Magical Puzzles
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Slide 1 (Title Slide)
Thank you and good evening. I am honored to be able to tell you a bit about Magical Puzzles.
The close relationship between magic and puzzles can be seen from Crambrook's Catalogue of Magical Curiosities and Deceptions. It was published in 1843 and it includes 95 mechanical puzzles such as trick opening boxes and purses, string and wire puzzles, 2 dimensional dissected puzzles and lock and key puzzles.
Professor Hoffmann, Harry Eng and Mel Stover are three people that have made significant contributions to both Magic and Puzzles, and have brought puzzles and magic closer together.

Slide 2 (Professor Hoffmann.) Well known for his books on magic, in 1893 Professor Hoffmann published the first comprehensive book about puzzles,

Slide 3 "Puzzles Old & New". It included over 50 mechanical puzzles that were dependent on some trick or secret as well as hundreds of other mechanical, mathematical, and word puzzles.

Slide 4 The secret opening mechanical Puzzles in Hoffmann's book are made of boxwood and look very similar to the magic tricks of the time. And most are made of boxwood.

Slide 5 Harry Eng was a talented self-taught magician and
Slide 6  a genius at making "Impossible Puzzles" such as this one. We will see one of his Masterpieces a little later.

Slide 7. Mel Stover was a magician and a genius at devising clever and difficult puzzles with an unexpected "twist". He modified Sam Loyd's Mules Puzzle into his clever zebras, which puzzled us all over again, and he invented several new vanish-type puzzles.

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 form a 4 x 7 table with a 3 x 1 piece left over. Serlio however didn't notice that the total area increased by 1.

Now I would like to show you some mechanical puzzles, most of which are associated with magic, I call them "Magical Puzzles".

I thank Mark Setteducatti for helping me select the puzzles.

Slide 8. Put Together Puzzles - That is your task with these 2 & 3 dimensional puzzles, from Tangrams to the Soma Cube.

Slide 9. The T Puzzle only has 4 pieces and the task is to make a capital T with them. It is surprisingly difficult to solve. Everyone has learned since childhood that a "T" is formed with a vertical line and a horizontal line, and everyone tries to solve this puzzle by lining the pieces up that way. However the solution requires the key piece to be placed.

Slide 10. diagonally. I wonder if this isn't a curtural form of mis-direction?

Slide 11 (Bucephale) Sam Loyd designed another puzzle that also takes advantage of a "universal curturally learned" phenomon. His Pony puzzle reverses the normal figure-ground relationship, with the negative image of the pony outlined by the pieces in this French version of Loyd's Puzzle.
Slide 12. (Dexterity Puzzles.) From the Bilbouquet to devils and clowns, all of these puzzles emphasize dexterity for the solution.

Slide 13. (Journet's Niagara.) During WW1 this type of dexterity puzzle, made by R. Journet of London, was sent to British prisoners of war in German POW camps. What the German's didn't know was that Journet had hidden inside the puzzle, a compass, a map and a hacksaw blade to help the British prisoners escape and return to Allied controlled territory.

Slide 14. Here are a variety of Disentanglement Puzzles, from Chinese Rings to the Bootlegger. And, of course, the popular AC Gilbert set of wire puzzles.

Slide 15. (Mysto Puzzle set) This earlier Mysto set of wire puzzles was made by AC Gilbert and John Petrie.

Slide 16. (John Petrie - Tom Lewis Puzzle set.) The Sphinx Puzzle Set was made by Petrie - Lewis after Gilbert and Petrei split up. It contains more innovative and interesting puzzles than the Mysto or Gilbert sets.

Slide 17. The "Buttonhole Puzzle" was invented by Sam Loyd for John McCall, President of the New York Life Insurance Company, to help them sell insurance. When it is put into a buttonhole of your coat, it is very difficult to remove. Several Magicians have used the puzzles for advertising including: Dell O'Dell, Dale Lorzo and Blackstone.

Slide 18. The Houdini "Devil's Puzzle" was advertised as being invented by Houdini.

Slide 19. (Take-Apart Puzzles) There are many links between magic and Take Apart Puzzles such as trick purses, locks, knives, coins, boxes, and banks.
(Purses)

Slide 20. This American Indian Puzzle Purse is from the Chippewa tribe. The puzzle is to open it.

It was used by the Squaw to hold and carry "dice", shown below the purse, and money. Squaws would gamble while the Braves danced. The puzzle purse kept the winnings and losings from their husbands.

Slide 21. (Purse - Flap up) This side is sewed shut.

Slide 22. (Purse - Other side) So is this side

The purse is opened by pulling the leather strips through the stitches. I found an identical purse described in the book,

Slide 23. "Recreations Mathematiques et Physiques", written by Jacques Ozanam in 1735. The puzzle purse is shown in the upper right. Did the French learn about the Puzzle Purse from the Indians, or did the Indians learn the idea from the French?

You are all familiar with the modern version of the same puzzle, called the

Slide 24. "Scotch Purse".

Slide 25. This Brass & Leather Puzzle Purse, is dated 1813. Push on a section of the brass to open

Slide 26. (Purse) - each side. Perhaps the 2 sides have been used by magicians.

(Padlocks)

Slide 27. (Sinclair Padlock.) In the 17th through 19th century padlocks frequently included a "trick" or puzzle to increase their security. This Sinclair Padlock was one of the highest security locks made during the mid-19th century, and it has a hidden keyhole. Before combination locks, it was used with a locking bar across the keyhole of a bank safe to
prevent dynamite being placed in the keyhole and used to blast the safe open.

To open the padlock, the pin on the key is placed in the right rivet hole and the keyhole guard is rotated.

Slide 28. (Padlock) - exposing the keyhole. A bar on the back also must be rotated to release the shackle.

Slide 29. The Bashful Lock opens when you put it behind your back (and automatically turn it upside down). This set, for magicians, also includes an additional Bashful lock that will not open at all.

(Matchsafes)

Slide 30. These matches are puzzles to open.

The center section of the hinge is pushed in to open the Black Cat matchesafe.

The writing on the back of the lower matchesafe says, "Open this box and I'll stand you a Johnny Walker".

Slide 31 (Matchsafes) - It is the earliest puzzle that I know of to use centrifugal force for the solution. It was patented in England in 1910.

(Knives)

Slide 32. A knife expert at the British Museum has written that tricks or puzzles were added to folding knives beginning in the 16th century, so that if the knife were stolen it could not be used by an assailant on its owner. The principle of the knife with the key on the handle is the same as the earliest trick knives, the metal piece on the left end of the handle slides up.

Slide 33. (Knife) - the 2 sides of the handle are counter-rotated and the blade is exposed. Slide the metal piece back down to lock the blade.

The lower, 18th century Spanish knife, has a small, almost invisible blade inside the larger blade.
(Coins)

Slide 34. The puzzle with the 1890 silver dollar on the left is to find the hidden picture. The task with the 5 Lire 1848 Italian coin or the right is to find an American word.

Slide 35. Both coins are solved by opening them. The silver dollar has a very clever invisible hinge that allows the back to be flipped open. The Italian coin unscrews and an American dime is inside.

(Secret Compartments)

Slide 36. This "Writing Slope" was used by the "purser" of early 19th century sailing ships for safe-keeping the money and records of the ship's payroll. The money was hidden in secret opening drawers, behind false panels and was opened by hidden buttons and by pressing on what appear to be solid mahogany blocks.

Slide 37 (Slope) Opening the cover doesn't help to find the secret compartments.

Slide 38. (Slope) - The first secret panel is opened by pushing the hat pins through the felt, just where the points are shown in the slide.

Slide 39. (Slope) - The secret drawers and panels are shown here. The 8 drawers would hold 650 British Gold Guinea coins, and there was also a large secret compartment for papers.

Slide 40. The keyhole on the front of this chest, made in Nuremburg Germany, is false. When the stud above the left side of the handle is pushed to the right, the concealed keyhole is revealed. I hope that one of you can explain to me later why this secret security was needed on a 17th century brass and iron casket!
Slide 41. Professor Hoffmann’s book, Puzzles Old & New, contained dozens of secret opening boxes and objects as well as, trick knives, trick coins and trick matchesafes. They are all called "Hoffmann Puzzles" by puzzle collectors. The object of this "Canon & Ball" puzzle is to remove the ball from the barrel of the cannon.

The "plug" on the back of the canon can be unscrewed easily and is usually set aside by the solver. The plug, however, is the key to solving the puzzle.

Slide 42 (Canon) - because a section of the threaded portion unscrews to reveal a "tool" that must be inserted in the barrel and used to unscrew a threaded insert, allowing the ball to come out.

Slide 43. A box to keep two of your decks of cards.

Slide 44. (Box) - They can be found by pushing the "Heart" on the front of the box.

Slide 45. Akio Kamei, from Hakone, Japan currently designs some of the best secret opening puzzles ever made. The 2 lumps of sugar must be put in the coffee cup and stirred to release the locking pins and allow the secret compartment to be opened. The shape of the "Egg" is the clue to finding the secret compartment inside. It is opened just like an egg.

Slide 46. This puzzle, titled "Joint", is one of Kamei’s most difficult puzzles.

To open the secret compartment take out the dowel pin shown in the center of the left side, slide the light colored portion up, put your fingers over the dowel pin openings and push the light part down quickly. Yes the solution depends on air pressure. And I am sure Kamei never heard of "Psycho".
Slide 47. This Pyramid Puzzle is even more diabolical. It must be properly aligned to the magnetic North pole for the drawer in the pyramid to be removed. There is a crude compass mechanism inside.

Slide 48. Kamei recently designed and installed 3 puzzle doors in my Puzzle Museum. You must turn the lever up and push the opposite "hinge" side of the door in. Slide 49 to open it.

Slide 50. This door has several locks

Slide 51 including a trick padlock. To open it however, turn the door knob and push in the panel to the right of the locks.

Slide 52. (Door Opened.)

(Puzzle Vessels.) I will show a few examples of Magical Puzzle Vessels.

Slide 53. This Chinese cup and its base are called by various names such as

**Greedy Cup and Justice Cup.**

The cup can be used as a normal drinking cup, unless you fill it completely full. Then all the contents drain out the bottom into the base, and the cup is empty.

Slide 54. This Chinese pot will pour two different liquids. There is a small hole on the handle that you place your finger over. Whether you finger seals the hole determines which liquid pours out of the spout.

(Demonstration?).

Slide 55. When you pour from this pot, it appears that there is only enough liquid inside to fill one of these small cups. But if you try again you can fill another cup before the pot is empty, and then another cup, and another, and another.

Slide 56. The "Pope" is not very happy, until you turn the cup over

Slide 57. (Pope )- and fill it with his favorite beverage!

Many Impossible Puzzles are closely related to Magic.
Slide 58. This rare American Indian Puzzle Peace Pipe was made by the Chippewa Indians out of an Ash tree in about 1890. The standard smoke channels in Peace Pipes were made by using a long native copper wire heated in the fire to burn out the pith in the center of an ash sapling. This amazing and highly revered Puzzle Peace pipe, however, could not be made in that way because the five decorative holes in the stem would interrupt the path of the smoke.

Slide 59. The pipe was so amazing to the Chippewa that it was the centerpiece in the Indian's "Dream Drum" dance ceremony.

Slide 60. Harry Eng's masterpiece of putting amazing objects in bottles is, I believe, this huge steel bolt that somehow he inserted inside this large glass jar. The nut on the bolt is much too large to put through the open end of the jar.

Slide 61. You are all familiar with this "Arrow through the Coke bottle", perhaps the most popular of all Impossible Puzzles. How this can be made with no glue from a single piece of wood and a single piece of glass baffles everyone. Although Albert Hopkins explains how it is made in his 1897 book, "Magic", few people know the solution. This one was made by Gary Foshee, a patient man,

Slide 62. who shows us his secret, but time-consuming, method.

Slide 63. This is an improved "Arrow through a bottle 3 Times".

Slide 64. Celts or Rattlebacks have also been written about since the 1890s. All 3 of these celts spin normally clockwise. When spun counterclockwise, however, after a few rotations they reverse their direction of spin, something that Sir Isaac Newton disapproved of. The lower one, with the turtles attached, is a new invention by 2 Russian puzzle designers. You can turn both turtles around on the celt 180 degrees, so they point in the opposite direction. The Turtle celt then spins normally counterclockwise. No matter which way that you turn them, the turtles only want to go
forward, and reverse the direction of spin if you try to spin them backwards.

**Slide 65. When this puzzle is turned upside-down**, the sand in each hour glass starts to fall into its lower chamber. After a minute or so, while the sand is still falling, the upper hourglass begins to descend to the bottom of one tube and the lower hourglass begins to rise to the top of the other tube. It is especially interesting to ask for an explanation from group of physicists.

**Slide 66. Explaining how the holes were made in this block of plexiglass is the puzzle.**

**Slide 67. Another view of the plexiglass block.**

**Slide 68. (Magic Mirror) - The oldest and one of the most studied and baffling impossible puzzles that I know of is the Chinese Light-Penetration Mirror.** One of these ancient bronze magic mirrors, made over 2000 years ago during the Han Dynasty, is in National Museum in Beijing, China. This shows the backs of 2 typical mirrors.

**Slide 69. The convex spherical shape on the front is uniformly polished and reflects**

**Slide 70. a clear and undistorted image.**

**Slide 71. When the sun shines on the mirror on the right, the image that is reflected is identical to the design on the back of the mirror. This led to the belief that the bronze mirror is transparent. The Chinese scientist's explanation in the 11th century, was that when the mirror was cast, the thinner part became colder first, and the bronze formed minute "wrinkles" too faint to be seen by the naked eye.** The Shanghai Museum currently sells modern "Transparent Mirrors" and explains the phenomenon the same way.

**In the 13th century another Chinese scientist** said the effect was due to 2 kinds of bronze with unequal density being used in the manufacture. In the 1830s, the **British physicist, Sir David Brewster**, the discoverer of
polarized light, independently came to exactly the same explanation. From 1844 until 1886 many experiments and observations of the manufacturing of these mirrors was made by prominent scientists in France, Italy and Germany until the effects of the mirror could be duplicated in bronze and other metals. The explanation was that minute differences in the curvature of the mirror were produced during the polishing process due to the thinner parts of the mirror being weaker and bending more under the strong force of polishing than the thicker portions. The thinner portions therefore have slightly less material removed by polishing and when the pressure of the polishing passes they spring back and become slightly elevated compared to the average level of the surface. In 1932 Sir William Bragg wrote a definitive explanation of the mirror. So after 2000 years, the Magic Mirror was explained. The only still-puzzling aspect is

**Slide 72. the image reflected by the smaller Magic Mirror** on the left. Notice that both mirrors have identical designs on the back.

**Slide 73.** However, when sunlight is reflected off the smaller mirror, the image of Buddha is formed, not the same image as the design on the back. After 2000 years of study, this Mirror is still a "Magical Puzzle".

Thank you very much!
Magical Puzzles Talk AGPC...