Introducing Mechanical Puzzles – Part 5
by Jerry Slocum © 1999-2002

The introductory article in this series appeared in the Spring 2001 issue of GPCQ. Put Together and Take Apart puzzles were covered in the Winter 2001 issue. Interlocking and Disentanglement puzzles were described in the Fall 2001 issue. The Winter 2001 issue includes Sequential Movement and Dexterity puzzles. And Puzzle Vessels, Vanish Puzzles, Folding Puzzles and Impossible Puzzles described in this issue complete the series.

Puzzle Vessels

Puzzle Jugs and lidless wine containers (wine and tea pots), two of many types of puzzle vessels, are the oldest surviving mechanical puzzles. The trick in drinking from puzzle jugs is not to spill the contents. (Figure 58 - Drink if You Can Puzzle Jug) These vessels have a lattice or series of holes around the upper portion of the sides of the jug and the liquid spills out if you try to drink in the conventional manner. The solution is to discover a hidden or disguised tube which is used like a straw to suck the liquid out. The remaining holes, including a traditional hidden hole on the underside of the handle, are covered with the fingers. A puzzle jug made in the South of France about 1400, and found in Exeter England, is in the Exeter museum. Similar jugs were made in England, the Netherlands and Germany during the sixteenth, seventeenth and eighteenth centuries.

Drinking vessels that used the same “built in straw” principles as puzzle jugs have been discovered in zoomorphic bowls used by the Philistines for ceremonies about 1000 B.C. They appeared in Canaan from the Late Bronze Age. The Israel Museum in Jerusalem has several examples.

The puzzle of the lidless wine or teapot is how to fill it. (Figure 59 - Lidless Chinese Wine Pot).

The solution is to turn it over and fill it through the funnel-shaped hole in the bottom. When it is turned back over, the inverted funnel keeps the liquid from spilling.

Among Phoenician pottery found in Cyprus were several vases filled through small holes in the bottom. The same principle was used in a tenth century Chinese wine pot made for the Emperor of China that is displayed in the Xian Art Museum. (Figure 60 - Lion Chinese wine pot) And in the early nineteenth century, Cadogan teapots made at the Rockingham pottery factory in England were based on the same idea.

The Chinese cup and it’s base, shown in Figure 61, are called by various names such as Greedy Cup, Justice Cup and Tantalus Cup. The cup can be used as a normal drinking cup, unless you are greedy and fill it completely full. Then all the contents automatically drain out the bottom into the base, and the cup is empty.

Vanish Puzzles

There are many geometric paradoxes which involve the dissection and rearrangement of parts of a figure. When the rearrangement is completed, a portion of the original figure has apparently vanished without a trace. When the pieces are further rearranged to their original form, the missing area or picture mysteriously appears again. The earliest known vanish puzzle was found by David Singmaster in a book by Sebastiano Serlio published in 1545. In the book, a 3 x 10 board is cut on a diagonal and the pieces were used to reassemble a 4 x 7 table and there was a 3 x 1 piece left over. Serlio didn’t notice that the total area of the new figures increased by 1.

In 1880 Wemple and Company of New York used a similar principle in the Magic Egg Puzzle. (Figure 62 - Magic Egg Puzzle) An illustration of a hen and nine eggs was cut into four pieces that can be rearranged to form 6, 7, 8, 10, 11, or 12 eggs. This may well have been the puzzle that inspired Sam Loyd to produce what many think is his greatest achievement, The Get Off the Earth Puzzle. (Figure 63 - Get Off the Earth Puzzle) It first appeared in 1896 and was enormously popular. It consists of a brightly colored miniature Earth revolving on a central pin. Thirteen figures of Chinese men can be clearly seen. When the Earth is rotated a few degrees, one figure mysteriously vanishes, leaving only twelve Chinese men. The solution, although simple, is so well disguised in the puzzle that very few people can solve it. The explanation is that the thirteen men spiral across the circumference of the Earth, and when it is rotated, each of the twelve resulting men has grown slightly.

Folding Puzzles

Folding puzzles have frequently been used for advertising and political purposes since late in the last century. During World War II several patriotic puzzles were published. One called the Fifth Pig showed drawings of four pigs. The fifth pig was to be found by folding. Solving the puzzle showed the fifth pig to be the face of Adolph Hitler. (Figure 64 - The Fifth Pig Puzzle)

(Continued on page 21)
In 1939, A.H. Stone, a student at Princeton University discovered flexible six-sided figures called hexahexaflexagons. Their remarkable properties stimulated interest in their use as puzzles. The Camel puzzle was patented in 1943 by Harold Edborg. The puzzle is to fold along the dotted lines until three triangles make a complete picture of a camel. (Figure 65 – The Camel Puzzle)

Impossible Puzzles

Impossible objects can instantly capture and stimulate one’s imagination. They can bother you for weeks - or even years. The puzzle of an impossible object is to figure out, “How was it made?” Impossible wooden joints have been made by woodworkers for at least 100 years. They were sold as puzzles in the Martinka Magic Catalog circa 1900.

Perhaps the most popular of all Impossible Puzzles is the Arrow through the Coke Bottle. (Figure 66 – Coke bottle and arrow) It is made with no glue from a single piece of wood and a single-piece glass bottle. This puzzle baffles and intrigues everyone. Although Albert Hopkins explains how it is made in his 1897 book, “Magic”, few people know the solution and it is the only puzzle where the solution is a closely held secret.

Physicists wrote about impossible tops over a century ago. One of these is called a Celt or Rattleback. A typical Celt spins normally in a clockwise rotation. When you try to spin it counterclockwise, after a few rotations it reverses its direction of spin. This appears to defy Sir Isaac Newton’s laws of physics. A new type of Celt, with turtles mounted on each end, has recently been invented by two Russian puzzle designers. (Figure 67 – Turtle Celt) The turtles are mounted on pins so you can turn each of them around 180 degrees on the Celt, pointing them in the opposite direction. The amazing Celt then spins normally in a counterclockwise rotation. No matter which way that you turn them, the turtles only want to go forward, and if you try to spin them backwards, they reverse the direction of spin of the Celt.

Another puzzling top is the Tippy Top. It turns over and raises its center of gravity during its spin. If it is spinning clockwise before it turns over it is still spinning clockwise afterwards.

Putting objects in bottles is a very old form of impossible object. A master of impossible bottle puzzles was the late Harry Eng, from La Mesa, California. (Figure 68 – Bottle with Tennis shoes and ball inside) Harry’s masterpiece of putting amazing objects in bottles is the huge steel bolt that somehow he inserted inside the large glass jar. (Figure 69 – Bolt in a bottle) The nut on the bolt is much too large to put through the open end of the jar.

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Figures: Mechanical Puzzles by Jerry Slocum Pages 16 and 21 (Continued on Reverse)

Figure 58 - Drink if You Can Puzzle Jug, late 19th century

Figure 59 - Lidless Chinese Wine Pot, ca.

Figure 60 - Lion Chinese wine pot, 1998

Figure 61 - Chinese Justice cup, 1998