TANGRAM: THE WORLD'S FIRST PUZZLE CRAZE

by

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The only mechanical puzzle craze that most readers will remember is the Rubik's Cube fad of the early 1980s. Reportedly more than 100 million of the fascinating, but incredibly difficult puzzle, were sold. After the solid colors on each of the six sides were scrambled, very few were ever restored to their pristine initial condition. Solving the puzzle required sequentially rotating layers of the 3 by 3 by 3 cube to restore the solid colors to each side.

The world's first puzzle craze occurred almost 200 years ago, during the years 1817 and 1818, when transportation and communication consisted of sailing ships and horse-drawn carts and carriages. A Chinese Puzzle, later named the Tangram swept from China to London and became a fashionable puzzle craze in England, Europe and America. This remarkable event was the world's first puzzle craze. The Tangram is still popular and has been used in schools worldwide to help students learn, while having fun, since the 1860s.

Among the international celebrities who are said to have amused themselves with Tangrams are Napoleon Bonaparte, Lewis Carroll, Edgar Allan Poe, Hans Christian Anderson, English scientist Michael Faraday, and John Quincy Adams, the sixth President of the United States. As far as Carroll and Poe are concerned we can be quite sure that they did know the puzzle. Henry Dudeney wrote in a 1908 Strand magazine article, 'Tales with Tangrams,' that he had obtained an early Tangram book, The Fashionable Chinese Puzzle, from the library of Lewis Carroll. In his Mathematical Games column
in *Scientific American* Martin Gardner included a photograph of Edgar Allan Poe's ivory Tangram. Hans Christian Anderson mentioned the Tangram in his fairy tale, The Snow Queen, and Michael Faraday invented a set of Tangram figures after solving all the problems in his Chinese puzzle book. Extensive research of the dairies, library, home and biographers of John Quincy Adams failed to find any evidence that he owned Tangrams or tried to solve any Tangram puzzles. More about Napoleon and the Tangram later.

**The Tangram**

The Tangram, a two-dimensional rearrangement puzzle, is formed by dissecting (cutting) a square into seven pieces, called tans. (Fig. 1)

The pieces are rearranged to form thousands of different figures of people in motion, animals, letters of the alphabet, geometric shapes and the universe. The puzzle is to assemble all seven pieces, without overlap, to form a given problem figure. Several rearrangement puzzles were invented before the Tangram and many have been invented since, but the Tangram has turned out to be the most popular by far. The seven pieces are simple shapes: two small triangles, one medium-sized triangle, two large triangles, a rhomboid and a square. It is unique among rearrangement puzzles in its ability to transform these simple, geometric pieces into charming, elegant, sophisticated and sometimes paradoxical figures. The silhouette problems are presented in books or cards that accompany the Tangram. Or you can create your own designs, limited only by your imagination. The inscrutable face of a Chinese Emperor, the elegance of a bird in flight and puzzling paradox figures can all be made from the amazing Tangram. The puzzle’s very simplicity proves most maddening: how can seven simple tans create such extraordinary images and puzzling challenges?

In Chinese, the Tangram is known as *Ch‘i ch‘iao t‘u*, which translates to 'seven ingenious plans' or 'picture using seven clever pieces.' (Fig. 2)
**Invention of the Tangram**

According to Chinese reference literature, Yang-ch'uai-shih (Dimwitted recluse) invented the Tangram during the reign of Chia-ch'ing (1796-1820). He wrote, edited, and published the first Tangram problem manuscript (or book). The inventor and author used a pen name, as was common in China during this period. No copies of the book are known to exist.

The date of the first Tangram may be further defined by the hand-written inscription on a silk covered cardboard box containing a carved ivory Tangram that was given to Francis Waln, the third child of Robert and Phebe Waln, on April 4, 1822. (Fig. 3)

Robert Waln was a major ship owner and importer in Philadelphia with a financial interest in at least twelve ships trading with Canton, China.

Sang-hsia-k'o (a pen name - Guest under the mulberry tree) compiled the problem figures for the second Tangram book, entitled, *Ch'i ch'iao t'u ho pi*. [Harmoniously combined book of Tangram problems,] and wrote a preface for it.

The preface and the 334 problem figures in the book, which was published in 1813, were widely reprinted in numerous editions by several Chinese publishers for over 100 years. No copies of the 1813 edition have been found in China, Japan, England, Europe or the USA. However, a replica of the original 1813 Chinese book, including the cover, the text and 130 of the problems, was discovered in Japan. The copy, with the text in blue and the figures in red, was published in Japan in 1839. (Fig. 4)

The preface by Sang-hsia-k'o tells a bit about the history of the Tangram and the problem figures. "It's origin lies within the Pythagorean theorem. Last year Hsü Shu-tüan traced 160 Tangram designs and published them. Mr. Wang I-yüan brought a copy of Hsü Shu-tüan's booklet and added designs by his younger brother, Ch'un-sheng, to it. The manuscript included about 200 designs. I invented another 100 new designs which were added to the copy. I didn't want to keep it for my pleasure only, so I decided to publish it for the entertainment of those who also love this game."

Our investigation of the Pythagorean theorem in Chinese mathematics found no evidence that the Tangram was invented or known by ancient
Chinese mathematicians. However their method of dissecting a figure and rearranging the pieces to form a new figure was an integral part of Chinese mathematics in the third century AD and was the approach used by the Chinese to prove the Pythagorean theorem. This is one of the roots in the Chinese culture that may well have contributed to the invention of the Tangram many centuries later.

The publisher of Sang-hsia-k'o's 1813 book published a new edition in 1815, containing the same preface and the same problems as the earlier edition. A book of solutions was also published and the books were sold as a pair.

The books were made of accordion-folded rice paper sewn together with a string binding. Copies of the 1815 edition were widely distributed, not only in China, but also in England, Europe, and America, and they were responsible for spreading the Tangram craze to the Western world.

The Tangram Craze Hits Europe and America
Puzzles made in China of ivory and wood, as well as copies of Sang-hsia-k'o's Tangram books, were brought to England and Europe on sailing ships.

After the Chinese books reached England, the problems were copied and published and the puzzle quickly became fashionable in London. Its popularity rapidly spread to other European countries. The German author, C.L.A. Kunze describes; “this game, soon after its appearance had become a favorite amusement in educated families of Northern Germany. The examples came from England and were offered by Hamburg art dealers and, according to information passed by word of mouth, they were very elegant: the figures printed on natural paper with the beautiful Chinese cinnabar (brilliant red), the seven pieces decoratively carved from foreign wood or ivory or mother of pearl, the whole enclosed in cases being lacquered in black and gold.”

The credit for making the puzzle fashionable and popular not only in London, but throughout most of Europe must be given to a pair of elegant British books: The Fashionable Chinese Puzzle and its companion, Key, published by John and Edward Wallis and John Wallis, Junior, in March of 1817. (Fig. 5)

The problem book includes a hand-colored illustration of a Chinese scene on the cover and a poem called Stanzas as the preface. The hand-colored problem drawings looked accurate, and the companion solution book was easy to use. Both books used high-quality, watermarked paper.

The poem mentioned, among other things, that the Chinese Puzzle was “the favourite amusement of Ex-Emperor Napoleon.”

Napoleon's Tangram Found
One member of the team of researchers supporting the author in the investigation into the history of
the Tangram, Die Sonneveld, searched the internet and libraries and read dozens of books about Napoleon for clues to the mystery of almost 200 years of whether, as Wallis said, Tangrams were Napoleon’s favorite pastime. On one trip to the Bibliothèque Nationale of France, in Paris, he visited museums containing Napoleon artifacts in and around the city. None yielded any important items until he visited the Bois-Préau Château, ten miles to the west of Paris and located next to the Château de Malmaison in a 42-acre landscaped park. The Château, bought in 1810 by the Empress Josephine, is a national museum devoted to Napoleon’s captivity and death on St. Helena Island, the return of his ashes and the Napoleonic legend.

The third showcase in Salle III, the room that contains ‘The games of Napoleon,’ includes A Chinese Puzzle of ivory, accompanied by two volumes of problems and solutions.’

The box, 2 3/8 inches square, and the pieces of the puzzle are extremely well made of beautifully carved ivory. (Fig. 6) The Chinese problem book has lost its cover, but the companion solution book is intact, with the title, Ch‘i ch‘iao t‘u chieh, dated 1815, and with Luan-ts‘ui-ch‘u named as publisher. (Fig. 6 Alt.)

Mr. Pantel, the Archivist of the Museum, informed us that the puzzle and books had come from the family of General Gourgaud, who left St. Helena in 1818.

Still, the question of whether Napoleon’s Chinese Puzzle was his “favorite amusement” remains open. It seems likely that with his long-term interest in mathematics and especially, geometry, he at least tried to solve some of the problems in his Chinese book with seven ivory pieces. However, several of his associates on St. Helena kept diaries that describe in detail how Napoleon spent his time and the games that he played with his companions, and none of these mention that he owned or used the Tangram. Therefore it seems reasonable to conclude that Napoleon owned and used the Tangram, but that it was not his “favorite amusement.”

**On the Continent**

The first Tangram book on the Continent was published in France by Grossin of Paris on July 19, 1817 and bore the title Énigmes Chinoises. (Fig. 7)

It was copied from Wallis’ *Fashionable Chinese Puzzle*. Likewise the first Tangram books published in Switzerland, Italy, the Netherlands and Denmark all copied Wallis. And while the first Tangram books published in America copied the Chinese book, this changed when Wallis books arrived. In 1817 most countries had laws forbidding the copying of books inside the country itself, but there were no treaties between countries prohibiting the copying of books published in another country.

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Fig. 6 This ivory Tangram and a pair of Chinese problem and solution books dated 1815 once belonged to Napoleon.

Fig. 7 Enigmes Chinoises was the first Tangram book published on the European continent.
Fig. 8 The portrait of King Henry IV of France was published in Paris in 1818 as one of a set of 16 Tangram problem cards.

Fig. 9 Caricature of life in Paris, published at the height of the Tangram craze in January 1818. The caption translated: "Take care of yourself, you're not made of steel. The fire has almost gone out and it is winter. It kept me busy all night. Excuse me, I will explain it to you. You play this game, which is said to hail from China. And I tell you that what Paris needs most right now is to welcome that which comes from far away."

Fig. 10 One of ten plates of engraved Tangram architecture problems in Metamorfosi Del Gioco Detto L'Enigma Chinese (Metamorphosis of the Game also known as Chinese Enigma), published in Florence, Italy in 1818.

Fig. 11 These figures are part of 24 problem cards published in Germany with the title Hieroglyphen oder Bilderschrift. (Game of Mystical Characters).
In France, in 1817 and 1818, artists improved of the plain outlines used for problems in the Chinese and British books and created beautiful hand-colored problem figures of people and animals that looked like miniature pictures. (Fig. 8)

Cards with the problem drawings were included in boxed sets, along with the seven pieces of the puzzle. The Tanagram craze peaked in France during the first quarter of 1817, as demonstrated by the number of Tanagram sets and books published as well as by two elaborate caricatures showing the excesses brought on in France by the Tanagram craze.

The first, *Le Goût du jour No. 45; Le Casse-tête Chinois [Caricatures Parisiennes]*, was published in Paris on 10 January 1818 by Chez Martinet and shows a couple ignoring their crying baby’s needs and the lack of heat in the house while they are staying up all night to solve Tanagram problems. The Martinet bookshop was famous for its caricatures and they always had some in the windows, with new ones every 15 days. (Fig. 9)

Caricature of life in France during the Tanagram

The caricature had a long caption:

“Take care of yourself, you’re not made of steel. The fire has almost gone out and it is winter. It kept me busy all night, excuse me I will explain it to you. You play this game, which is said to come from China.

And I tell you that what Paris needs most right now is to welcome that which comes from far away.”

The Tanagram craze ended in France by the end of 1818.

The first Italian Tanagram book, published in 1817, was a copy of the British book by Wallis. But in 1818, G. Landi of Florence Italy, produced, *Metamorfosi Del Giuoco Detto L’Enigma Chinese*, a beautiful book of 100 miniature pictures of architectural features such as monuments, buildings, fountains and bridges that were so artistically made that each problem was a beautiful picture. (Fig. 10)

And many of the Tanagram problems in two other Italian books published during the craze were new designs. A beautiful hand colored set of problem pictures on cards, copied from the French, was also published in Italy.

Germany became fascinated by the Tanagram at least 6 months later than France with numerous publications during 1818 including two beautiful hand-colored sets of picture problem cards. (Fig. 11)

Although the Tanagram did not reach the level of craze seen in France, it was much more sustained with German Tanagram publications occurring every few years through the end of the nineteenth century.

Denmark had a remarkable interest in the Tanagram during 1818, with four publications. (Fig. 12)

One of the books stated, “Many thousands of sets are sold at different shops in Copenhagen made from mother-of pearl, ebony, mahogany, and other

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Fig. 12. A glass Tanagram, with a sheet of problem figures, was made in China, but found in Denmark.
types of wood, even of glass."

Sweden was also interested in the Tangram as the craze swept Europe. A beautiful set of 36 hand colored problem pictures was published in Sweden. (Fig. 13)

In America, a pair of Sang-hsia-k'o's 1815 Tangram books was given to Captain Edward M. Donnaldson on 30 October 1815 while he was docked in Canton. He brought them to the United States on his ship, Trader and arrived in Philadelphia in February 1816.

Although two books with Tangram problems, copied directly from the 1815 Sang hsia k'o book, were published in the United States in 1817, there was not nearly as much excitement about the puzzle in America as there was in China, England and Europe.

The first book, Chinese Philosophical and Mathematical Trangram was published by James Coxe in August 1817; later the same year a New York publisher, A.T. Goodrich, published a pair of problem and solution books entitled The New and Fashionable Chinese Puzzle.

The poor quality of these first Tangram books was probably a major factor in the lack of enthusiasm for the puzzle in America. And in 1818 the only new Tangram book published in America was a copy of Wallis' Fashionable Chinese Puzzle by A.T.
Goodrich. This book and the puzzles themselves continued to be advertised in New York and Boston through the end of 1822. Interest in the puzzles increased during the period from 1865 to 1880 when numerous boxed sets of Tangrams were produced by several companies. This increased activity may have been due to the use of Tangrams in the schools, which began during the same period. McLoughlin Brothers published a beautiful boxed set with hand-colored problem cards copied from the French edition. (Fig. 14)

America's greatest puzzle designer, Sam Loyd (1841-1911) designed and published many Tangram problems. His first booklet of original Tangram problems appeared in 1875. (Fig. 15) and his famous, Eighth Book of Tan, with untrue but imaginative stories of the history of Tangrams and hundreds of original problems, was published in 1903.

Merchandising of the Tangram
According to Carl Crossman's book, The China Trade, "Ivory puzzles intrigued every merchant who went to China. These seemingly simple products of clever design and good craftsmanship were made in all shapes and forms and were often described in great detail by Westerners who had purchased them. The puzzles could be bought singly or in groups, either in fabric covered pasteboard boxes or very handsomely decorated lacquer boxes."

The popularity of the Tangram in China inspired merchants there to produce plain Tangrams for domestic use (Fig. 16) and fancy puzzles for export.
Fig. 16 Uncarved ivory Tangram pieces in a handy wooden case for use in China.

Fig. 17 Tangram problem book with ivory cover and silk pages that contain over 340 problem figures.

Fig. 18 The sides of these ceramic Tangram dishes are decorated with colorful scenes of ancient Chinese legends.
from materials such as ivory, tortoise shell, ebony, mahogany, copper, and even glass.

Pairs of beautiful Tangram problem and solution books were sold with intricately carved ivory (Fig. 17) and mother-of-pearl covers; some books even had the pages covered with hand-painted silk. Sets of dishes in the form of the seven tans using cloisonné over bronze (Fig. 18) were also marketed. Miniature sets of sandalwood and rosewood Tangram tables were produced for export, and beautiful full-sized Tangram tables of ironwood with burl inlay were made to sell in the country itself. (Fig. 19)

Fig. 19

Fig. 19 The author in his Slocum Puzzle Museum arranging Tangram tables of ironwood with burl inlay, made in China about 1840.