

# Mongolian Interlocking Puzzles

## Jerry Slocum and Frans de Vreugd

Peter, an antique dealer who spends most of his time searching for rare antiques in places that most of us collectors would consider too remote or too dangerous, visited Jerry during August 2000. He enthusiastically described an amazing Puzzle Museum that he had just found in a most unlikely place, Ulaan-Baatar, Outer Mongolia. “There are more than 2,000 puzzles; you must go there”, he said. He provided the business card of the Director, Mr. Zandraa Tumen-Ulzii, drew a map of the location of the museum, and mentioned that Monica, the daughter of the Director, was living in Los Angeles!

Ulaan-Baatar, the capital of Outer Mongolia, is located between northern China and Russia’s Siberia. The country is twice the size of Texas and the average altitude is about 5,000 feet. It has very cold winters and even during the summer it is frequently quite cool. Historically Mongolia has been a nomadic society and even today many people live in easily moved, round, felt-covered *Gers* (tents) while tending herds of horses, sheep, yaks, goats and camels. There is little agriculture and limited industry in the country. With the help of Monica and her brother Itgel, a trip to Mongolia was arranged. Jerry invited puzzle friends Dick Hess and Frans de Vreugd to accompany him on the trip. Our adventure in Mongolia is described in the reference.

### Mr. Tumen-Ulzii, puzzle inventor, artist and craftsman

Mr. Tumen-Ulzii, shown in Figure 1, was born in 1944 in Aguit, Western Mongolia, as part of a family of eleven children. His parents were herdsmen. He is married and has two sons and two daughters. He and all of his children are



Figure 1. Mr. Tumen-Ulzii

University graduates. Mr. Tumen-Ulzii became interested in puzzles at a very young age when he was given a six-piece burr puzzle by his Father with one of the pieces missing. He soon figured out the design of the missing piece, carved a replacement and solved the puzzle. He was hooked on puzzles!

Since 1955 Mr. Tumen Ulzii has invented, patented and crafted more than 2445 different interlocking mechanical puzzles. He opened his International Intellectual and Puzzle Museum in Ulaan Baatar in 1990 in order to share his puzzles and chess sets with other Mongolians and visitors from all over the World.

The work of Mr. Tumen-Ulzii can best be described as a delicate combination of intricate puzzle design, art and very skillfull craftsmanship. He has used these talents to design and fabricate a

completely new class of interlocking puzzles, unsurpassed in its kind. Mr. Tumen-Ulzii has designed puzzles that range from simple (but beautifully decorated) ones to extremely complicated interlocking structures using hundreds of pieces. Many different techniques are used, including dovetails, rotational and tilted moves.

He has been recognized for his many accomplishments. He was awarded a prize as the “Best inventor of Mongolia” in 1994 by the Mongolian Government. And in 1998, the President of Mongolia awarded him Mongolia’s highest honor, a gold medal and the title of “Meritorious Person of Culture of Mongolia” “for his contribution to developing the minds and thinking skills of children and youth”.

### Puzzle Art and jewelry

In addition to designing and making puzzles, he has painted several pictures which feature puzzles with symbolic meaning. The picture on the left in Figure 2 shows a baby’s pacifier in the shape of a puzzle, meaning that you should not only nourish your young children with food, but also feed them intellectually.



Figure 2. Puzzle Art by Tumen-Ulzii



Mr. Tumen-Ulzii has also designed and made a unique four-band puzzle ring, shown in Figure 3. The design, in Mongolian, signifies 10,000 puzzles.



Figure 3. Puzzle Ring

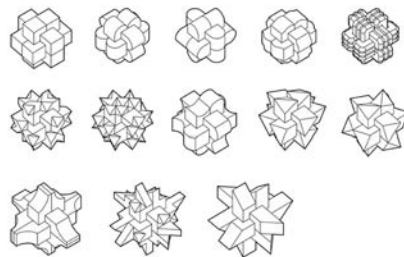


Figure 4. Six Piece Burr variations

### Six-piece Burrs

Although most of the six-piece burrs Mr. Tumen-Ulzii has designed are relatively simple as puzzles, others require as many as seven moves to remove the first piece and seventeen moves to disassemble the six pieces completely. All of them are extremely decorative. He came up with several dozen different ways to decorate the pieces. The ends of the pieces of some of the puzzles have an unusual shape, shown in Figure 4. Other puzzles are



Figure 5. Disney characters and Zodiac figures decorate the six-piece burrs.

miniature sculptures with intricate hand carved decorations. Figure 5 shows a six piece burr with the ends of the pieces carved and decorated as Donald Duck and Mickey Mouse on the left and the twelve traditional Chinese Zodiac animals carved and painted on the pieces of the burr on the right.

### More complex burrs

Mr. Tumen-Ulzii moved up to a higher level of complexity with the twelve and twenty-seven piece burrs shown in Figure 6. And each piece in the



Figure 6. Decorated twelve and twenty-seven piece burrs



Figure 7. Eighteen-piece Board Burr and one of it's pieces



Figure 8. Three hundred seventy-five piece puzzle.

eighteen piece Board Burr shown in Figure 7, is different and quite complex, making this one of the most difficult puzzles we found in the Museum. The orientation of the pieces is utterly confusing, not just the alternating ends, but also the different configurations of pieces in X-, Y- and Z-direction (2x3 vs. 1x6). Many of his interlocking puzzles contain many more pieces. The puzzle shown in Figure 8 contains 375 pieces. Another puzzle he designed called, "Cosmic Eden" uses 673 wooden pieces.

### **Figural and decorative interlocking puzzles**

Several of his more complicated puzzles, such as those shown in Figure 9, are decorated by beautifully carved animal shapes. From the outside it is often unclear how many pieces the puzzle has, and as with previous puzzles, the decorations frequently have a traditional symbolic meaning. Figure 10 shows four out of a complete set of twelve animals representing the signs of the Zodiac. The internal structure and mechanisms to disassemble and reassemble the puzzles are all different and vary in difficulty.

Shown in Figure 11 is one of his best puzzle designs. It is a turtle-shaped interlocking puzzle, made from eleven pounds of silver! This turtle is also the symbol of the city of Ulaan Baatar. It requires nine complex moves to remove the first piece and thirty-three moves to completely disassemble it. The person who can take it apart and reassemble the puzzle in ten minutes will be awarded \$100,000. by Mr. Tumen-Ulzii. We tried, but could not even get the first piece out in ten minutes. Some of the movements required are very unusual. We doubt that even an experienced solver can solve the puzzle in the given time.





Figure 9. Carved and decorated wooden Cat and Mouse Puzzle and Turtle Puzzle



Figure 10. Zodiac figural puzzles.

### **Interlocking buildings**

Mr. Tumen-Ulzii has also designed several interesting interlocking puzzles in the shape of famous buildings. Shown in Figure 12 are the fairly simple seven-piece Statue of Liberty and a puzzle in the shape of a traditional Mongolian home *Ger* (tent). Other impressive puzzle structures in the Museum include the Eiffel tower as well as The Chinggis Khaan Hotel and the statue of Sükhbaatar in Ulaan Baatar (both very difficult).



Figure 11. Silver Turtle Puzzle

### Puzzle Chess sets

One of Mr. Tumen-Ulzii's main passions is playing chess. He has designed more than twenty different puzzle chess sets. In most of these, each of the pieces (seven different white and seven different black) are distinctly different puzzles, ranging from easy (pawns) to difficult (king/queen). Not just the chess pieces are puzzles, all the joints in the accompanying table are also puzzles. There is a great diversity in size, shape and material. For example the smallest chess set is about 20 x 20 cm, and the pieces are tiny. Another chess set that was only finished the day before we arrived uses animal figures for all of the pieces, which become decorative as well as intriguing puzzles. The chess table, shaped like a big turtle, is shown in Figure 13. The pawn, the simplest puzzle, uses a 180 degree rotation as first move. His most precious chess set, shown in Figure 14, uses gold for the black chess pieces and silver for the white pieces.



Figure 12. Statue of Liberty and Mongolian *Ger* puzzles



Figure 13. Turtle chess set

The intricate design of the six pieces of the Chess King indicates the difficulty of disassembling and assembling the puzzle. Eight moves are needed to remove the first piece and eighteen moves to disassemble it completely. The Chessboard includes 108 jewels and precious stones. In May 2002, as part of the 840<sup>th</sup> anniversary celebration of Chinggis Khaan, he made the World's largest Mongolian Chess set with pieces two feet high and a chessboard 25 feet square.



Figure 14. Gold and Silver Chess Set with six pieces of the King on the right

## Conclusion

The Mongolian Puzzle Museum and Mr. Tumen-Ulzii are amazing. The richness and diversity of interlocking puzzles in the Museum is unmatched anywhere in the world. Mr. Tumen-Ulzii has combined his inventiveness and technical design skills with his unique talent as an accomplished artist and sculptor for the design and fabrication of thousands of complex interlocking puzzles. His Museum will move to larger and better facility in 2003 and we plan to visit his new Museum and bring many other puzzle enthusiasts with us.

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## Reference

Frans de Vreugd. Puzzle Adventures in Mongolia. *Cubism for Fun 57*, Dutch Cubists Club (NKC), March 2002.