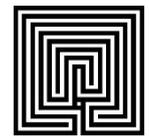


The Origin of Mirror & Wooden Panel Mazes

Jeff Saward



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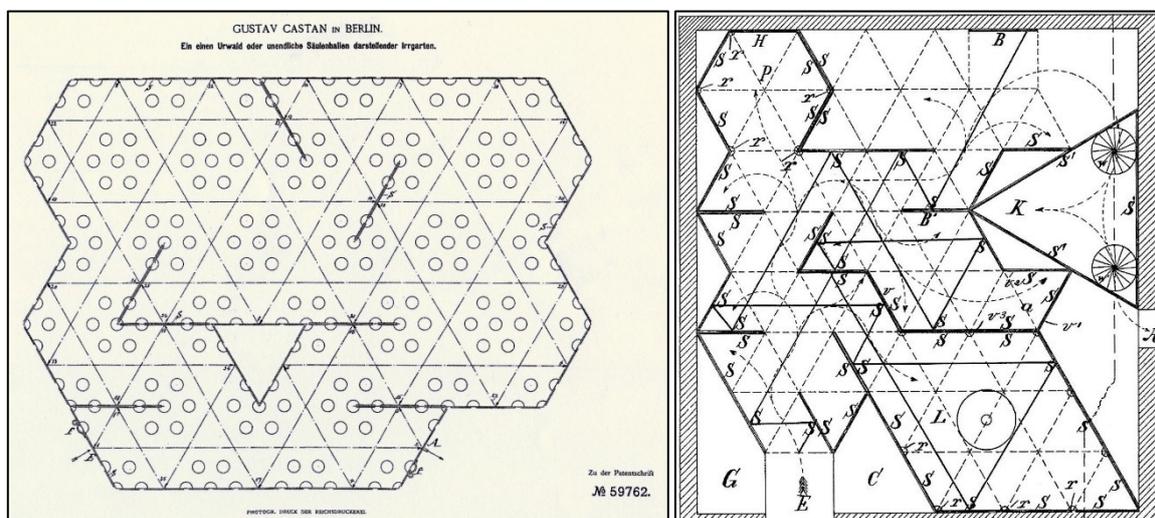
During the current revival of popularity of mazes, which has taken place since the 1970's, two important categories of mazes, namely those constructed from mirrors and wooden fence panels, have figured prominently. Numerous examples, of both types, have been constructed at premier tourist attractions worldwide and have proved particularly popular with visitors. However, despite their apparent novelty, both of these maze forms have their commercial origins during a previous episode of enthusiasm for mazes, in this case during the late 19th century.

Mirror Mazes

The potential for large full-length mirrors to produce multiple reflections and trick the perception of those in front of them has been appreciated since they first became available during the 17th century. Indeed, even before this period, Leonardo da Vinci sketched an octagonal chamber of mirrors in which a visitor could see all sides of their body, infinitely reflected, even though the technology for creating such mirrors did not exist in Leonardo's time.¹ The famous "Galerie des Glaces" – the Hall of Mirrors – created by Louis XIV at the Palace of Versailles, France, in 1678, was not a maze as such, although a "House of Mirrors" supposedly constructed in 1651 by Peter Stuyvesant in the newly founded town of New Amsterdam (New York, USA) was probably the first built as an attraction, with an admission fee of one Dutch Guilder.²

While such "Hall of Mirrors," often creating grotesque reflections of the visitor, have long been a familiar fairground attraction, it would seem that the first formal attempt to create a specific arrangement of mirrors designed to form a maze in the strict sense, can be attributed to Gustav Castan of Berlin, Germany. With his brother Louis, Castan was owner of the Panopticum attraction in Berlin (first opened in 1873), and was granted a patent for a mirror maze in France in September 1888. This patent, subsequently also granted in Belgium in the same year, in England in 1889, in Germany in 1891 and in the USA in 1895, contains both a description of the material construction and also plans of the resulting maze.³ In the words of Castan's patent:

The primary object of my invention is to provide such an arrangement of mirrors in a room or inclosure as shall cause them, by their reflection of objects suitably located with relation to the mirrors, to present to the vision of a person in the apartment the illusion of a labyrinthian device composed of seemingly endless passages, which appear to him to be freely traversable until he is stopped in his course by an obstructing mirror, from which long passages seem to extend to the right and to the left.



Plan of Castan's mirror maze, left: as given in the 1891 German patent and right: in the 1895 USA patent

The specifications that follow describe how mirrors are to be placed at precise 60-degree angles (or multiples thereof) around one or more sides of equilateral triangles that form various rhombic and hexagonal arrangements, to produce different reflective effects. Of particular interest are his suggestions that one section of the maze is to be decorated with pillars (marked 'r' on his plan of the design) to produce an effect "in imitation of the Lion Court of the Alhambra" (area L on the plan), and in another section (area P) the placing of palms and exotic plants around pillars (r) at the corners of the compartment, combined with a painted representation of the entrance to a Moorish temple placed on the back wall (H), will through multiple reflection give the impression of a mosque surrounded by a tropical garden. These features are found in some of the earliest photographs of mirror mazes, leading one to suppose that Castan's patented design was indeed employed in their construction. He also gave plans in his 1895 patent for an ingenious kaleidoscopic chamber appended to his maze (area K), on a raised level, with entrance and exit via spiral staircases (w). A small group of people entering this section would appear to the visitors to be "an immense crowd."

The oldest surviving mirror maze, originally created for the Prague Jubilee Exhibition held in the Czech Republic in 1891, was subsequently moved to Petřín Hill, overlooking the city, in 1893, where it survives to this day, housed in a curious wooden building modelled on a medieval gateway of the fortress at Vyšehrad. The mirror maze itself, designed by local architect Antonín Wiehl and built by master carpenter Matěj Bilek, is of a simple design, quite unlike Castan's patent, with unpretentious ornamentation around the mirror frames, and is said to have been influenced by a mirror maze existing at that time in the Prater amusement park in Vienna, Austria.

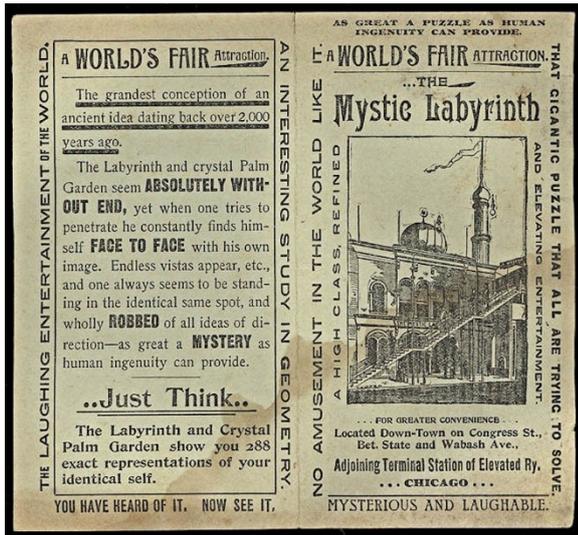


The Petřín mirror maze, Prague, Czech Republic. Photo: Jeff Saward, 2019

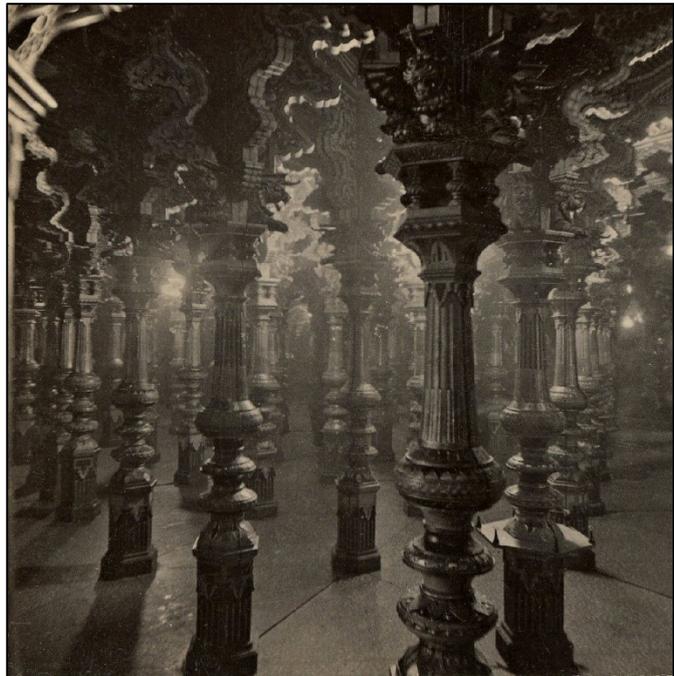
However, the first example actually constructed was surely the "Moorish Maze" opened on the third floor at Castan's Panopticum on June 9th 1889, at their new venue at Friedrichstrasse 165, Berlin, Germany, opened in 1888, the same year that their patent for the mirror maze concept was filed and granted. Guide books to the Panopticum from 1889 onwards describes the mirror maze on the premises in flamboyant style and detail, including the kaleidoscopic chamber.⁴ In 1893 a waxworks Harem was added, and in 1896 the maze was further enhanced with the addition of the illusion of a palm garden.⁵

Another example, surely built to Castan's design and called "The Labyrinth of Pillars," was located at the "Palace of the Sultan" in Constantinople (modern-day Istanbul, Turkey) and also dates to 1889.⁶ A photograph of this maze, originally published on a stereo viewer card, is sufficiently detailed to show the mirrors with pillars placed at their intersections and ornate decoration, reflected many times to produce the illusions that Castan describes in his patent. Where exactly this mirror maze was installed, and how long it stood for, is uncertain. What is certain, is that a number of similar mirror mazes were soon built, and many apparently to Castan's specification. One that is certainly Castan's work was the example at their Panopticum attraction in Köln (Cologne) and newspapers of the day name Gustav Castan as the designer of a mirror maze (complete with kaleidoscope and palm garden) in the Moorish Palace at the World's Fair held in Chicago during 1893.⁷ A photo of the interior of "The Wonderful Maze" also installed in Chicago in 1893, at a different location, shows almost identical pillars and ornament to the Constantinople example, and is also likely a Castan installation.⁸ A "Mystic Moorish Maze" installed at the California Midwinter International Exposition, opened in Golden Gate Park, San Francisco, on January 24th 1894, was probably the Chicago World's Fair maze, shipped from Chicago after the 1893 fair ended.⁹ The "Mystic Maze" at the 1895 Atlanta Exposition also appears to have been very similar. Another impressive example, constructed from 90 full-length mirrors, was created for the Swiss National Exhibition in Geneva in 1896. Subsequently moved and re-installed later that year at the Metropol in Zurich, it was then moved again in 1899 to the Gletschergarten (Glacier Garden) in Lucerne, Switzerland. Described in a 1903 brochure as the "Orient Labyrinth,"¹⁰ and built in "Moorish style after the model of the Alhambra Palace at Granada," it once again bears many of Castan's distinctive design elements, and survives to this day in excellent condition as testament to his creative genius.

Early Mirror Mazes



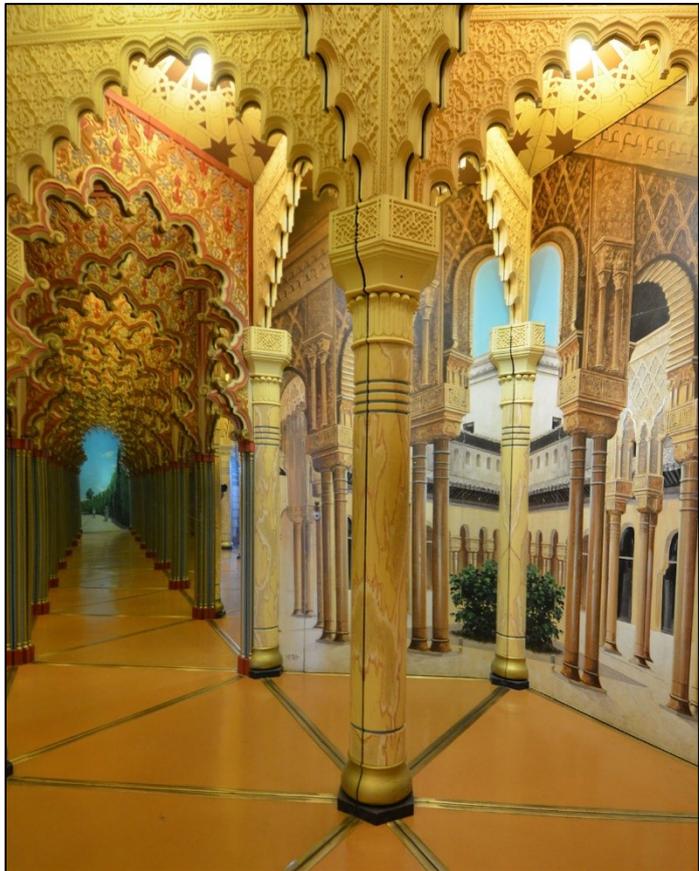
Handbill for the "Mystic Labyrinth" mirror maze at the Chicago 1893 World's Fair



"The Labyrinth of Pillars" mirror maze at the "Palace of the Sultan" in Constantinople (Istanbul), Turkey, 1889



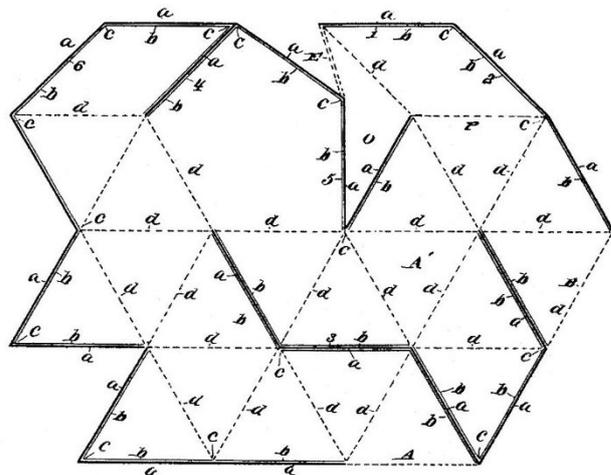
Brochure (1903) for the Glacier Gardens "Orient Labyrinth," Lucerne, Switzerland



*Interior of the Gletschergarten Labyrinth, Lucerne, 1899
Photos: Labyrinthos Archive*

Gustav Palm's mirror maze in his May 1893 USA patent

However, it would appear that Gustav Castan was not the only designer of mirror mazes active at this time. Although Castan was granted a patent for his design in the USA in September 1895, his application for that patent was originally filed in January 1891. In the interim, Gustav von Prittwitz Palm, who describes himself as "a subject of the Emperor of Austria-Hungary, residing in New York," filed several patents for mirror mazes between November 1892 and September 1893, resulting in two patents being granted by the United States Patent Office in May and October of 1893.¹¹ Although not dissimilar to Castan's design, Palm utilises mirrors arranged in combinations of 45, 60 and 120 degrees to create specific effects, including the illusion of being able to see other visitors to the maze, but not yourself, in specific mirrors.

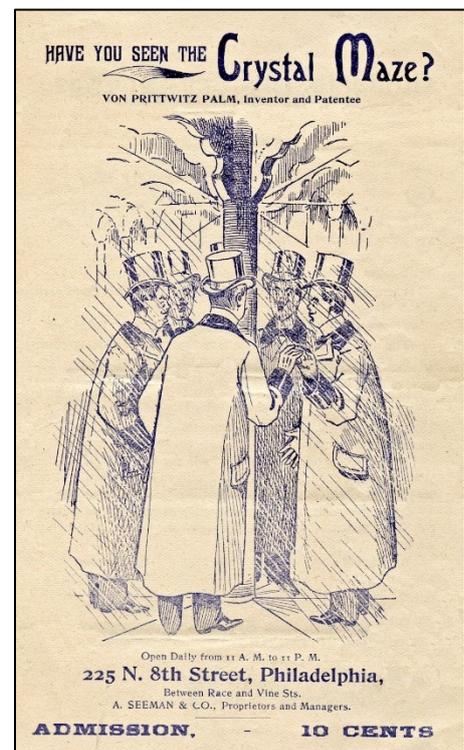


Clearly he was familiar with Castan's earlier installations in Europe, as he refers in his May 1893 patent to installations "well-known under the name of mirror mazes" (and goes on to say) "...this invention belongs to the same class. By it new effects are obtained." The patent gives a plan of his mirror maze and an ingenious arrangement whereby an object or "attraction" placed at a point (O) near the exit (E) can be glimpsed six times during the process of navigating the maze, apparently just ahead, but not elsewhere in the maze. His October 1893 patent also goes into great detail of construction methods and techniques for prefabricating sections of the maze for easy installation and transportation.

With an eye on a wider market than the major national exhibitions that were popular at the time, he seems to have coined the term "Crystal Maze" for his creations, as evidenced by an announcement in the New York Times for the opening of a maze by this name as a public attraction at 38th Street and Broadway in New York on April 19, 1893.¹² Naming von Prittwitz Palm as the inventor, this may have been the first maze installed by Palm, shortly after his patents had been filed, but a few months before they were actually granted. Subsequent coverage of vandalism to four of the mirrors in the maze the following month, quotes Adolph Seeman, the manager of the maze as stating that "the mirrors here cost \$25,000 and we can't afford to have them spoiled."¹³ This high figure would seem to have been quoted for 'insurance purposes,' as another "Crystal Maze" opened on May 14, 1893, at Fairmount Park in Kansas City, Missouri, was built at a cost of \$5,000.¹⁴ Allowing for inflation over the past 115 years, that's still the equivalent of around \$100,000 dollars today. Clearly then, as now, a mirror maze was an expensive installation!

A handbill for a "Crystal Maze" in Philadelphia, USA, once again proclaims "Von Prittwitz Palm, Inventor and Patentee."¹⁵ Unfortunately undated, but presumably from the mid to late 1890's, it gives numerous details of the maze - it occupied a space 20 x 60 feet, had 150 feet of actual passageways, 31 mirrors, 35 pillars and 18 electric lights to illuminate it. It also describes the maze as an "entirely new and popular amusement, being open every afternoon as well as each evening, has speedily become a favorite diversion for Ladies and Children (who can visit the Crystal Maze without escort)." Apparently "a visit to Philadelphia is not complete without having seen the Crystal Maze" and for an admission fee of 10 cents, surely plenty did visit this wonderfully marketed attraction, and others that bear his hallmark.

Crystal Maze handbill. Labyrinthos Archive



Indeed, the success of Palm's "Crystal Mazes" can be judged by the numerous examples that appear in early postcards, produced between c.1900 and the time of the First World War, especially at fairgrounds, coastal resorts and other attractions, in the USA, Canada and in Britain.¹⁶ Unfortunately these photographs normally just show the frontage, not the interiors of the mazes. They were often built alongside roller coasters, water chutes, photograph booths and other sideshows, and were presumably constructed under licence from Palm's design, to judge from the similarity of size and consistency of being named "Crystal Maze" - possibly one of the first examples of successful maze-marketing.



A "Crystal Maze" installed on the beach at Skegness, England, on a postcard from 1907. Labyrinthos Archive

Surely a healthy rivalry existed between Castan and Palm, (and possibly other installers), as examples named the "Egyptian Labyrinth," built at Brandywine Springs, Wilmington, Delaware in 1903 and the "Mystic Moorish Maze" constructed in 1897 at Willow Grove Park, Pennsylvania and another installation with the same name at Rocky Point, Rhode Island, are all using similar mystical and Arabic themes for their titles, whoever their designers and whatever precise materials are employed for their construction.



Ladies stroll past the "Mystic Moorish Maze" at Rocky Point, Rhode Island, USA, on a postcard from 1909. Above the entrance is a sign that promises "Many Merry Moments." Labyrinthos Archive

Undoubtedly there were other designers and builders of mirror mazes working during this time, whose details still lie buried in archived documents from the events and attractions concerned, and some maze designers that simply plundered their ideas, regardless of any patents previously awarded. Indeed, an advertisement in the *New York Clipper* newspaper (August 5, 1893) offers the sale of franchise rights, for cities and territories, for “The Mystic Maze,” a portable maze invented by W.A.J. Foster and E.J. Loupe (and they claimed an application for a patent had been submitted) that contained “1200 feet of puzzling, endless avenues, where beautifully decorated ceilings, hanging baskets of flowers, mirrors and a myriad of colored electric lights make up a most fascinating, romantic labyrinth of dazzling splendour....” Despite this fulsome description, no trace of the patent for this maze, or evidence for the construction of their invention can be found.



Travelling mirror mazes, left: Lübeck, Germany, 1920s? - right: Detroit, USA, 1968. Photos: Labyrinthos Archive

Mirror mazes continued to be popular between the World Wars, and indeed after, especially at fairs, exhibitions and tourist attractions. Pre-fabricated, portable mirror mazes and banks of distorting mirrors installed on trailers with brightly painted entrances, were a common feature at travelling funfairs both in the USA and Europe.¹⁷ In recent years they have undergone something of a renaissance, with the splendid modern examples created by Adrian Fisher since the early 1990s pushing the boundaries of the effects can be created by combining mirrors with modern technology.¹⁸ Indeed, a number of other builders of mirror mazes are once again actively in competition, especially in the USA, a situation reflecting the time just over a century ago when this art form was first developed.



“Magical Mirror Maze,” Wookey Hole Caves, Somerset, England. Adrian Fisher’s first mirror maze. Photo: Jeff Saward

Wooden Panel Mazes

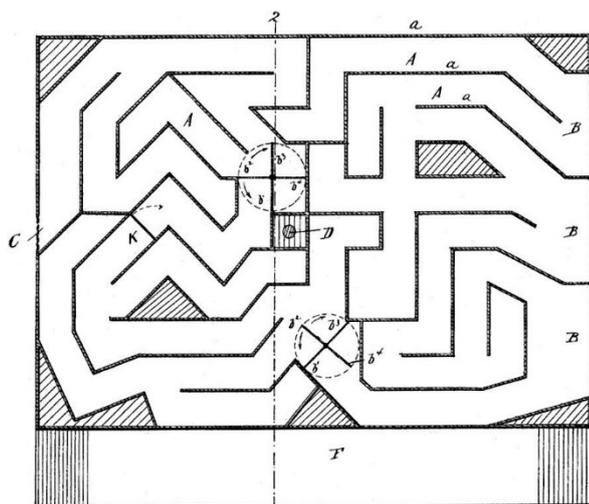
While it might be assumed that wooden panel mazes, also known as fence mazes or simply as panel mazes, are very much a modern invention, having sprung to widespread popular attention in the 1980s, the reality is that their origin also lies much further back in time.

A tantalising reference to a labyrinthine structure “containing recess within recess, room within room, turning within turning,” built by Louis of Bourbourg in c.1195 at Ardres in Flanders “with a skill in woodwork little different from that of Daedalus,” was presumably constructed of fencing or trellis-work.¹⁹ Likewise, a record of repairs to a *maison dédalus* at Hesdin, France, in 1338, and several similarly named structures from mid-14th century France give few direct clues to the materials or designs employed, but hint at labyrinths constructed from wood in some fashion.

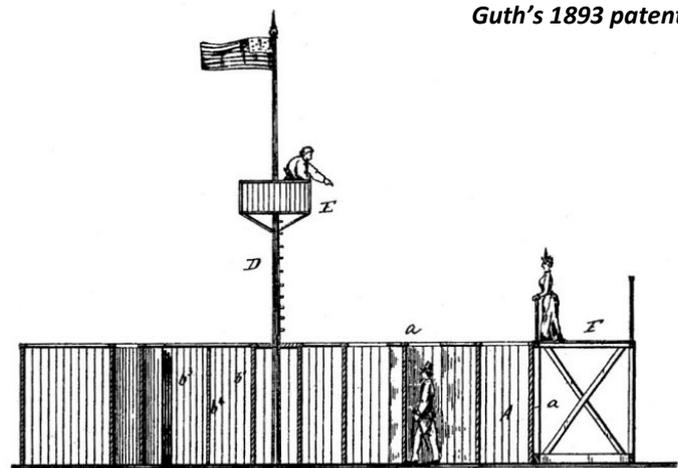
The recent popularity of mazes formed from either timber panelling or pre-fabricated fence panels slotted between concrete pillars, can rightly be traced to the pioneering construction of a panel maze at Wanaka in New Zealand by Stuart Landsborough in 1973.²⁰ Wooden panel mazes, based on Landsborough’s design concept became extraordinarily popular in Japan during the mid-1980s, and the concept soon spread worldwide with examples built elsewhere in New Zealand and Australia, the USA (the Wozz at Vacaville, California, was widely publicised and popular in the late 1980s and early 90s) and also in Europe. Various examples survive from this initial period of popularity, including the now-historic example at Wanaka, and they continue to be built to this day as stand-alone features, at funfairs and other attractions. Rapidly constructed, they can be opened to the public on completion to get a speedy return on investment costs, unlike traditional hedge mazes that need to grow for some years before the public can be admitted.

However, as with mirror mazes, there were also a number of mazes constructed during the 1890s and early 1900s that employed timber construction and a certain amount of pre-fabrication, likewise usually built at exhibition grounds, funfairs and seaside resorts in both the USA and Europe. As with the mirror mazes, there were several patents granted for their designs and construction, and fortunately a few photographs of the resulting mazes preserved on early postcards to provide us with evidence of their existence.

Two early patents for wooden panel mazes are of particular note. The first, granted to Ferdinand Guth, another subject of Austria-Hungary resident in New York, in May 1893, describes and illustrates a rectangular “labyrinth which affords great amusement and numerous novel complications... constructed with a series of walls forming passages and a number of entrances and one outlet and a series of doors arranged in said passage so as to deceive the person attempting to leave the labyrinth.”²¹ The specifications call for the walls of the passages to be constructed from timber planks five to six feet high, and the design incorporates a door that only opens in one direction (K) and two revolving doors that give the appearance of blocked passages when in their closed positions (b). A viewing platform above the three entrances and a pole with a watch-tower at the centre complete the remarkable construction. Despite the ingenuity of the concept, to date, a maze actually constructed to this design has not been recorded.

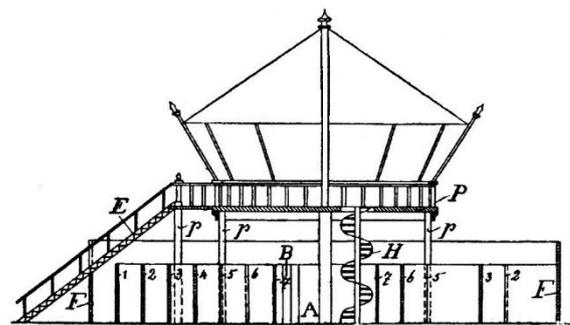
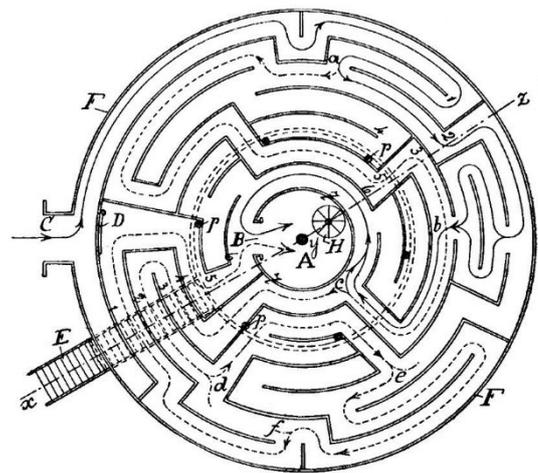


Plan and side view of a wooden maze given in Guth's 1893 patent



The second patent of interest, issued in Switzerland in January 1896, although presumably also patented elsewhere in Europe around the same time, was granted to the Naamlooze Vennootschap Doolhof-Maatschappij (roughly translated as “The Labyrinth Company”), a limited company based in Amsterdam in the Netherlands.²² Shares issued by the company in Amsterdam in November 1893 suggest they had already been active for a few years before the Swiss patent was granted, but their product, detailed and illustrated in the patent, is of considerable interest.

The maze design itself draws heavily on the Dutch origins of the company. Its circular form is essentially the same as the hedge maze at Paterswolde, and therefore similar to a number of other hedge mazes in the Netherlands, all of which are based on design of Hampton Court hedge maze, popular in both the British Isles and the Netherlands, as well as elsewhere worldwide since the late 17th century onwards. The construction of the maze from wooden fencing planks, arranged in a series of concentric circles, with a viewing pavilion raised on pillars at the centre reached by a spiral staircase, and with a raised walkway and stairs to provide an exit, is both dramatic and advanced for its time. However, unlike Guth’s patent, it would appear that the capital raised by the Doolhof-Maatschappij allowed them to put their design into production.



Plan and side view of the Doolhof-Maatschappij 1896 patent

The first example built to their design would seem to have been created in 1893, the same year the company issued shares in the Netherlands, and was installed at an exhibition of agriculture, animal husbandry and industry held in Batavia (modern-day Jakarta) on the island of Java, at that time a Dutch colony. A photograph of the maze shows the circular design, with a rustic thatched central ‘pavilion,’ with walls apparently formed of thin wooden panels, all held together with a web of bamboo poles. Another example from Java is recorded ca. 1895, and could perhaps have been the same maze reassembled at a different location.²³

The first example constructed in Europe would appear to have been installed in 1895 at the *Wereldtentoonstelling van het Hotel- en Reiswezen* (world hotel and travel exhibition) in Amsterdam.²⁴ Photos of the fairground area of the exhibition capture some details of the Doolhof maze, including one particular shot taken from the tower of the adjacent Rijksmuseum in April 1895, shortly before the exhibition opened the following month.²⁴ Standing adjacent to the Oud-Holland attraction, the circular structure and central raised pavilion of the maze all conform well with the patent, and the trellis work on the interior walls also matches a sketch of the doolhof contained in a souvenir booklet produced for visitors to the exhibition.

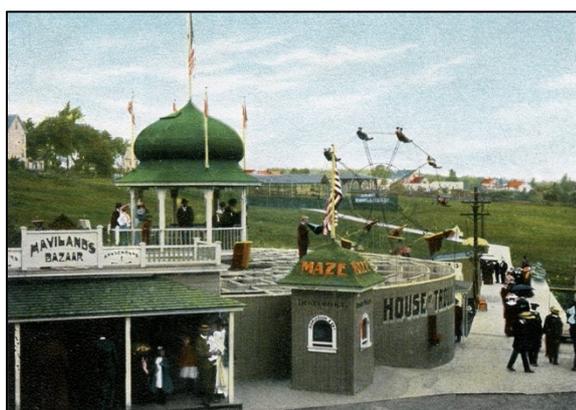


The doolhof in the Oud-Holland attraction at the 1895 World Hotel and Travel Exhibition in Amsterdam. Photo: Amsterdam Stadsarchief, inv. no. 10019/40074165.

Once again, postcards from the period provide tangible evidence of wooden mazes probably built by the Doolhof-Maatschappij, or to their licensed design, including those installed at Wolverhampton (1902), Nottingham (1903) and Roker (1904) in England, in the Saturno Parque in Barcelona, Spain (1911) and another at Old Orchard Beach in Maine, USA (1902). All are essentially of very similar design and four are called “House of Trouble” or “House of Many Troubles” - possibly a ‘trade name’ for the product. The details shown in these early photographs suggests that they may have been partly pre-fabricated and supplied in kit-form for ease of construction, especially the central pavilions and fence sections forming the walls of the maze.²⁵ The House of Many Troubles constructed at Wolverhampton was only in place for the duration of the Art & Industrial Exhibition during the summer of 1902, but it seems it was then taken apart and re-erected at the Nottingham Home & International Exhibition in 1903, where it stood until 1904.²⁶ Although relatively inexpensive to construct, and essentially quick and easy to build, their maintenance must have entailed fairly high upkeep costs and unlike the mirror mazes from the same period, none of these early wooden mazes have survived.

Early wooden panel mazes

Right: “House of Many Troubles” wooden panel maze at the Wolverhampton Art & Industrial Exhibition, 1902



Above: “House of Trouble” wooden maze at Old Orchard Beach, Maine, 1902

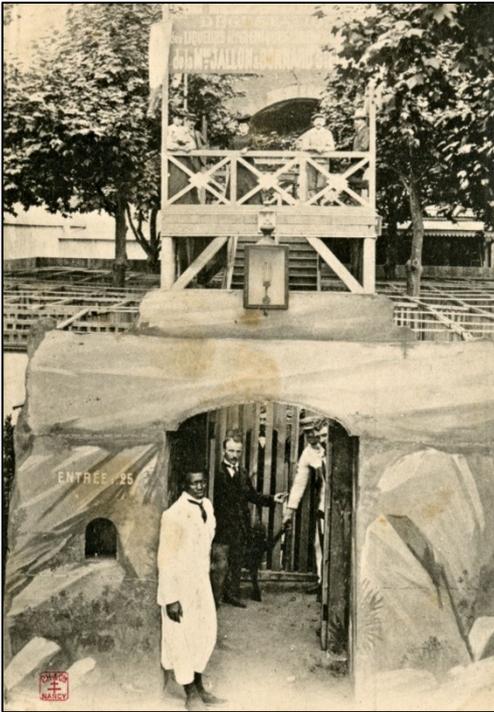


Right: wooden panel maze, Saturno Parque, Barcelona, Spain, 1911

Right: detail from a 1904 postcard of the seafront at Roker, NE England, showing the “House of Many Troubles”



Photos: Labyrinthos Archive

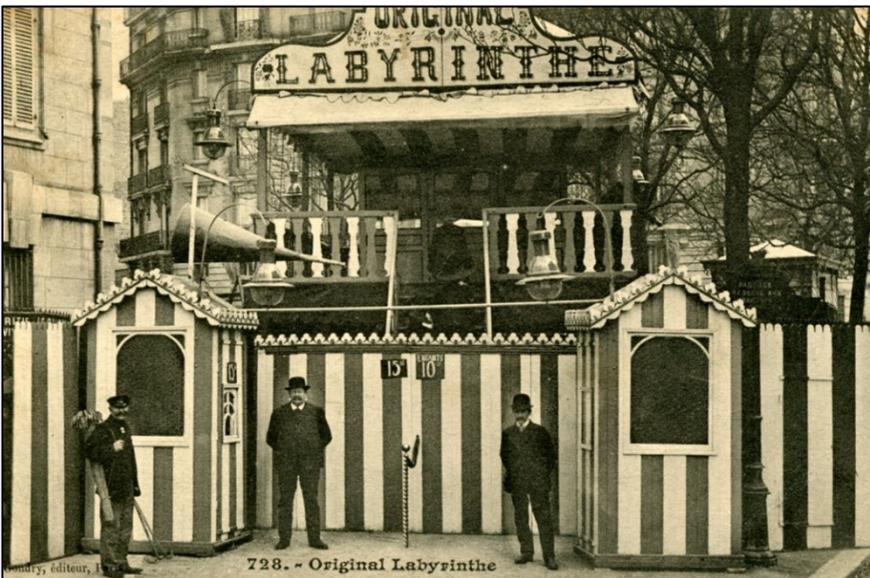


This proclivity for prefabrication and relative portability was obviously appreciated by other enterprising showmen of the day, as a series of wooden labyrinths, once again documented on early postcards, are recorded in France and Belgium during the early years of the 20th century. The “Mysterious Labyrinthe” installed at the Sainte-Étienne International Exposition in 1904 appears to have been a rather rustic affair, a grid-like construction of lumber and planks with an equally simple viewing platform at its centre. Another, the “Labyrinthe Cosmopolite” postmarked in Verviers, Belgium, 1909, but with no specific location provided, shows a much grander creation, with two levels, candy-striped picket fencing, flagpoles and balconies and an awning covering the entire structure. A much more compact version, although similarly ornate and named the “Original Labyrinthe” (postmarked Neuilly-sur-Seine, France, 1912) appears to have been a travelling ‘sideshow’ variety, complete with electric lighting and loud hailing trumpet. Another very similar example, the “Grand Labyrinthe,” is featured on postcard produced in Lyon in 1908. Both show obvious signs of being modular ‘flat-pack’ installations that could presumably be transported from town to

town, to be bolted together at fairs and carnivals with relative ease. Undoubtedly more examples, and some details of their promoters, might be found in archival trade directories, press reports and publicity of the period.

While the popularity of these early wooden mazes appears to have declined with the onset of the First World War, they were clearly the forerunners of the familiar modern wooden fence and panel mazes by the best part of 75 years.

Jeff Saward, Thundersley, England;
March 2008,
updated January 2020



French & Belgian wooden mazes

upper:

**“Mysterious Labyrinthe”
Sainte-Étienne, France, 1904**

middle:

**“Labyrinthe Cosmopolite” Belgium,
1909**

lower:

“Original Labyrinthe” France, 1912

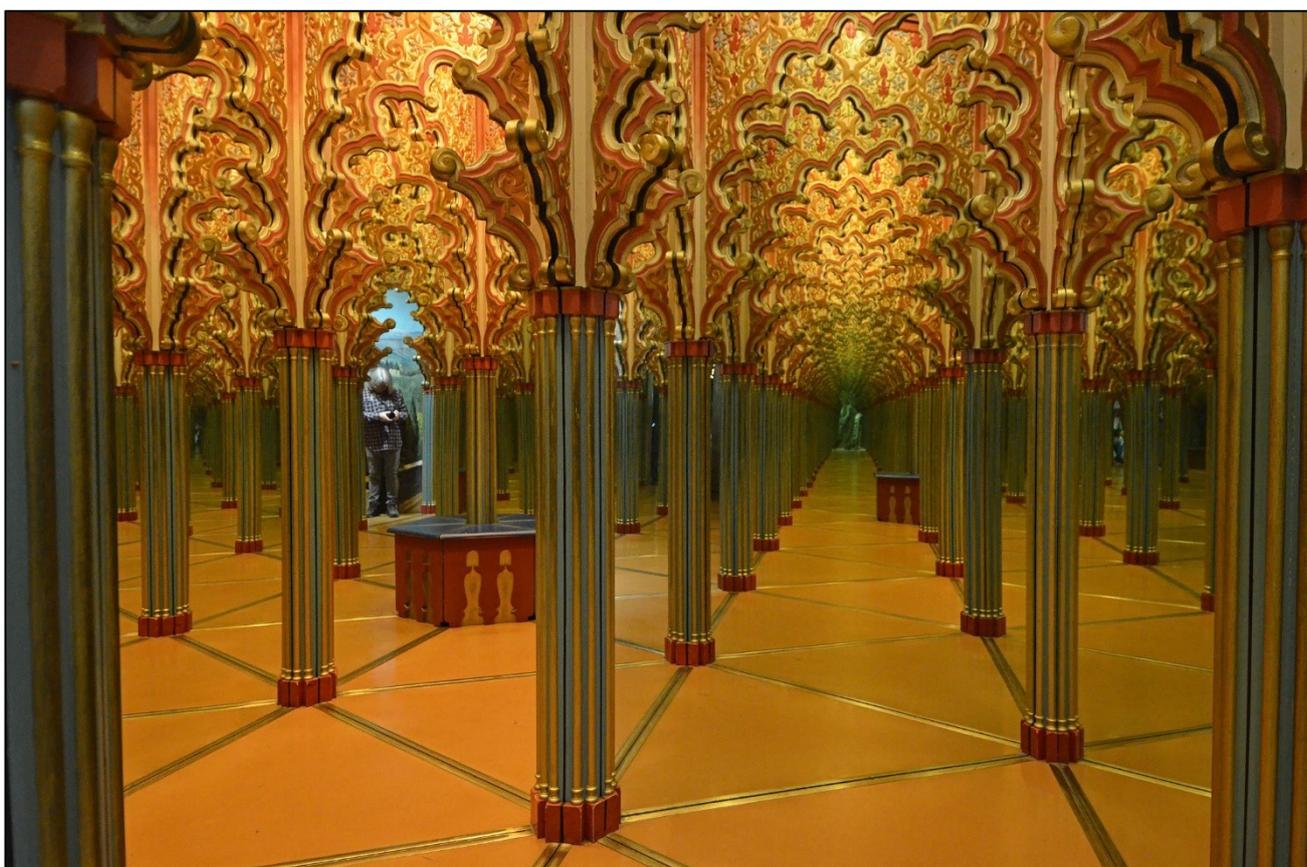
Photos: Labyrinthos Archive

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1. Kern, Hermann. *Through the Labyrinth*. New York & London: Prestel, 2000, p. 187.
2. Pendergrast, Mark. *Mirror Mirror: A History of the Human Love Affair with Reflection*. New York: Basic Books, 2003.
3. Patented in France, September 8, 1888, no.192868; in Belgium, September 12, 1888, no.83240; in England, October 21, 1889, No.16593 and in the USA, September 3, 1895, (filed January 6, 1891) no. 545678. The German patent, issued November 14, 1891, no.59762, interestingly lapsed due to non-payment of fees in 1895.
4. "Führer durch Castan's Panopticum" brochure in the Labyrinthos Archive. Specifically for the exhibit at Friedrichstrasse 165, Berlin, the brochure is undated as such, but has a date of 10 April, 1896 written on the cover (presumably the date that the original owner attended). The mirror maze, "Castan's Irrgarten," is detailed on pages 28-30.
5. Friederici, Angelika. "Gustav Castan's Mirror Maze" *Caerdroia* 45 (2016), p. 32-35. This is an English translation of "Gustav Castans Spiegellabyrinth," originally published in *Optische Erscheinungen und technische Illusionen*, part D10, p 12-15, of the *Castan's Panopticum. Ein Medium wird besichtigt* series, Berlin, 2015.
6. On a stereo viewer card, photograph by George Barker, 1889, in the Labyrinthos Archive. Possibly this was situated at the Dolmabahçe Palace, Istanbul, or perhaps in the Şale Pavillion at the nearby Yıldız Palace, extended in 1889 for Kaiser Wilhelm II of Germany, in which case the Castan connection becomes more likely.
7. "Attractions for Moorish Palace" *Chicago Daily Tribune*, March 21, 1893. The article names Gustav Castan as the creator and also suggests that the mirror maze was fabricated in Berlin and then shipped to Chicago.
8. Depicted on a stereo viewer card, photograph by George Barker, 1893 (in the Labyrinthos Archive), it was situated on Wabash Avenue as a stand-alone attraction, and was still open for visitors (as advertised in the *Chicago Daily Tribune* Nov. 12, 1899) long after the World's Fair had moved on.
9. "Its Fair Now Open" *Chicago Daily Tribune*, January 2, 1894.
10. "Orient-Labyrinth beim Gletschergarten" brochure, published 1903, in the Labyrinthos Archive.
11. Patents granted by the United States Patent Office: No.498524, May 30, 1893 & No.507159, October 24, 1893.
12. "A New Entertainment – Something about the new Crystal Maze that is to astonish us" *New York Times*, April 16, 1893, p. 13.
13. "Scratches on the Mirrors" *New York Times*, May 13, 1893, p. 9.
14. Ulichne, John M. & Debra Topi. *The Illustrated History of Fairmount Park* online at www.oldfairmountpark.com/1893.html
15. "Have You Seen the Crystal Maze?" handbill in the Labyrinthos Archive.
16. Examples in the Labyrinthos Archive include postcards of "Crystal Mazes" at Canobie Lake Park, Salem, New Hampshire (opened 1902) and Asbury Park, New Jersey (ca. 1900), in the USA; Dominion Park, Montreal (ca. 1907) in Canada and at the Bradford Exhibition (1904) and on Skegness Seafront (ca. 1907) in England.
17. A December 1945 advertisement by the National Amusement Device Co. of Dayton, Ohio (in the Labyrinthos Archive) illustrates and describes their mirror mazes as "equipped with a new special glass 5 to 6 times stronger than formerly used. Assembled in factory before delivery. Portable or permanent."
18. Fisher, Adrian. "The Renaissance of Mirror Mazes" *Caerdroia* 37 (2008), p. 13-16.

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19. Doob, Penelope Reed. *The Idea of the Labyrinth from Classical Antiquity through the Middle Ages*. Ithaca & London: Cornell University Press, 1990, p. 106-107.
20. Landsborough, Stuart. "The Great Maze at Wanaka" *Caerdroia* 25 (1992), p. 14-16.
21. Patent granted by the United States Patent Office: No.496604, May 2, 1893.
22. Patent granted by the Swiss Patent Office: No.11757, January 21, 1896.
23. Saward, Jeff. "Doolhoven in Indonesia" *Caerdroia* 48 (2019), p. 55-58.
24. A photograph by Jacob Olie in the Amsterdam Stadsarchief, inv. no. 10019/40074165.
25. A report on the opening of the exhibition in *The Nottingham Evening Post*, 28th May 1903, states that "there is also an Australian pine-wood maze, full of intricate twists and turns to puzzle those who attempt to thread their way through it." Initially described as the "Australian Maze" in 1903 literature, it is then named in advertisements for the exhibition in 1904 as "The House of Many Troubles." A small photograph of the Nottingham maze appears in *The Strand Magazine*, January 1906, p. 119.
26. This is, perhaps, not so surprising, as both events were organised by Charles and Albert Kiralfy, the sons of Imre Kiralfy, a famous theatrical showman, who was himself involved with the 1893 Chicago World's Fair. The Kiralfy's were also involved with the attractions at Roker - the new Pier was opened on the seafront in 1903 - suggesting that the wooden panel maze featured on the 1904 postcard was another Kiralfy installation?



In the mirror maze at the Gletschergarten, Lucerne, Switzerland. Photo: Jeff Saward 2015

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