

# The Folded Page

by Rhys Hughes

"Eight times," said Aguri.

"Eight times what?" wondered Mikiko. She had adopted the tone of a bored child learning a multiplication table.

"A piece of paper can only be folded eight times," elaborated Aguri.

"Nonsense," replied Mikiko firmly.

"It's true." Aguri creased his brow. "Believe me, no matter how large that piece of paper, eight times is the limit. I'm surprised you don't already know this. It's one of those unexpected facts that people like to share with each other."

"Not with me," said Mikiko.

"That's not my fault. The number remains eight."

"I require proof," announced Mikiko.

Aguri puffed out his little cheeks and folded his little arms. His expression was a combination of annoyance and resignation. He indicated a sketch pad that lay on the table next to a vase of flowers and said, "Try for yourself."

Mikiko opened the pad and tore out a blank sheet. She folded it once, then twice. "Easy so far."

"Keep going," sniffed Aguri.

A few minutes later Mikiko was scowling. "I'm not strong enough."

"Only seven times," chuckled Aguri. "If you were fully grown you might manage another fold. But consider the mathematical progression involved in this problem. Every time you fold the paper in half, the thickness of the paper is doubled. After one fold there are two layers, after two folds four layers, then eight, then sixteen, thirty two, sixty four and so on. By folding the paper seven times you created one hundred and twenty eight layers and it's very difficult to fold so many layers all at once."

"But some people can do it," frowned Mikiko.

"Yes. It takes a lot of strength. After eight folds there are two hundred and fifty six layers and nobody has ever progressed beyond that point. The ninth fold is an impossibility."

Mikiko scratched her chin. "I still don't believe it."

Aguri was exasperated. "Why not?"

"Because the paper I used was relatively small," she explained. "Next time I might try the experiment with a *huge* sheet. If the paper is wide enough I'm sure I can beat the limit. Nine, ten or even eleven folds should be possible."

Aguri nodded slowly. It was clear he wanted to divulge a secret. Mikiko moved her ear closer to his mouth and listened carefully as he told her the following story in breathless whispers. It

was the story she had been waiting to hear.

"There was a powerful lord," he began, "who once shared your opinion on this matter. Almost a thousand years ago he decided to settle the argument with an improbable experiment. He paid for the manufacture of the largest piece of paper in history. No blank page quite like it has ever existed since. How big was it, you might ask? As wide as a misty dawn, as long as a frosty road, that's my answer. The lord saw it and was very pleased.

"Surveyors in his employ calculated the halfway point and marked it with an inked brush. Then servants and horses pulled on ropes to draw the paper back on itself. That was the first fold. Again the surveyors ventured forth to make a new mark, again the men and beasts struggled in their harnesses. Within a week the second fold was completed. As the apparent surface area of the sheet diminished, so it grew thicker and harder to fold. Servants and horses collapsed from exhaustion.

"But the lord was resolute. He urged them on with promises and threats. Months passed, the seasons changed. First there was snow on the page, then cherry blossom, all swept away with brooms. Eventually the eighth fold was made, then with great jubilation the ninth. Poets wrote poems on the margins of the paper but their words were smudged and lost when the tenth fold was completed. The sheet was now one thousand and twenty four layers thick.

"Still the lord was dissatisfied. He grew old and should have watched his children grow up, but his attention was wholly directed at the onerous business of the eleventh, twelfth and thirteenth folds. Finally he realised the foolishness of his obsession and announced that the fourteenth fold would be the last one. When it was made he wept openly, for he had simultaneously achieved his greatest dream and wasted his life.

"Despite his age and decrepitude he walked around the excessively folded page to examine it and this circuit did not take long. Let me now reveal that the original sheet of paper was approximately the same size as the Inland Sea, about eighty five kilometres long on each side. Forget what I said earlier about misty dawns and frosty roads. After all that folding it was now less than a third of one kilometre on each side.

"The fourteenth fold had increased its thickness to sixteen thousand three hundred and eighty four layers. It occurred to the lord that it might be a good idea to build a new castle on the summit of this implausible paper outcrop. It was his way of redeeming those wasted years, of apologising to his servants by demonstrating a more practical result to his whimsical project. And so they laboured for him again and one year later the castle was ready.

"It towered over the surrounding lands on its paper foundations and the lord felt very proud when he took up residence with his family. He hobbled the ramparts and gazed far in every direction and access to the door of the castle was possible only with a long ladder that was drawn up afterwards. But a serene retirement was not to be his, for a neighbouring lord had viewed this paper citadel with jealous eyes and now decided to attack it with steel and fire.

"The battle raged all day. Flames licked the lofty walls but a sudden shower extinguished them. Arrows cut notches in the sheer sides, swords slashed them. The old lord repelled the invaders but the strain proved too much for him. He collapsed and died within the week. The castle was abandoned and fell into ruin. Nobody knew what to do with the folded page and so it was left where it was. It sagged in the rains and dried stiffly in the sun.

"One day an enterprising merchant came to collect it. The descendants of the lord had apparently sold it to him for a trifling sum. He carted it down to the northern shore of the Inland Sea. There he began the task of unfolding it. Suspended on high poles the original page exactly covered the island dotted expanse of water. And now fishermen and other sailors might travel between Shikoku, Kyushu and Honshu in the shade during the hot summer months.

"But there were unforeseen consequences. When you fold a piece of paper and then cut out

little pieces along the crease, what do you get when you unfold it? A pattern of holes! The more folds and the more irregular the cuts, the more complex the pattern. The steel and fire of the attackers all those years earlier had created an amazing pattern in this unfolded sheet. But in fact the fishermen and other sailors were able to use it as an aid to navigation from island to island.

"During the day, the sun shone through the holes in the paper sky and formed new constellations with distinctive characters. Men on ships have always looked at the stars to determine direction. But these artificial constellations were deceitful and many sailors arrived at the wrong destination or failed to arrive at all. The problem was that the same groups of stars appeared in different parts of the sky. Identical constellations were found in the north, south, east and west!

"When you fold a page many times, cut into it along the edges and then unfold it, the resulting pattern is a regular whole no matter how irregular it may seem in parts. The individual constellations that a sailor might use to guide him to Shodo or Setoda were mirrored or duplicated in other directions and he often ended up in Omi or Yashiro by mistake. Business suffered as a result and the merchant who bought the folded page was reviled. He had provided a defective sky.

"Anything can fall into a state of disrepair, even the heavens! Birds pecked at the page, storms lashed it. Within a few generations it hung in tatters and eventually it was gone completely. Not a shred of evidence remains to prove it was ever really there. The names of the lord and the merchant have been forgotten. Yet nobody has ever duplicated the feat of folding a page so many times. Eight has once again become the limit, eight times only. That is the truth."

Aguri stopped speaking and gazed hopefully at Mikiko.

Then he added, "What do you think of that?"

"I don't like it," said Mikiko without hesitation. "I expected something better. It won't do, I'm afraid. You've failed the test."

Aguri shut his little eyes and trembled quietly.

Mikiko reached forward and crumpled him up in her fist. Then she threw him at the wastepaper basket. He missed and lay on the floor as a paper ball, one among the others already there. Mikiko selected a new sheet and turned to consult the next chapter of her book, *Intelligent Origami*, but then she heard the familiar footfalls of one of her human friends coming up the garden path.

She forgot about the book and hurried outside.

*The End*

### **About the author**

Maliciously maligned in his home land, Rhys Hughes' books have found success amongst the far more discerning and fruit-favouring folk of the Iberian Peninsula. Also, his ears are spoons. His book, [A New Universal History of Infamy](#), has recently been published in [Spanish](#).