 page
9, The Square Knot Puzzle, 1972, 1 page
9, Supplement, for new version, 1986, 1 page
12, The Triangular Prism Puzzle, 1980, 1 page *
13-B, The Ring of Diamonds Puzzle, 1995, 1 page
14-A, The Second Stellation Puzzle, 1980, 1 page
14-A, The Second Stellation Puzzle, 1984, 1 page
15, Triumph, 1974, 1 page
15-A, The Fusion-Confusion Puzzle, 1990, 1 page
18, Abbie's Puzzle, 1975, 1 page
19, Pyracube, 1975, 2 pages
21, The Cuckoo Nest Puzzle, 1977, 1 page
21, assembly directions for, 1990, 1 page *
22, The Locked Nest Puzzle, 1977, 1 page
22, solution to six-elbow version, 1977, 1 page *
23, The Scrambled Scorpius, 1978, 1 page
23-A, The Egyptian Puzzle, 1993, 1 page *
24, The Saturn Puzzle, 1978, 1 page *
25-A, The Hexsticks Puzzle, 1979, 1 page *
25-B, Giant Hectix, 1993, 1 page *
25-C, Four-Color Hexsticks, 1995, 2 pages
26, The Four-Piece Pyramid Puzzle, 1979, 1 page*
27, The Three Pairs Puzzle, 1979, 1 page *
28, Truncated Octahedra Puzzle, 1979, 2 pages
29, The Half-Hour Puzzle, 1980, 1 page
29, 21 problem shapes for, 1983, 1 page
30, The Convolution Puzzle, 1980, 1 page *
31, The Octahedral Cluster Puzzle, 1980, 1 page
32, The Broken Sticks Puzzle, 1980, 1 page *
33, The Twelve Point Puzzle, 1980, 1 page
33, The Twelve Point Puzzle, 1984, 1 page
34, Augmented Four Corners Puzzle,1981,1 page
35, 36, and 40, Six-Piece Burrs, 1981, 3 pages
35, sol. to Burr 305, 1984, reprint 1995, 1 page *
37, The Star-of-David Puzzle, 1981, 1 page
37, The Star-of-David Puzzle, 1990, 1 page *
37-A, improved " " , 1990, 2 pages *
39, The Rosebud Puzzle (obsolete), 1982, 1 page
39 and 39-A, The Rosebud Puzzle, 1983, 1 page *
40, The Interrupted Slide, 1982, 1 page
41, The Unhappy Childhood Puzzle, 1983, 1 page
42, The Seven Woods Puzzle, 1971, 1 page *
43 and 44, The Sleeper-Stoppers, 1972, 1 page
45, The Buttonhole Puzzle, 1972, 1 page *
43, 44, and 45, (combined), 1984, 1 page
52, The Pennyhedron (revised), 1984, 1 page
53-56, Supplement to Square Knot, 1973, 1 page
60, The Garnet Puzzle (obsolete), 1984, 1 page
60, The Garnet Puzzle, 1985, 1 page
61, The Setting Hen Puzzle, 1984, 1 page
61-A, The Distorted Cube Puzzle, 1988, 1 page
61-A,The Distorted Cube Puzzle, rev. 1996, 1 page
62, The Nine Bars Puzzle, 1983, 1 page
62, The Nine Bars Puzzle, 1990, 1 page *
65-A, 30 Notched Rhombic Sticks, 1987, 1 page *
67, The Peanut Puzzle, 1988, 1 page
67-B, The Pennydoodle Puzzle, 1989, 2 pages
68, The Confessional Puzzle, 1994, 1 page
68, Analysis and Solution to " , 1994, 2 pages *
68-B, Confessional, long version, 1995, 1 page *
71, Stucksticks, 1995, 1 page
73-A, Seven-Piece Third Stellation, 1996, 1 page *
74 and 74-A, Square Face Puzzle, 1990, 1 page
76, Cornucopia, 1985, 2 pages before folded
76, instructions for Cornucopia kit, 1985, 1 page
77, Pieces-of-Eight Puzzle,1986, rev.1990,2pages
77, Pieces-of-Eight Puzzle supplement, 1986, 2 pages
80, Thirty Pentagonal Sticks, 1987, 1 page
81-A, The Two-Three Puzzle, 1987, 1 page
81-B and 81-B1, Four-Legged Stand,1987, 1 page
81-C and 81-C1, Double " " , 1987, 1 page
83 and 83-A, Pentagonal Stand Puzzle, 1990, 1 page
85, Twelve-Piece Separation Puzzle, 1988, 1 page
85, assembly directions for " , 1990, 1 page *
85-A, The Geodynamics Puzzle, 1994, 1 page
85-A, Geodynamics assembly instr. 1995, 1 page *
87, Modified Five-Piece Puzzle, from P.C., 1992, 1 page *
87-A, Quadrilateral Puzzle, from P.C., 1992, 1 page *
92, 92-A, Queer Gear and 2nd Gear 1996, 1 page
95, The All Star Puzzle, 1990, 2 pages *
96, 96-A, 98-A, Wild Burrs, 1994, 1 page
97, Crooked Notches, 1994, 1 page
97, Crooked Notches (revised), 1995, 1 page
99, The Disinclination Puzzle, 1994, 1 page
101, The Isosceles Puzzle, 1994, 1 page
101-A, The Iso-Prism Puzzle, 1994, 1 page
102, The Incongruous Puzzle, 1995, 1 page
102, " " analysis and solution, 1995, 1 page *
104, Tech-Sticks, 1995, 2 pages
105, Lock Nut, 1995 (draft only), 1 page

Serial list of AP-ART instructions, descriptions, and other printed matter Jan. 1998

* indicates explicit assembly directions **Boldface** are newest

Note: Most of these sheets contain little or no information as to how to make the puzzle. They are offered here only as a service for replacing lost instruction sheets or to indicate subsequently published solutions.

106, Burr Noodle, 1995, 1 page
110, Spare Pair, 1996, 1 page
111, Lost & Found; 111-A, Lucky Star; 111-B,Star Dust;
and 111-C,A-B-C; 1995,1 page
112, Burr Muda, 1995, 1 page *
112, Burr Muda Assembly Jig, 1996, 1 page *
114, Cluster Plus, 1996, 1 page
115, 115-A, Fancy This!, 1996, 1 page
117, Overdrive, 1996, 1 page *
120, Nine-Piece Pentagon, 1996, 1 page *
121, Pentagonal Star, 1996, 1 page *
123, The Chimney, 1997, 1 page
126, Stew's Scrap Pile, 1997, 1 page
131, Six of Diamonds, 1997, 1 page
134, Courtyard, 1998, 1 page

Rec-Tangle, 1973, 1 page
Occ-Wood, 1973, 1 page
Instructions for Various AP-ART puz., 1973, 1 page
Directions for making Jupiter-Saturn, 1983, 1 page
Bill's Baffling Burr, 1984, 1 page
Bill's Baffling Burr, 1986, 1 page
The Blue Mahoe Story, 1 page
The Third Stellation, 1986, 1 page
Old list (obsolete), 1 page
Polly's Flagstones, 1993, 2 pages
Odyssey of the Figure Eight Puzzle, 1993, 2 pages
Anniversary Newsletter, 1995, 2 pages
Use of multi-colored woods, 1995, 1 page
Serial list of AP-ART puzzles, 1998, 5 pages

To puzzle friends:

Here is a revised version of the E-mail with attachment that I tried unsuccessfully to send you yesterday. One of these days I will attempt to master this procedure, as it would be very useful.

STC, May 3.

Puzzle news from Castle Creations, May 2, 2002

Drop and Slide

I have been hard at work for the past month or more investigating the possibilities for a new sort of puzzle. It is a polyomino-type puzzle not so different from some others I have made recently that most of you have already seen. This type consists of the familiar 5x5 square tray and six dissimilar polyomino pieces that will assemble into it with multiple solutions. What makes it different and novel is the plexiglas top with one (or more) openings in it through which the pieces are inserted and then moved about in order to fit them all in. This greatly reduces the number of solutions, ideally to only one. Furthermore, a judicious choice of puzzle pieces and openings can produce some truly baffling puzzles. It is such an obvious idea that probably others have already thought of it. However, if so, I am not familiar with them. In any case, perhaps I have improved on previous designs. I will be curious to know.

I am thinking in terms of possible exchange puzzle designs for next year. I continue to offer my design ideas but I do not intend to make any more sets of exchange puzzles, so if interested you would need to arrange for fabrication. For me the hardest part is cutting the plexiglas. There must be some plastics manufacturing methods that I am not familiar with. I have seen several beautifully made exchange puzzles recently with plexiglas tops. The woodworking part is fairly simple.

I will send the remainder of this message as an attachment - hopefully. This will be an experiment to see if my ancient Mac is capable of sending an E-mail attachment with graphics. I tried to do this on my Dell, but the graphics in the Word 2000 program is enough to drive a person utterly out of their mind. So I finally gave up and will try it this way.

The <u>**Drop and Slide**</u> family of puzzles

All of this has been made possible by the Puzzlesolver3D program. At first I investigated sets of five pieces but did not find any satisfactory combinations, so I then settled on sets of six. Furthermore, I narrowed this down to investigating only sets consisting of the crooked triomino, the three crooked tetrominoes, and two dissimilar pentominoes. A further restriction was considering only the eight pentominoes that fit into a 3x3 square.

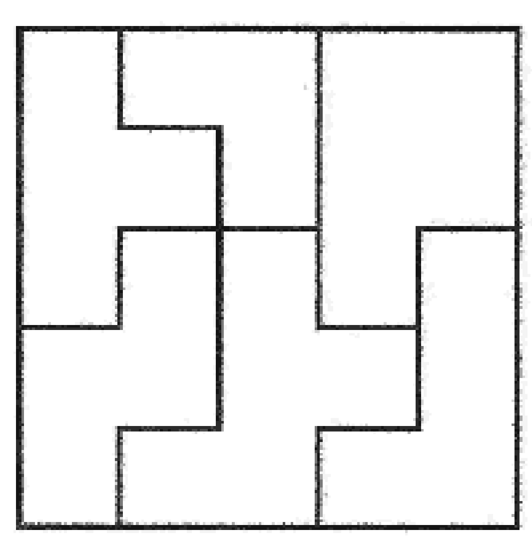
The following table shows all 5x5 solutions for such sets:

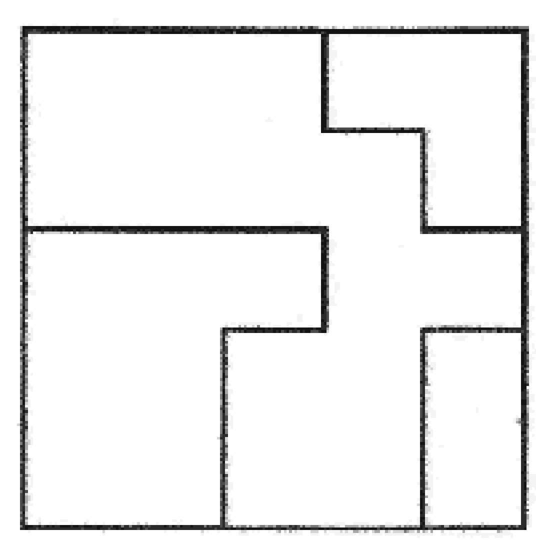
	F	P	T	V	W	X	Z
C	2	27	1	0	2	1	0
F		12	1	2	5	0	0
P			9	14	23	1	1
T				2	2	0	0
V					3	0	0
W						0	0
X							0

It is desirable to have a large number of solutions to play with at the start, since the whole idea of the plexiglas cover is to impose baffling restrictions on what would otherwise be a simple exercise. It also simplifies the design process by providing a larger pool from which to select the most interesting one. I did not investigate any combinations with fewer than nine solutions, which rules out the X and Z pieces altogether. When one considers all of the possible openings in the plexiglas top combined with the combinations in the table above, the possibilities must be in the hundreds. But only a few will be found to be outstanding. Out of the dozens that I have investigated so far, I find only five worth reporting. Perhaps other persons will be encouraged to investigate further.

Design summary:

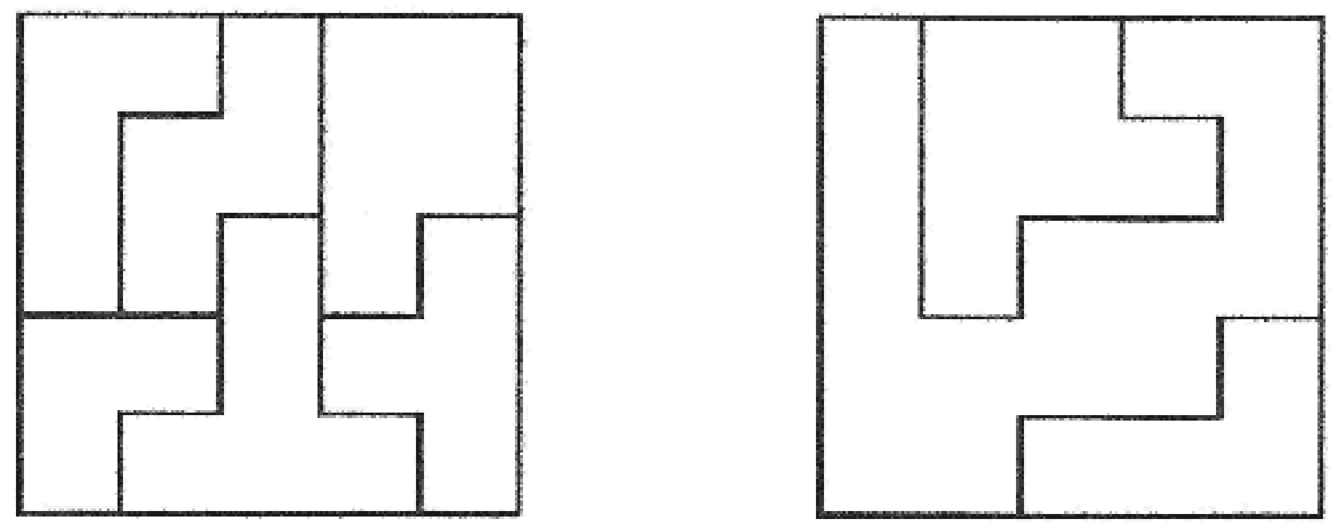
Design No. 187
type FP
"Double Play"





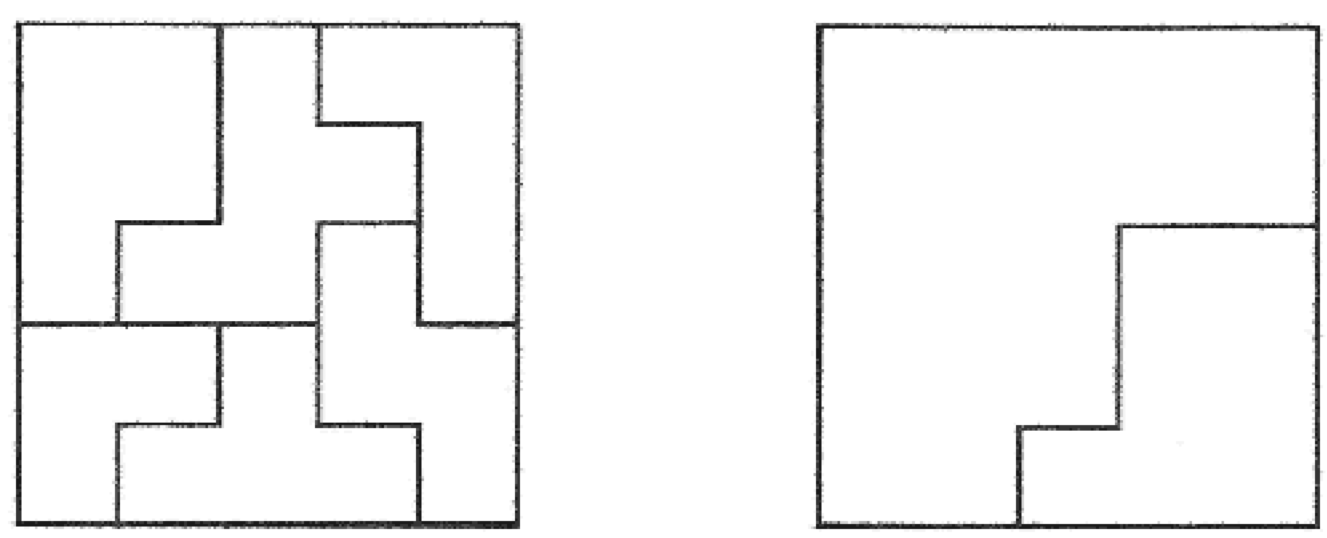
There are two solutions out of the 24 possibilities (12 x 2 because mirror images must also be counted), hence the name. The solution shown above is by far the more complicated of the two, involving coordinate motion and requiring the rounding of corners. The drawing on the right shows the cutouts in the cover. The two smaller openings are for access to allow easy movement of the pieces using the eraser end of a pencil. I have made five of these for distribution. Have to charge $40 each.

Design No. 187-A
type PT
"The Decoy"



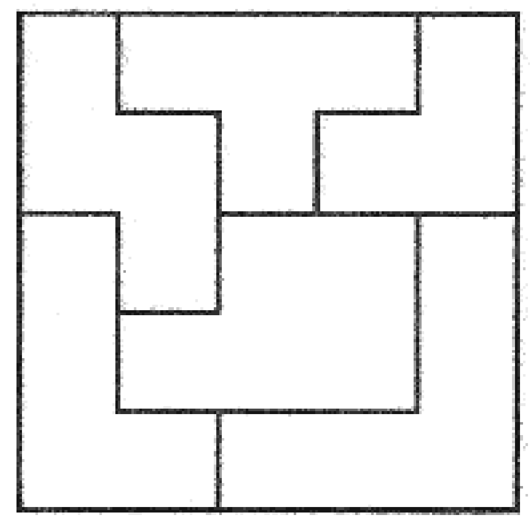
This is my favorite. There is only one solution out of the 18 possibilities, and is it very tricky, requiring numerous steps including two coordinate motion moves. The smaller opening also serves as a decoy, since many persons will try to insert the piece of that shape into it, hence the name. The corners of the pieces must be rounded. Nick already has one of these, and I have four more made up.

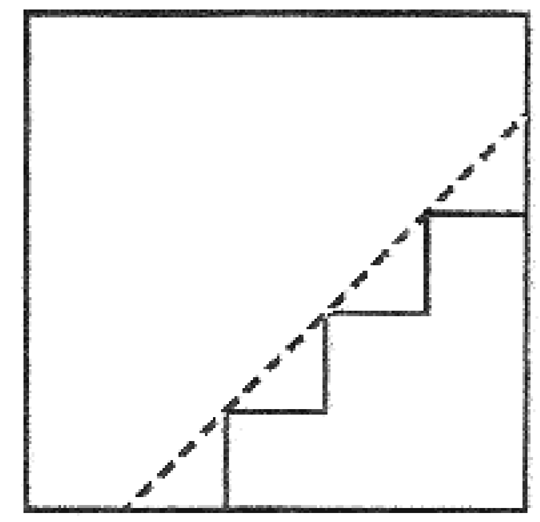
Design No. 187-B
type FP
"The Rectifier"



This one is relatively simple, for those who prefer that kind. Only one solution out of 24 possibilities. All the moves are rectilinear and the pieces are waxed to slide easily, so extra access holes are not necessary. Incidentally, I have found a way to analyze ones like this using the Puzzlesolver3D program. You start with a hollow 7x7x3 block with opening on top as piece 1, add the six pieces, and fill the top opening with piece 8. There is only one rare special case where it would not work. All of my other designs involve some rotation of pieces, and consequently the Puzzlesolver3D will not solve them. I have made two.

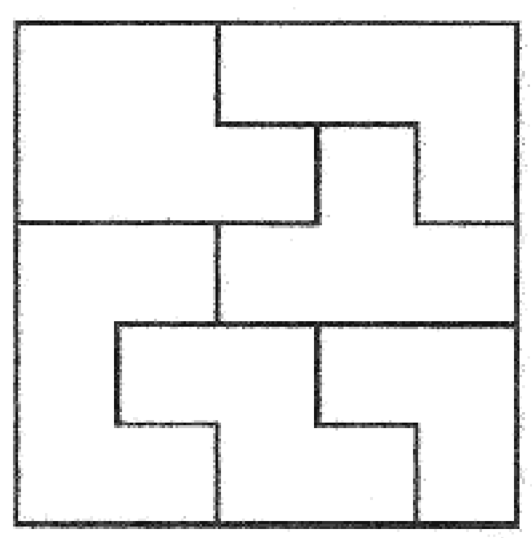
187-C
type PV
"The Diagonal"

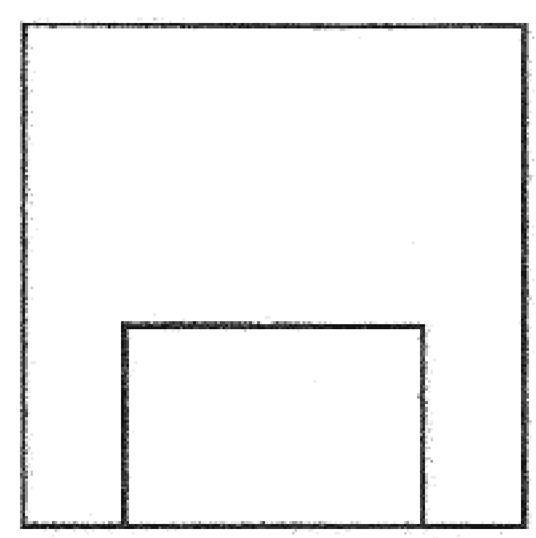




This one has two solutions, only one of which is shown, out of the 14 possibilities. The stairstep opening has an optional version of a diagonal cut. I haven't made one but I think it will work ok. Both solutions are fairly simple and do not require rounding of corners. The auxiliary openings have not been worked out yet.

Design 187-D
type CP
"Triple Play"





Three solutions out of 27 possibilities. All three are fairly interesting. I like the large number of possibilities, and also the symmetry of the cover.

All of my results should be double-checked for accuracy.

Finally, I wish to report the newest development - a universal set for those who like to tinker with design ideas. One edge of the tray attaches with a pair of screws, and the plexiglass top slides out. Thus with a set of tops and a few extra pieces one could try all of the above. You could also cut out your own tops and experiment with new design ideas. I have just made one of these and have enough materials for a couple more, if anyone is interested. With a full set of five tops and ten pieces, would have to charge $90 (plus shipping).

STC, May 3, 2002

<u>Square Root of Five Type Packing Problems</u>
(For lack of a better name for this subject)

This investigation has to do with certain puzzling ways in which polyomino-type pieces can be packed inside a square or rectangular tray. Typically, in the type of puzzle under consideration here, the first impulse is to pack the pieces orthogonally. When that fails, the hapless puzzle solver may try to pack them in a grid at 45 degrees to the tray, or perhaps randomly, likewise unsuccessfully. The solution, presumably unique, requires that the pieces all conform to a grid pattern tilted at some angle other than 90 or 45 degrees to the tray.

After making a few semi-successful attempts to discover combinations of pieces that would make satisfactory puzzles, I decided to take a more systematic approach and build up a store of useful information. Mainly I wanted to find out how many different ways such pieces could be packed in trays of various size and shape in the manner mentioned above.

So far I have thoroughly investigated only grid patterns tilted at an angle whose tangent is 2, as the title suggests. However, when it comes to practical puzzle designs, the designer will wish to test for all other presumably unwanted solutions, for which all possible grid angles must be considered. The two obvious ones are orthogonal and 45 degrees. There is also the angle whose tangent is 3 (which I call <u>Square Root of Ten Type</u>) I started investigating these but stopped when I found that it would be much more arduous than the Square Root of Five type. If one's only interest is to determine if unwanted solutions exist, note that in most cases one can easily determine their impossibility just by considering the restrictions imposed by the size of the tray

The first page of drawings shows all of the 10 different ways that squares can be packed into square trays. Those in the <u>**A**</u> column are symmetrical and those in the <u>**B**</u> column are not. The numbers along the edges indicate the tray sizes, and for convenience these have all been multiplied by the square root of five to make them whole numbers. They arbitrarily start at size 10 and go down the column to size 14. Then they go back to the top for the next cycle, 15 to 19.

This cycle of progression in size could be repeated indefinitely, but I have little interest in larger numbers. I have always felt that the most satisfactory puzzle designs are those that achieve their objective with the fewest and simplest pieces. The numbers inside indicate the number of squares contained. If you wish to investigate larger groups, it is a simple matter to take any of the patterns shown, enlarge the tray by five in both directions either on graph paper or computer screen, and sketch in the added spaces. Whenever I have done this I have noted that the number of squares added each time follows an arithmetic series. If this is a consistent rule, which I assume but have not proven, then one can easily calculate the number of squares that will fit into a tray of any given size and shape.

The second page of drawings shows all of the 15 different ways that squares can be packed into certain rectangular trays, specifically trays which deviate from square by the least possible amount. Again those in the **A** column are symmetrical while all the others are not.

The third page of drawings shows the same but for rectangles that deviate from square by the next larger amount - two units of length instead of one.

One could continue in this manner for rectangles of increasing deviation from square but I have not done so. It is time consuming. Perhaps someone will program a computer to do this and print it all out. Each deviation group will likewise have 15 different ways, except for rectangles whose dimensions are in the ratio of whole numbers, for they are in effect square trays joined together and therefore have only 10 distinct patterns because of symmetry.

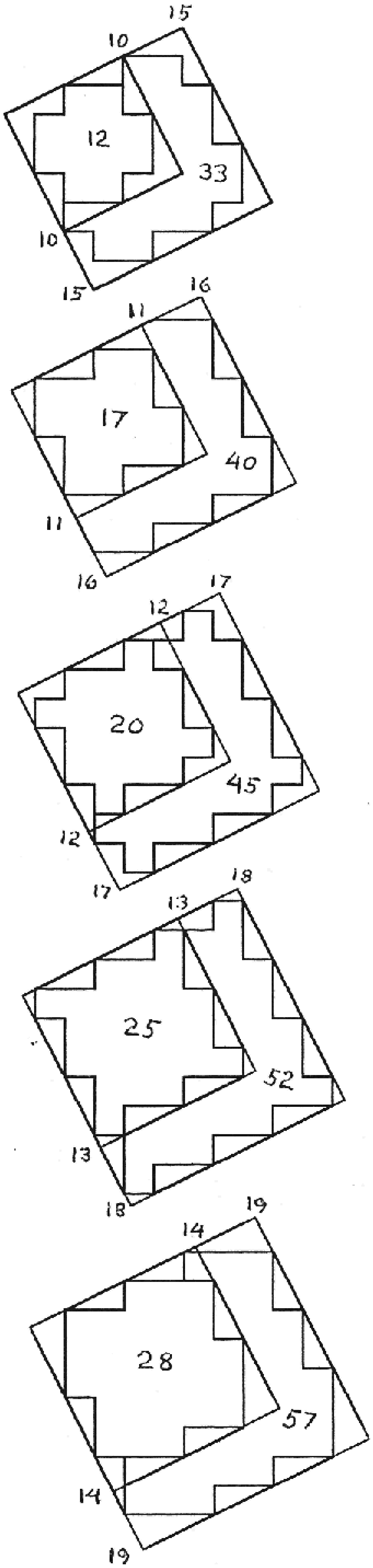
Some of the numerical results are summarized in the following table, arranged by increasing numbers of unit squares. Note the neat method used to identify the various patterns - simply the tray dimensions followed by the column letter. This method has the advantage that each pattern is uniquely identified, it can be applied to both square and rectangular trays of any size and shape, symmetrical or otherwise, and the letter **A** will always indicate symmetry.

The last column, "ratio," is an indication of how fully the puzzle pieces occupy the total area of the tray. Those with a low ratio are the most difficult to design because of the increased likelihood of unwanted solutions. Another useful consideration is the column marked "tray size." A tray with low numbers following the decimal point is much more likely to have false solutions that is one with, say, 4.919 or 5.814 sides.

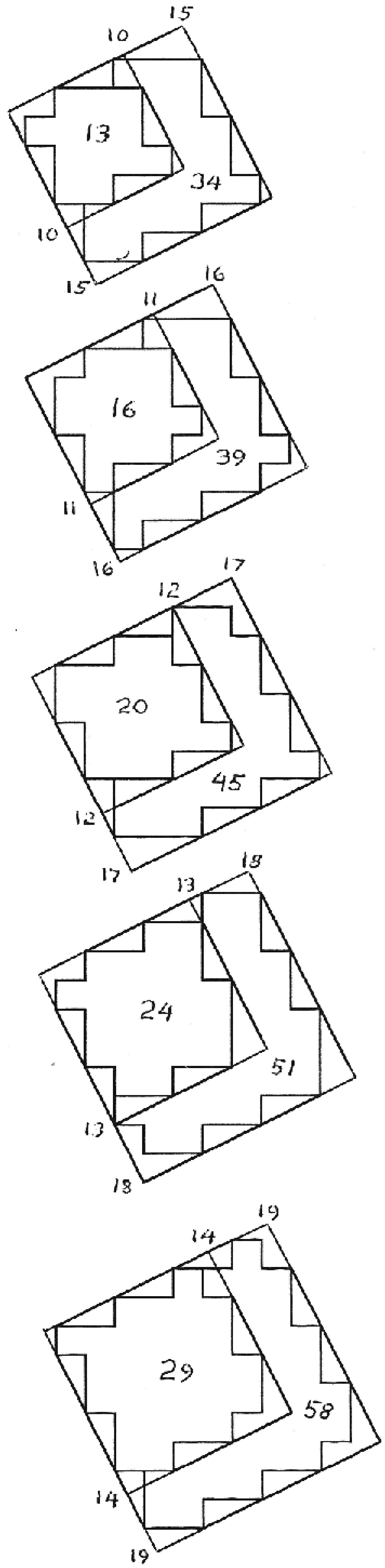
In looking for practical puzzle designs, I have not looked much beyond a pattern size of 25, nor have I considered puzzle pieces larger than pentominoes. Beyond the fact that I prefer simple designs, with large numbers of pieces the search for unwanted solutions can be exceedingly tricky. Even if I had a computer program for solving polyomino-type puzzles, which I do not, the hardest part is eliminating solutions with one or more pieces resting at incongruous angles.

pattern size	type	tray size	tray area	ratio
12	10x10 A	4.472	20.0	0.600
13	10x10 B	4.472	20.0	0.650
14	10x11 A	4.472 x 4.919	22.0	0.636
14	10x11 B	4.472 x 4.919	22.0	0.636
15	10x11 C	4.472 x 4.919	22.0	0.682
16	10x12 A	4.472 x 5.367	24.0	0.667
16	10x12 B	4.472 x 5.367	24.0	0.667
16	10x12 C	4.472 x 5.367	24.0	0.667
16	11x11 A	4.919	24.2	0.661
17	11x11 A	4.919	24.2	0.702
18	11x12 A	4.919 x 5.367	26.4	0.682
18	11x12 B	4.919 x 5.367	26.4	0.682
18	11x12 C	4.919 x 5.367	26.4	0.682
19	11x13 A	4.919 x 5.814	28.6	0.664
20	11x13 B	4.919 x 5.814	28.6	0.699
20	11x13 C	4.919 x 5.814	28.6	0.699
20	12x12 A	5.367	28.8	0.694
20	12x12 B	5.367	28.8	0.694
22	12x13 A	5.367 x 5.814	31.2	0.705
22	12x13 B	5.367 x 5.814	31.2	0.705
22	12x13 C	5.367 x 5.814	31.2	0.705
24	12x14 A	5.367 x 6.261	33.6	0.714
24	12x14 B	5.367 x 6.261	33.6	0.714
24	12x14 C	5.367 x 6.261	33.6	0.714
24	13x13 B	5.814	33.8	0.710
25	13x13 A	5.814	33.8	0.740
26	13x14 A	5.814 x 6.261	36.4	0.714
26	13x14 C	5.814 x 6.261	36.4	0.714
27	13x14 B	5.814 x 6.261	36.4	0.742
28	13x15 C	5.814 x 6.710	39.0	0.718
28	14x14 A	6.261	39.2	0.714
29	13x15 A	5.814 x 6.710	39.0	0.744
29	13x15 B	5.814 x 6.710	39.0	0.744
29	14x14 B	6.261	39.2	0.740
31	14x15 B	6.261 x 6.710	42.0	0.738
31	14x15 C	6.261 x 6.710	42.0	0.738
32	14x15 A	6.261 x 6.710	42.0	0.762
33	14x16 C	6.261 x 7.155	44.8	0.737
34	14x16 A	6.261 x 7.155	44.8	0.759
34	14x16 B	6.261 x 7.155	44.8	0.759

A

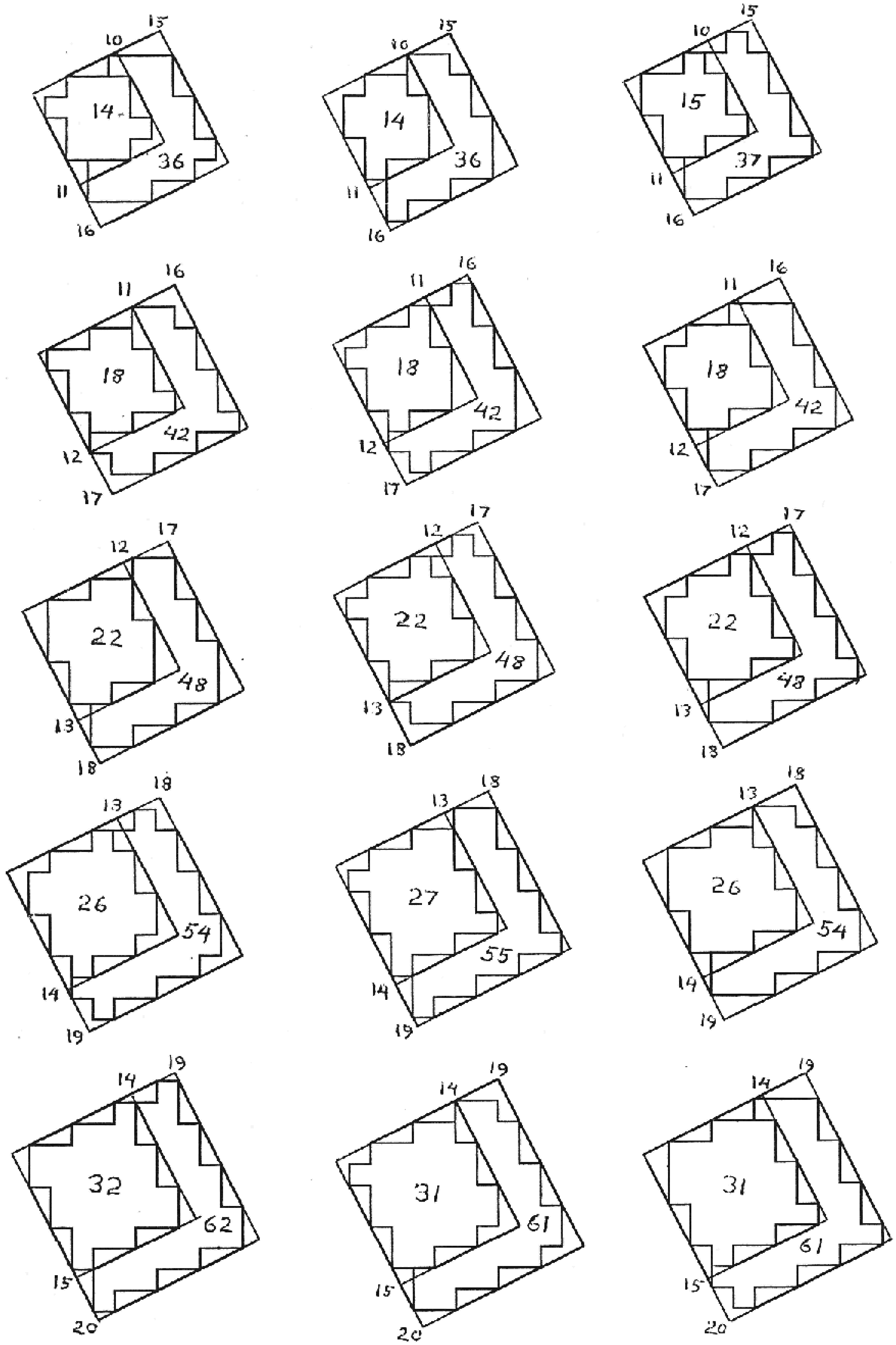


B



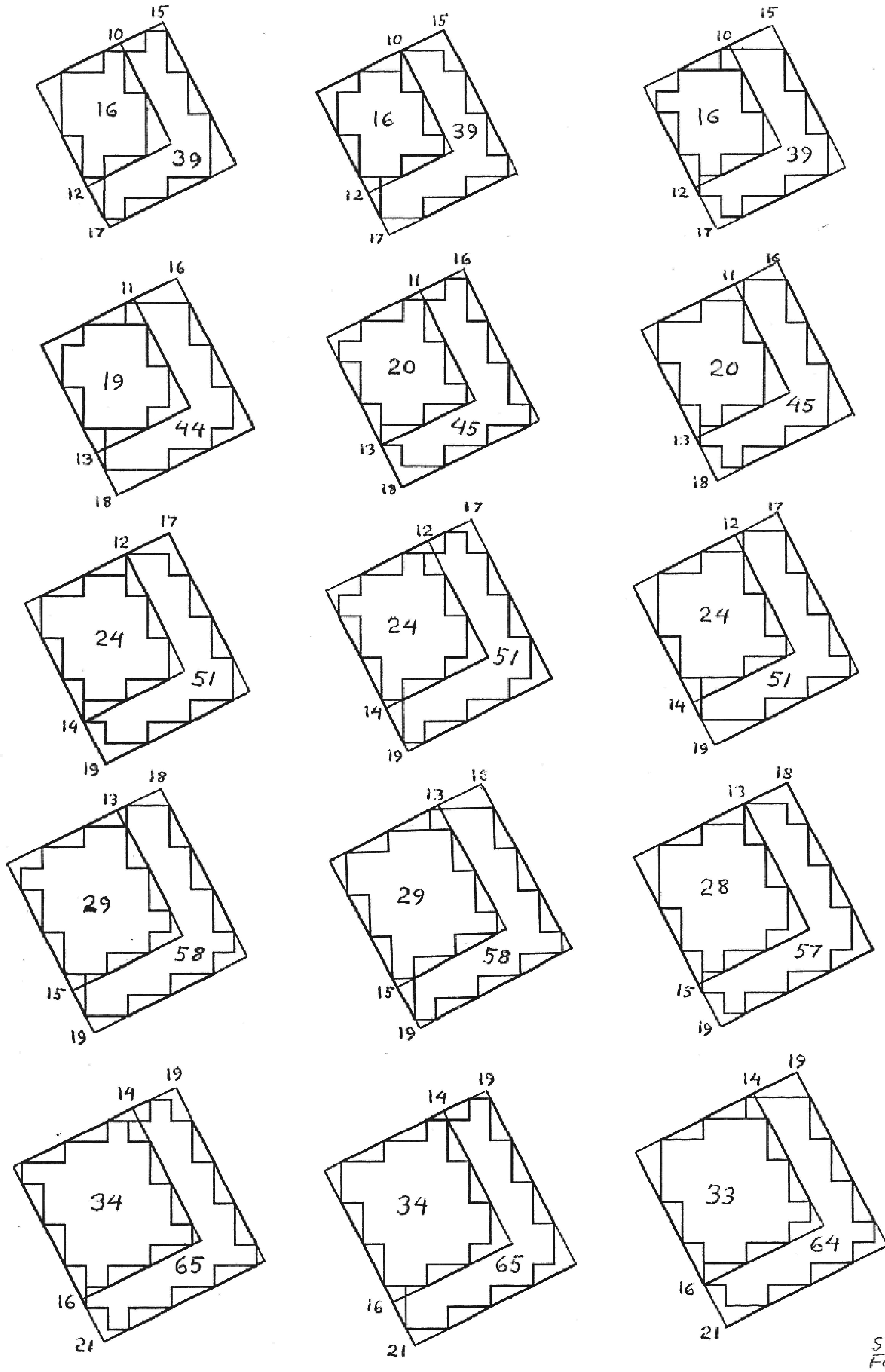
STC
Feb 2001

A B C



STC
Feb. 2001

A B C

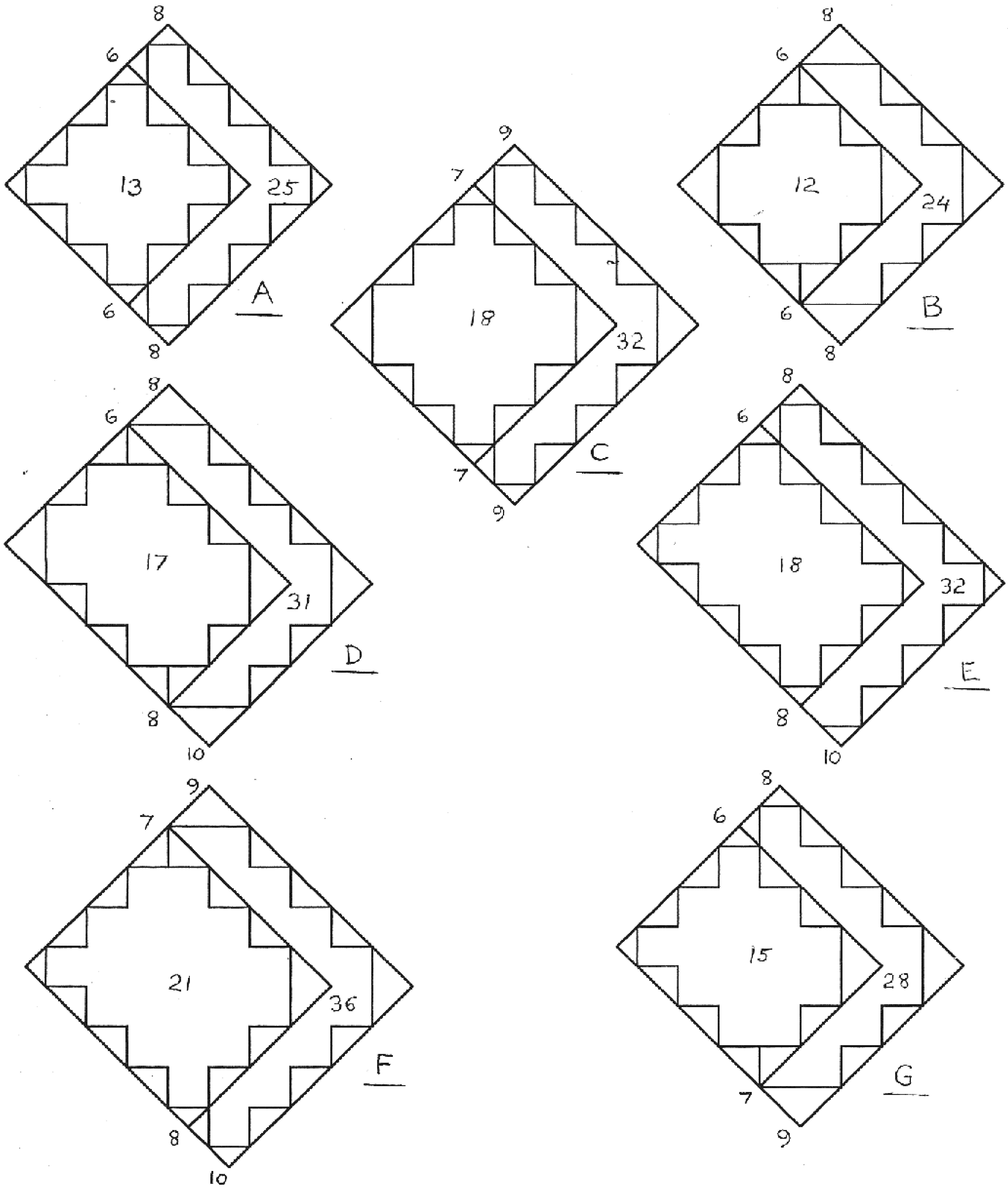


STC
Feb 2001

The last page of drawings shows the various ways in which squares can be packed into square and certain rectangular trays at 45 degrees, arranged in descending degrees of symmetry. Note that all tray dimensions have been multiplied by the square root of two. These are summarized in the following table. Note also that the packing efficiencies (ratios) tend to be greater than those in the previous table. This indicates that unwanted 45 degree solutions are more likely to occur. By the same token, all orthogonal patterns have a packing ratio of unity, so are therefore the most likely of all.

pattern size	type	tray size	tray area	ratio
12	6 x 6 B	4.243	18	0.667
13	6 x 6 A	4.243	18	0.722
15	6 x 7 G	4.243 x 4.950	21	0.714
17	6 x 8 D	4.243 x 5.657	24	0.708
18	7 x 7 C	4.950	24.5	0.735
18	6 x 8 E	4.243 x 5.657	24	0.750
21	7 x 8 F	4.950 x 5.657	28	0.750
24	8 x 8 B	5.657	32	0.750
25	8 x 8 A	5.657	32	0.781
28	8 x 9 G	5.657 x 6.364	36	0.778
31	8 x 10 D	5.657 x 7.071	40	0.775
32	9 x 9 C	6.364	40.5	0.790
32	8 x 10 E	5.657 x 7.071	40	0.800
36	9 x 10 F	6.364 x 7.071	45	0.800

This report prepared by Stewart Coffin, Feb. 8, 2001. It may be duplicated and disseminated freely.


8
6
13
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G

STC
Feb 2001

AP-ART

The sculptural art that comes apart

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773
617-259-8348

Use of multi-colored fancy woods in AP-ART puzzles

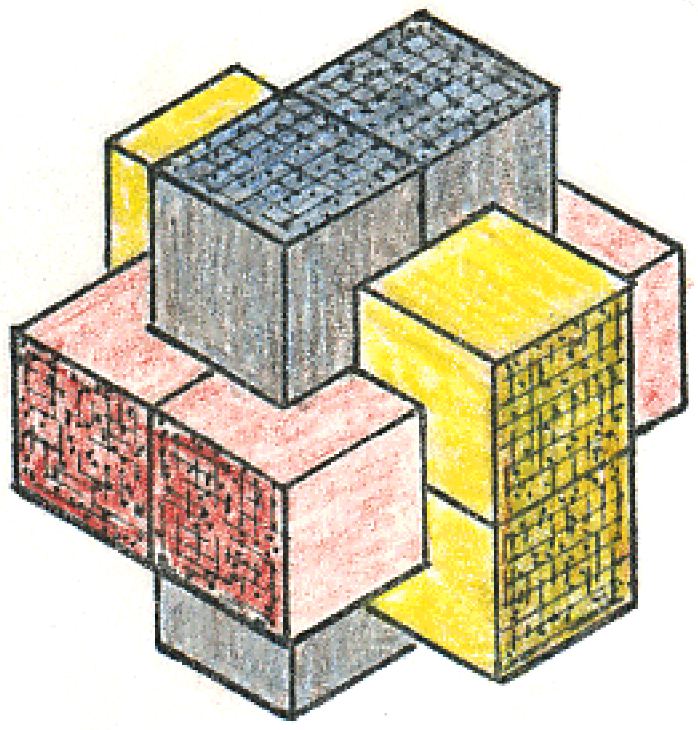
When I began producing AP-ART polyhedral puzzles in the early 1970's, typically they were mechanically simple, using combinations of fancy woods in contrasting colors, arranged in color symmetry, such as Four Corners and Seven Woods. I sometimes wondered to what extent this extra feature of color symmetry was appreciated. When I see my Jupiter puzzle displayed in someone's collection, or even illustrated in a book, the chances are better than even that it will be assembled randomly.

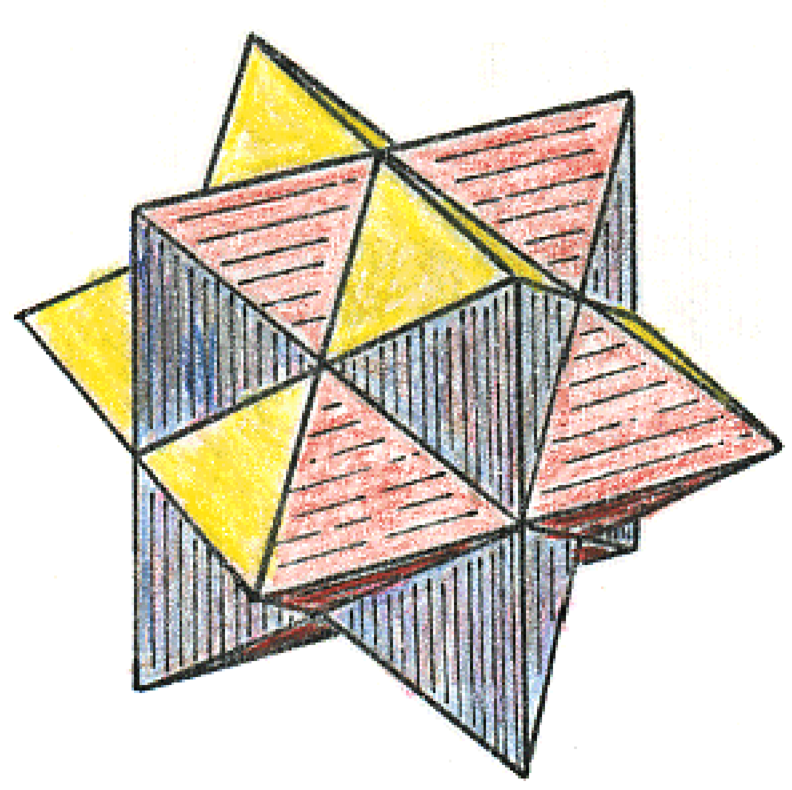
Gradually I shifted to more mechanically complicated designs, which typically did not involve color symmetry, sometimes necessarily so. Also, to be entirely satisfactory, many of my more recent designs, such as Star-of-David or the Egyptian, require a very accurate fit, so I prefer to use woods that are easy to work. Many of the so-called exotic woods are more difficult.

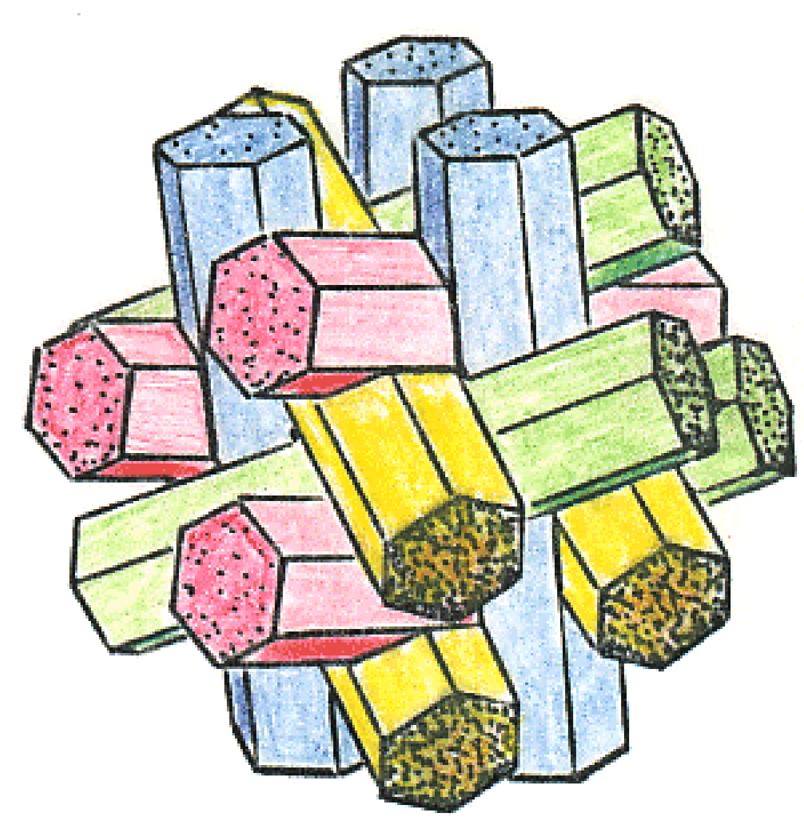
I put in a good supply of fancy woods years ago, when they were much easier to find than they are now. I still have some set aside, waiting for the right project. As time permits, I am now using them up in special limited editions of certain puzzles, often at no increase in price. I have finally converted my saws entirely to carbide, which makes this somewhat more feasible than it was before.

In some combinatorial AP-ART puzzles, such as Scrambled Scorpius or Second Stellation, depending upon the way it is used, the addition of multi-color symmetry tends to make the solution easier, which may be an advantage or disadvantage, depending upon your point of view. In others, it has no effect other than to accentuate some geometrical feature (when assembled properly!), and these are the puzzles in which I am more inclined to experiment now with fancy woods. I hope you like this little extra feature.

S.T.C., March 1995



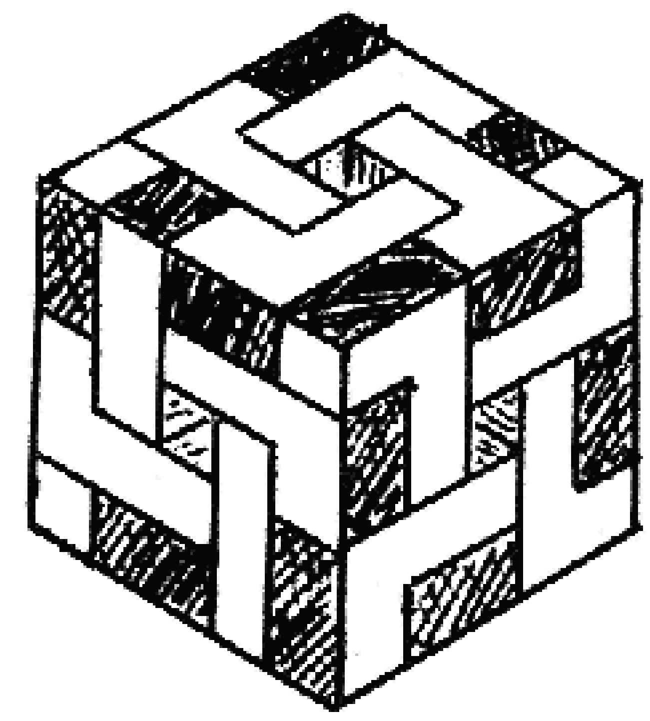




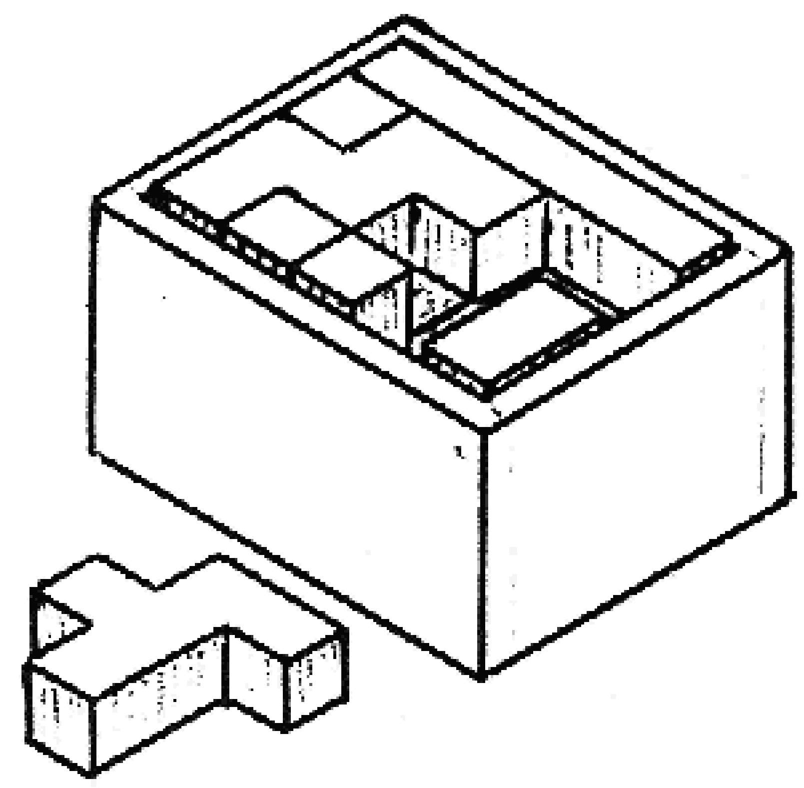
STEWART T. COFFIN

OLD SUDBURY RD. RFD 1 LINCOLN, MASS. 01773

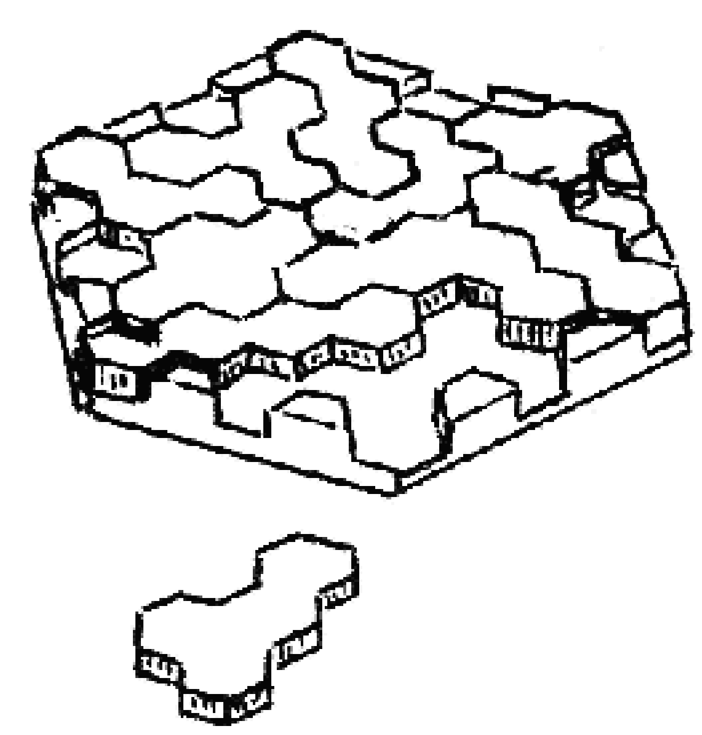
UNUSUAL PUZZLES



1. ORTHO-CUBE A twelve-piece cubic interlocking puzzle of unique design, with convolute light and dark patterns on each face of unusual beauty and symmetry. Solid birch, 4-1/2 inches. Handmade, finished in oil and beeswax, a very attractive puzzle. Instruction sheet included.
   Price: $8.00 (for mailing, add $1.00)



2. PENTABLOCK Twelve dissimilar orthogonal geometric elements can be packed inside a 3 x 4 x 5 box several different ways. They also build six other rectangular figures, plus a practically limitless number of other geometric shapes - some easy, others extremely frustrating. The design is based on mathematical theory. Handmade in solid birch, natural finish, box and instruction sheet included.
   Price: $7.50 (for mailing, add $1.00)



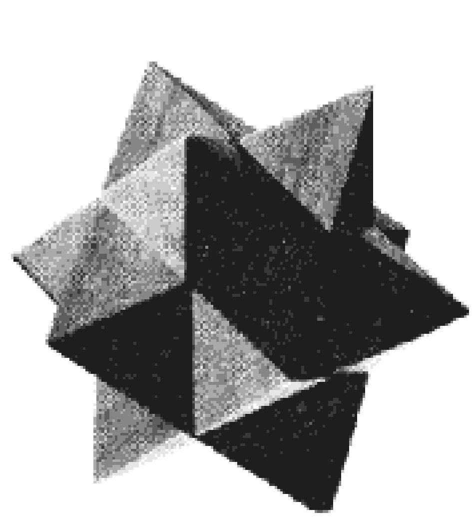
3. SNOWFLAKE Ten dissimilar hexa-morphic elements can be fitted together within a hexagonal base to generate numerous different patterns, including The Snowflake shown here. Instruction booklet explains the mathematical principles involved, and lists several interesting problems - ranging from elementary to very advanced. Unique and original, our only two-dimensional puzzle. The pieces look and feel solid because they are solid, individually cast in tough thermosetting resin, not injection molded plastic. Made in various colors.
   Price: $5.00 (for mailing, add 50¢)

Mass. Sales Tax: 3%

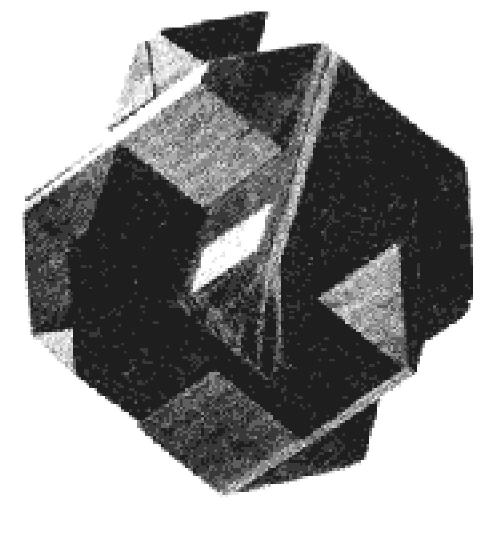
Visit our shop and Puzzle Museum, where these and many other unusual puzzles are on display.

Stewart T. Coffin

POLYHEDRAL PUZZLES IN WOOD



1



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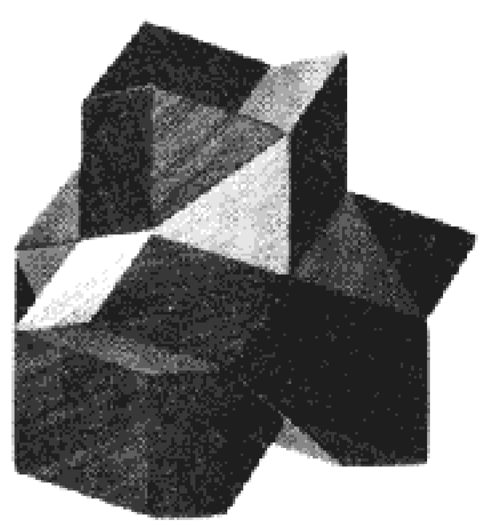

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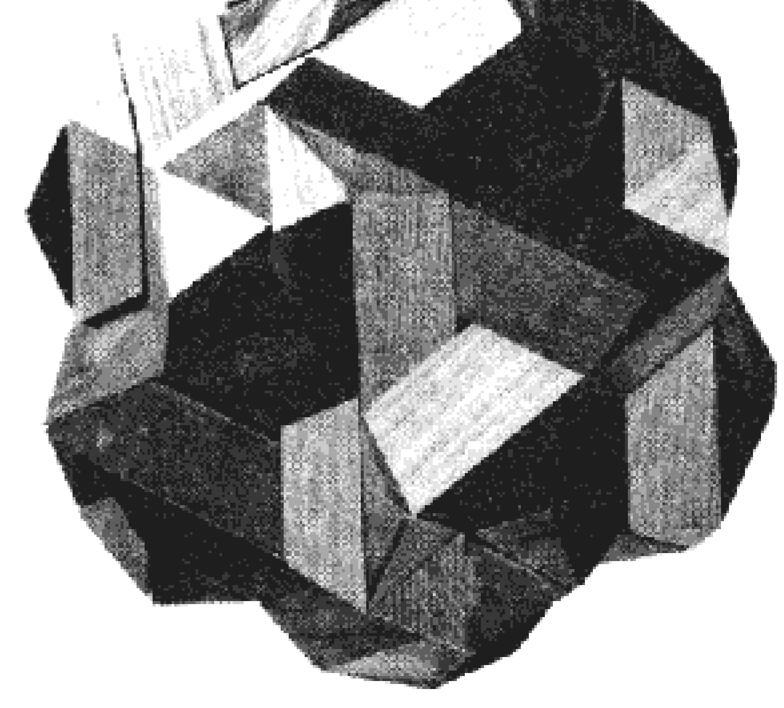

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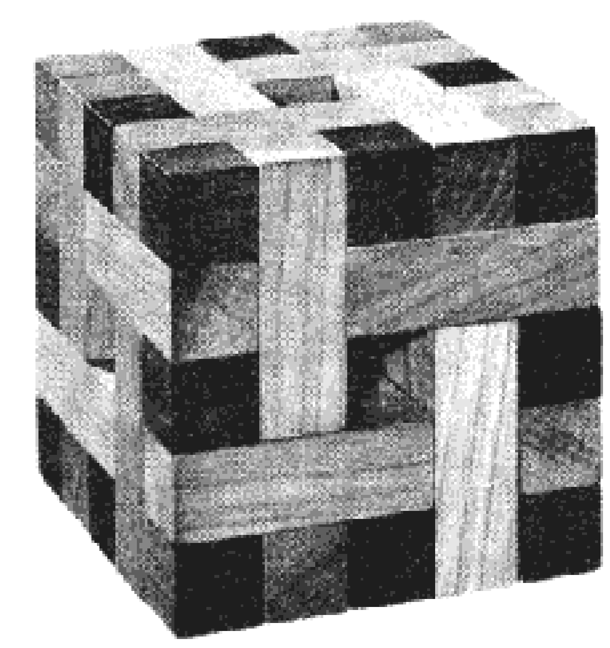


4

1. **SIRIUS**, The Star Puzzle. A new and improved variation of a classic design. Six identically shaped pieces, made up of three different woods, interlock to form a stellated rhombic dodecahedron. Two distinctly different symmetrical solutions are possible, in contrasting wood patterns. 3-¼ inches.

2. **SCORPIUS**, The Spider-Slider Puzzle. Unique and original. Twenty-four individual pieces of wood, of four contrasting types, make up the six spider-shaped pieces of this diabolical design. SCORPIUS slides apart in four different directions, in a manner which is baffling to say the least. Four possible symmetrical patterns provide added challenge. 3-¾ inches.

3. The **FOUR CORNERS** Puzzle. An original design. Each of the six pieces is made up of three contrasting woods, selected for beautiful end grain effect. The four different woods which form the apexes of this tetrahedral solid come literally from the four corners of the world. The solution is simple and yet perplexing. Arranging the corner woods in different combinations of patterns results in four distinct symmetrical solutions. 3-½ inches.

4. **THE CUBE** Puzzle. Unique and original. This orthogonal interlocking design is unusual because of its dual symmetry. Fifty-six individual blocks in three contrasting woods constitute the twelve pieces of this challenging puzzle. Identical spiral vortex patterns appear on each of the six faces. It comes apart into two identical halves and, surprisingly, four identical quarters. 3-¾ inches.

5. **JUPITER,** The Super Spider-Slider Puzzle. Totally unique. Sixty individual pieces of wood in six contrasting types are used to construct the twelve identical spider-shaped pieces of this fantastic structure, which has the form of a castellated triacontahedron. Being absolutely symmetrical in design, it slides apart in six different directions independently, and has five distinct symmetrical solutions. 6-½ inches.

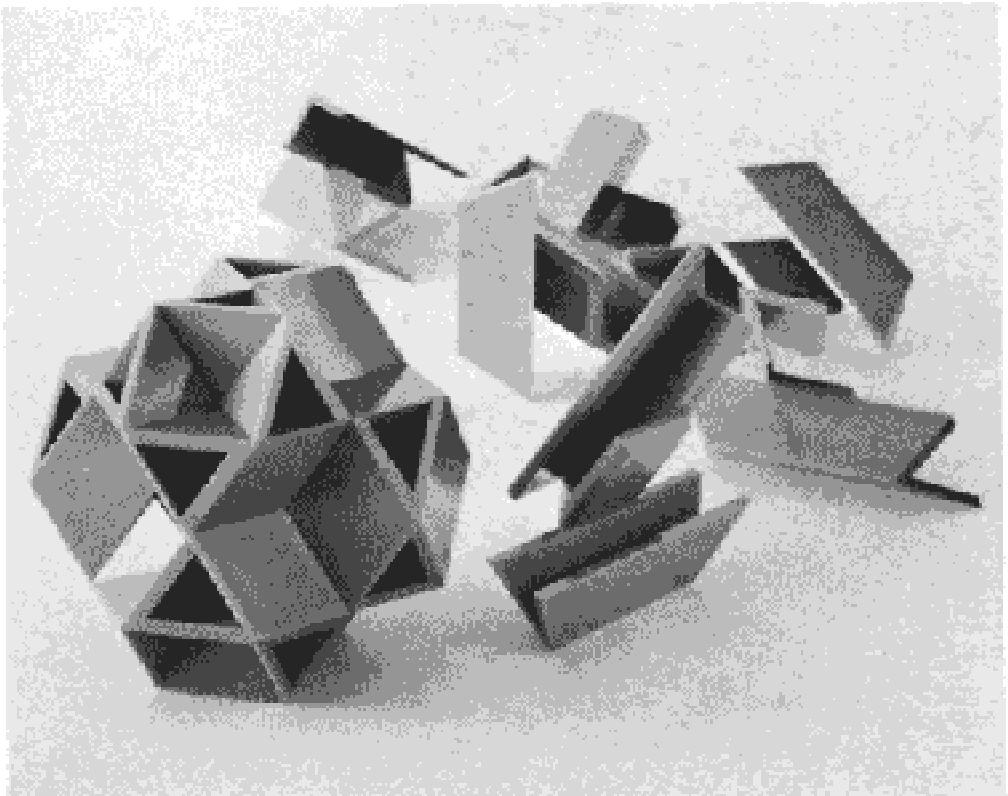
These puzzles are handmade of the finest cabinet woods - mahogany, walnut, rosewood, bubinga, teak, padouk, and other kinds - with a natural oil finish. Each comes with an instruction sheet which includes, in addition to assembly directions, interesting observations and intriguing geometrical pastimes to be found in these beautiful polyhedral structures.

"AP-ART, the sculptural art that comes apart."

1971

FOR 1972, *FOUR* GREAT NEW AP-ART™ PUZZLES from SMALL WONDERS.

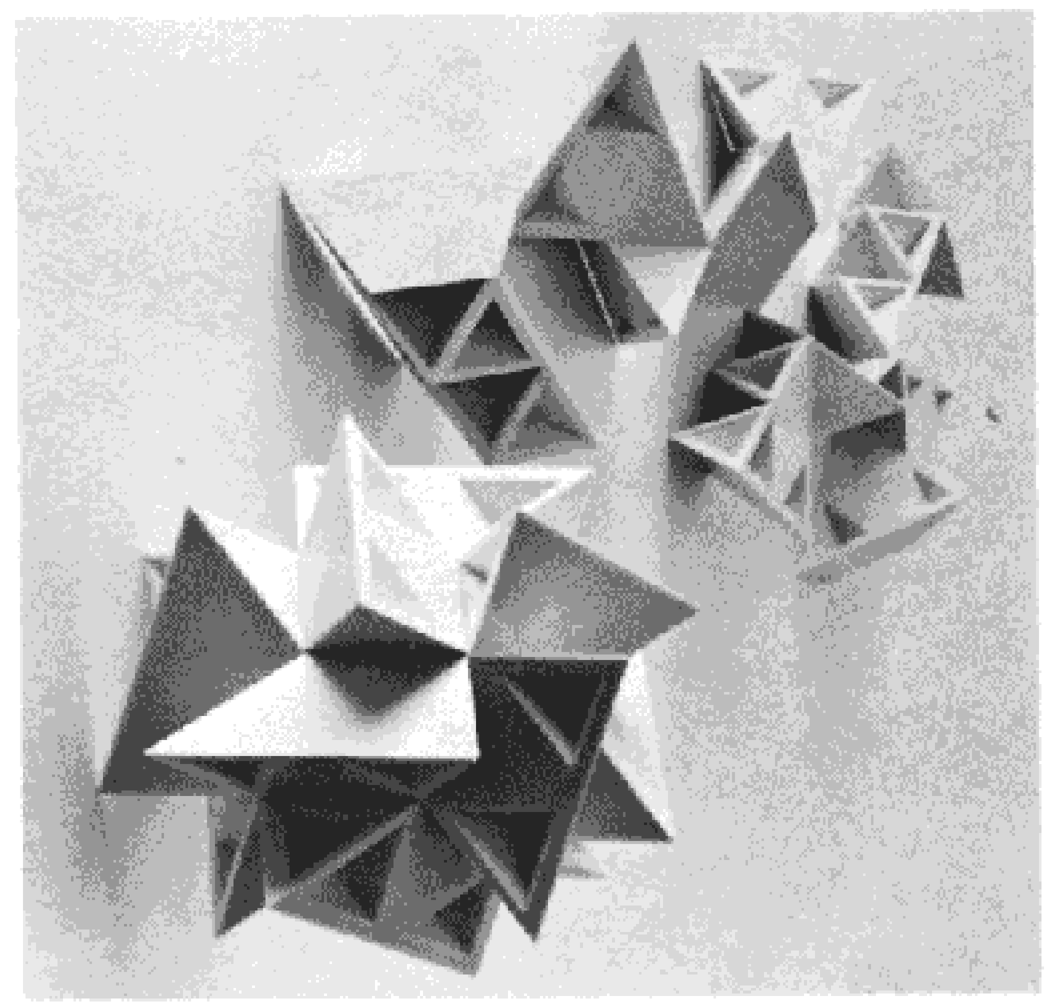
The Geo - Logic™ Star-Art™ Series



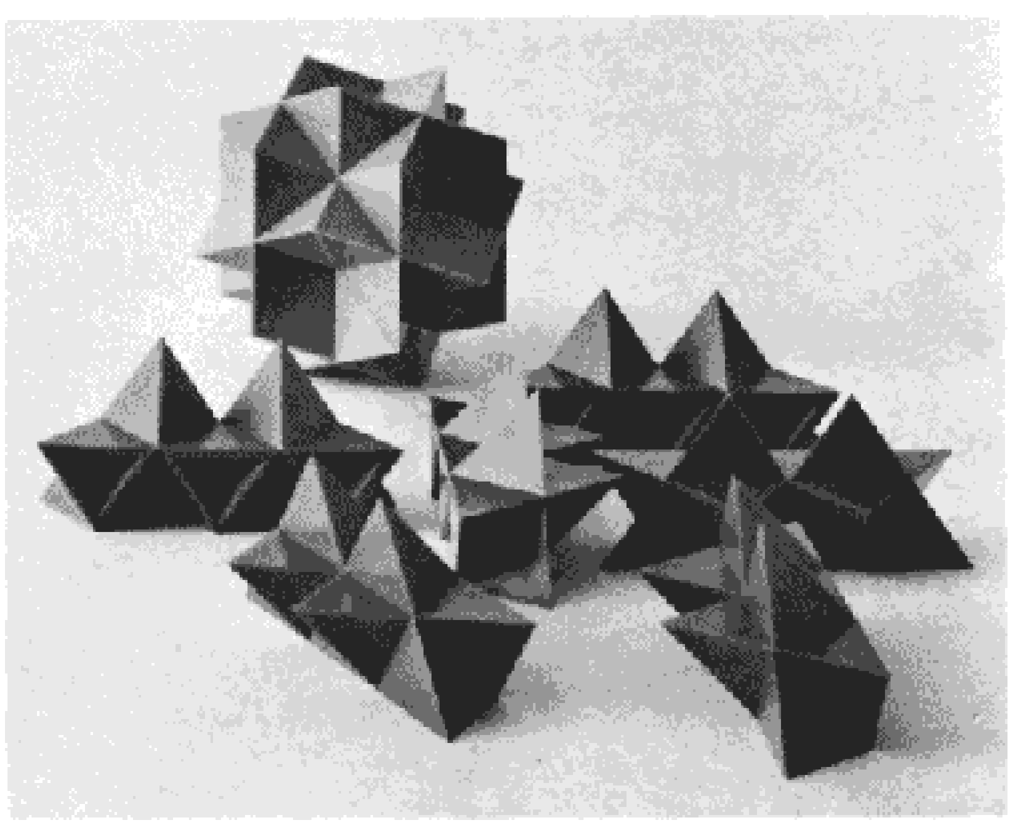
TAURI

Mr. Stewart T. Coffin's hand-crafted exotic hardwood versions of these original and unique puzzles necessarily retail for $15 to $30 and up, and will always be in short supply. So, Nylon Products Corp. has skilfully engineered these new Coffin "AP-ART, sculptural art that comes apart™" puzzles to join TETZL, our first low-budget-but-beautiful AP-ART™ success. Injection-molded styrene **can** be art: START-ART™.

Would you believe that TAURI,™ SPIRUS,™ NOVA™ and ARIES™ are also each constructed of six geometrically-identical pieces? They are obviously more complex than TETZL™ --each of these new pieces is very unlike **anything** many of us have ever seen before. Skill with TETZL is some help in solving the new ones, but not much. As with TETZL, we supply literal instructions to stores, but only amusing hints to purchasers. Challenge their minds and dexterity! AND, pieces of SPIRUS, NOVA and ARIES can be intermixed, with mind-blowing and sales increasing results! HYBRID GALAXIES™.



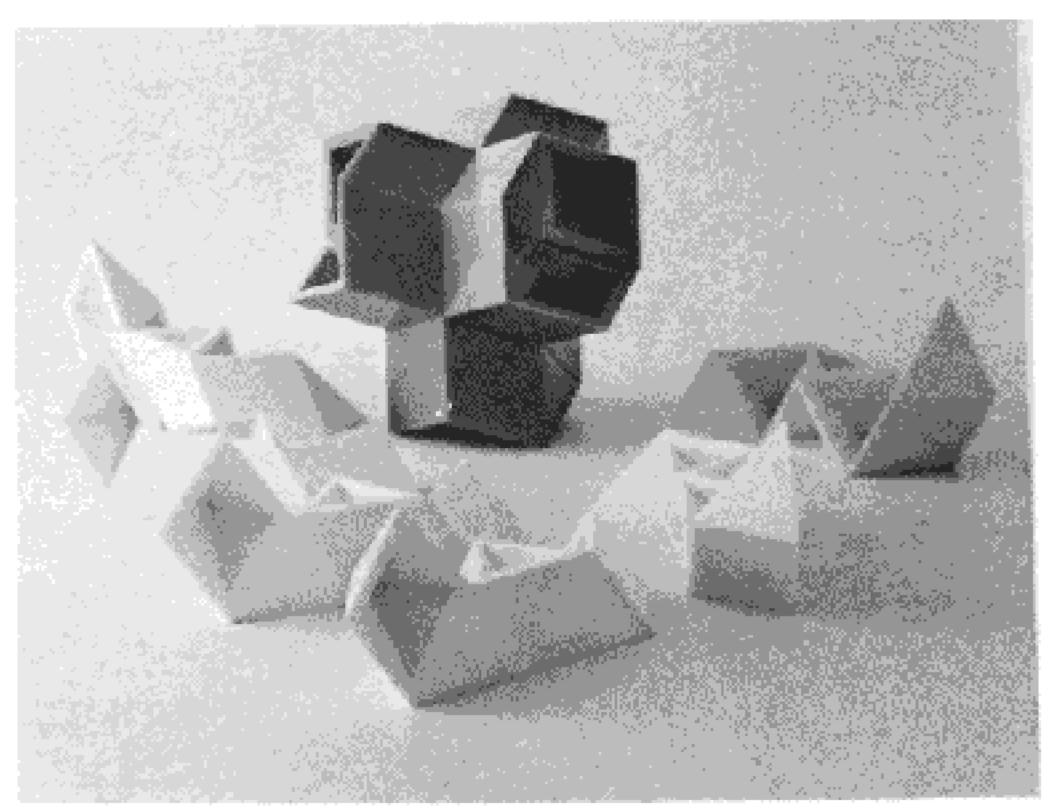
SPIRUS



NOVA

Shipped in cartons of 10, FOB Lowell, Mass.; individually netted in a timely new "minimal packaging" concept with proven retail appeal. Our MININET bags hang anywhere; resemble flowers on the counter; give frustrated puzzle fans a way to keep loose pieces together until they catch on; look great on Christmas trees.

Like our S. T. Coffin SNOWFLAKE™, a special edition of TAURI™ has been selected for the 1972 Christmas Catalog of The Museum of Modern Art, New York.
Suggested retail $3.00/each; 3 color mix.



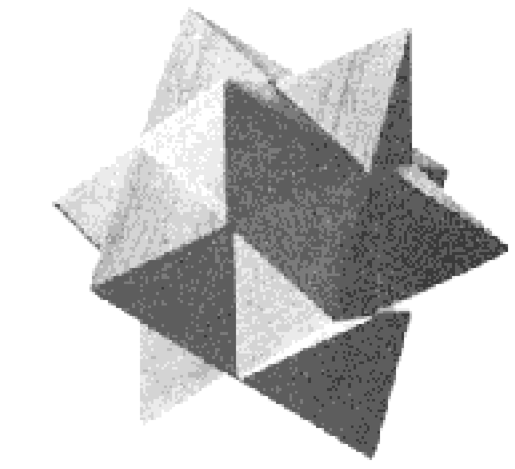
ARIES

SMALL WONDERS, Inc., Acton, Massachusetts 01720

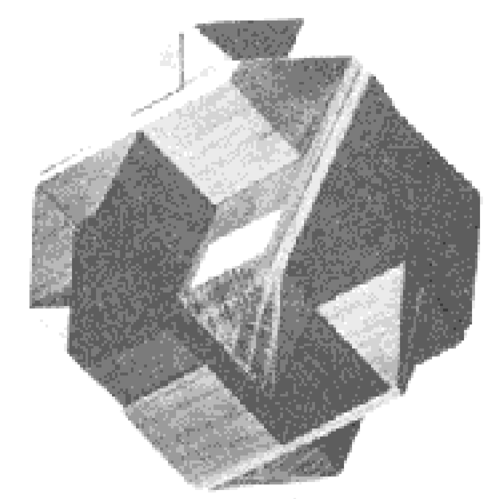
POLYHEDRAL PUZZLES IN WOOD

These puzzles are handmade of the finest cabinet woods cocobolo, paldao, rosewood, bubinga, teak, padouck, and other kinds - with a natural finish. Each comes with an instruction sheet which includes, in addition to assembly directions, interesting observations and intriguing geometrical pastimes to be found in these beautiful polyhedral structures.

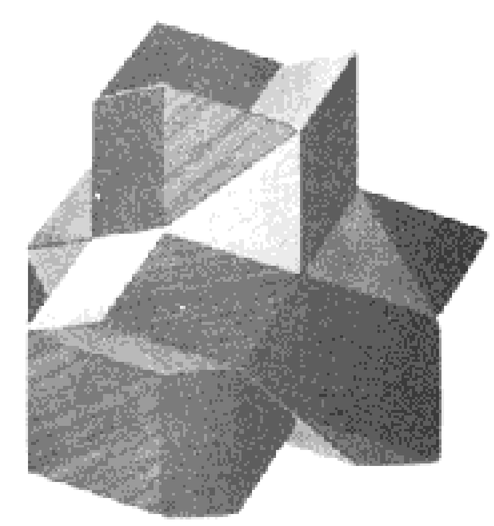
"AP-ART, the sculptural art that comes apart."



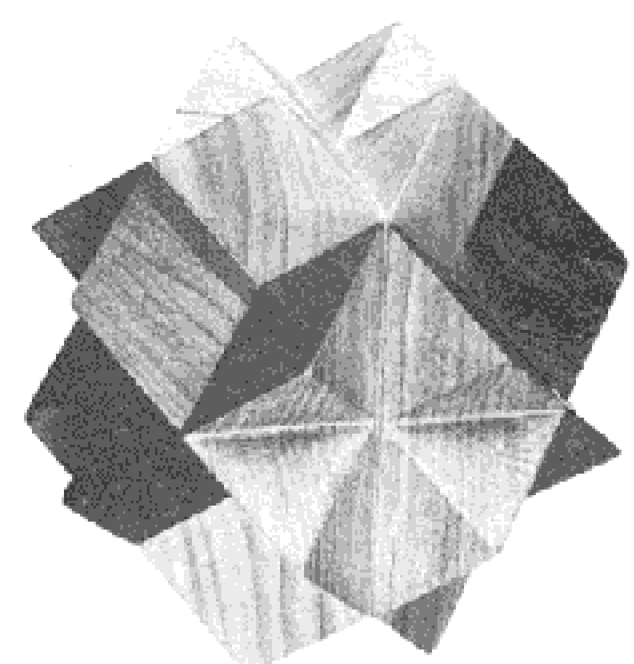
SIRIUS Puzzle. A new and improved variation of a classic design. Six identically shaped pieces, made up of three different woods, interlock to form a stellated rhombic dodecahedron. Two distinctly different symmetrical solutions are possible, in contrasting wood patterns. 3 inches. $10.00



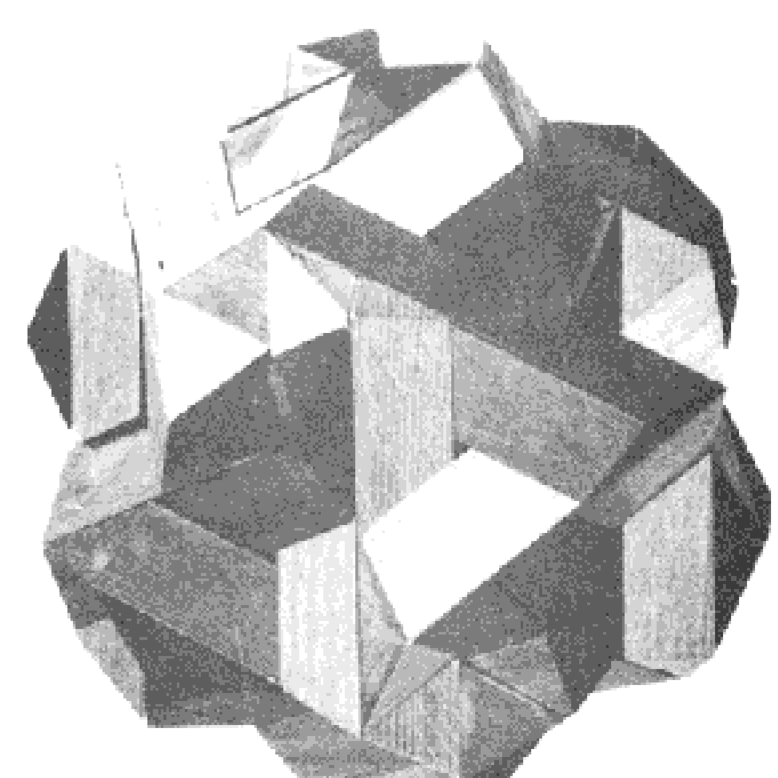
SCORPIUS, The Spider-Slider Puzzle. Unique and original. Twenty-four individual pieces of wood, of four contrasting types, make up the six spider-shaped pieces of this diabolical design. SCORPIUS slides apart in four different directions, in a manner which is baffling, to say the least. Four possible symmetrical patterns provide added challenge. 3 ¾ inches. $12.00



The **FOUR CORNERS** Puzzle. An original design. Each of the six pieces is made up of three contrasting woods, selected for beautiful end grain effect. The four different woods which form the apexes of this tetrahedral solid come literally from the four corners of the world. The solution is simple and yet perplexing. Arranging the corner woods in different combinations of patterns results in four distinct symmetrical solutions. 3 ½ inches. $14.00



NOVA Puzzle. Original and unusual. A symmetrical stellated polyhedron with 72 polished faces expands apart surprisingly in virtually all directions at once. Crafted of select exotic woods. 4 inches. $16.00



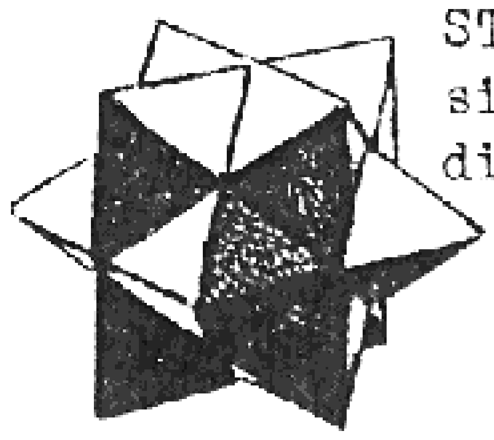
JUPITER, The Super Spider-Slider Puzzle. Totally unique. Sixty individual pieces of wood in six contrasting types are used to construct the twelve identical spider-shaped pieces of this fantastic structure, which has the form of a castellated triacontahedron. Being absolutely symmetrical in design, it slides apart in six different directions independently, and has five distinct symmetrical solutions. 6 ½ inches. $25.00

Stewart T. Coffin

Old Sudbury Road, Lincoln, Mass. 01773 **(617) 259-8348**

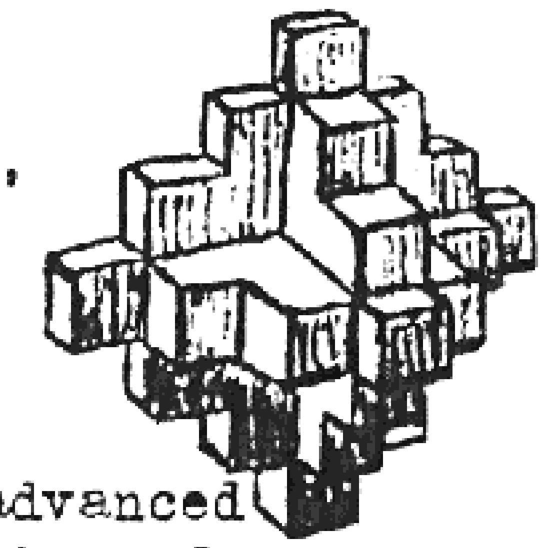
3/72

POLYHEDRAL PUZZLES IN WOOD



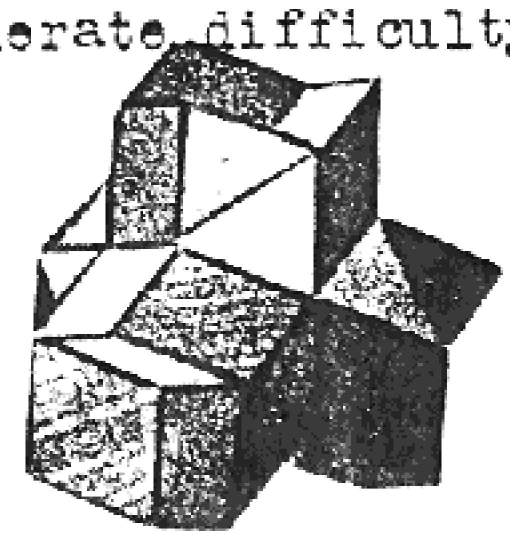
STAR - three woods, six pieces, not very difficult, $3\frac{1}{2}$", $10.00

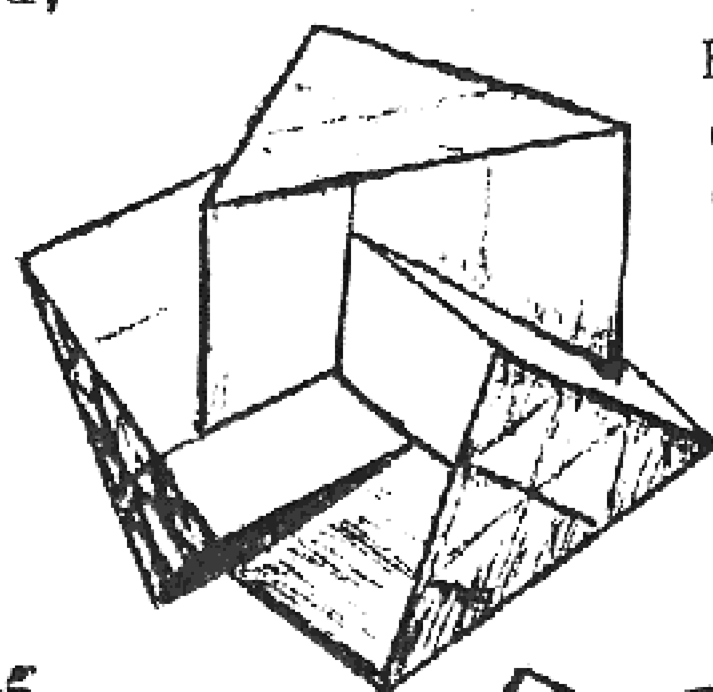
SQUARE KNOT - an interesting 12-piece notched stick puzzle, (not shown), 4", $10.00
14-piece version, $12.00



GIANT STEPS - a more advanced notched stick type design of 12 pieces, 5", $15.00

FOUR CORNERS - six pieces in four contrasting woods form interesting patterns when correctly assembled, moderate difficulty, 4", $14.00

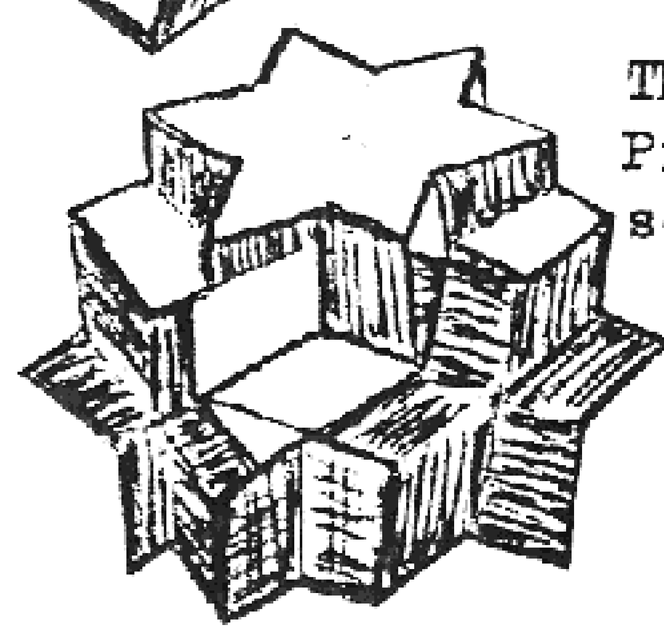




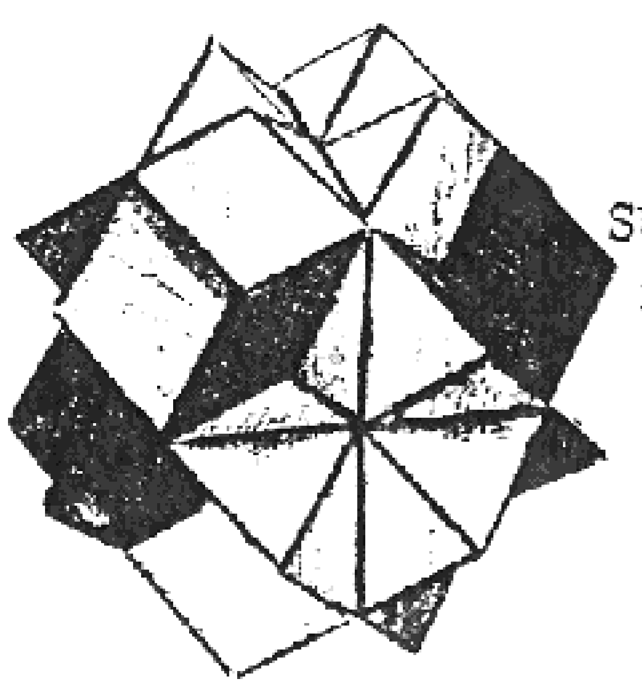
HEX PRISM - made in one solid wood or or two contrasting woods, difficult, (not illustrated), 4", $16.00

TRIANGULAR PRISM - more complex than Hex Prism, an interesting dissection of an unusual solid, $4\frac{1}{2}$", $18.00

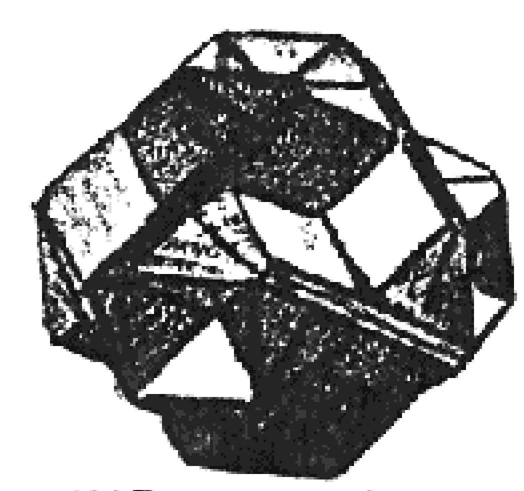
TRIUMPH - at last, an interlocking puzzle which assembles into three different shapes - most unusual, made in two contrasting woods, (not illustrated, but closely related to Four Corners), $18.00



THE GENERAL - most complex of the Prism Puzzle family, made in one solid wood, baffling, 5", $20.00

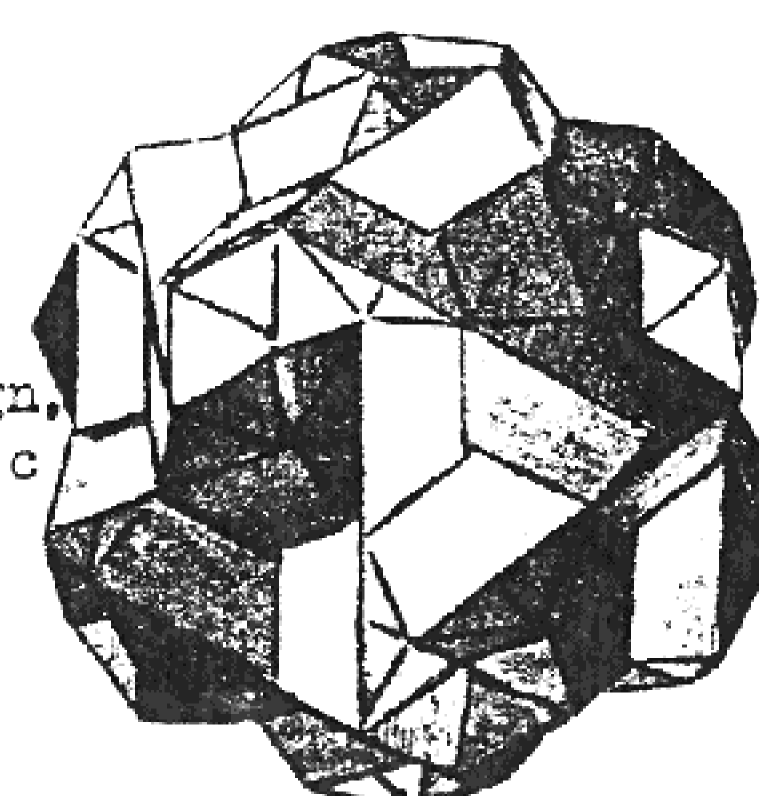


SUPER NOVA - six pieces form a stellated rhombic dodecahedron, very difficult, one wood, 4", $20.00



DISLOCATED SCORPIUS - an improved and more difficult version of the now discontinued Scorpius Puzzle, four kinds of wood, 4", $12.00

JUPITER - a most intriguing design, twelve puzzle pieces in six exotic woods form a totally symmetrical interlocking shell, $6\frac{1}{2}$", $25.00



DISLOCATED JUPITER - resembles standard Jupiter when assembled and likewise has twelve identical pieces, but even more difficult, one wood, $6\frac{1}{2}$", $35.00

Many other designs available.

All prices shown are postpaid.

These puzzles are handmade of the finest cabinet woods - mahogany, walnut, rosewood, bubinga, teak, padouk, and other kinds - with a natural oil finish. Each comes with an instruction sheet which includes, in addition to assembly directions, interesting observations and intriguing geometrical pastimes to be found in these beautiful polyhedral structures.

"AP-ART, the sculptural art that comes apart."

Stewart T. Coffin

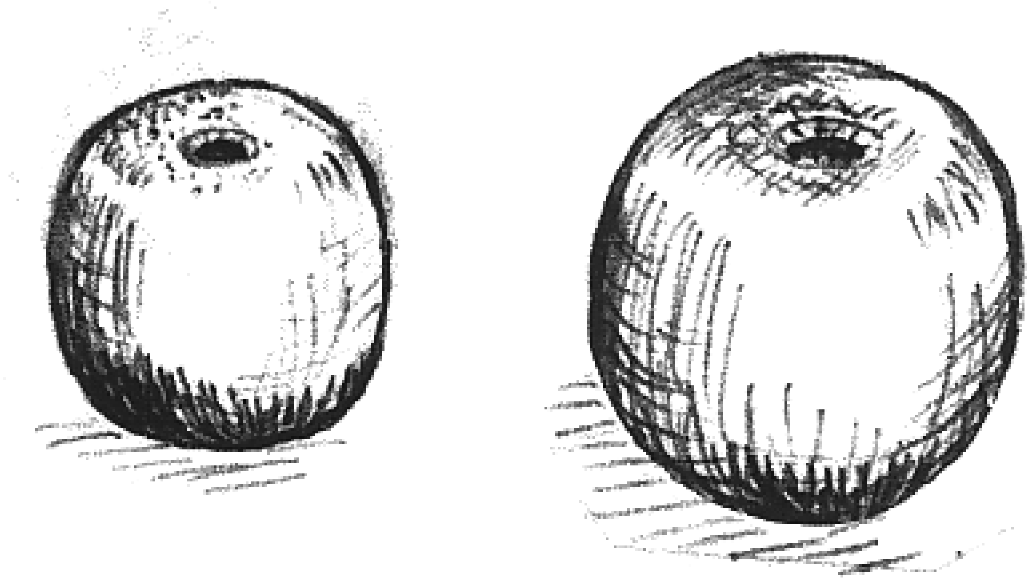
Old Sudbury Road, Lincoln, Mass. 01773

(617) 259-8348

7-74

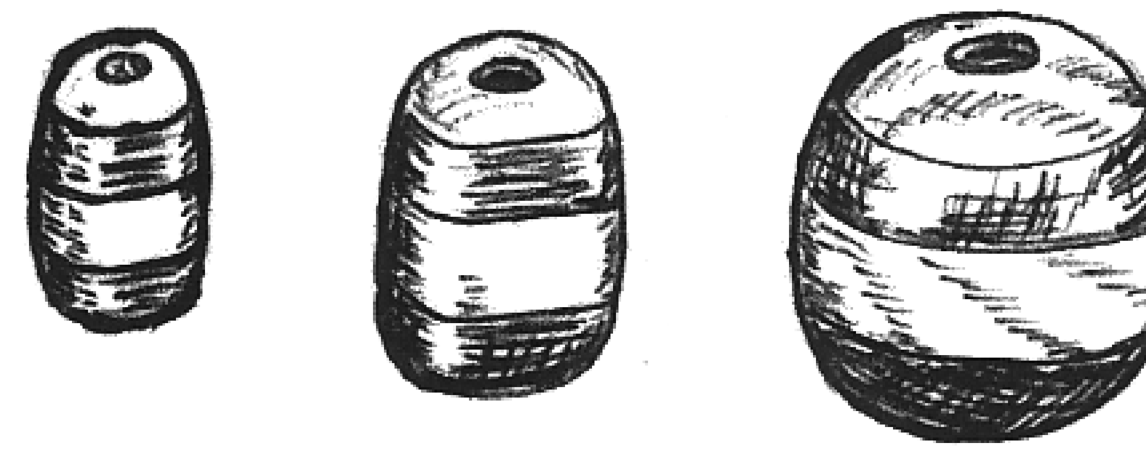
ABBIE'S WOODEN BEADS - WHOLESALE PRICE LIST

3/4" hardwoods	$8.00 per 100
3/4" exotic woods	12.00 " "
1" hardwoods	11.00 " "
1" exotic woods	15.00 " "



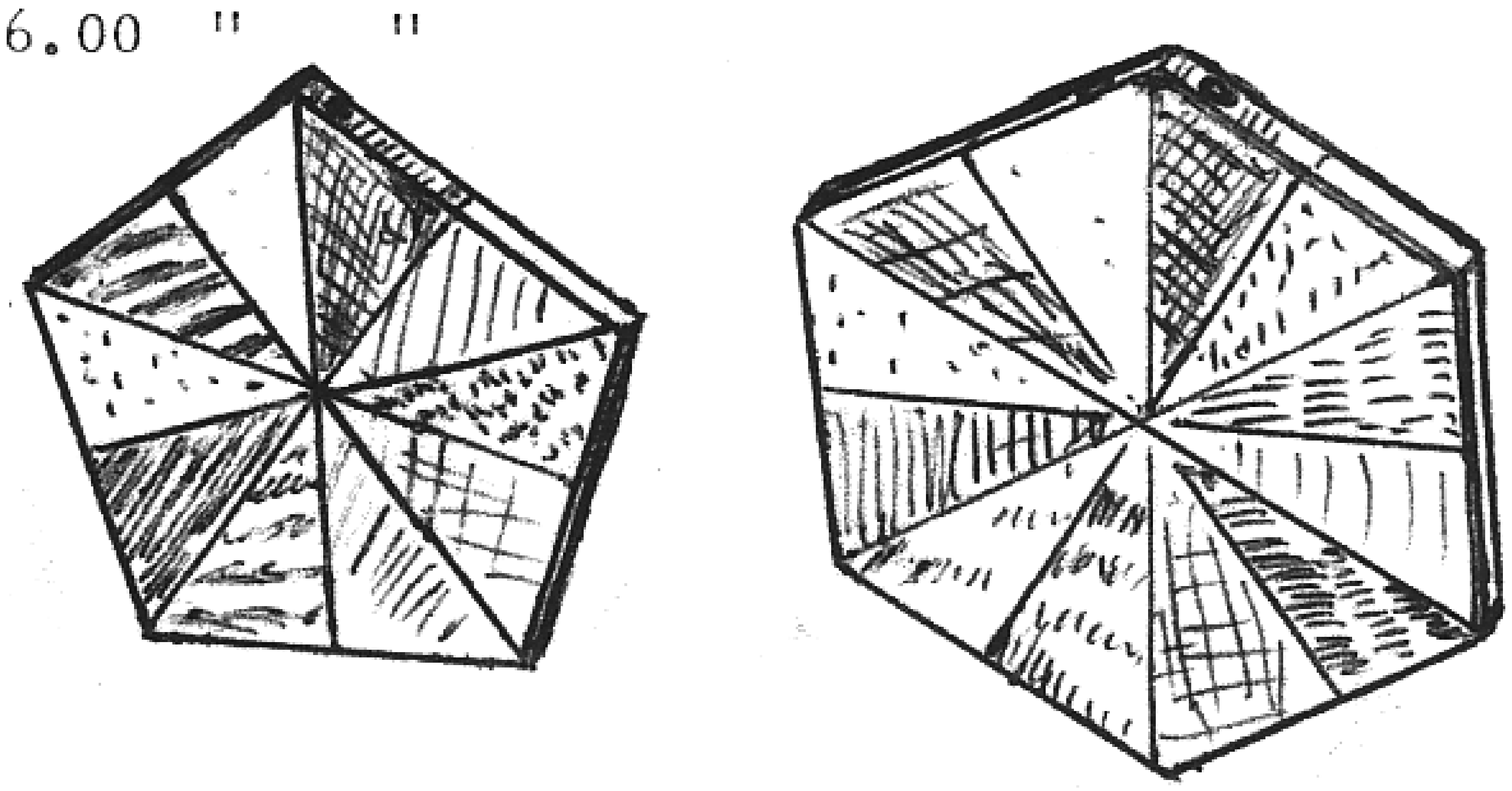
Typical hardwoods: walnut, cherry, mulberry, oak, maple, mahogany.
Exotic woods: bubinga, cocobolo, paldao, satinwood, rosewood, zebrawood, et

small laminated	8.00 per 100
medium "	16.00 " "
large "	24.00 " "
punkin	16.00 " "
watermelon	24.00 " "



Pendants

pentagon	5.00 per dozen
hexagon	6.00 " "



Note:

Holes range in size from 1/8" in the small beads to 3/16" in the large beads Special hole sizes available on request.

All woods are natural, with a clear non-toxic wax finish.

Sizes shown are typical. Because of the unusual technique by which these beads are hand crafted, size and shape will vary randomly.

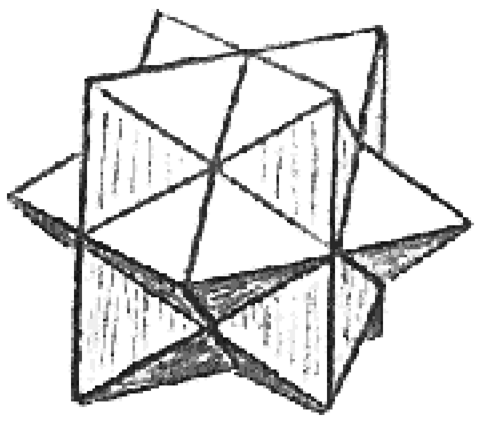
Orders are normally filled with a random assortment of woods. Requests for particular woods or colors will be considered, but because our supply of exotic woods is most limited and uncertain at this time, substitutions may be necessary.

Minimum wholesale order of each type - as listed above. Shipped Parcel Post insured. Terms: net 30 days, FOB.

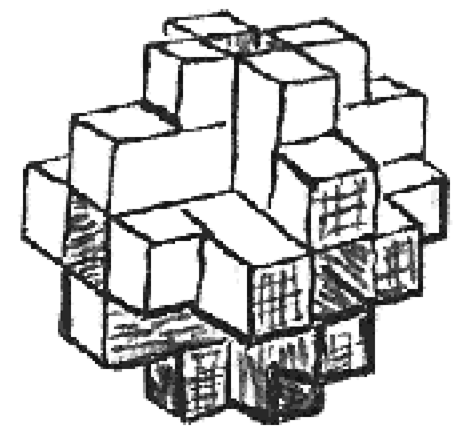
Abbie Coffin
Old Sudbury Road
Lincoln, Mass. 01773

July 1974

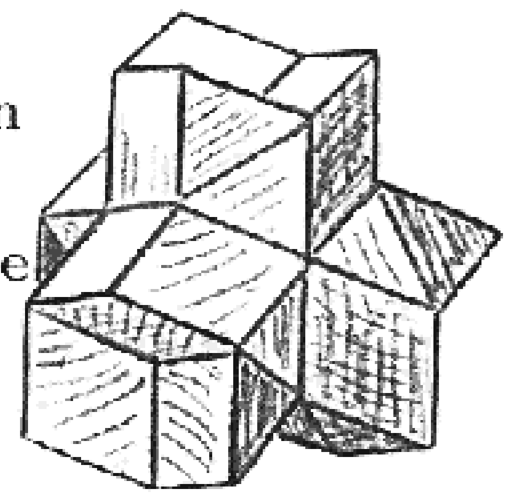
POLYHEDRAL PUZZLES IN WOOD



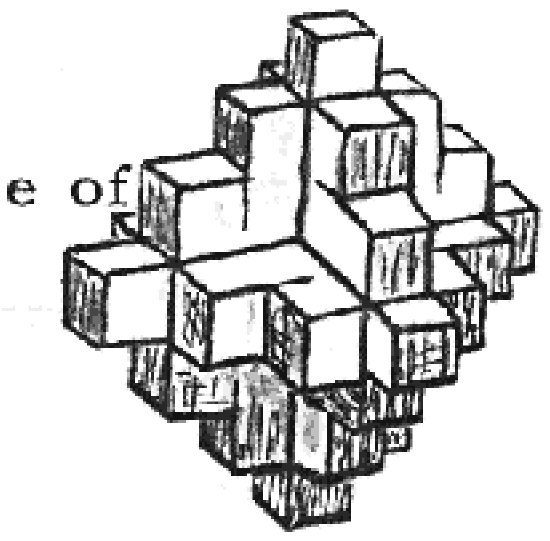
STAR - 3 woods, 6 pieces, not very difficult, $3\frac{1}{2}$", $10.



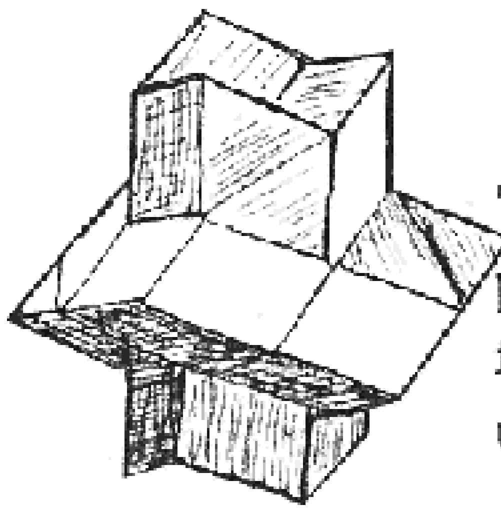
SQUARE KNOT - an interesting 12(+2)-piece notched stick puzzle, 4", $12.



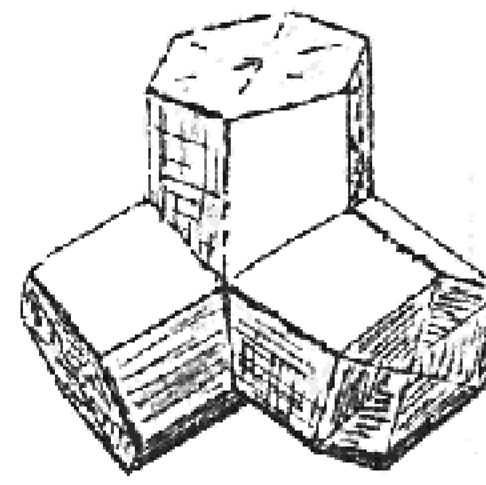
FOUR CORNERS - 6 pieces in 4 contrasting woods form interesting patterns, moderate difficulty, 4", $15.



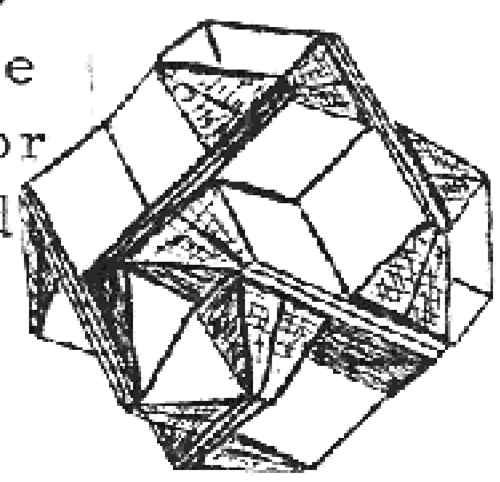
GIANT STEPS - a more advanced notched stick type of 12 pieces, 5", $15.



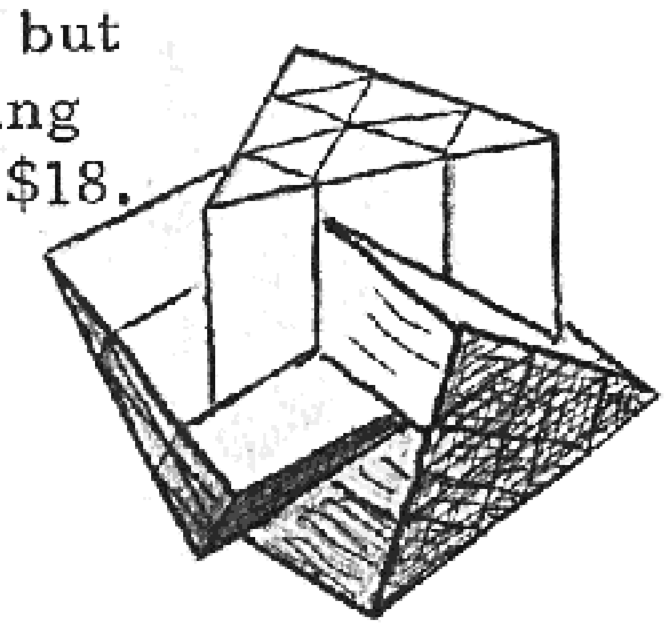
TRIUMPH - 6 interlocking pieces in 2 contrasting woods form 3 different shapes, unusual, 4", $18.



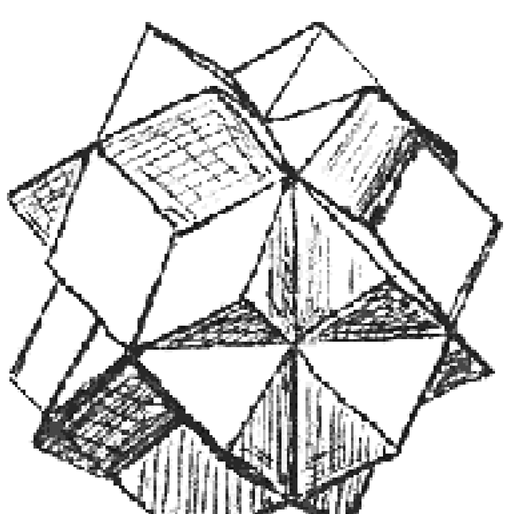
HEX PRISM - 6 pieces, all different, a permutation puzzle, one kind of wood, difficult, 4", $16.



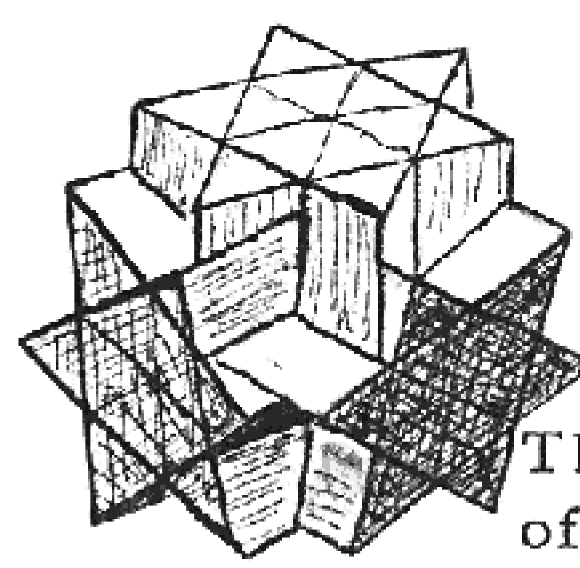
DISLOCATED SCORPIUS - an unusual 6-piece puzzle in 4 contrasting woods (or slightly harder one-wood version), 4", $14.



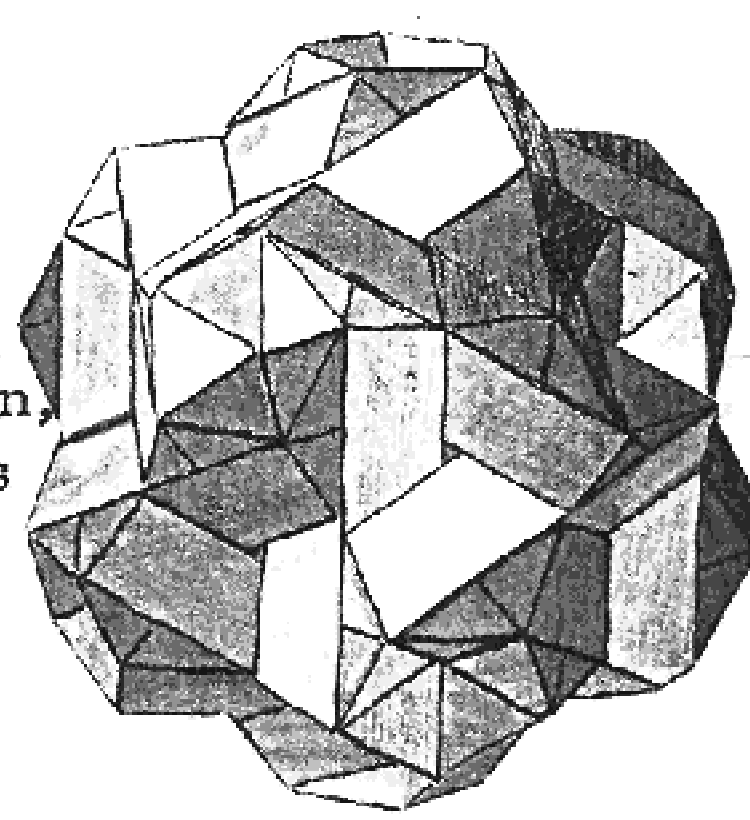
TRIANGULAR PRISM - resembles Hex Prism, but more complex, intriguing geometric shape, $4\frac{1}{2}$", $18.



SUPER NOVA - 6 pieces form a stellated rhombic dodecahedron, one wood, quite difficult, 4", $20.



THE GENERAL - most complex of the prism puzzle family, 4 star prisms intersect in space, baffling, 5", $20.



JUPITER - most intriguing design, 12 puzzle pieces in 6 exotic woods form totally symmetrical interlocking shell, $6\frac{1}{2}$", $30.

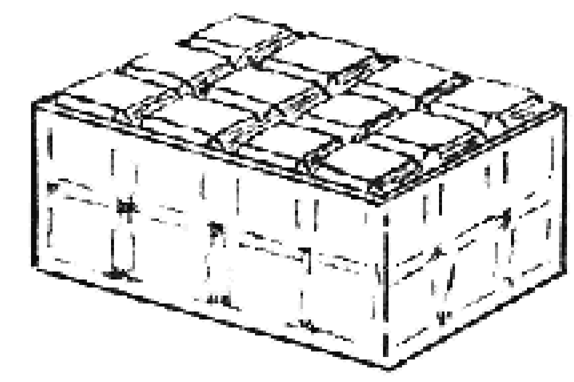
DISLOCATED JUPITER - more difficult than standard Jupiter, the Ultimate in polyhedral puzzle designs, one wood, $6\frac{1}{2}$", $35.

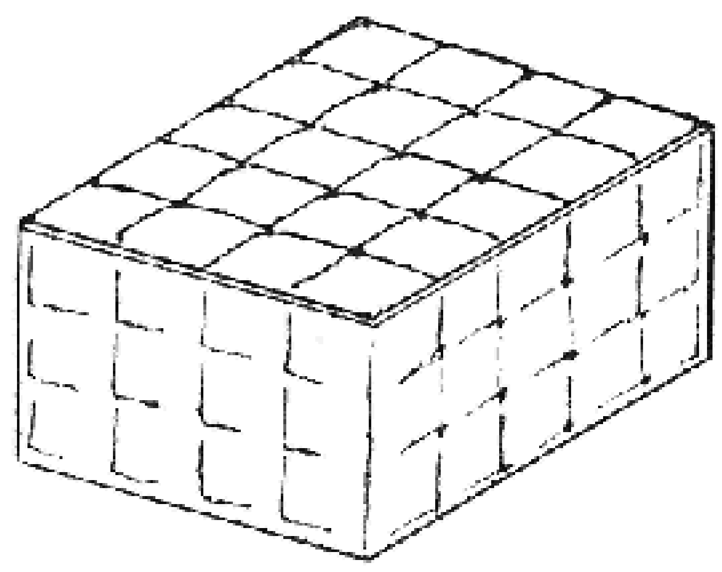
These puzzles are hand-crafted of the finest and most exotic cabinet woods. Each comes with an instruction sheet of sorts, which includes interesting observations and pastimes to be found in these unusual interlocking polyhedral structures.

"AP-ART", the sculptural art that comes apart.

DISSECTION-TYPE PUZZLES

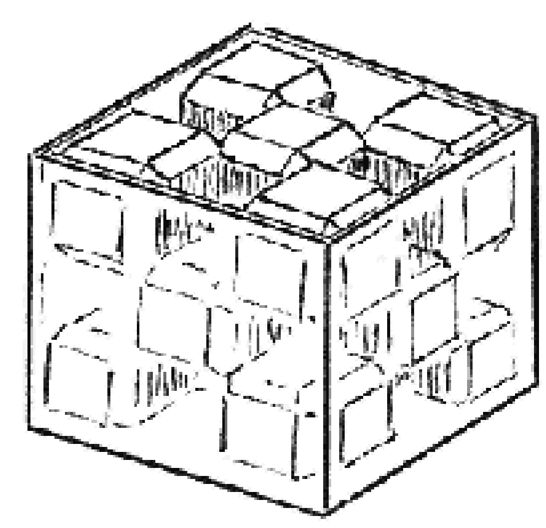
WAFFLE PUZZLE - for the junior puzzler. Six hardwood pieces fit into plexiglass box 8 ways, and make 11 other shapes, $6.





PENTABLOCK PUZZLE - new version of classic combinatorial puzzle set, 12 pieces in plexiglass box, very difficult, $12.

PYRACUBE - 5 pieces fit snugly into cubic plexiglass box, and do a number of other confusing things, based on truncated rhombic dodecahedron, fancy wood, 3", $10.



On mail orders, please add $1 per order, regardless of quantity, for postage and handling ($1.50 west of Miss.). Mass. residents add 3% sales tax.

Other Products

Puzzle Craft booklets - discuss background, theory, and practical construction of all sorts of puzzles - 30¢ each, postpaid.

- No. 1 - bibliography, burr puzzles - 6-piece, 12-piece
- No. 2 - combinatorial puzzles, colored cubes, geometric, checkerboard
- No. 3 - topological puzzles, buttonhole, string & bead, Loony Loop, wire
- No. 4 - puzzle patents, history, classification, selected illustrations
- No. 5 - dissection-type puzzles, close-packing solids, lattices in space
- No. 6 - interlocking polyhedral puzzles, classification & theory of basic types

Fancy beads and buttons, hand-crafted of exotic woods - wholesale & retail.

Stewart T. Coffin

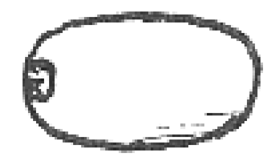
Old Sudbury Road, Lincoln, Mass. 01773 **(617) 259-8348**

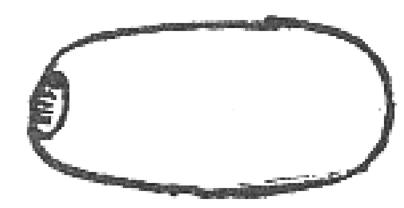
RETAIL PRICE LIST

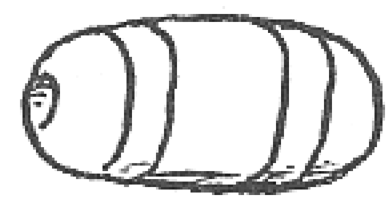
STEWART T. COFFIN

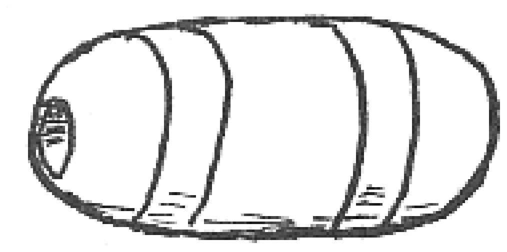
OLD SUDBURY RD. RFD I LINCOLN, MASS. 01773
259-8348

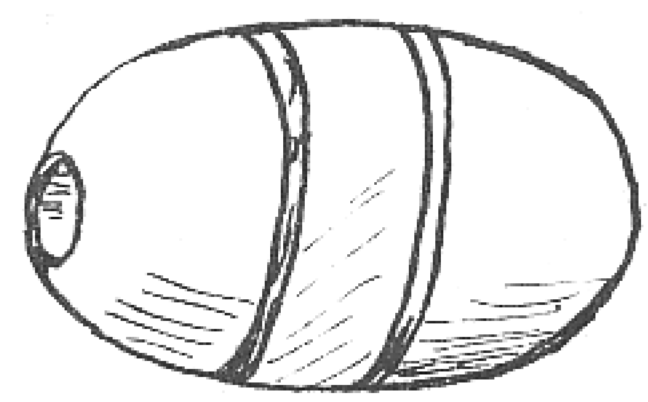
WOODEN BEADS

Small Oval, in assorted exotic woods  9¢ each

Standard Oval, in assorted exotic woods  15¢ each

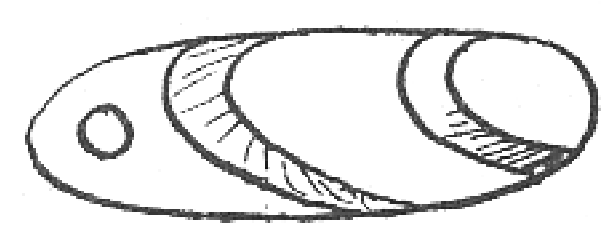
Small Laminated, with five layers of contrasting woods  20¢ each

Medium Laminated, five layers, same as above only larger  30¢ each

Large Laminated, in a wide assortment of sizes, shapes, designs, and wood combinations  45¢ each

Holes range in size from 1/8" in the small beads to 1/4" in the largest ones. Various exotic woods are used, and unless requested otherwise, they are supplied in a random assortment of woods. Sizes shown are typical. Because of the unique method by which these beads are hand crafted, size and shape will vary.

PENDANTS

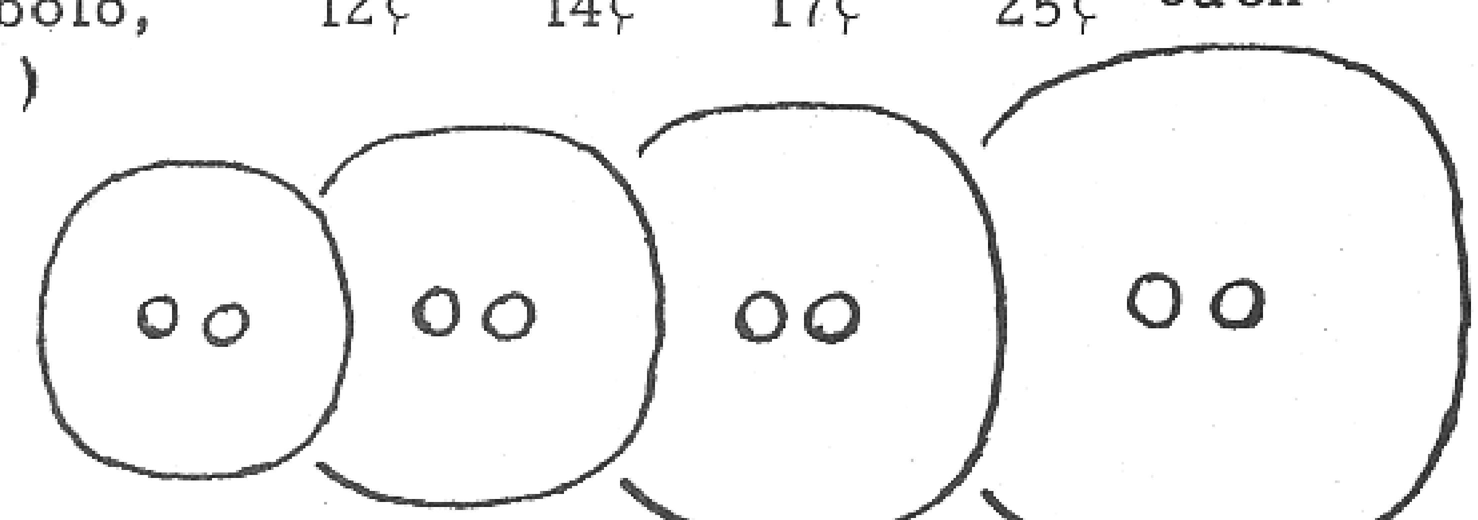
Minnows, diagonal laminations, with 1/8" eye, may be used as beads, small pendants, or earrings, available in matched pairs  25¢ each

Fancy Pendants, in a wide assortment of unusual designs and colorful combinations of fancy woods (not illustrated) 1.00 each and up

BUTTONS

	3/4"	7/8"	1"	1-1/4"	
Brazilian Tulipwood or African Blackwood	14¢	17¢	21¢	30¢	
All other exotic woods (Rosewood, Cocobolo, Zebrawood, Amaranth, Bubinga, etc.)	12¢	14¢	17¢	25¢	each

Indicate preferred color or wood type, and whether matched or assorted.



Please add $1.00 on all mail orders for postage and handling. Mass. residents add 3% Sales Tax.

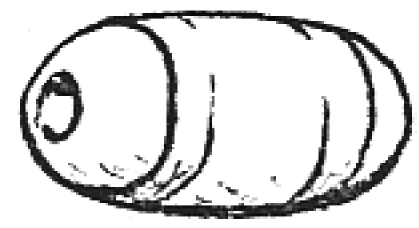
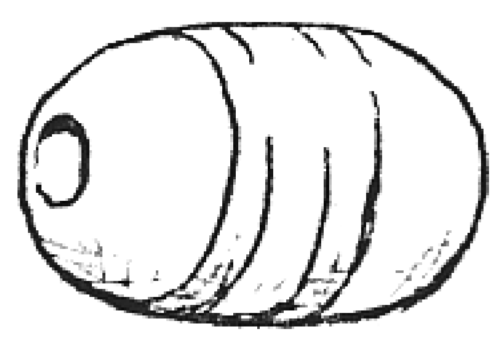
Many other styles available at shop - open odd hours - best to phone ahead.

6-75

STEWART T. COFFIN

OLD SUDBURY RD. RFD I LINCOLN, MASS. 01773
(617) 259-8348

COFFIN's WOODEN BEADS - 1976 WHOLESALE PRICE LIST

Solid Oval		10.00 per 100 90.00/1000
Small Laminated		10.00 per 100 90.00/1000
Medium Laminated		16.00 per 100 144.00/1000
Large Laminated		24.00 per 100 216.00/1000
Clam Shell		12.00 per 100 108.00/1000

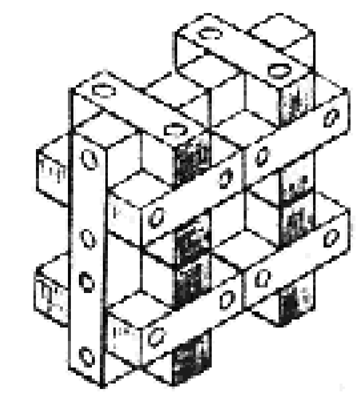
Holes range in size from 1/8" in the small beads to 1/4" in the large beads. Sizes shown are typical. Because of the unique method by which these beads are hand crafted, size and shape will vary. Orders are normally filled with a random assortment of wood types, colors and shades.

Sold wholesale in lots of 100's. Shipped Parcel Post insured or U.P.S. · Terms: Net 30 days, FOB. Please note: if payment is not received within 30 days of date on invoice, a charge of 1-1/2% per month is added to the account until paid.

FAMILY PUZZLES

The PIN-HOLE Series of Puzzles

The table below gives the numbers of pieces in each set, and the price. If you already have a set and wish to have a larger one, simply consult the table to see how many more pieces of each type you require. Note that the price of all sets and extra pieces is based on $1 per piece, except PINS which are 25¢.

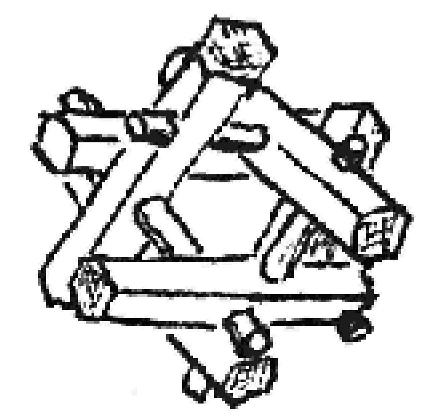


SQUARE

	PINS	BARS	CROSSES	ELBOWS	LINKS	PRICE
BASIC	1	1	2	3	-	$ 6.25
DOUBLE	2	1	4	5	1	11.50
TRIPLE	3	1	6	7	2	16.75
SQUARE	4	1	8	9	4	23.00
GREEK CROSS	5	1	9	12	4	27.25
GRAND CROSS	7	1	12	17	6	37.75

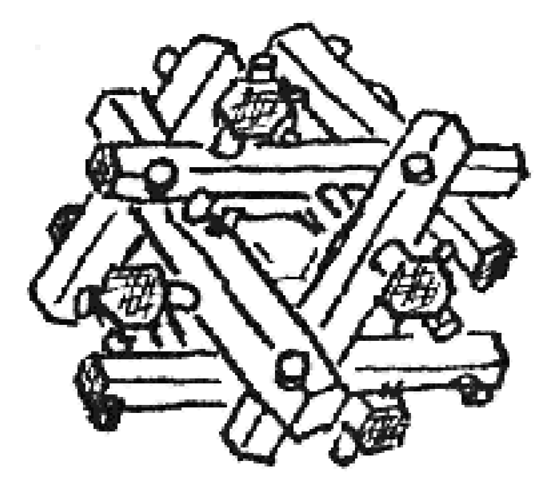
The CUCKOO NEST

A toroidal arrangement of six hexagonal bars and six dowels, seven puzzle pieces, birch. Simple but confusing. $7.00



The LOCKED NEST

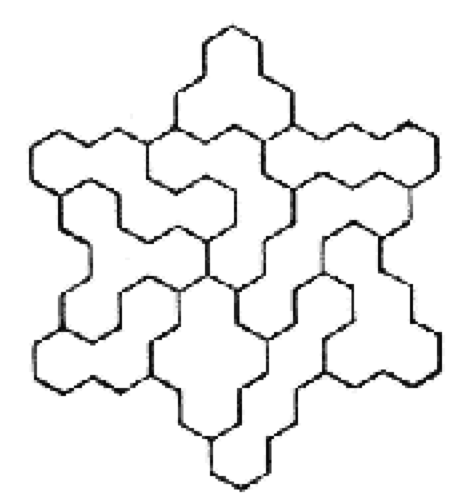
A symmetrical monstrosity of twelve hexagonal bars and twelve dowels, nineteen puzzle pieces, birch. Difficult. You can let Junior amuse himself with it, or set it on the mantel to look at. $18.00



Other interesting design possibilities in this newly discovered family of puzzles are being investigated.

The SNOWFLAKE Puzzle

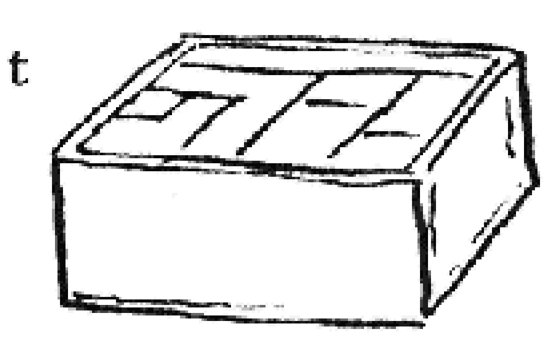
One of my favorite combinatorial designs, a few of these were cast in resin several years ago, then discontinued. The new version will probably be in wood, but is not yet in production. Ten pieces, plus base and instruction booklet. Around $8.00



SNOWFLAKE PATTERN

The PENTACUBE Puzzle

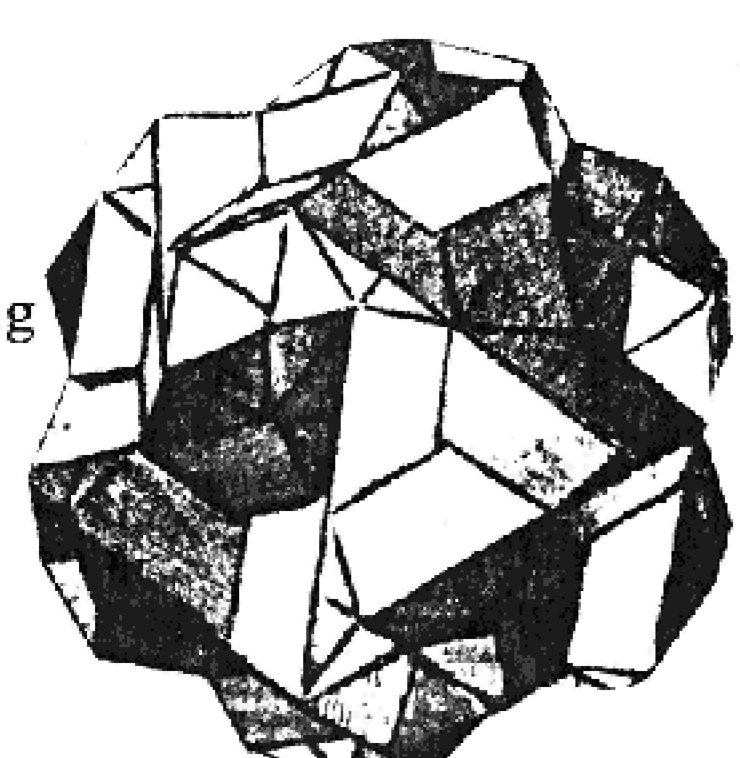
This classic combinatorial puzzle was included in my first brochure in 1970, then discontinued. The new improved version is in twelve colorful woods (identified) in an attractive wooden box. $15.00



POLYHEDRAL PUZZLES

JUPITER

The most popular of my Polyhedral series, in six contrasting woods, not a toy. Several months back-orders. Still $30.00



I will probably make a few other puzzles in this series from time to time, in the range of $20-30

Please add $1.00 to all orders for postage. Mass. residents add sales tax.

Stewart T. Coffin, Old Sudbury Road, Lincoln, MA 01773

Jan. 1977

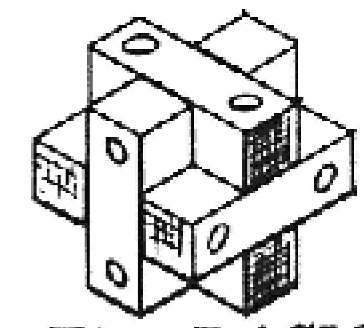
PUZZLES

This year's line of puzzles continues a trend started last year of phasing out my "polyhedral puzzles" in exotic woods, in favor of some new and unusual designs in common hardwoods, plus an experimental cast model. There are two reasons. One is the diminishing supply and increasing cost of the rare woods which were used, plus the considerable hand labor in fabrication. The other more important reason is that all too many of them were ending up on cabinet shelves, rather than in the hands of youngsters, where I think puzzles belong. Accordingly, the first four of the puzzles below are made to withstand hard use, yet are moderately priced.

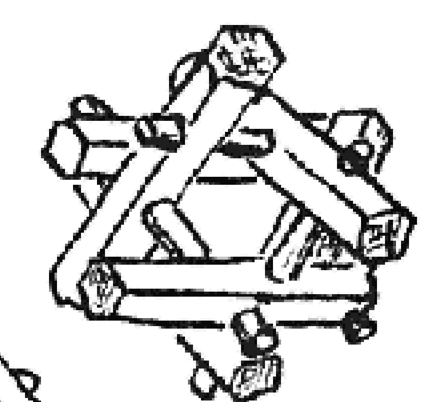
The PIN-HOLE Series of Puzzles

This unusual family of puzzles starts with a BASIC set of seven pieces, which can be added to later to make up a larger set. The 10-page booklet describes numerous problems, ranging from easy to very difficult. Made of cherry and birch, simple and rugged, suitable for all ages.

	PINS	BARS	CROSSES	ELBOWS	LINKS	PRICE
BASIC	1	1	2	3	-	$ 6.25
DOUBLE	2	1	4	5	1	11.50
TRIPLE	3	1	6	7	2	16.75
SQUARE	4	1	8	9	4	23.00
GREEK CROSS	5	1	9	12	4	27.25
GRAND CROSS	7	1	12	17	6	37.75

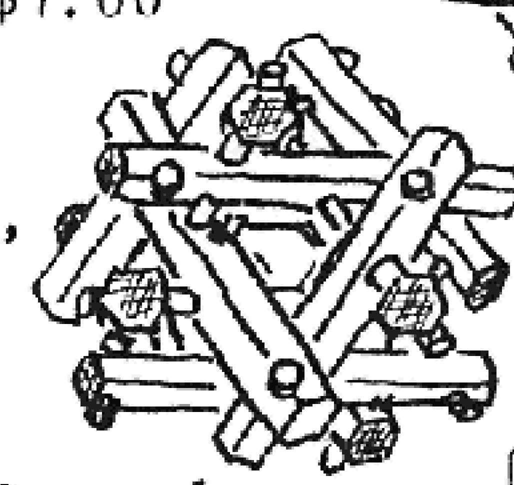


The BASIC



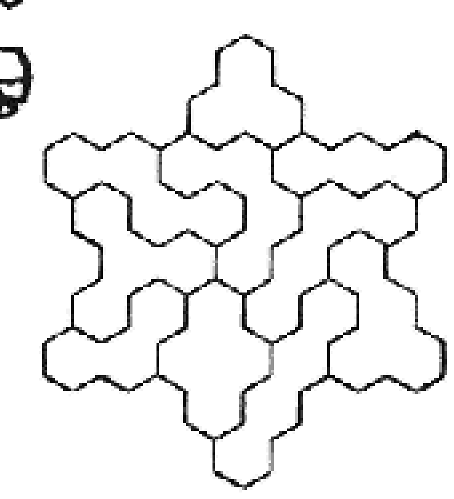
The CUCKOO NEST

A toroidal arrangement of six hexagonal bars and six dowels, seven puzzle pieces, birch. Looks simple, but isn't. $7.00



The LOCKED NEST

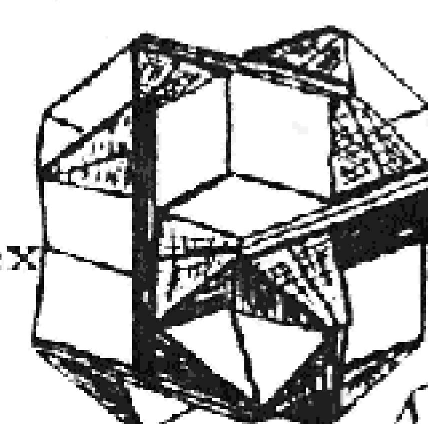
A symmetrical cage of 12 hexagonal bars and 12 dowels, 19 puzzle pieces, birch. Difficult. $18.00



SNOWFLAKE PATTERN

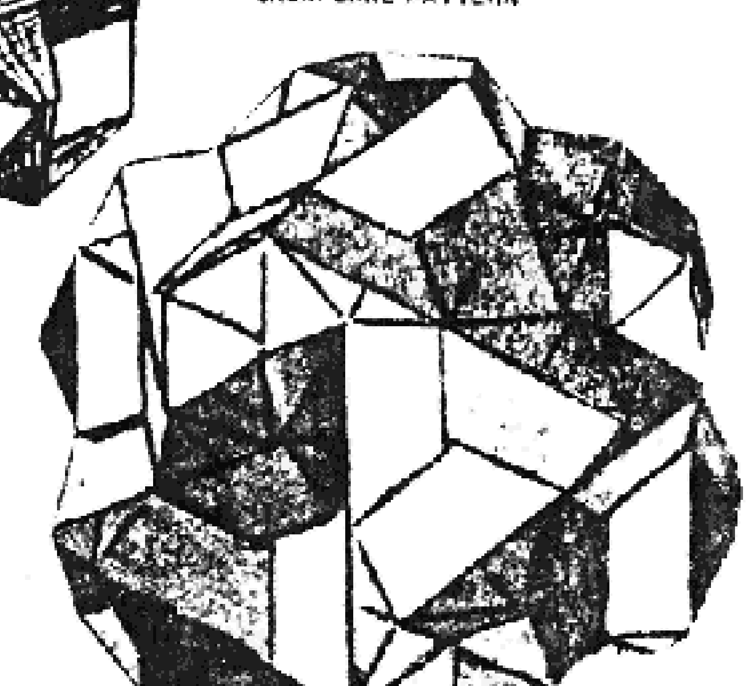
The SNOWFLAKE

A new version of my favorite combinatorial set. The 10 puzzle pieces are cast; base is molded plastic. Comes with 10-page booklet showing 49 problems. For all ages. $6.00



The SCRAMBLED SCORPIUS

First came the SCORPIUS, followed by the more complex DISLOCATED SCORPIUS. Now this ! Six dissimilar pieces in mahogany. Difficult - not a toy. $20.00



The SATURN

For years, my old JUPITER puzzle was the top of the line, until superseded by the more complex DISLOCATED JUPITER. This new version of 12 irregular pieces in mahogany goes beyond JUPITER, hence the name. $50.00

PUZZLE CRAFT Booklet

Tells most everything I know about mechanical and geometrical puzzles. $2.00 ppd

Please add $1.00 to all orders for postage, (overseas $2.00 for surface mail). Massachusetts residents add sales tax.

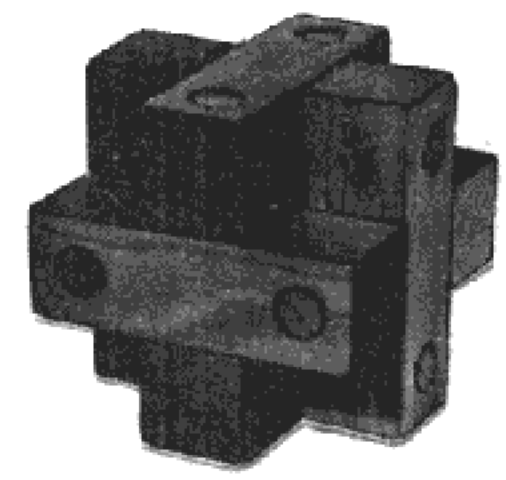
Stewart T. Coffin, Old Sudbury Road, Lincoln, MA 01773

Jan 1978

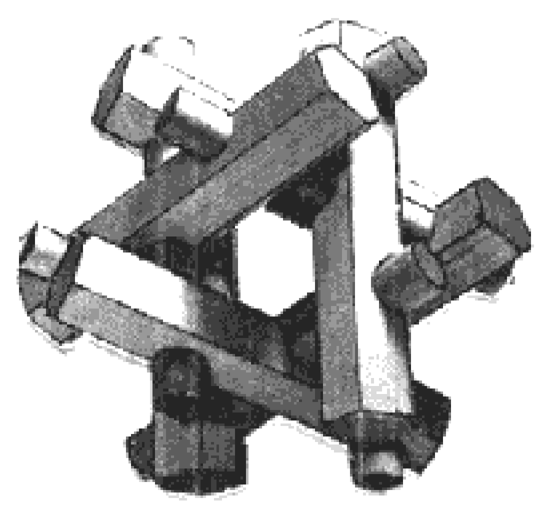
UNUSUAL PUZZLES IN WOOD by Stewart T. Coffin

The PIN-HOLE Series of Puzzles

This family of puzzles has the unusual feature that one can start with the easy BASIC, and add to it later to make up a larger set, as explained in the 10-page booklet. Made of cherry and birch, and practically indestructable. The BASIC, seven pieces — $6.25



The SQUARE set contains 26 pieces, makes 10 different figures, intermediate difficulty. Comes as a kit unassembled — $23.00

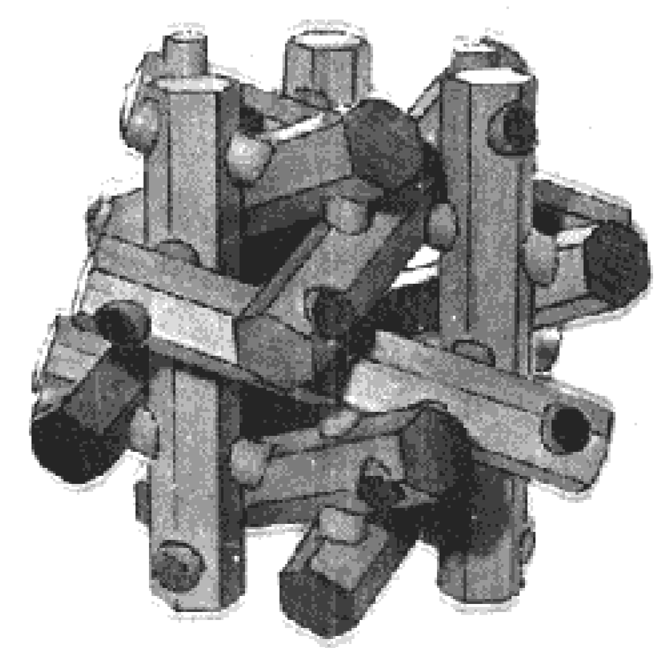


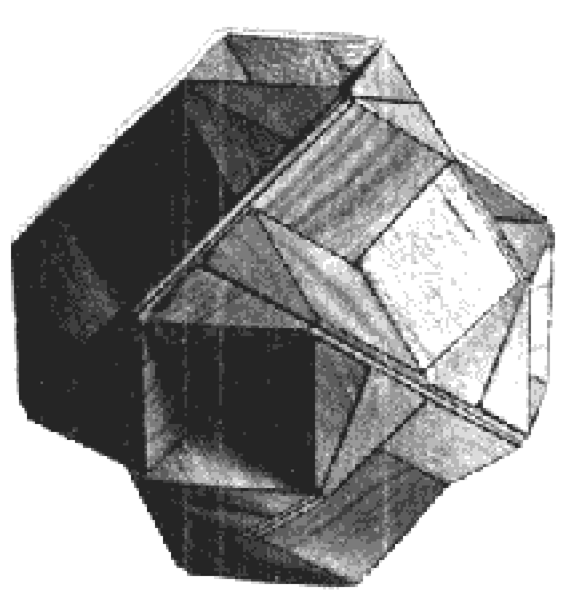
CUCKOO NEST

A toroidal arrangement of six hexagonal bars and six dowels, seven rugged puzzle pieces, birch. Looks simple, but isn't. $7.00

LOCKED NEST

A symmetrical cage of 12 hexagonal bars and 12 dowels, 19 rugged puzzle pieces, birch. Difficult. Solution available on request. $18.00



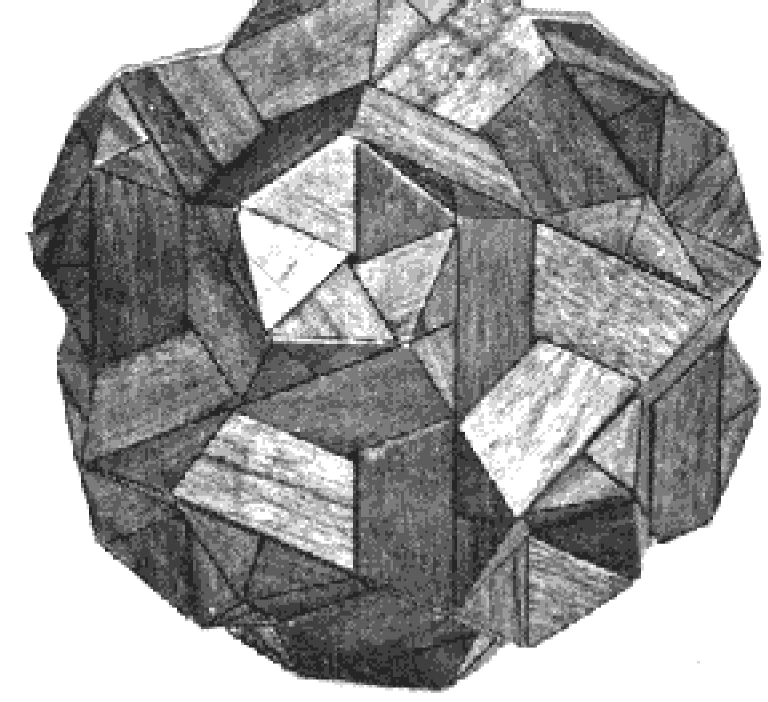


SCRAMBLED SCORPIUS

Six dissimilar pieces go together one way and one order only to form a recessed rhombic dodecahedron. Difficult, not a toy. Mahogany. $20.00

SATURN

Six pairs of dissimilar and perplexingly irregular pieces interlock to form a symmetrical castellated triacontahedron. Solution included. Mahogany, 6½ inches. $50.00



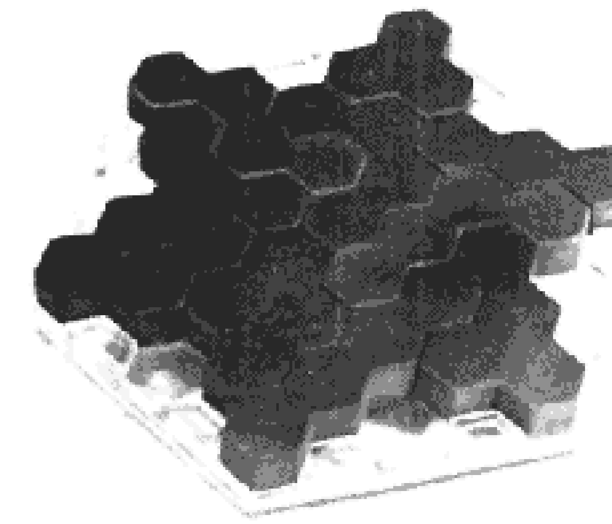
PUZZLE CRAFT Booklet

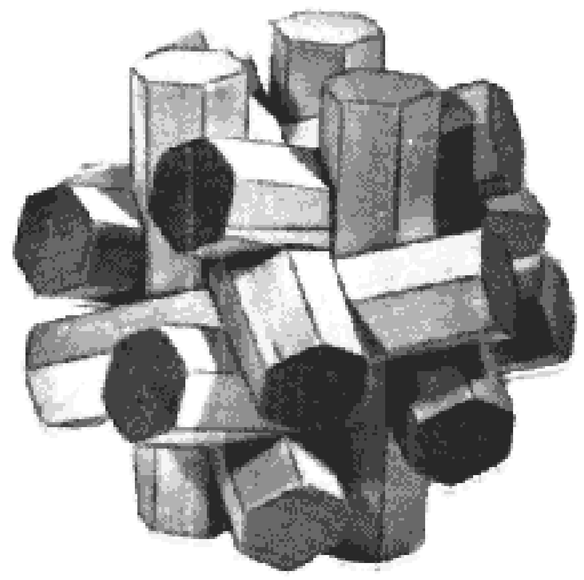
A 24-page reprint of the old Puzzle Craft newsletter, tells most everything I know about mechanical and geometrical puzzles. $2.00 ppd.

January 1979

SNOWFLAKE

The 10 puzzle pieces are cast in hydrastone; base is molded plastic. The 10-page booklet shows 49 problems, from easy to difficult. My favorite combinational puzzle. $6.00



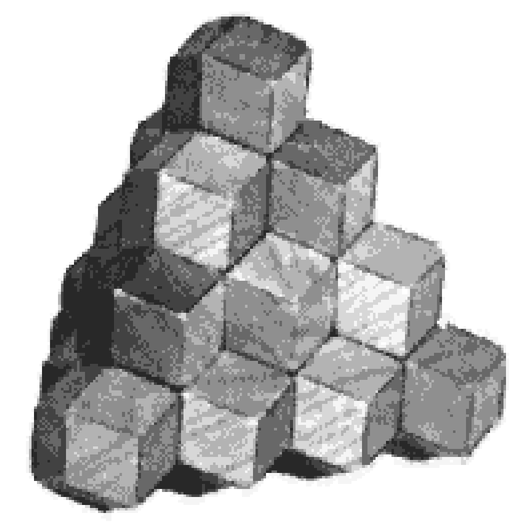


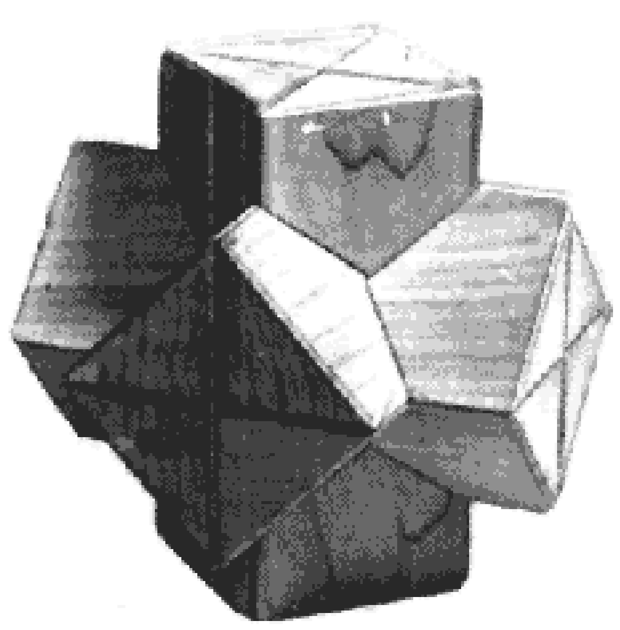
HEXSTICKS

Twelve notched hexagonal sticks go together three different ways to form a symmetrical cluster. New and improved version of a classic puzzle. Birch. $9.00

FOUR-PIECE PYRAMID (New)

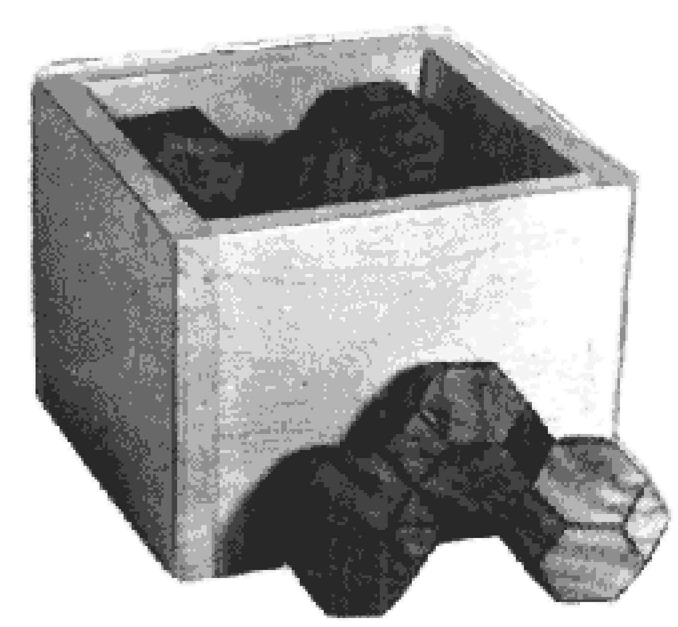
The four dissimilar pieces, each made up of five rhombic dodecahedra, interlock to form a triangular pyramid. Much harder than it looks. Instructions available on request. Cherry. $16.00





THREE PAIRS (New)

Six puzzle pieces — three right-handed and three left-handed — interlock to form what looks like three diagonally intersecting square rods. Looks easy, but contains a surprise, and is one of the most baffling puzzles I have ever devised. For maximum enjoyment, request that it be sent unassembled. Solution included if requested. Cherry. $20.00



TRUNCATED OCTAHEDRA (New)

A truly unusual combinatorial puzzle. The five puzzle pieces, which are made up of 14 truncated octahedra joined in different ways, pack into a four-inch-square box. Also forms a square pyramid, for which the cover serves as base, and eight other confusing figures. Walnut. $25.00

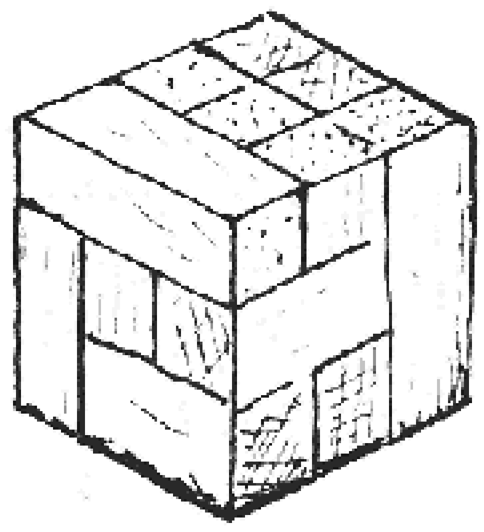
The size of some puzzles is indicated, and the others are approximately to the same scale. Wood types indicated are subject to change.

Please add $2.00 to all orders for postage and handling, $3.00 west of the Mississippi and Canada, $4.00 overseas. Massachusetts residents add sales tax. For insurance or air mail, consult postal rates and include extra amount.

Please allow several weeks for delivery. All puzzles are made by a craftsman working alone, using archaic machinery.

Stewart T. Coffin, *Old Sudbury Road, Lincoln, MA.* 01773

UNUSUAL PUZZLES IN WOOD 1980 SUPPLEMENT

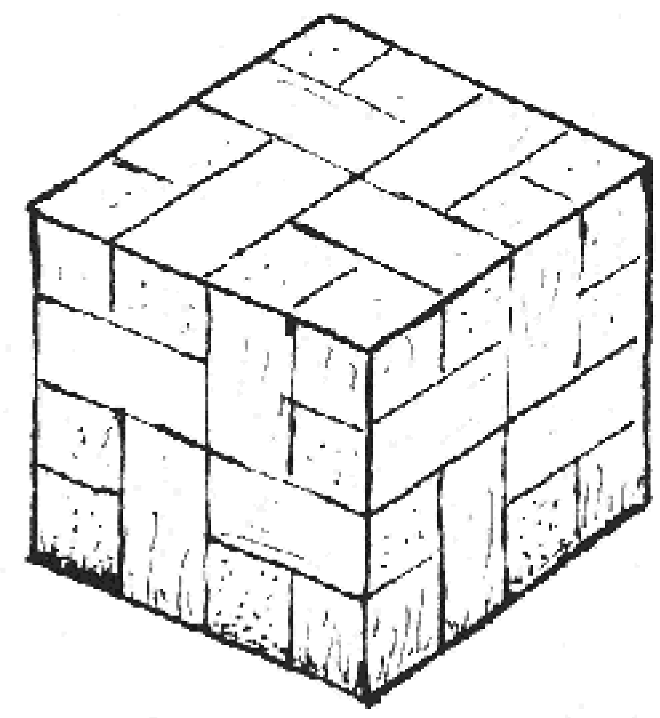


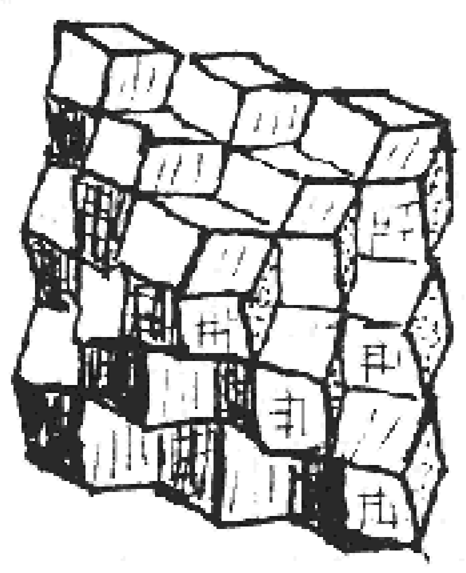
HALF-HOUR

(So named because that is a good solution time.) You are all probably familiar with the many puzzle designs based on the dissection of the cube into smaller cubes joined together various ways. This may appear to be just another of same, but if so, would it be included here? Six pieces, mahogany. $12.00

CONVOLUTION

I still get requests for the old CUBE puzzle, long since discontinued. I consider this new design to be much improved. Seven dissimilar pieces interlock to form a cube. It has two interesting properties, one being the symmetry of the dissection, the other to be discovered when and if you solve it. Very difficult, solution provided. Mahogany. $25.00



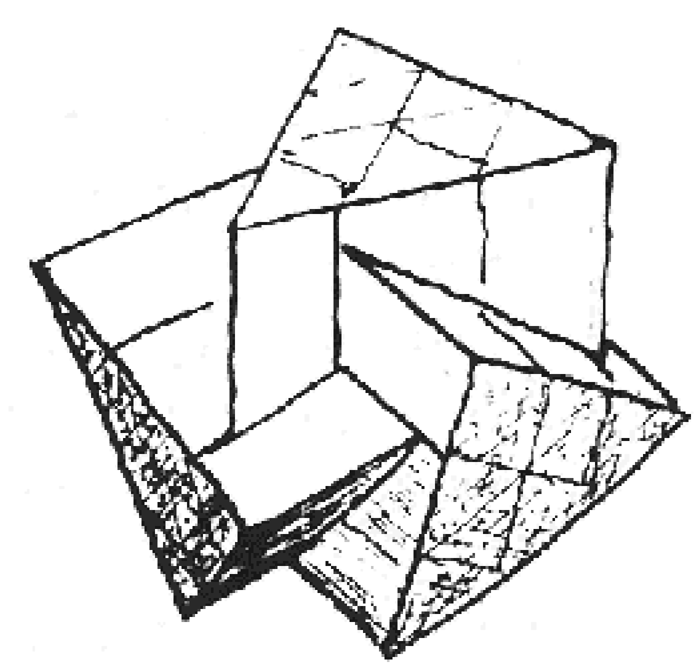


OCTAHEDRAL CLUSTER

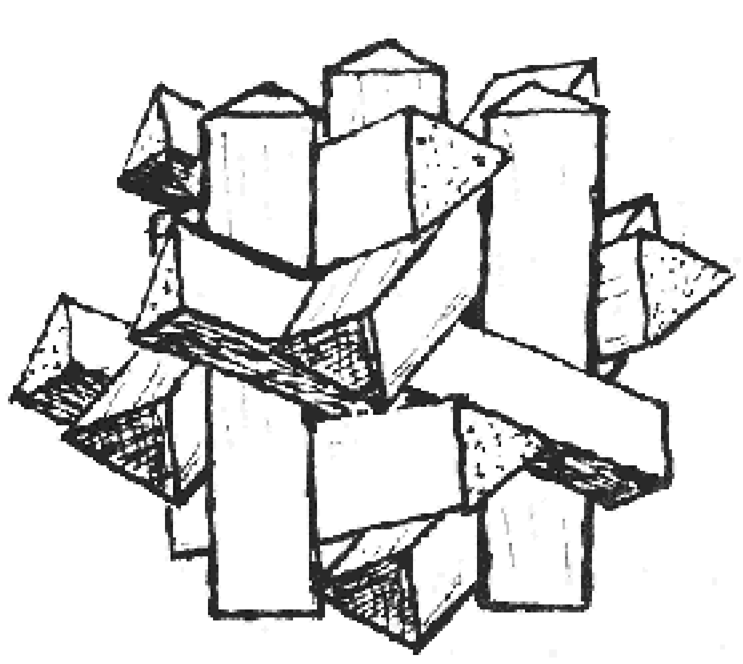
Note the similarity of this puzzle to the FOUR-PIECE PYRAMID. This one also has four pieces, but is even harder - somewhat larger too. Mahogany. $30.00

TRIANGULAR PRISM

A popular puzzle when it was made in very limited number a few years back (see other side), it is being reissued. It has a most intriguing geometry, appearing to consist of four mutually intersecting half prisms. I list it here with some trepidation, as I am not at the moment set up to make it, but expect to be in a couple months. Fairly difficult, six pieces, mahogany. $30.00



BROKEN STICKS



I tinkered with the basic idea of this puzzle for many years off and on, and had nearly convinced myself that the combination I sought was impossible. Now that I have finally stumbled upon it, I can only wonder why it took so long. Six dissimilar pieces assemble one way only to form what appears to be a symmetrical assembly of twelve continuous interlaced triangular sticks. Quite difficult. One of my best designs, and one I would not be ashamed to bow out on. Mahogany. $35.00

See 1979 brochure for ordering information. Please include street address, as I now ship by UPS. All prices expire Dec. 31, 1980.

Stewart T. Coffin, *Old Sudbury Road, Lincoln, MA.* 01773

This year I am offering the five new puzzles shown on the reverse side of this sheet, in addition to the ten listed on my 1979 brochure. All of the prices on both sheets are good until the end of this year.

I now have a card file of about 1000 names of persons I have had some puzzle transactions with since starting business. To economize, this mailing is being sent only to those who have purchased a puzzle within the past two years, or I have heard from within a year.

I have now been in the puzzle business for ten years, so here is a brief account of those years: Of the three puzzles on my 1970 brochure (SNOWFLAKE, CUBE, and PENTABLOCK), only SNOWFLAKE is still in production. The next two years saw the development of my polyhedral designs - STAR, SCORPIUS, FOUR CORNERS, NOVA, and JUPITER. All of these were identical-piece assemblies, and their appeal lay more in their intriguing geometry and exotic wood combinations, rather than as challenging puzzles. They have all been discontinued.

My 1974 brochure marked a departure from the previous work, for here we find the PRISM family and SUPER NOVA, in which the pieces are all dissimilar, usually with only one solution. Thus they not only assemble into intriguing polyhedra, but are challenging combinatorial puzzles as well. There was also the unusual TRIUMPH puzzle, which assembled into several different polyhedral shapes. In 1975, we had the PYRACUBE, the first in another new category of puzzles, consisting of polyhedral blocks joined together different ways, with a set of problem diagrams.

The next two years marked a low ebb in the puzzle business, for somehow I became involved in the mass production of buttons and beads made of fancy woods, and then key ring cases. The only new puzzles were the PIN-HOLE series, CUCKOO NEST, and LOCKED NEST. In 1978, the SCRAMBLED SCORPIUS and SATURN were listed - a pair I regard as among my better works. Last year I added four more new puzzles to the line - HEXSTICKS, FOUR-PIECE PYRAMID, THREE PAIRS, and TRUNCATED OCTAHEDRA.

In addition to the 38 puzzles which have been listed up to the present, there have been many others made in very limited numbers from time to time, most of which I have some record or recollection of, and still others which exist as models only and have never been produced. I receive many requests (some quite fervent) for puzzles I have once made, from persons who may have seen one or heard about it. In response to this, I regret to say that I can only supply those which are currently listed, because of the need to economize time and materials in every facet of my operations. When a puzzle has been discontinued, it was usually because it was too difficult to fabricate, or I have replaced it with an improved version. Sometimes, if there is much demand, and if I can devise improved production techniques, I will revive certain old favorites, as is the case this year with TRIANGULAR PRISM.

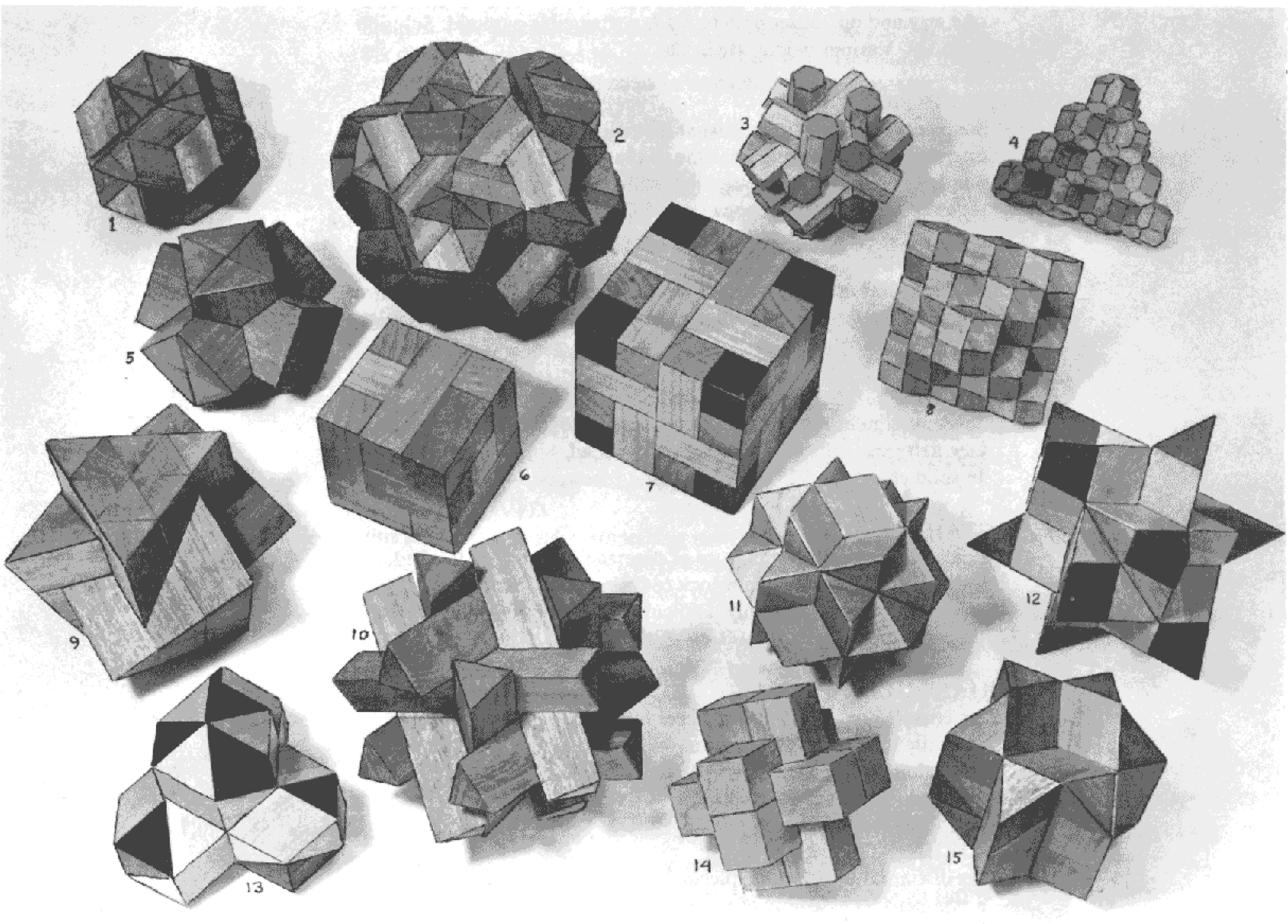
Last year, I offered to custom-make puzzles in Rosewood or other choice woods at a premium price, and I had quite a few takers. I am discontinuing it this year, as it was too time-consuming. What I now do instead is to make up small runs of them as time permits, and sell them on a first-come basis. You may inquire if interested. (At this moment, I have in Rosewood: SATURN at $90, SCRAMBLED SCORPIUS at $35, and THREE PAIRS at $35.)

It has become increasingly difficult to survive in this business lately, with the steady and systematic devaluation of our currency and the prospects of worse to come. Therefore, I am seeking some more profitable line of work, and at this moment am looking into solar heating, insulated window shades, and other related and much needed items. This means that the puzzle business will be part-time only, so in addition to my usual slow deliveries, please allow even more time this year. Thanks.

S. T. C. January 1980

UNUSUAL PUZZLES IN WOOD

by Stewart T. Coffin



79 OLD SUDBURY ROAD, LINCOLN, MASS. 01773

1. SCRAMBLED SCORPIUS
   Six dissimilar interlocking pieces go together one way only (surprisingly) to form a recessed rhombic dodecahedral shell. One of my most satisfactory designs — difficult. Mahogany. $25.00
   (In rosewood — $40.00)

2. SATURN
   Six pairs of perplexingly dissimilar interlocking pieces form a hollow castellated triacontahedron. Very difficult, but solution included. Size — 6½ inches. Mahogany. $60.00 (In rosewood — $100.00)

3. HEXSTICKS
   Twelve notched hexagonal sticks go together three different ways to form a symmetrical cluster. Solution included. Birch. $12.00

4. FOUR-PIECE PYRAMID
   Four dissimilar pieces, each made up of five blocks, go together one way and one order only to form a triangular pyramid. Solution included. Various woods used. $30.00

5. THREE PAIRS
   Six pieces interlock to form what looks like three diagonally intersecting square columns. One of the most unusual and baffling puzzles I offer. Sent disassembled, with sealed instructions, unless requested otherwise. Mahogany. $25.00

6. HALF-HOUR
   Six dissimilar non-interlocking pieces assemble into a cube and twenty other shapes shown on the instruction sheet. Harder than you might suppose. Cherry. $12.00

7. CONVOLUTION
   Seven dissimilar interlocking pieces form a solid cube with symmetrical face patterns. Difficult, but solution included. Size — 4 inches. In solid cherry — $25.00. Cherry and rosewood — $30.00

8. OCTAHEDRAL CLUSTER
   Four dissimilar pieces made up of nineteen rhombic dodecahedra joined different ways to interlock to form an octahedral assembly, one way and one order only. Difficult, and no directions included. Various woods used. $35.00

9. TRIANGULAR PRISM
   Six complicated interlocking pieces form what appear to be four mutually intersecting half prisms — an intriguing geometrical dissection. Fairly difficult, but assembly directions (of sorts) included. Mahogany. $35.00

10. BROKEN STICKS
    Six dissimilar interlocking pieces form what deceptively appears to be a symmetrical assembly of twelve triangular sticks. Quite difficult, but assembly hints given on instruction sheet. Size — 5 inches. Mahogany. $40.00

New Puzzles for 1981

11. SECOND STELLATION

This is a reissue of a puzzle made in very limited number in 1974. Six dissimilar interlocking pieces form the intriguing second stellation of the rhombic dodecahedron. Not too difficult, but requires patience. Cherry. $30.00

12. TWELVE POINT

Six dissimilar pieces assemble one way only to form an attractive geometrical solid with twelve stellations — a companion design to the one above. The smooth interlocking action of the precisely fitting parts should please the hand as well as the mind. Quite difficult, but straightforward combinatorial, and assembly directions are not included. In solid cherry — $40.00. Cherry and rosewood — $45.00. Cherry and ebony — $50.00.

13. AUGMENTED FOUR CORNERS

The old FOUR CORNERS Puzzle was one of my original "AP-ART" designs. This augmented version is more difficult and interesting. Six dissimilar pieces made up of contrasting woods assemble one way only to form an attractive solid having tetrahedral symmetry. Cherry and rosewood. $30.00

14. SIX-PIECE BURR

I am now set up to make the so-called notchable pieces for the familiar six-piece burr using one-inch square hardwood stock. These may be ordered by number (see Puzzle Craft II, page 3) at $1.00 each, or a complete set of twenty-five for $25.00.

For an interesting solid burr of intermediate difficulty, assembled, with instructions, order BURR No. 305 — $7.00.

For a more difficult version, containing some unnotchable pieces, order COFFIN'S IMPROVED BURR — $10.00. (Don't be misled by the familiar shape or low price — this is a very interesting puzzle.)

15. STAR OF DAVID

For the serious puzzler, something new. Six dissimilar pieces assemble strangely different ways to form various shapes. This confusing puzzle comes assembled one way, but you must figure out the other solutions yourself. (Included with purchase of this puzzle is a prospectus for our new Puzzle Club, whereby you may receive other challenging new designs, as they become available, on a subscription basis.) Mahogany. $35.00

Other Puzzles Still Available, but Not Illustrated

SNOWFLAKE

A two-dimensional dissection-type puzzle. Ten pieces are cast in hydrastone; base is molded plastic. The ten-page booklet shows 49 problems. $8.00

TRUNCATED OCTAHEDRA

Five pieces, made up of fourteen truncated octahedra, pack into a square box, form a pyramid, and make fifteen other figures shown in instruction booklet. Mahogany. $25.00

Puzzle Craft I

This is a revised edition of the 24-page booklet many of you already have, covering combinatorial, topological, and dissection-type puzzles, puzzle patents, and related topics. $2.00 postpaid.

Puzzle Craft II, POLYHEDRAL PUZZLES

This new booklet covers practically all of my work up to the present in the design of "polyhedral" puzzles. Twenty pages, 48 illustrations. $3.00 postpaid.

Puzzle Craft III WOODWORKING TECHNIQUES

Shows how my puzzles are made. To be used in conjunction with booklet II above. Available around mid-1981. $2.00 postpaid.

The size of some puzzles is indicated, and the others are approximately to the same scale. Wood types indicated are subject to change. I think I have enough Brazilian rosewood to last through 1981. When it is gone, I may substitute bubinga, same price.

Please add $2.00 to all orders for shipping, $3.00 west of the Mississippi and Canada, $4.00 overseas, regardless of quantity, (I absorb extra cost on large orders). Massachusetts residents add sales tax. For orders of $5.00 or less, cash is preferred. Prices are good until December 31, 1982.

I now ship by UPS, for which we need street address. Please allow several weeks for delivery. These puzzles are designed and made by an eccentric craftsman working alone, using archaic machinery.

This year, as we begin our second decade in the puzzle business, I have added five new puzzles to the line, and discontinued three of last year's, in my continuing effort to upgrade the quality of what I have to offer. Now, for the first time, I have found it necessary to make an across-the-board price increase to catch up with the past several years of inflation, plus that anticipated through 1982. I should publish a catalog supplement in January 1982, as I did last year, with a few new designs.

Many of you never received last year's supplement, the reason being that I mailed them out alphabetically, starting in January, whenever I got ahead on production, but by the end of the year was only up to *D*. No need at all to change your names to Adams — I will try to do better this year. At least delivery has been improved, and most orders last year were shipped out within a few weeks.

Some of you have made standing requests to be sent every new and reissued puzzle as soon as it is available, and billed for same, but you probably did not receive any. This year I am organizing this into a Puzzle Club, whereby you will be notified in advance of each new puzzle, (see note under STAR OF DAVID Puzzle).

Thank you for your continued interest in and support of my work.

Stewart T. Coffin
January 1981

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

Puzzle Inventory, January 24, 1983

Scrambled Scorpius, mahogany, $30.00
Saturn, mahogany, $60.00
Hexsticks, birch, $12.00
Three Pairs, mahogany, $30.00
Triangular Prism, mahogany, $40.00
Broken Sticks, mahogany, $40.00
Second Stellation, cherry, $35.00
Twelve Point, cherry, $50.00
Augmented Four Corners, cherry and rosewood, $35.00
Burr #305, cherry, $10.00

Puzzle Craft I-II-III, $7.00 postpaid

Books:

Puzzles Old and New, Hoffmann, $80.00 or best offer
" " " " " (Xerox), $10.00
Mathematical Recreations and Essays, Ball, $20.00
Spelen Met Puzzles (Dutch), van Delft & Botermans, $20.00
Museum of Playthings (Japanese), Sukane, $25.00
Regular Figures, Toth, $4.00
Shapes, Space, and Symmetry, Holden, $12.00
Mathematical Models, Cundy & Rollett, $10.00
The Master Book of Mathematical Recreations, Schuh, $2.00
Mazes and Labyrinths, Shepherd, $1.00
Mathematical Recreations, Kraitchik, $2.00
Mathematical Puzzles, Gardner, $3.00
Sixth Book of Mathematical Games, Gardner, $8.00
Geometric Dissections..., Lindgren, $2.00
536 Puzzles and Curious Problems, Dudeney, $3.00
Perplexing Puzzles and Tantalizing Teasers, Gardner, $1.00
Puzzles in Math and Logic, Friedland, $1.00
Amusements in Mathematics, Dudeney, $2.00
The Canterbury Puzzles, Dudeney, $2.00
Mathematical Puzzles, Mott-Smith, $1.00
Mathematical Puzzles of Sam Loyd, Gardner, $1.00
Mathematical Puzzles, Filipiak, $5.00
Polyhedral Models of the Classroom, Wenninger, $1.00
The Graphic Works of M.C.Escher, $4.00
Puzzles in Wood, Wyatt (Xerox), $1.00
Illustrated Magic, Fischer, Ch. 14 - Puzzles (Xerox), $1.00
Miscellaneous Puzzles, Stubbs, (Xerox), $5.00

Miscellaneous puzzles, models, tools and supplies - too numerous to list here. Will attempt to start doing so in next edition.

On all orders, please estimate UPS charge, and include $1.00 additional for packing. On orders of $20 or less, cash is preferred. If item already sold, you will receive refund or credit - indicate which.

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

Puzzle Inventory and Price List, February 23, 1983

Scrambled Scorpius, mahogany, $30.00
Hexsticks, birch, $12.00
Three Pairs, mahogany, $30.00
Triangular Prism, mahogany, $40.00
Second Stellation (improved), $35.00
Twelve Point, cherry, $50.00
Augmented Four Corners, cherry and rosewood, $35.00
Burr #305, cherry, $10.00

Puzzle Craft booklets I-II-III, $7.00 postpaid ($5.00 for each additional copy after the first, or when included in puzzle shipment).

For descriptions and shipping information, refer to 1981 brochure. Only those puzzles listed above are now available, all others having been discontinued.

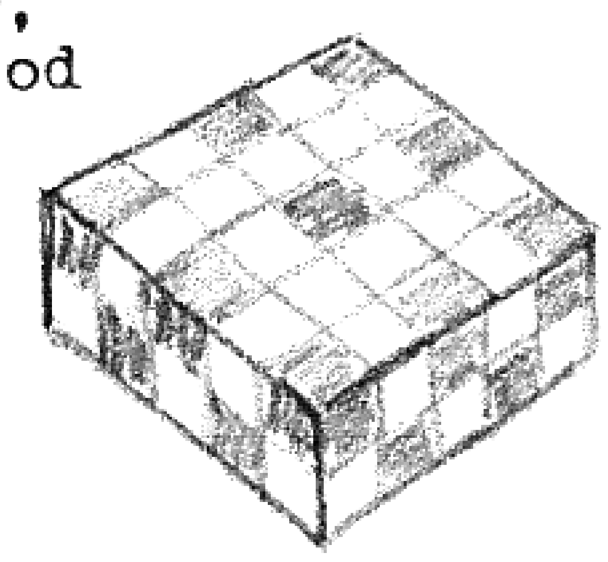
Puzzle Club Notice:

This notice is being sent to the 78 persons whom I presently have listed as faithful "puzzle club" customers.

Over the course of this year, I hope to liquidate most of my puzzle-making operations in order to make space and time for some other projects I am starting. I still have lots of lumber to use up, both plain and fancy, and so I expect to continue making puzzles part-time at least through this year. Hopefully, as orders for my inventory of standard puzzles taper off, I can devote more attention to what I regard as "unfinished business."

I am discontinuing the practice of numbering these puzzles, because someone is always reminding me that they missed number so-and-so. This is usually my fault for not having sent them a notice, but it is quite a chore keeping all of you up to date, and it greatly simplifies my production operations if I can concentrate on just one design at a time.

So, the next puzzle in this series, available probably around April, will be the "Unhappy Childhood" puzzle. It is a solid checkerboard type - 50 blocks, ten puzzle pieces. It will be available in plain wood ($20.00 postpaid), or fancy wood ($30.00 postpaid).



S.T.C.
Feb 23, 1983

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

Puzzle Liquidation Sale June 1983

This newsletter is being circulated to special small list of puzzle persons. I need some cash, and would like to liquidate most of my puzzle inventory before leaving for vacation in early August.

Standard Stock Puzzles	Qty. in Stock	Price Each
Scrambled Scorpius, Hond. Mah.	2	30.00
" " Braz. Rose.	1	45.00
Saturn, Hond. Mah.	2	70.00
Hexsticks, Birch	5	12.00
Four-Piece Pyramid (improved), Hond. Mah.	8	35.00
Three Pairs, Hond. Mah.	16	30.00
Triangular Prism, Hond. Mah.	1	40.00
Second Stellation (improved), Hond. Mah.	3	35.00
Twelve Point (improved), Hond. Mah. & Rose.	3	50.00
Augmented Four Corners, Cherry & Rose.	2	35.00
Burr #305, Cherry	3	10.00
Set of 25 Notchable Burr Pieces, Cherry	1	25.00
Snowflake, Hydrastone	1	12.00
Truncated Octahedra, Hond. Mah.	4	25.00
Star-of-David, Hond. Mah.	1	35.00
Unhappy Childhood, Acle & Limba	1	30.00

Odd Puzzles, Mostly One-of-a kind

Modified Kirsch Puzzle (see PC-I, p-15), 5 pc. cherry, needs box, $5.0

Variation of Solid Pentominoes, 12 pc. & box, walnut, $15.00

Bag containing all leftovers from Pin-Hole Puzzles, enough to make two BASICs with 6 pc. left over, cherry, $15.00

Experimental hollow box, 5 pc., hardwood, $5.00

Like Second Stellation, but pieces different, $15.00

Variation on above, small and rough, but interesting new shape, $15.00

Ordinary Six-Piece Diagonal Burr, well made, Mah., $15.00

Variation on Altekruse, sort of a box, rough pine, unusual, $10.00

Variation on Aug. Four Cor., fancy wood but very rough, $10.00

Variation of Octahedral Cluster, 4 pc., Spanish Cedar, $25.00

Corner Block in Cherry & Ebony (one of two made), $25.00

Original Four Piece Pyramid in Oak, with doweled joints, $20.00

Puzzle Parts - These would be of no interest to puzzle collectors, but might be of some use to hobbiests and tinkerers

Bag of experimental Locked Nest and Cuckoo Nest parts, about 20 pc. plus some 7/16" dowel, maybe enough to make some sort of puz. $5.0

Bag of experimental Pin-Hole Puzzle pieces, about 40 pc., with extra dowel, enough to invent a puzzle of some sort, $10.00

Tetrahedral blocks produced as waste, quite accurate, might be used to make Pennyhedron-type puzzles, mostly Cherry but some Rosewood, Ebony, and Tulipwood, 1¢ each

Announcement - In response to numerous requests, I will be making up a few TRIUMPH Puzzles as time permits (refer to PC-I, p-13), in Rosewood and Tulipwood while supply lasts, $35.00

Please include $2.00 per order for shipping, $3.00 west of Miss.

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773
259-8348

July 1983

Second Puzzle Liquidation Notice

This notice supersedes one which was sent out to many of you last month, which listed odd puzzles, mostly one-of-a-kind, for sale. I should have known that was a mistake. Most of the twenty persons who received that mailing phoned or wrote immediately offering to buy every item listed. Of course, the first one who phoned got them all. For the rest of you, it was a wasted phone call and a disappointment, and a nuisance having to return all of your orders. We won't do it that way again.

I still have quite a large number of odd puzzles which I intend to liquidate as fast as I can sort them all out from the incredible jumble in my shop. Here is how we will do it this time. Since so many of you seem to be willing to buy these on faith, you may send any amount of payment you wish, up to a maximum of $30, and receive in return one such puzzle which I judge to be of equivalent value. Limit of one per customer. I have records of every puzzle you have bought, so it will not be a duplicate. If disappointed, you may return it for refund or replacement. Please try to indicate what sort interests you most, and I will try to match your wishes.

For those of you who are still having trouble with the Rosebud Puzzle, I can now supply an assembly jig and instructions for $10. If you want just the instruction sheet, it is free for the asking.

I am now making up a batch of Triumph Puzzles (see PC-I, page 13) in Rosewood and Tulipwood, priced at $35.00. Limit of one per customer.

I have discovered a box of unfinished Sleeper-Stoppers and Super Sleeper-Stoppers (see PC-I, page 16) in fancy woods which I am finishing and selling. They are priced at $6.00 and $8.00 respectively. Limit of one per customer.

Of my standard stock puzzles, the only ones left now are: Four-Piece Pyramid - $35.00, and Three Pairs - $30.00. The following are not in stock, but I will still make them up on special order: Second Stellation - $35.00, Twelve Point - $50.00, and Augmented Four Corners - $35.00.

I would like to sell my Snowflake Puzzle production equipment and supplies complete to some enterprising person for a price of $90 plus shipping. Included are patterns, mold, Hydrastone, pigment, bases and instruction - enough to make at least 100 sets.

Several of you have asked about buying my woodworking jigs. Most of them work in conjunction with my power tools and with each other, and the only practical way to liquidate them would be to sell my entire puzzle operation complete. If anyone has about $10,000 to spare, they may visit and we can discuss.

Through 1975, most of these puzzles were sold either wholesale or at craft fairs. Then for the next two years I was involved in wooden jewelry and key rings. Not until the article appeared in "Scientific American" in January 1978 did I concentrate on direct mail retail and start keeping a card file of all puzzles sold. From that file I have compiled the following list of persons to whom I have sold at least ten different puzzles. (The numbers of puzzles are only approximate.)

N.S. - 35?	J.A. - 21	J.R. - 15	V.S. - 10
T.R. - 31	J.E. - "	C.S. - "	R.S. - "
W.S. - 28	M.B. - 20	D.B. - ~~14~~ 21	R.W. - "
W.C. - 26?	R.P. - "	S.S. - "	J.D. - "
J.S. - 25?	E.S. - "	D.F. - "	E.S. - 15
D.A. - 25	H.H. - "	K.A. - "	S.T. - "
R.H. - "	D.B. - 19	D.M. - "	B.C. - "
R.B. - 24	W.C. - ~~"~~ 32	E.L. - 13	G.D. - ?
J.E. - ~~"~~ 27	H.L. - "	WvP. - "	D.K. - ?
B.F. - "	M.J. - 18	W.D. - 12	M.S. - ?
K.K. - 23	K.P. - "	B.M. - "	S.I. - ?
R.S. - "	S.R. - "	G.S. - "	A.P. - ?
L.S. - "	P.L. - "	E.C. - 11	L.B. - 15
P.B. - "	A.G. - 17	H.I. - "	M.B. -
H.C. - 22	J.K. - "	J.M. - "	J.L. -
M.S. - "	E.S. - 16	B.P. - "	H.M. -
R.A. - 21	G.A. - "	W.T. - "	
M.C. - "	K.E. - 15	S.B. - "	
R.H. - "	J.M. - "	J.H. - 10	
D.W. - "	J.S. - "	W.Mc - "	
R.B. - "	E.H. - "	E.M. - "	

This memo is being sent to the ~~73~~ ~~76~~ 79 individuals listed above. This list corresponds closely to what I referred to as "Puzzle Club" members for a while. If any of you are interested in acquiring any more of the puzzles listed, I would suggest that you begin by making a complete list of those you now have and sending it to me, as my records may not be complete or accurate. Secondly, since some of the puzzle names will mean nothing to you (or me either!), I am compiling a little booklet of about 35 pages which will contain information on all of these puzzles, including old brochures and instruction sheets. To obtain a copy, just mail a \$5 bill. Note also that Puzzle Craft I-II-III is still available for \$7.00 postpaid. To obtain both of these publications, send \$10 for the lot.

As of this moment, the following puzzles are being offered for sale, either from stock or a few weeks delivery:

Three Pairs - \$30
Second Stellation - \$35
Twelve Point - \$50
Augmented Four Corners - \$3
Scrambled Scorpius - \$30
~~Sleeper Stopper - \$6~~
Cuckoo Nest - \$10
Burr #305 - \$10
Hexagonal Prism - \$35
Triumph - \$35
Hexsticks - \$12
Rosebud assembly jig - \$10

A few others may become available from time to time, and inquiries are welcome. Note however that the following are definitely and permanently discontinued: 1, 2, 4, 5, 6, 7, 8, 9, 10, 16, 17, 18, 20, 28, 30, 31, 32, 36, 40, 42, 45, 46, 50, 51, 53, 54, 55, 56, and 59.

S.T.C. Oct 1983

From: Stewart T. Coffin

79 Old Sudbury Road
Lincoln MA 01773

PUZZLE NEWS - December 1983

This memo is in response to numerous inquiries I have received from persons wishing to acquire a complete set of my puzzle designs, all old or discontinued puzzles, plans, instructions, etc.

I started designing puzzles in earnest in 1968. These were created only as design models for licensing and manufacture in plastic. The first and by far the most successful was Hectix. Others were Frantix, Geo-Logics, and Snowflake. These are all described in Puzzle Craft. Most of the others were either later made in wood, or are not worth mentioning.

In 1970, I started producing puzzles in wood, and printed my first brochure. Thereafter, brochures were printed in 1971, 1972, 1974, 1975, 1977, 1978, 1979, 1980, and 1981. I believe that the 1981 brochure is a distillation of practically all of my most satisfactory designs. The following is a fairly complete list of all puzzles produced, with the year introduced and discontinued:

1. 1970-1972 Ortho-Cube (cube)
2. 1970-1978 Pentablock (Pentominoes)
3. 1970-1983 Snowflake
4. 1971-1975 Sirius (star)
5. 1971-1975 Scorpius
6. 1971-1975 Four Corners
7. 1971-1978 Jupiter
8. 1972-1974 Nova
9. 1974-1976 Square Knot (Altekruse)
10. 1974-1976 Giant Steps
11. 1974-1976 Hex Prism
12. 1974-1983 Triangular Prism
13. 1974-1976 The General - Four Star
14. 1974- Super Nova - Second Stell.
15. 1974-1976 Triumph
16. 1974-1976 Dislocated Scorp.
17. 1974-1976 Dislocated Jup.
18. 1975-1976 Waffle
19. 1975-1976 Pyracube
20. 1977-1980 Pin-Hole family
21. 1977-1981 Cuckoo Nest
22. 1977-1981 Locked Nest
23. 1978- Scrambled Scorp.
24. 1978-1983 Saturn
25. 1979- Hexsticks
26. 1979-1983 Four-Piece Pyr.
27. 1979- Three Pairs
28. 1979-1983 Truncated Octa.
29. 1980-1983 Half-Hour
30. 1980-1983 Convolution
31. 1980-1983 Octahedral Clus.
32. 1980-1983 Broken Sticks
33. 1981- Twelve Point
34. 1981- Augmented Four C.
35. 1981- Burr #305
36. 1981-1983 Coffin's Improved B.
37. 1981-1983 Star-of-David

Puzzles listed on supplementary mailings:

38. 1981-1983 Three-Piece Block
39. 1982-1983 Rosebud
40. 1982-1982 Interrupted Slide
41. 1983-1983 Unhappy Childhood

Other puzzles never listed, but produced in small numbers:

42. circa 1970 Seven Woods
43. " 1972 Sleeper Stopper
44. " 1972 Super " "
45. " 1972 Buttonhole
46. " 1973 Vega
47. " 1973 Cluster Buster
48. " 1973 Truncated " "
49. " 1973 Improved " "
50. " 1973 Superstar
51. " 1973 Little Superstar
52. " 1973 Pennyhedron & Mini.
53. " 1973 Little Giant Steps
54. " 1973 Defiant Giant
55. " 1973 Pagoda
56. " 1973 Giant Pagoda
57. " 1973 14-pc Square Knot
58. " 1974 Diagonal Cube
59. " 1980 Corner Block

(If you know of any others which should be included on this list, please let me know.)

Through 1975, most of these puzzles were sold either wholesale or at craft fairs. Then for the next two years I was involved in wooden jewelry and key rings. Not until the article appeared in "Scientific American" in January 1978 did I concentrate on direct mail retail and start keeping a card file of all puzzles sold. From that file I have compiled the following list of persons to whom I have sold at least ten different puzzles. (The numbers of puzzles are only approximate.)

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W.C. - 26?	R.P. - "	S.S. - "	J.D. - "
J.S. - 25?	E.S. - "	D.F. - "	E.S. - 15
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B.F. - "	M.J. - 18	W.D. - 12	M.S. - ?
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R.S. - "	S.R. - "	G.S. - "	A.P. - ?
L.S. - "	P.L. - "	E.C. - 11	L.B. - 15
P.B. - "	A.G. - 17	H.I. - "	M.B. -
H.C. - 22	J.K. - "	J.M. - "	J.L. -
M.S. - "	E.S. - 16	B.P. - "	H.M. -
R.A. - 21	G.A. - "	W.T. - "	
M.C. - "	K.E. - 15	S.B. - "	
R.H. - "	J.M. - "	J.H. - 10	
D.W. - "	J.S. - "	W.Mc - "	
R.B. - "	E.H. - "	E.M. - "	

This memo is being sent to the ~~73~~ ~~76~~ 79 individuals listed above. This list corresponds closely to what I referred to as "Puzzle Club" members for a while. If any of you are interested in acquiring any more of the puzzles listed, I would suggest that you begin by making a complete list of those you now have and sending it to me, as my records may not be complete or accurate. Secondly, since some of the puzzle names will mean nothing to you (or me either!), I am compiling a little booklet of about 35 pages which will contain information on all of these puzzles, including old brochures and instruction sheets. To obtain a copy, just mail a $5 bill. Note also that Puzzle Craft I-II-III is still available for $7.00 postpaid. To obtain both of these publications, send $10 for the lot.

As of this moment, the following puzzles are being offered for sale, either from stock or a few weeks delivery:

- Three Pairs - $30
- Second Stellation - $35
- Twelve Point - $50
- Augmented Four Corners - $3
- Scrambled Scorpius - $30
- ~~Sleeper Stopper - $6~~
- Cuckoo Nest - $10
- Burr #305 - $10
- Hexagonal Prism - $35
- Triumph - $35
- Hexsticks - $12
- Rosebud assembly jig - $10

A few others may become available from time to time, and inquiries are welcome. Note however that the following are definitely and permanently discontinued: 1, 2, 4, 5, 6, 7, 8, 9, 10, 16, 17, 18, 20, 28, 30, 31, 32, 36, 40, 42, 45, 46, 50, 51, 53, 54, 55, 56, and 59.

S.T.C. Oct 1983

STEWART T. COFFIN

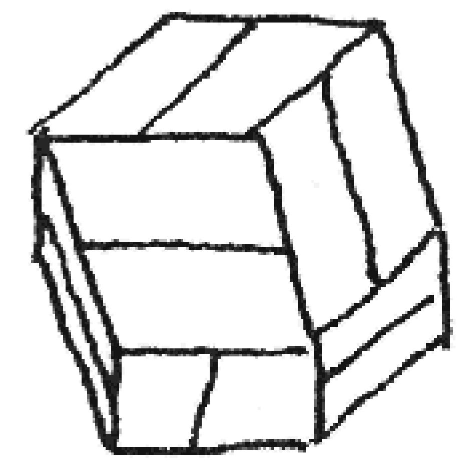
79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

Jan 31, 1984

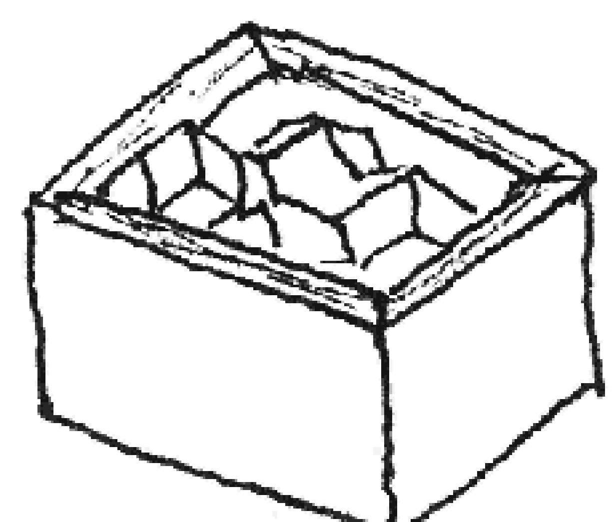
Bulletin - Announcing 4 New Puzzles

The GARNET Puzzle, being a revised and improved version of a model designed many years ago, filed away and forgotten until rediscovered recently. Six interlocking pieces, new and unusual, and quite difficult.



In hardwood (cherry or mahogany) 25.00
In Rosewood (or equivalent) 35.00
In six contrasting fancy woods 40.00

The SETTING HEN Puzzle.



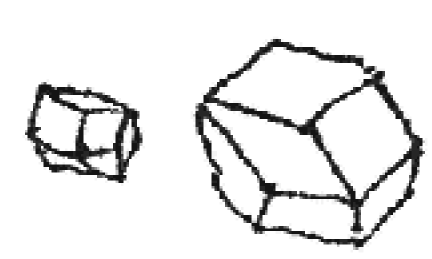
This is a new and improved version of the old Pyracube Puzzle, long since discontinued. Four pieces pack in a box. Much more difficult than you might expect.

In hardwood 25.00
In four contrasting fancy woods 35.00

The PENNYHEDRON Puzzle.

At last, a re-issue of one of my old favorites. For description, see Puzzle Craft II, page 15-16.

Set, in nice woods 20.00
Set, in fancy woods 25.00



The NINE BARS Puzzle. Resembles the old Cuckoo Nest Puzzle, but larger and more difficult. Comes disassembled, with no instructions.

In birch 18.00

All prices are postpaid anywhere in U.S.

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

Puzzle News, October 1984

Well, still here and still sawing wood. Spent most of this past summer making canoes and paddles. Business has slacked off for the season, so now back to some unfinished puzzle business.

The following puzzles are now in stock and for sale. Most persons receiving this mailing already have most of these. The ones you are not likely to have are those marked NEW. For descriptions, see Puzzle Craft.

	#3 SNOWFLAKE $15.00
	#14A SECOND STELLATION $35.00
	#23 SCRAMBLED SCORPIUS $35.00
	#25A HEXSTICKS $15.00
	#35 AUGMENTED FOUR CORNERS $35.00
NEW	#58 DIAGONAL CUBE (hardwood) $35.00
"	" " " (fancy wood) $40.00
NEW	#60 GARNET $40.00
NEW	#63 PSEUDO-NOTCHED STICKS $15.00 (more of a novelty than a puzzle in my opinion, but several of you have asked for it, so here it is)
NEW	Puzzle Craft Booklet #4, WOODEN PUZZLES $5.00
	Complete set of all four Puzzle Craft Booklets $10.00

All prices are postpaid. This list will expire at the end of 1984.

Some of you have asked what happened to the "Puzzle Club." That was nothing more than a select mailing list. The fact that you are receiving this newsletter indicates that you are still on it, even though the name "Puzzle Club" has been discontinued.

In order to reduce the size of my mailing list and better serve my regular customers, I usually skip anyone whom I have not heard from for two years. Thus, for some of you, this will be your last mailing unless I hear from you.

A article on my puzzles will appear in the November 1984 issue of Fine Woodworking magazine. I have some reprints which are free for the asking, to be included with all puzzle orders and Puzzle Craft orders while they last.

See also the fall 1984 issue of Abacus magazine for a related article on puzzles. I have requested reprints, but have not yet heard if they will be available.

S.T.C.
Oct 1984

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773
259-8348

Puzzle Inventory and Price List, October 1984

The following puzzles are still available. For descriptions, refer to Puzzle Craft. All prices are postpaid. Massachusetts residents add 5% sales tax. This list will expire at the end of 1984, after which please write for current list.

#3 SNOWFLAKE in Hydrastone and plastic $15.00

#14A SECOND STELLATION in Honduras mahogany $35.00

#23 SCRAMBLED SCORPIUS in Honduras mahogany $35.00

#25A HEXSTICKS in birch $15.00

#35 AUGMENTED FOUR CORNERS in two woods $35.00

#58 DIAGONAL CUBE in two woods $40.00

#60 GARNET in six fancy woods $40.00

Complete set of all four Puzzle Craft booklets $10.00

S.T.C.
Oct 1984

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

Puzzle Inventory and Price List, December 1984

The following puzzles are still available. For descriptions, refer to Puzzle Craft. All prices are postpaid. Massachusetts residents add 5% sales tax. This list will expire on March 31, 1985, after which please write for current list.

#3 SNOWFLAKE in Hydrastone $15.00

#23 SCRAMBLED SCORPIUS in mahogany $35.00

#25A HEXSTICKS in birch $15.00

#33 TWELVE POINT in hardwood $40.00

#60 GARNET in six woods $40.00

Complete set of all four Puzzle Craft booklets $10.00

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

Puzzle Inventory and Price List, January 1985

The following puzzles are now available. For descriptions, refer to Puzzle Craft. All prices are postpaid. Massachusetts residents add 5% sales tax. This list will expire on April 30, 1985, after which please write for current list.

#3 SNOWFLAKE in Hydrastone $15.00

#23 SCRAMBLED SCORPIUS in mahogany $35.00

#25A HEXSTICKS in birch $15.00

#60 GARNET in six woods $40.00

Complete set of four Puzzle Craft booklets $10.00

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773
259-8348

Puzzle News - May, 1985

I spent quite a lot of time the past few months making a nice set of puzzles for the cover plate of a new edition of Puzzle Craft, for two forthcoming exhibits, and for some magazine articles. As usual, some old puzzle designs were resurrected, a few others were improved, and several new ones came to light. The new revised and improved Puzzle Craft is now at the printers, so it is back to the workbench.

Puzzles now available:

#7 Jupiter, in choicest woods, with doweled joints - $80.00 postpaid

#59 Corner Block Puzzle, new improved version, fancy wood - $35.00 ppd

New: Cornucopia, see enclosed sheet - $30.00 postpaid

(Possibly several others later)

I have concluded that the only way to survive in the puzzle business for another year is to depend heavily on the sale of the new Puzzle Craft. This printing will be 2000 copies, and the price has been raised to $12.00. It will be mentioned in the September issue of Scientific American and possibly elsewhere. I am printing 3000 extra cover sheets to be used as handouts at the exhibits. The section which lists puzzle books, periodicals, manufacturers, stores, and craftsmen has been improved and expanded; and I am hoping that many of those listed will be willing to help distribute these sheets for me. I will also sell Puzzle Craft at a wholesale price of $8.00 postpaid in lots of ten.

Thanks very much for your continuing support.

S. T. Coffin

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773
259-8348

Puzzle News - July 1985

I have decided that the time has come to make some major changes in my puzzle operations. Note the abrupt increases on my new price list. I don't expect to sell many puzzles at these prices. I am counting on the sale of Puzzle Craft for much of my income for the next year or two.

In the process of preparing the new edition of Puzzle Craft, I realized how many unfinished puzzle projects there were languishing in my shop and waiting to be done; for example - making one complete set of my puzzle designs for display using the choicest woods and best workmanship. Fifteen of these will be in the "Puzzles of the World" exhibit which will open in Los Angeles on Nov. 20 at the Craft & Folk Art Museum, and will also be shown at the Cooper-Hewitt Museum in New York and the Minnesota Museum of Science in St. Paul during 1986. Also, as complete a set as I can produce will be displayed for the first time in public at the Worcester, Mass., Public Library during the month of October 1985. Thereafter, this set will be available for public display anywhere in the U. S. that can be arranged. I figure this helps to sell my book.

Getting back to the new price list, this is in fact hardly a price increase at all. To begin with, these puzzles are now being made with my most choice woods, while my supply lasts. (I can still obtain woods like Rosewood, Ebony, and Tulipwood, but at a price three to six times what I once paid; while others like Acle, Breadnut, and Blue Maho cannot be replaced at any price.) Since most persons receiving this notice already have practically all of the puzzles listed, all this does is increase the value of your collection. My prices are designed to outperform the stock market, and unlike stocks and bonds, they will never come back down. I might even double them again next year. If you want only one or two of the puzzles on this list to round out your collection, please note that I can probably give a sizable discount off some of these prices, depending on the circumstances, so inquire before sending a check.

In other news, the puzzle article in Scientific American is now rescheduled for the October 1985 issue. There will be a short puzzle article in the September 1985 issue of Woodworker's Journal featuring the Half-Hour Puzzle.

Part 4 of Puzzle Craft has just been reprinted with minor revisions, mostly having to do with page numbering. Part 3 will be reprinted with similar corrections in late July. At that time, I will add a two-page supplement with corrections and additions. Suggestions and contributions from readers are always welcome.

S.T.C.
July 8, 1985

STEWART T. COFFIN

79 OLD SUDBURY RD.   LINCOLN, MASS. 01773

259-8348

PUZZLE PRICE LIST - July 1985

Puzzle Craft, 1985 Edition	$12.00	postpaid
No. 7, Jupiter	200.00	"
" 11, Hexagonal Prism	80.00	"
" 14-A, Second Stellation	80.00	"
" 15, Triumph	60.00	"
" 59, Corner Block	60.00	"
" 60, Garnet	60.00	"
" 76, Cornucopia	30.00	"
" " " , kit	15.00	"
" " " , plans	5.00	"

Note: All prices are postpaid in the U. S. and Canada. Mass. residents add 5% Sales Tax.

For descriptions, see Puzzle Craft.

Only one puzzle per order please, and allow several weeks, as they are all painstakingly custom made.

This price list expires Dec. 31, 1985, after which please inquire.

Incidentally: A new improved version of the Scrambled Scorpius is now in the works. At this moment it has just begun incubation inside a computer, and should hatch sometime in the fall. New price - probably $80.00

A new six-piece burr is also in the works - a sequel to Cornucopia. Details not available yet.

For a set of solutions to the Cornucopia puzzle in the October 1985 Scientific American, just send a self-addressed stamped envelope to me.

Puzzle Craft is $8.00 each postpaid in lots of ten or more. All orders must be prepaid.

S.T.C.
July 1, 1985

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773
259-8348

PUZZLE PRICE LIST - July 1985

No. 7, Jupiter - $200.00

" 11, Hexagonal Prism - $80.00

" 14-A, Second Stellation - $80.00

" 15, Triumph - $60.00

" 23, Scrambled Scorpius - $80.00

" 26, Four-Piece Pyramid - $80.00

" 27, Three Pairs - $80.00

" 35, Burr #305 - $20.00

" 49, Improved Cluster-Buster - $80.00

" 58, Diagonal Cube - $80.00

" 60, Garnet - $60.00

" 74, Square Face - $80.00

" 76, Cornucopia - $30.00 (see separate sheet)

PUZZLE CRAFT - $12.00 ($8.00 in lots of ten or more)

All prices are postpaid in the U. S. and Canada.

Massachusetts residents add 5% Sales Tax.

For descriptions, see PUZZLE CRAFT.

This price list expires Dec. 31, 1985, after which date please inquire for new list.

Please order only one puzzle at a time, and allow several weeks. Each one is carefully crafted of fancy woods, I have none in stock, and I am not able to handle large orders at this time.

There may be a few changes and additions to this list in the fall. For an update, send a self-addressed envelope anytime after the 1st of October.

For a reprint of the puzzle article in Fine Woodworking #49, just include a request for same with your order. They are free, while they last.

For a set of solutions to the Cornucopia puzzle in the October 1985 issue of Scientific American, just send a self-addressed stamped envelope to me.

S.T.C.
July 8, 1985

SPECIAL OFFER - CORNUCOPIA NO. 105747

Although as of this moment (Oct 1, 1985) Beeler's computer analysis of the Cornucopia puzzle is not yet finished, we can now report the following:

Of the 19,448 possible subsets, about two-thirds have no solutions, meaning none of the ten square patterns with fourfold symmetry and none of the three rectangular patterns.

Of those subsets which do have solutions, of the first 100 examined, the distribution is as follows:

37	make	1	pattern
24	"	2	"
18	"	3	"
11	"	4	"
8	"	5	"
2	"	6	"

On the basis of this, we can confidently predict that no subset will be found which will construct all thirteen patterns. However, we have just discovered one remarkable subset, octal code no. 105747, which makes nine patterns, including all of the square patterns with reflexive symmetry (A, E, H, J) and all three rectangles, a total of sixty different ways! Furthermore, the 6x6 square and all eight of the theoretically possible smaller rectangles can also be made with pieces from this set.

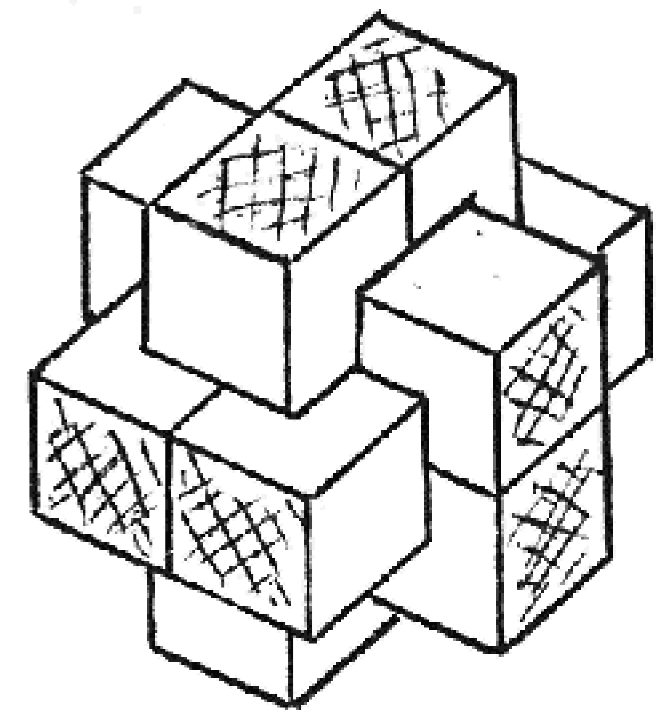
When you order the Standard Cornucopia, they are made and shipped in sequential order, and you take what you get. If the notion of multiple problems with enough different solutions to keep you puzzled from now to eternity appeals to you, we suggest you order this remarkably copious CORNUCOPIA No. 105747.

This special edition is made in ten different contrasting fancy woods, one wood for each piece. It comes with an instruction sheet showing one solution for each of the eighteen possible patterns - you find the other 147.

Price: $35.00 postpaid, U. S. and Canada (Mass. residents add 5% Sales Tax)

Order from: Stewart T. Coffin, 79 Old Sudbury Road, Lincoln, MA 01773

BILL'S BAFFLING BURR, A Cutler-Coffin Production



Since most of you have probably already read about this puzzle either in the October 1985 issue of Scientific American (where it is drawn incorrectly) or in my book Puzzle Craft, we will repeat here only that this remarkably clever and difficult version of the standard six-piece burr puzzle was designed by Bill Cutler with the aid of a computer, has only one solution, and requires a complicated sequence of shifts to assemble or disassemble. This limited edition of the puzzle is in one-inch hardwood with an oil finish.

Please note: if you are easily intimidated by three-dimensional puzzles, this one is definitely not for you, as it comes disassembled with no assembly directions included or forthcoming. Although you might eventually solve it by random trial and error, most puzzle enthusiasts will probably get more satisfaction, and certainly faster results, by applying logic and systematic method.

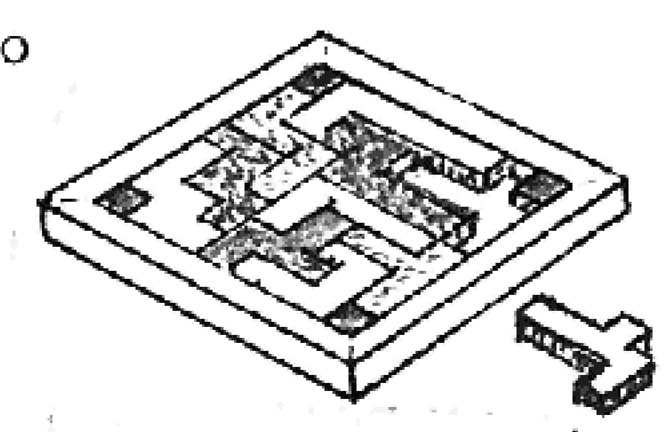
BURR #305

This interesting version of the standard six-piece burr, which is also described in Puzzle Craft, emerged from Cutler's computer analysis of the 314 possible variations of solid burrs using the set of 25 so-called notchable pieces. It is not nearly as difficult as Bill's Baffling Burr, but it is difficult enough, and it happens to be my favorite of all burr puzzles. It too comes disassembled with no assembly directions.

When you order both of the above burrs at the same time, they will be supplied either in two different woods or in two different lengths of pieces to prevent the two sets of pieces from becoming scrambled.

CORNUCOPIA

Ten hexomino-type pieces made of colorful woods fit onto a tricky two-sided tray. In the Standard version, each set is designed by computer and no two are alike. For further description, see Scientific American or PUZZLE CRAFT.



BILL'S BAFFLING BURR	$20.00
BURR #305	15.00
PUZZLE CRAFT Book	12.00
Standard CORNUCOPIA	35.00
CORNUCOPIA No. 105747 (other sheet)	35.00

All prices are postpaid in the U. S. and Canada. (Mass. residents add 5% Sales Tax.)

Cash, checks, money orders all acceptable. Please make checks payable to: Stewart T. Coffin

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773

Jan 1986

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

BORING PUZZLES

Yes, I'm still at it. A recent orgy of hole-boring to make models for illustrating a new book has resulted in some new designs, four of which I now offer for sale:

The Four-Legged Stand Puzzle, No. 81-B-1. Only six simple puzzle pieces, but surprisingly confusing. $20.00.

The Double Four-Legged Puzzle, No. 81-C-1. Not shown below. Twelve puzzle pieces, harder than the above. $40.00.

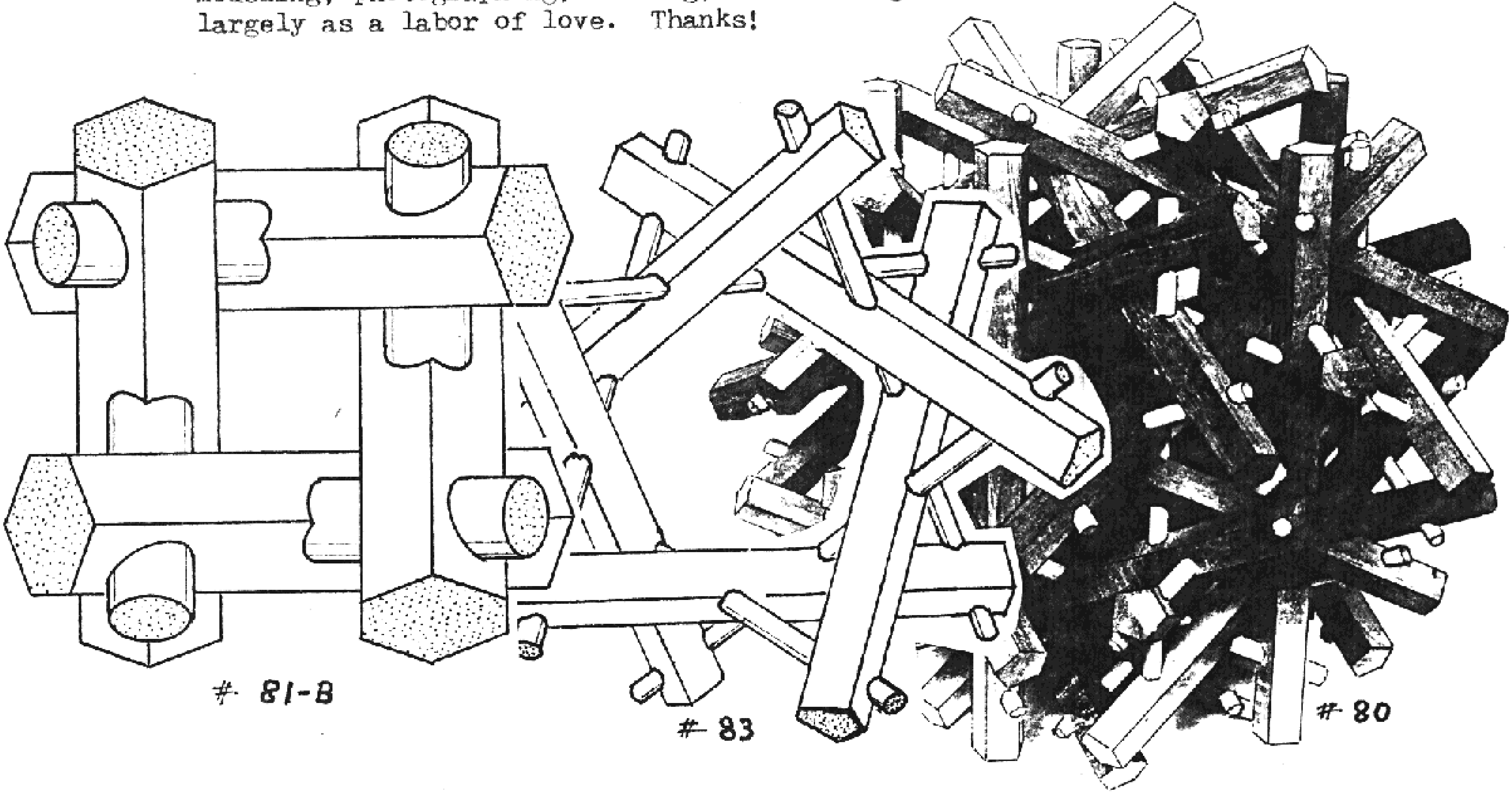
The Pentagonal Stand Puzzle, No. 83-A. Eight simple puzzle pieces, intriguing. $25.00.

Thirty Pentagonal Sticks and Dowels, No. 80. An interesting puzzle or fascinating sculpture. $100.00

Puzzle Craft book (1985) is still available. $12.00.

All the above puzzles are in hardwood, shipped disassembled with illustrations but not assembly directions. Prices are postpaid in the U.S.

Regarding the prices, as most of you should know by now, they are about three times what the puzzles are actually worth. Consider one-third to be for materials and labor and one-third for the design, since I spend about equal amounts of time at each. Consider the remaining third to be a donation towards the advancement of puzzle craft, since I now spend over half my time modeling, photographing, drawing, and writing about polyhedral dissections, largely as a labor of love. Thanks!



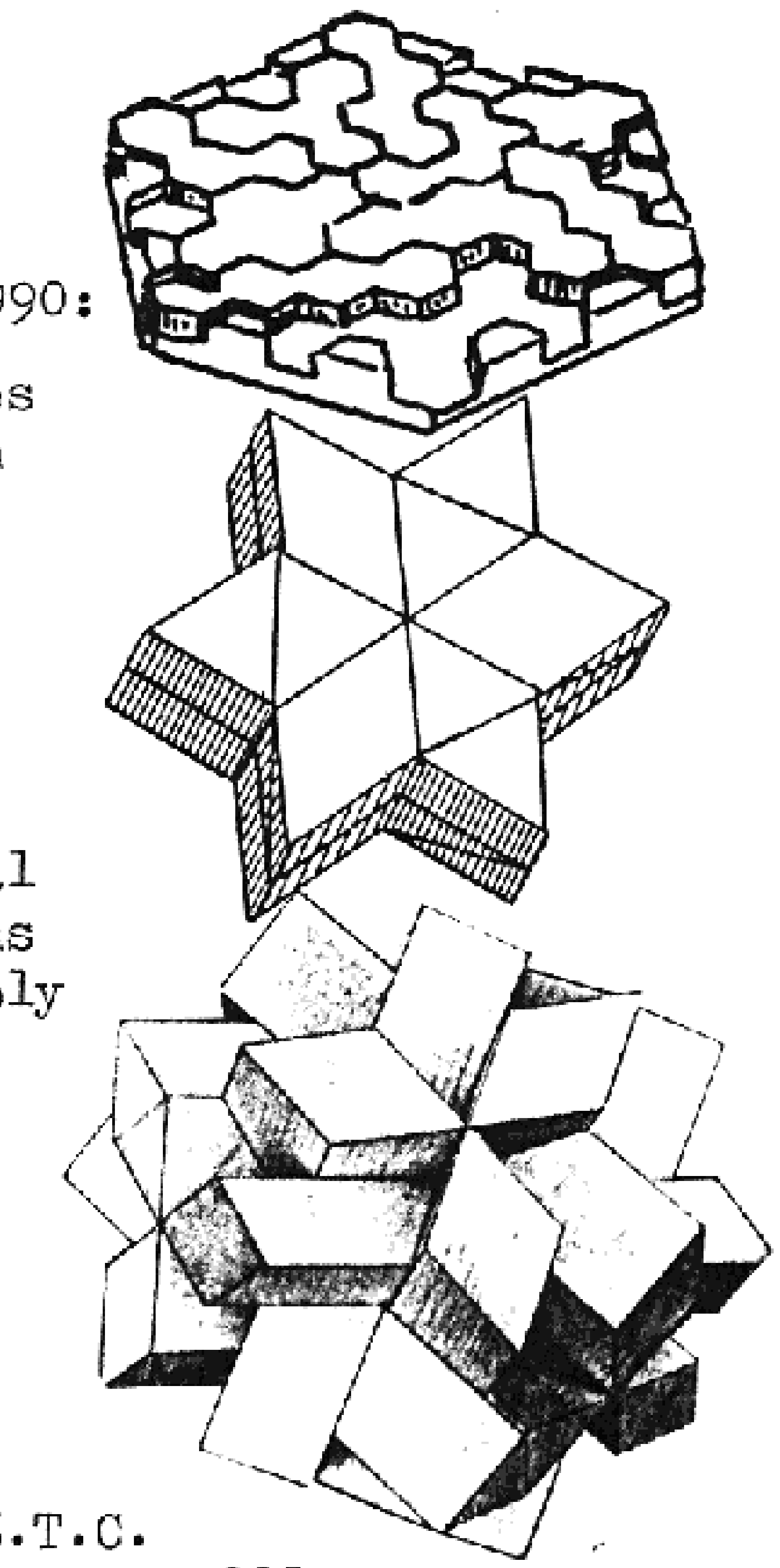
S.T.C.
DEC 1987

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773

259-8348

Puzzles for sale presently and probably through the end of 1990:



No. 3, SNOWFLAKE (1970). Simple pastime of ten hexagon pieces with plastic base. This version made by Jim Ayer in 1/4-inch birch plywood. With 10-page instruction booklet. $16.

No. 15-A, FUSION-CONFUSION (1990). Four interlocking pieces assemble into three different colorful polyhedral shapes, including the Star of David shown here. An improved version of the old TRIUMPH puzzle. In fancy woods. $45.

No. 85, TWELVE-PIECE SEPARATION (1988). An unusual polyhedral burr of twelve triangular sticks. Very difficult. Directions included. Now being made in Honduras rosewood, while my supply lasts. $50.

Books for sale:

Puzzle Craft (1985, revised 1989). Still only $12.

The Puzzling World of Polyhedral Dissections (1990). $33.50

All prices are postpaid to anywhere in the U. S.

S.T.C.
31 Aug 1990

STEWART T. COFFIN

79 OLD SUDBURY RD. LINCOLN, MASS. 01773
259-8348

Puzzle News - September, 1990

Puzzles for sale presently and probably through the end of this year:

No. 3, SNOWFLAKE (1970). Simple pastime of ten hexagon pieces with plastic base. This version made by Jim Ayer in 1/4-inch birch plywood. $16.

No. 15-A, FUSION-CONFUSION (1990). Four interlocking pieces assemble into three different colorful polyhedral shapes. Quite confusing. $45.

No. 85, TWELVE-PIECE SEPARATION (1988). An unusual polyhedral burr of twelve triangular sticks. Very difficult. Directions included. $50.

Books:

Puzzle Craft (1985, revised 1989). Still only $12.

The Puzzling World of Polyhedral Dissections (1990). $33.50.

All prices are postpaid to anywhere in the U. S.

Notes: I had planned to discontinue Puzzle Craft when the new book came out, but I still have 300 copies of the most recent printing left to get rid of. Since the new book is so scarce and hard to get (I believe only 3000 were printed), I may publish a new revised edition of Puzzle Craft as a substitute for it.

The new book has been a huge headache and bitter disappointment. There is nothing wrong with the book itself, but it was supposed to list for around $20, not $32.50. Oxford blames the cost increase on the number of illustrations, yet I drew them all myself and provided them with camera-ready copy, so it should have cost less, not more. Oxford is reported to be giving bookstores the unheard-of wholesale discount of only 20%, which margin no bookstore can operate at, so what few dealers have even been able to obtain copies are asking around $45 - an absurd price for such a small book. In my contract with Oxford, I insisted that I be able to buy any quantity at 50% off list for resale, as this is the only way I can justify the three years hard work that went into it. They agreed to this and it was written into our Agreement. Yet Oxford, New York, refuses to honor this, claiming they are a separate company not bound by my Agreement, and they offered me only the 20%. But when I placed an order anyways, they proposed to charge me the full $32.50 list price plus shipping from North Carolina. They also wanted me to enter into an agreement to fix the retail price to avoid price competition, which I have been advised by the Federal Trade Commission is a violation of federal law. I canceled that order. So now I have to order them from England and pay shipping. I ordered 100 copies three months ago and finally today (August 30) received only 28 copies! * They may be nearly sold out already. The Library of Science bought and sold 800 copies at a discount price. I wish I could too, but I can't, at least not without taking Oxford to court. So I am sorry, but I must charge the full list price plus a dollar for postage. I should have published it myself, and next time I will.

S.T.C.
30 Aug 1990

* finally received 100

AP-ART

The sculptural art that comes apart

Stewart T. Coffin
79 Old Sudbury Road
Lincoln, MA 01773
617-259-8348

Anniversary Newsletter

January 1, 1995

On this, the 25th anniversary of the start of my puzzle business, I am taking the opportunity to issue one of my infrequent newsletters, with no particularly momentous news to report at this time. My records show that just 25 years ago this week, I purchased some epoxy resins and other supplies with the notion of casting polyhedral puzzle pieces. A few months later, I had cast a prototype of the Hectix puzzle and entered into discussions with 3M Company for licensing it. On the strength of that, I liquidated my kayak and canoe paddle business to make way for puzzles. At first, I concentrated on casting prototypes of other polyhedral puzzles for possible licensing. When not much came of that, I started making them myself in wood. Regular puzzle sales began in November of 1970.

One of the questions I am frequently asked is how I come up with new puzzle ideas. I can now answer that question by referring persons to my book, *Puzzling World...* in its entirety. (I hope they don't expect a simple answer to a question like that!) That book is going out of print soon but perhaps can still be ordered from Oxford University Press. I am seeking another publisher and would welcome contacts.

Another question often asked is how I got started in the business and what my background was. One of these days, perhaps I will issue a chatty autobiographical supplement to *Puzzle Craft - 1992* with that information.

At my first craft fair, at DeCordova Museum in the summer of 1970, I adopted the slogan: "AP-ART, the sculptural art that comes apart," and have been using it ever since. With your help, perhaps someday the word "AP-ART" will become generally recognized and accepted into our language as descriptive of this unique art form.

Sometimes, not having heard from me recently, persons ask me why they have been dropped from my mailing list. The explanation is that I am now more-or-less retired from puzzle making and no longer issue regular sales brochures. My last general mailing was probably my puzzle survey five years ago. This mailing will go to generally those same select few, about 80 in number. I have the names and addresses of nearly everyone who has ever ordered anything from me by mail, mostly *Puzzle Craft* orders. They are filed away chronologically and never used. I have a much shorter list of all puzzle customers going back 15 years or more, about 350 in number, filed alphabetically, with puzzle sales listed, but that list likewise is never used for a general mailing. Only you of the *inner circle* receive this newsletter!

Every so often, just when I think I have run out of new ideas, something suddenly pops into my head and I have the urge to tinker with it in my workshop. This happened a year ago and led into a whole new category of distorted burr puzzles. Then there was the 14th International Puzzle Party in Seattle last August, my first to attend, and I felt obliged to bring a good supply of puzzles for sale, in addition to the two sets of exchange puzzles which I made for others. I still have a few of the Confessional (12-piece burr) puzzles left, $32 postpaid. For those who did not get my Crooked Notches distorted six-piece diagonal burr from Tom Rodgers, I have a few of them for $25 postpaid. For the Holey Astigmatism burr, you should contact Bill Cutler.

There will be two brand new puzzle designs of mine in the exchange at the 15th IPP in Tokyo. One of them is a unique and unusual variation of the six-piece diagonal burr, and the other is a perplexing variation of the Altekruse burr. Afterward, I may have a few of these for sale too.

With the aid of this amazing computer and printer, I have been entertaining myself lately writing and publishing miscellaneous things. Most of you should by now have a copy of my four-page "Serial listing of AP-ART puzzles produced and sold, 1970-1994." which I update as necessary. My serial listing is now up to number 102. There is also a one-page "Serial listing of AP-ART instructions, descriptions, and other printed matter." This list indicates all assembly instructions that are now available for my puzzles, including some added recently by popular request. For those who will admit to not having solved the baffling Confessional Puzzle, directions are now available upon request.

When I add up all of my listed puzzle designs produced and sold up to the present, I come up with about 216. This does not include one-of-a-kind or experimental models of unknown hundreds never recorded. As for total number of wooden puzzles made and sold, I can only come up with a rough estimate of around 10,000, and that would not include trivial ones like the Buttonhole or Sleeper Stoppers.

I would like to thank all of you for your support and encouragement over the years. Brace yourself - there will no doubt be more puzzles to come. I keep saying that I am retired. Yet these polyhedral dissections hold a never-ending fascination for me that keeps on growing and growing. Sometimes, while working on some intriguing new inspiration, with the afternoon sun streaming into my solar-heated workshop and one of my favorite Bach cantatas playing on the stereo, discovery becomes almost like an experience of spiritual revelation.

Eureka and Happy New Year!