



# TWIST ON TWIST

Miguel A. Gañán

Diagrams by Felipe Moreno and Miguel A. Gañán

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**For more information:**

**Facebook:** Miguel Gañán

**Flickr:** mganans

**IG:** tesegami\_origami

**Mail:** mgaran\_es@yahoo.com

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*Dedicated to my family (my wife Gabriela and our daughter Sol),  
for their continuous support. And a heartfelt thank you to my parents  
and my brother, who from the distance in Spain have been following  
and supporting all my steps in this fascinating world of origami.*

# IN MEMORIAN

I wish to dedicate this book to Shuzo Fujimoto, as my humble thanks for his extraordinary designs. His contribution to the modern geometric origami and specially in the tessellation field, was a breaking point and inspired many of us and to follow his path to become better creators.

His twist folds and the developments related to the equilateral triangle and the hexagonal grids have been marked as the beginning of the present tessellation designs. The Hydrangea has been and still is one of his best-known designs, with infinite variations discovered by many creators.



# ACKNOWLEDGMENTS

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SOL GAÑÁN YOSHIHARA: our daughter, once again, accepted to be the translator. And the result, with my help in the technical part, is perfect and finished in a really short time.

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Jimena Candia and Alejandra Naigeboren: for testing the diagrams to improve the folding process and accompanying texts.

My followers: many thanks to all of you that bought my first book, for the encouragement it gave me to decide to prepare this second volume.

**Miguel A. Gañán**

To MIGUEL GAÑÁN, by allowing me to “destroy” his amazing tessellations in order to look for the intricacies of the models.

To my wife ANA and my daughter IZARBE for their patience with all my hobbies.

To Origami, that has occupied a great part of my life and has made me (in my opinion), a better person.

To “Grupo Zaragozano de Papiroflexia”, that made me discover that “papiroflexia” is not only folding paper.

To EMOZ (Escuela Museo Origami Zaragoza), that has made it possible for me to achieve all the dreams that a fan of our hobby could have.

To AEP (Asociación Española de Papiroflexia), thanks to them and to my compromise with them for 10 years as President, which allowed me to discover a lot of friends.

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To “Figurative Origami” and “Wet Folding” that let me convey my wishes, my curves and the “modelling” that make my models alive.

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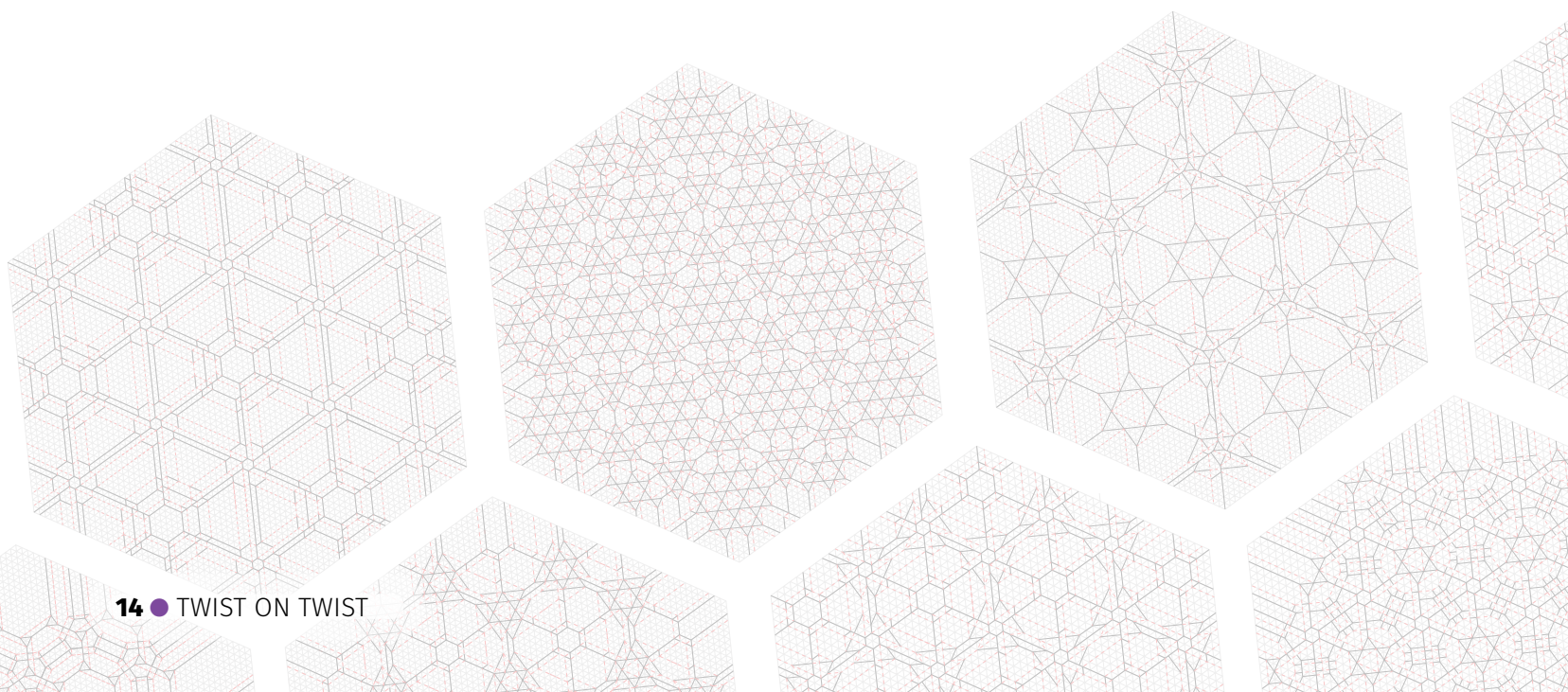
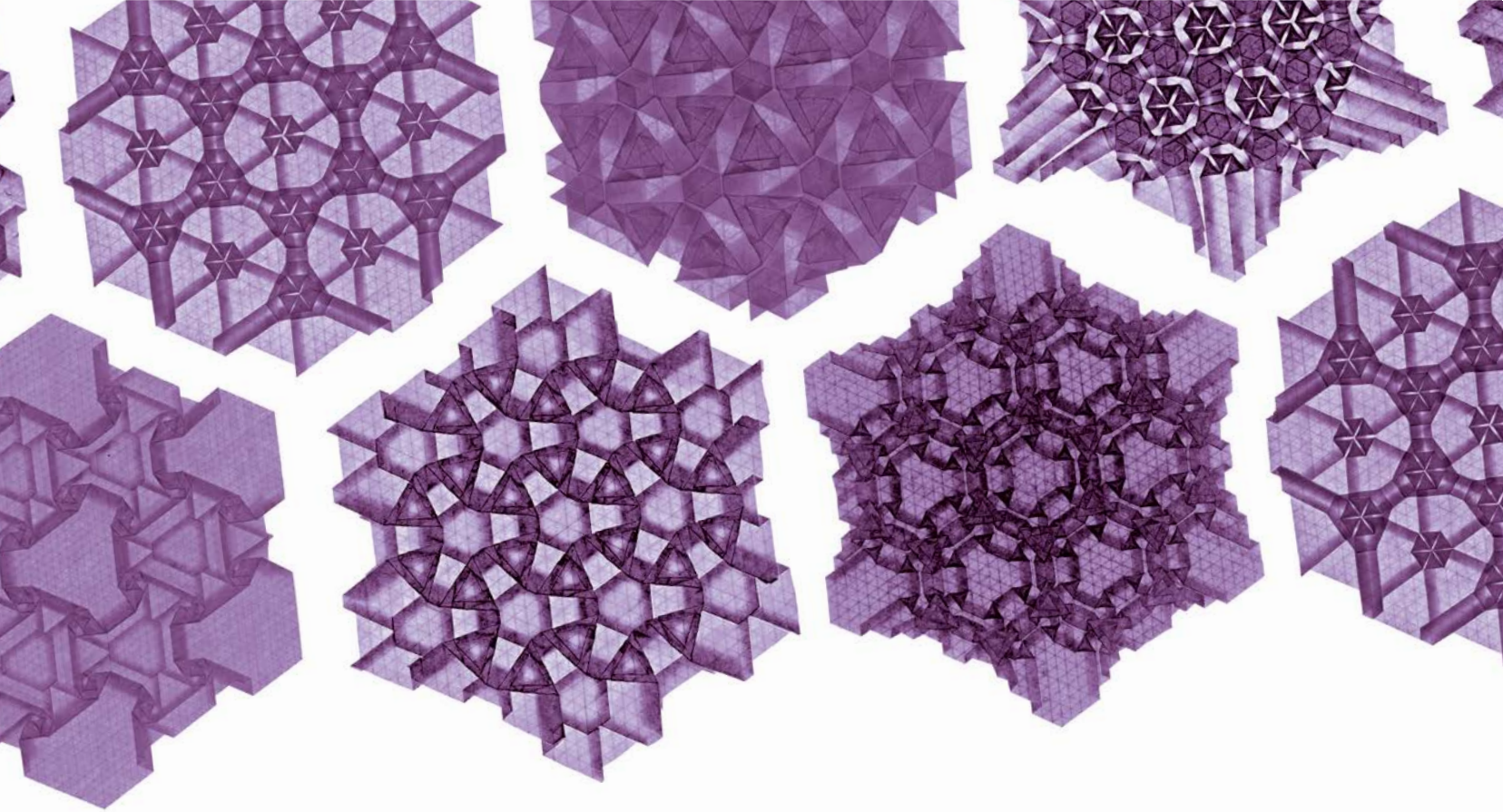
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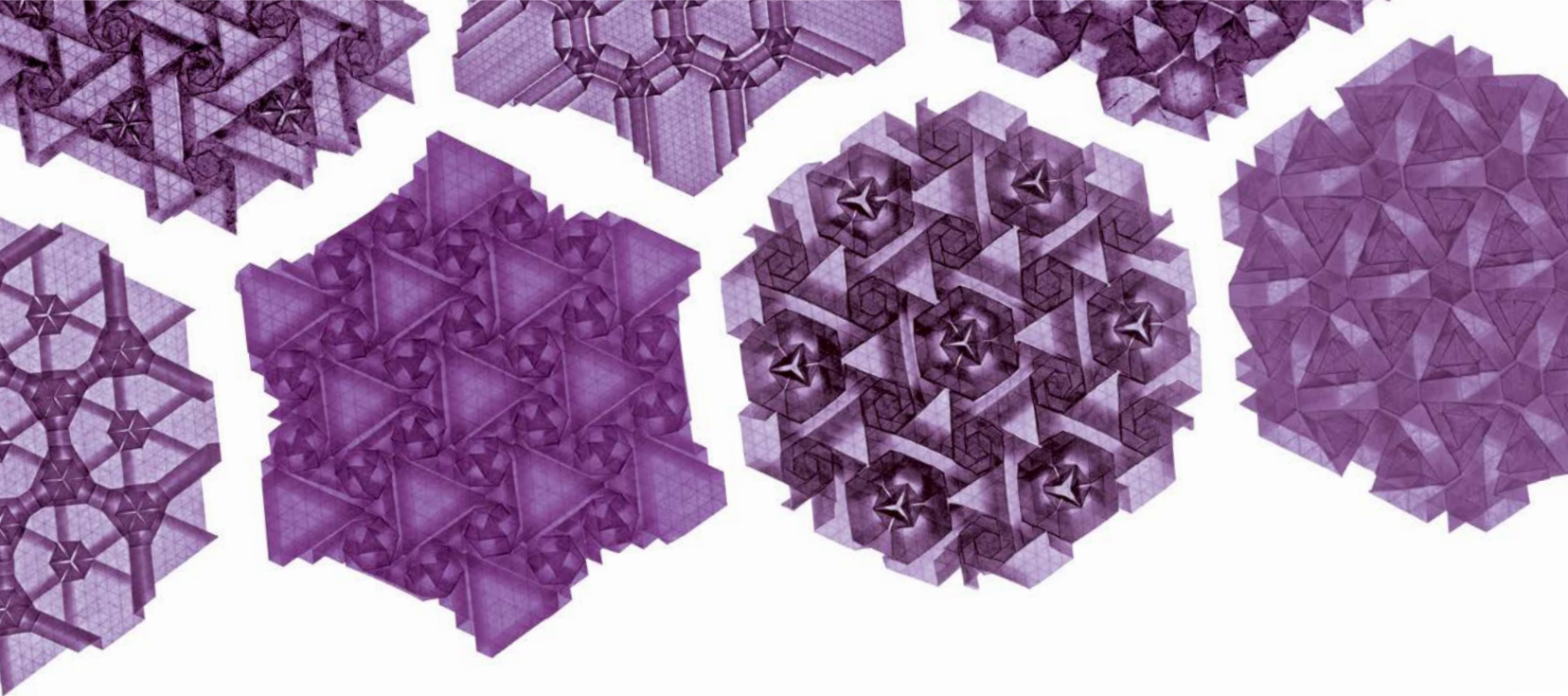
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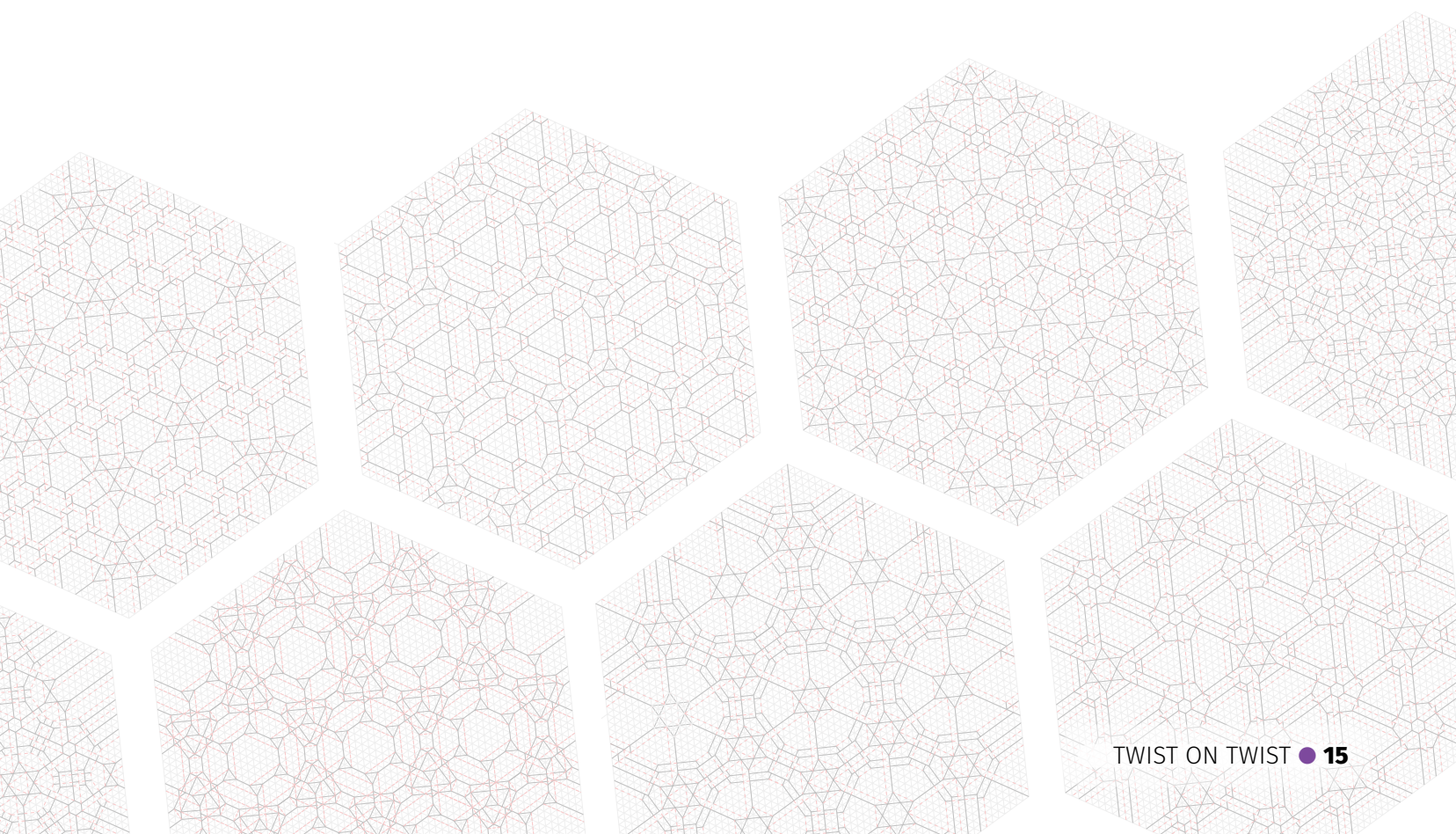
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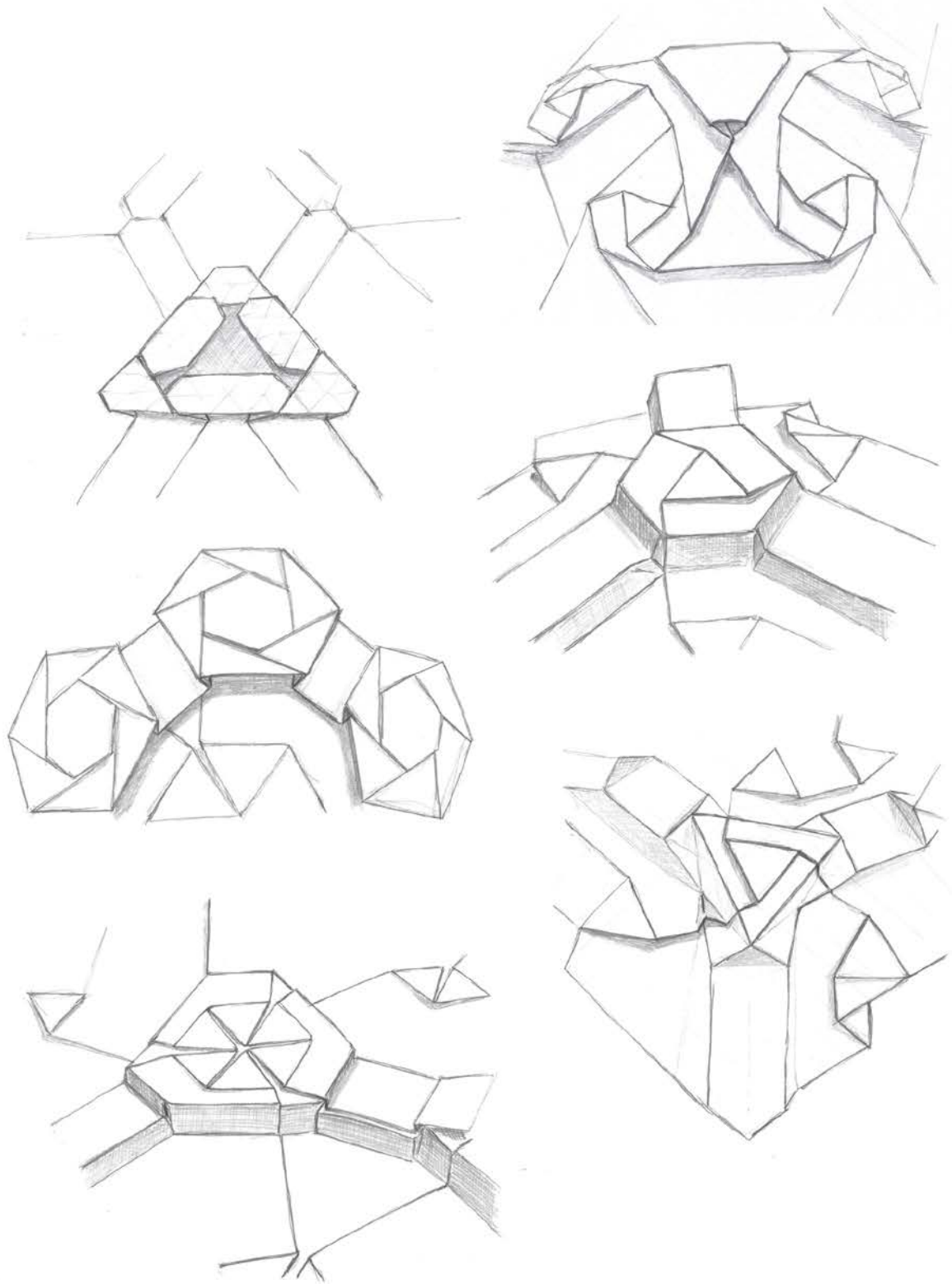






# INTRODUCTION





Composition of diagrams from several models.



# LET'S PLAY WITH PAPER

## Why a second book?

After publishing my first book, “Twist and tess”, my creative process continued with new challenges.

Reviewing my first model, “Hanoi Tower” (with which I began the process of creating tessellations), it can be seen that already at that time stacked twists appear in my designs.

It was oriented to origamists with some experience, that wanted to dabble for the first time in the world of tessellations.

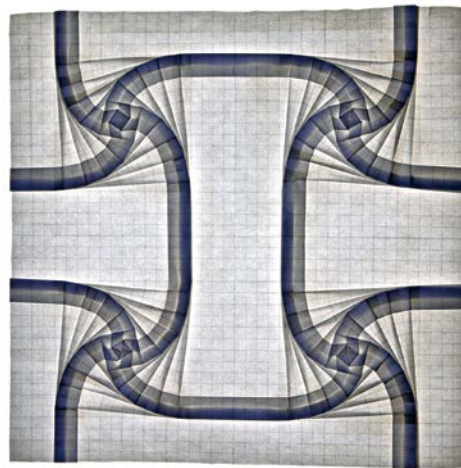
But I already published some models with stacked twists in that book:

- Hanoi Tower
- Pyramid fields
- Mallos de Riglos
- Tyled pyramids

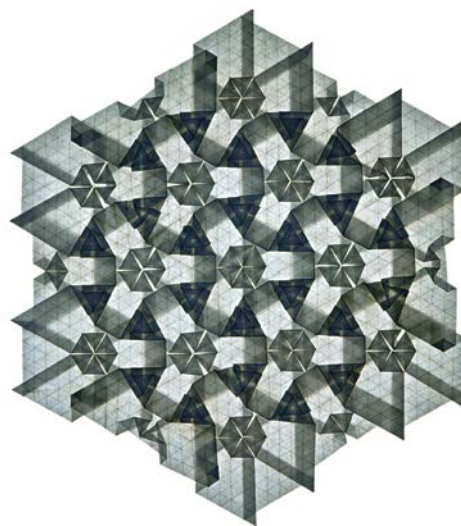
In addition to these initial models, in 2019 and 2020 I got two articles published in “The Paper” (OrigamiUSA’s magazine), analyzing tessellation molecules with combined twists.

- A New Twist on Twists (Summer 2019).
- A New Twist on Twists part 2 (Autumn 2020).

Between 2020 and 2021 I kept creating models, and focused on analyzing the possible combinations of twists that appeared between my fingers while playing with the paper.



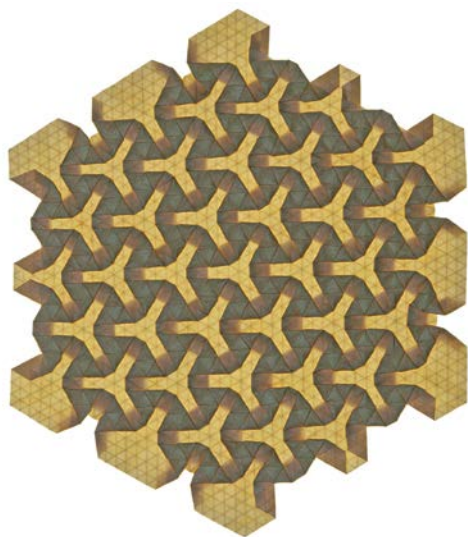
Hanoi tower



Pyramid field



Mallos de Riglos



Tiled pyramids

Encouraged by the warm welcome of my book in the world of origami, I decided to prepare this new volume, as a continuation of the previous one, but dedicating almost all of the content to tessellations created from molecules with stacked twists and others related to them.

The objective of this new book can be summarized in these points:

- Create a catalog of twists, starting with the single ones (most of them already diagrammed in “Twist and Tess”).
- Show the combinations of those twists with others (the ones analyzed up to the moment of the preparation of this book).
- Leave the door open for other creators to continue experimenting with this type of tessellations, and that some folders dare to experiment and create their own models.

For the preparation of the diagrams in this book, and with the experience of the first one, I decided to make the diagrams directly on Inkscape.

In the same way that I counted with the invaluable help of Alejandra Zapico in the first volume, for this second one I counted with the help of another dear friend, wet-folding enthusiast and founder of the EMOZ museum in Zaragoza: Felipe Moreno.

Knowing his skills with wet-folding and the “Crimp”, but also with the drawing of diagrams by hand, when he offered to help me during one of the virtual meetings in 2021, I couldn’t reject his tempting offer.

I hope that this book will help and inspire you to create new models and to be part of this world of tessellations, not only as folders but also as creators.

## How to use the book?

In the first chapter of the previous book, I detailed the history and origin of tessellations and the basic techniques:

- Necessary materials.
- How to fold a tessellation.
- Creation of grids.

In this first chapter, we shall review some basic concepts, before moving on to the content itself.

For those of you who don't have the first volume, you can download the first chapter in PDF format, along with several complete models of the book.

At this moment, they can be downloaded from these web pages:

- Origami-shop: <https://bit.ly/3RQin9J>
- Origamiteca: <https://bit.ly/3OjznSJ>

If for any reason they are not available, you can contact me at the email indicated in the initial pages or through my social networks.

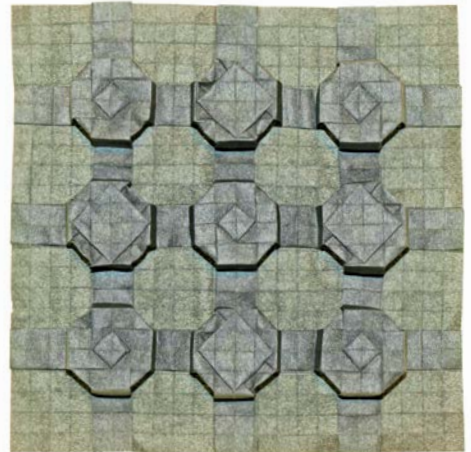
The second chapter is a catalogue of single and combined twists.

It begins with the details of each one of the single twists used in the combinations.

Then we will be able to see the combination of single twists to form more complex ones (molecules).

The models are classified according to the upper twist used in them, starting with the triangle twist, followed by the square and finishing with the hexagon ones.

We continue with models with multiple twists on top of other twists: models with 4 or 6 triangle twists over other twists.

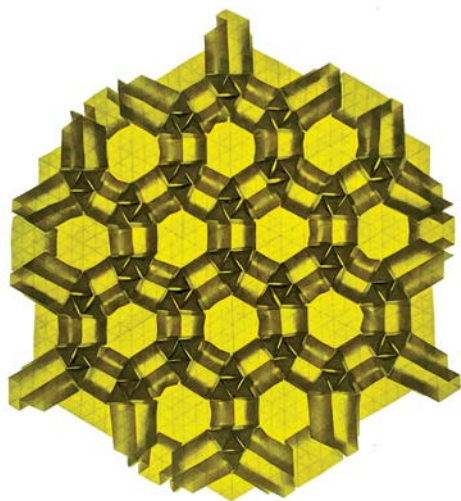


Octogonal Tic-Tac-Toe

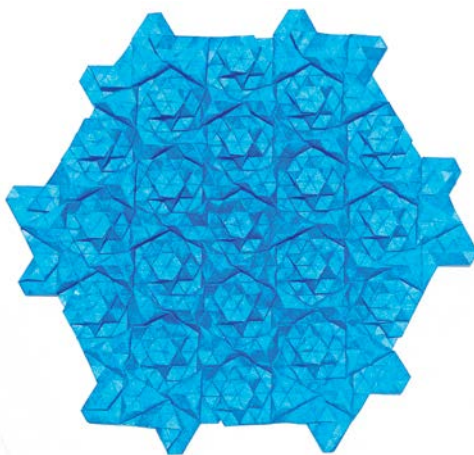


Hanoi tower 3D





4 over 1 3D



Star cradles

We shall then move on to something a bit different: combinations of twists over pleats (no twists).

And finally, twists over pleats to form 3D molecules.

The third chapter shows several of my designs, with the necessary instructions to fold them. It follows the same order as the second chapter, with models of several combination types.

- Triangle twist on top.
- Square twist on top.
- Hexagon twist on top.
- Multiple twists on top.
- Twists over pleats.
- 3D stacked twists.

Finally, there are two additional chapters, related to the same tessellations technique, but with a different final result:

- Boxes with tessellations on the lid.
- Brooches with tessellations.

# REVIEW OF CONCEPTS

## How to create a grid

### Grid sequences

First, the number of divisions to be done on the paper is defined.

The simplest is the sequence “2, 4, 8, 16, 32, 64, 128”. It consists of folding the paper in half (2 directions in square paper and 3 directions in hexagonal paper) and repeat this same process until you have the required number of divisions.

But there are other sequences used in certain models:

- Sequence 3, 6, 12, 24, 48, 96
- Sequence 5, 10, 20, 40, 80

To divide the paper into 3 or 5 parts, there are methods based on origami folds, but I recommend using a ruler to make the divisions more accurate on each side of the paper.

### Types of grids

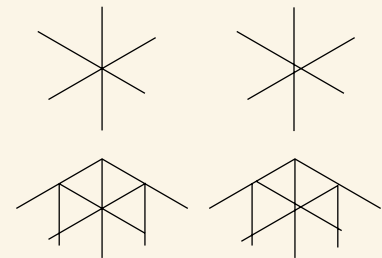
The ones used in both books are of 3 types:

- Square grid on square paper
- Triangular grid on hexagonal paper
- Triangular grid on square paper

We will review how to make a triangular grid on hexagonal paper. The process for a square grid on square paper is similar. We will not use the third type of grid in this book.

### SUGGESTION

- The first folds have to be as precise as possible, since the rest of the divisions depend on them.
- Check that after each step, the lines intersect at a single point and are not displaced.



Correct  
Grid

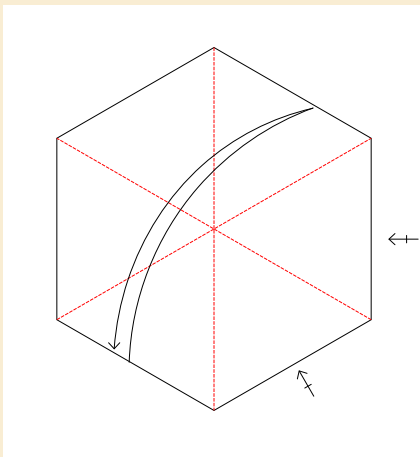
Incorrect  
Grid

### SUGGESTION

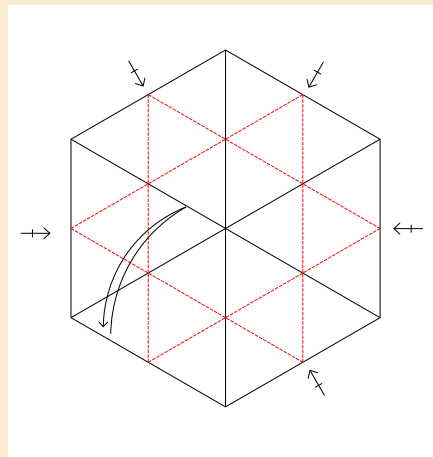
- Do not make all folds in one direction first and then in the other directions.
- In small grids you will not notice the difference, but on large ones (64, 80, 96) if all the folds are done first in one direction, the paper loses size because of the folding process itself.
- Depending on the type of paper, the size can be reduced by more than 2%, resulting in unusable grids because the lines do not intersect at the same point.

The hexagonal paper will have been previously cut from a square paper using the templates mentioned in the first volume. The process is as follows:

## Hexagonal paper



**1** Fold the paper in half in one direction. Twist the paper and repeat in the other directions (2x2x2 grid).



**2** Divide in 4x4x4: to do so, one side of the hexagon is brought to the center, folding the valley and unfolding. Repeat the process on the 6 sides, rotating the paper.

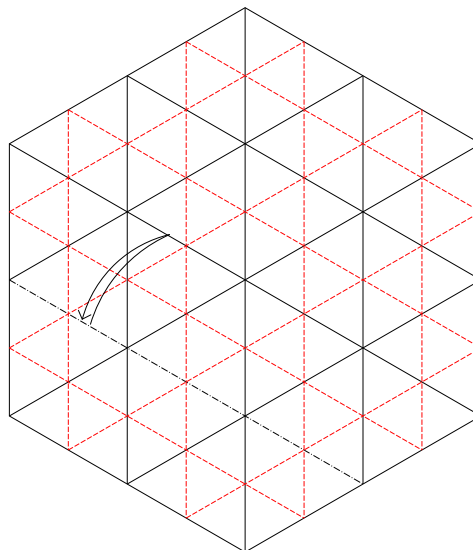
**3** For the rest of the divisions, the most commonly used method is explained. It consists of creating a valley fold in the middle of two mountain folds. To do this, one of the folds is brought up to the previous one, and the paper is flattened, creating the valley fold.

This method is very accurate and can be done with any size of paper and any number of divisions.

In the figure you can see the detail on a 4x4x4 grid (to convert it into 8x8x8).

The process is repeated to prepare a 16x16x16 grid and bigger ones.

The same would be done for sequences 3, 6, 12, 24, ... or 5, 10, 20, ...



## SUGGESTION

● It is recommended to convert all folds to neutral once the sequence is finished in each direction.

## The folding process

### Add the folds outside of the grid (pre-creasing)

This is the process of adding the folds that go outside the grid and in almost all the models of the book they are essential.

This previous step greatly facilitates the subsequent folding, making the paper twist and move in the desired direction and generating sharper folds.

It can be done with a scoring tool (or a pen without ink), or manually, by pinching the paper carefully so as to not exceed the limits of the fold.

### Collapsing the model

It is the real folding process of the model. The diagrams of the book show these steps.

## Necessary materials

### Papers

The papers used in the models of this book are some of the recommended on the previous one:

- Elephant Hide paper (EH), 110 gr.
- Tant paper, 78 gr.
- Stark paper, 60 gr.
- Alios Kraft paper, 28 gr.

All of them comply with the paper rules for tessellations:

- It must be flexible to be able to work easily.
- Memory: the paper keeps the folding lines.
- The paper does not tear when repeatedly folded.

### SUGGESTION

- To start folding tessellations, my recommendation is to use normal printer paper (A4 or A3 size). It is not the best for tessellations, but it is more affordable and easier to get.

The size of the initial paper we are going to work with, will generally be 30x30 cm or 35x35 cm, with the exception of the boxes and brooches which will be smaller.

Once a certain skill in tessellation folding is achieved, among all available papers, the ones I normally use are the following:



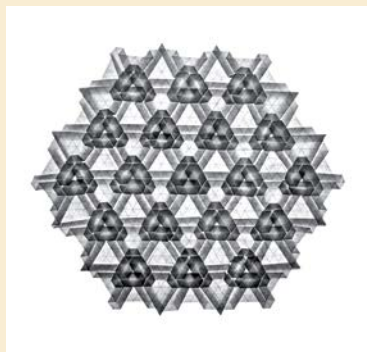
### **Elephant Hide (110 gr)**

the heaviest and most resistant to tearing. With a not very wide range of colors, it is one of the best papers for tessellations.



### **Tant (78 gr)**

it allows to fold very precise grids, reversing a fold is easy and the pre-creasing is not difficult. Very wide range of colors, which allows models with transparencies.



### **Alios Kraft (28 gr)**

very thin and resistant, in different colors. I generally use transparent white color.



### **Stark (60 gr)**

with a special texture (similar to wood), in two colors, brown and gray. The results are very good in tessellations.

## Necessary tools

### Clips, tweezers, folders.

- Metal or wooden clips, in various formats.
- Bone or wood folders.
- Scoring tool.



Herramientas necesarias para el plegado de teselados

### Hexagonal templates

To cut the paper accurately, made in different materials, although I recommend the metallic ones if available.

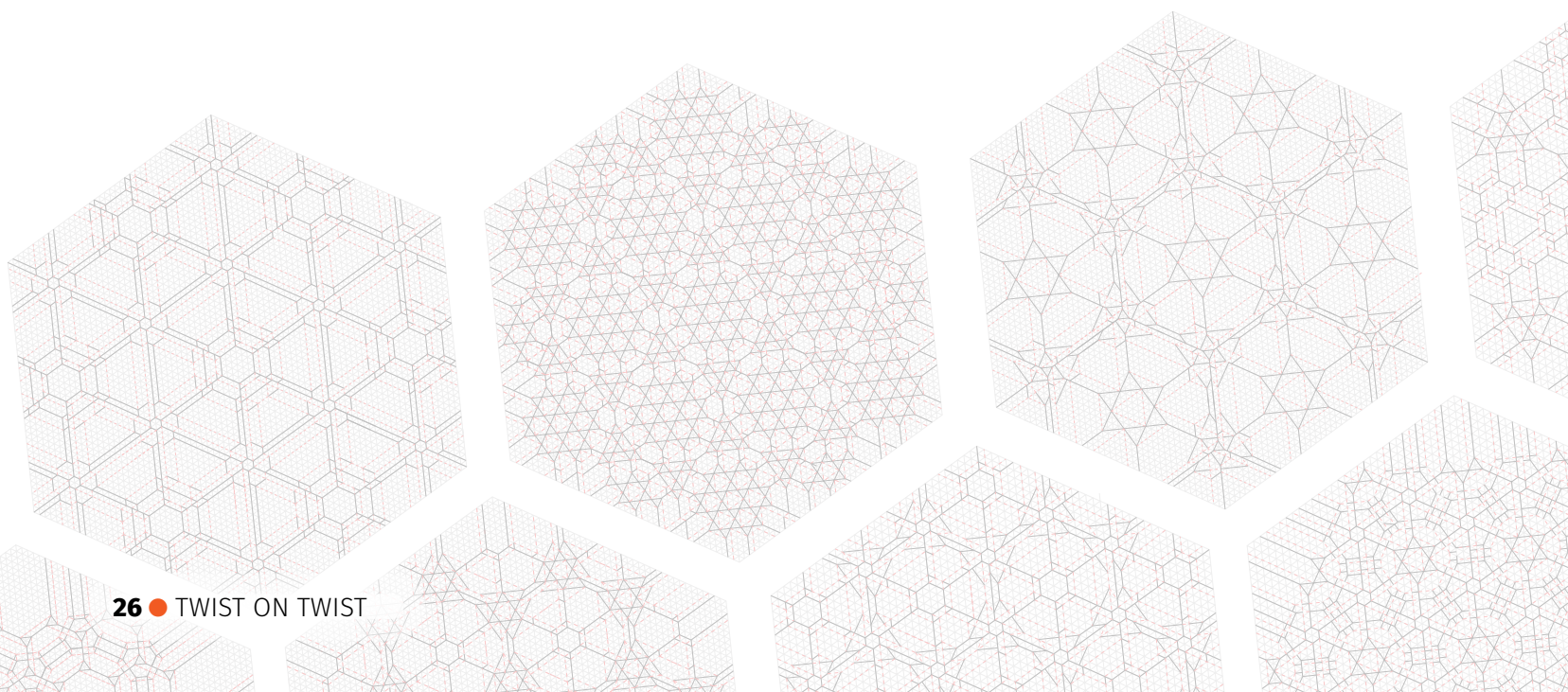
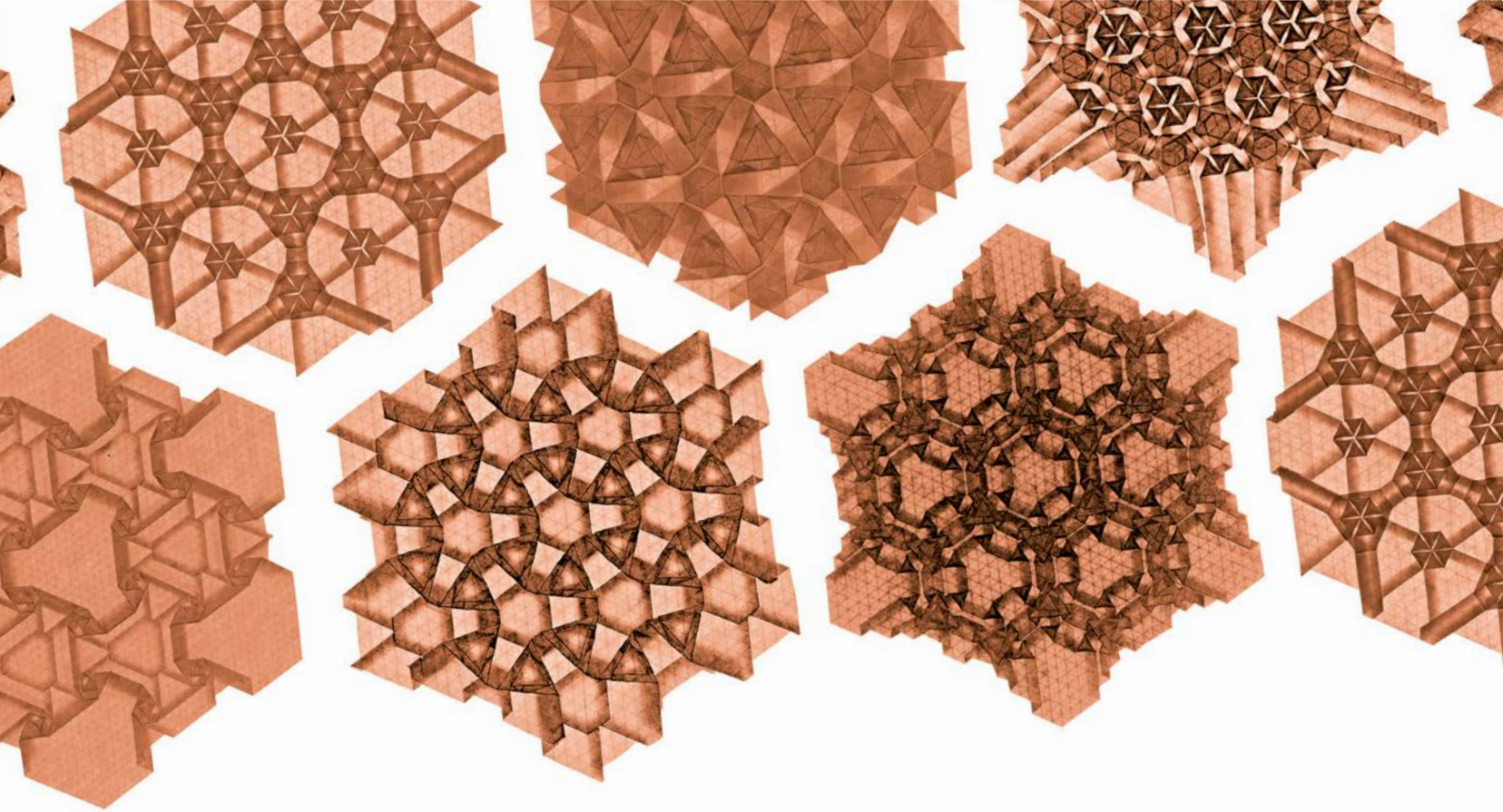
#### SUGGESTION

- Good hexagonal templates are a great investment, because of the cutting accuracy and the time saved when preparing the grids.

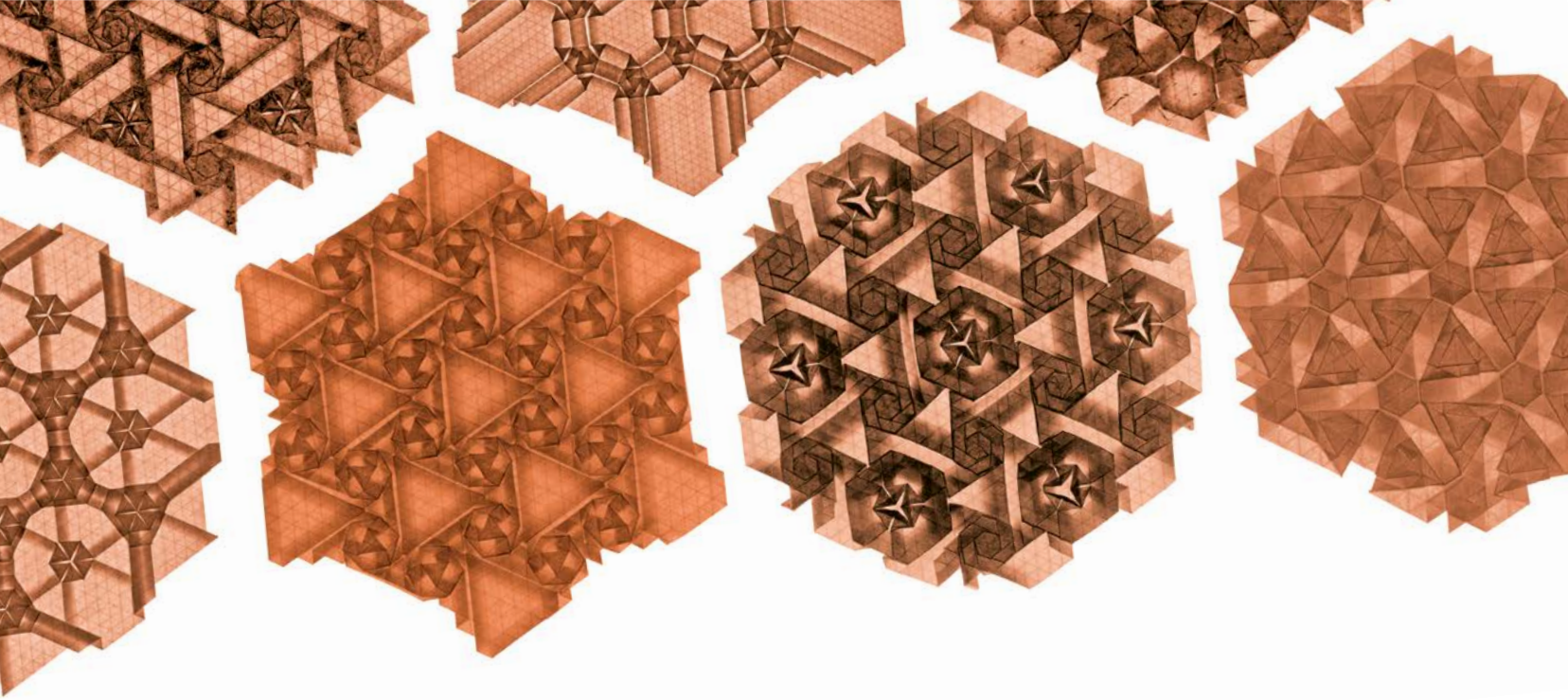


Plantillas hexagonales

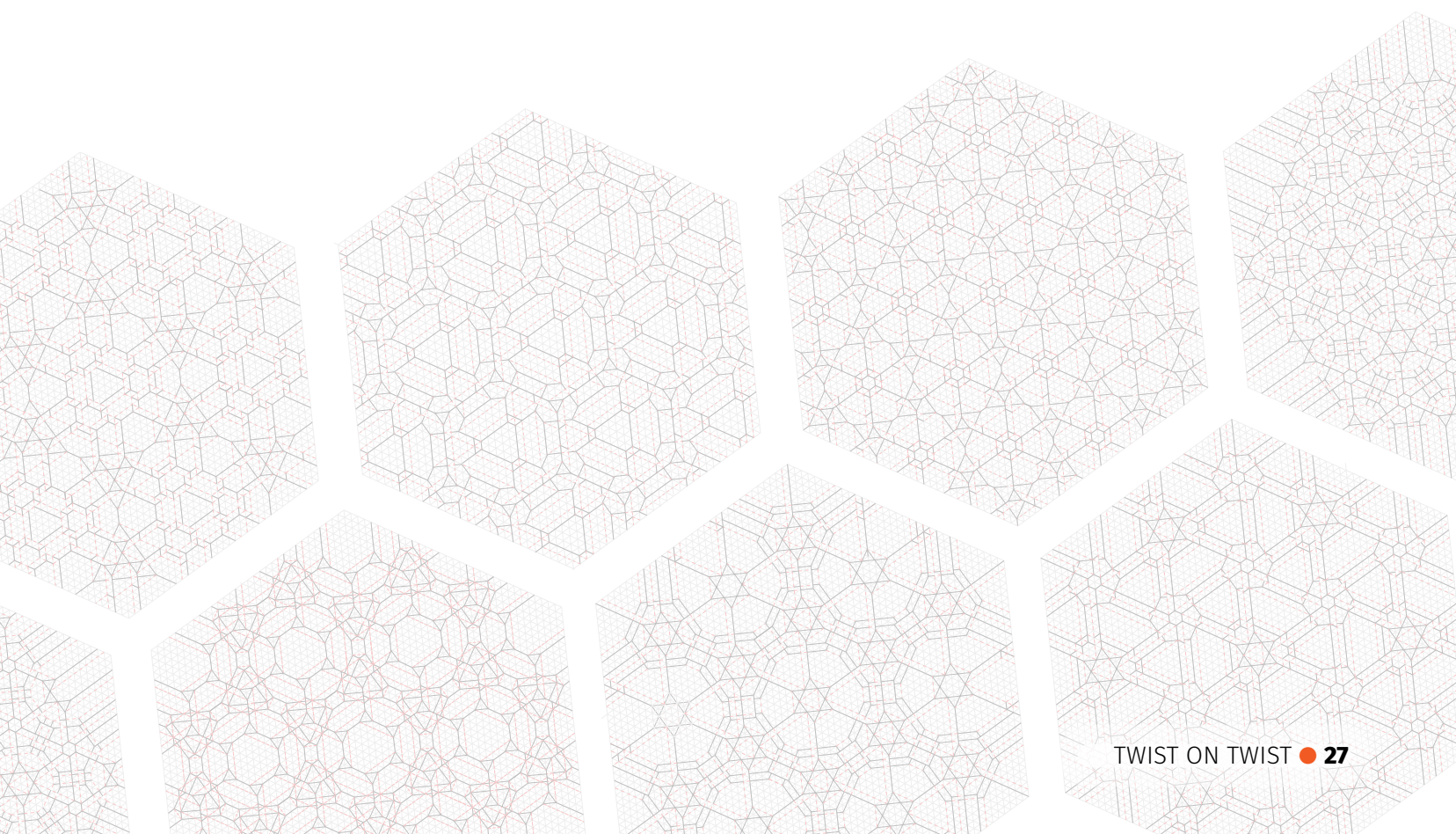






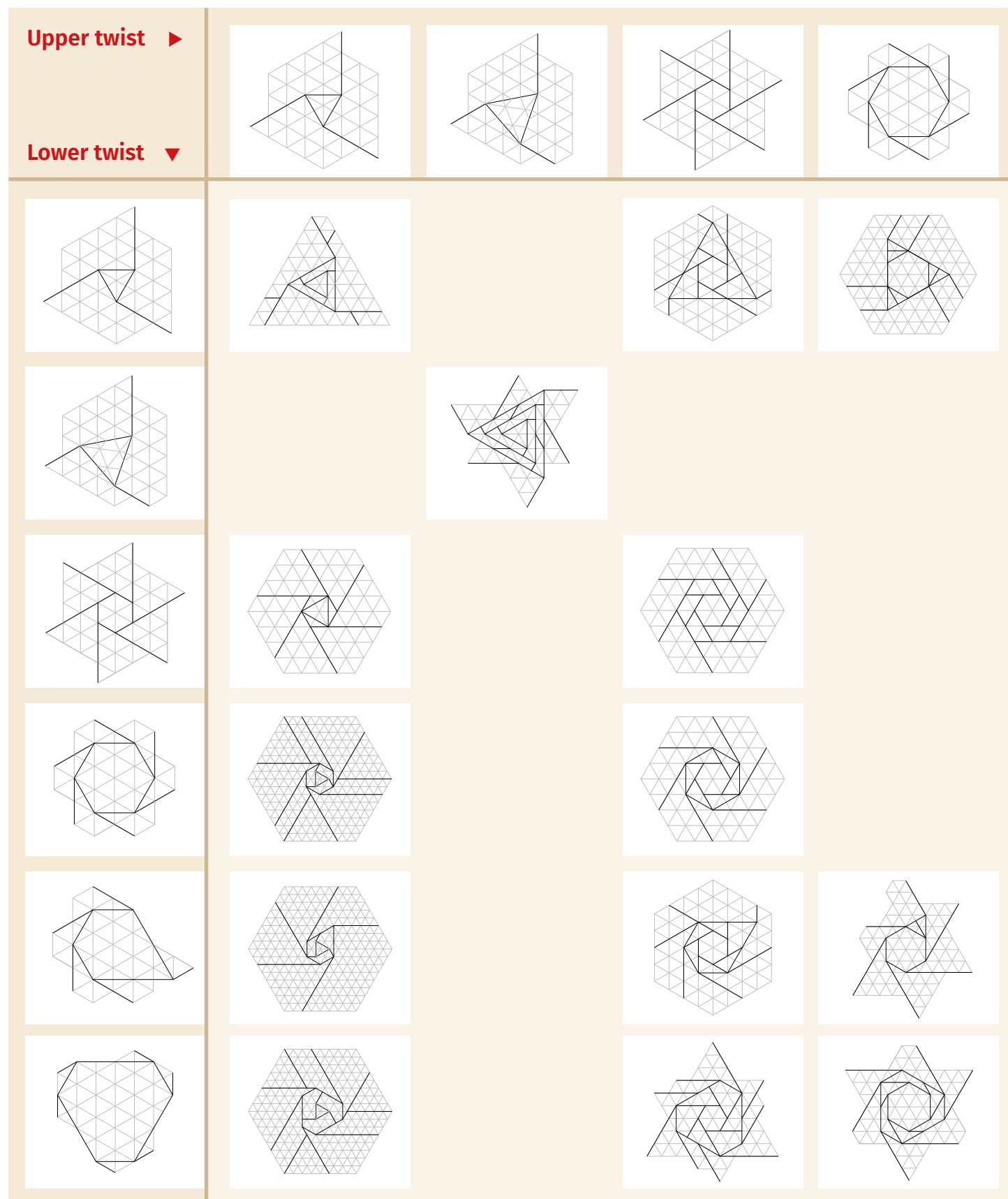


# BASIC TECHNIQUES





## Combinations of stacked twists



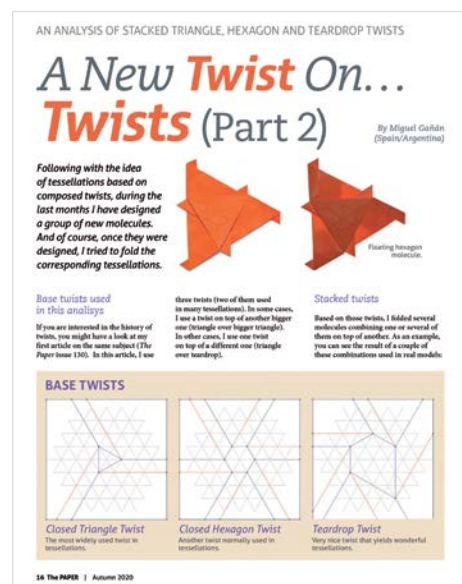
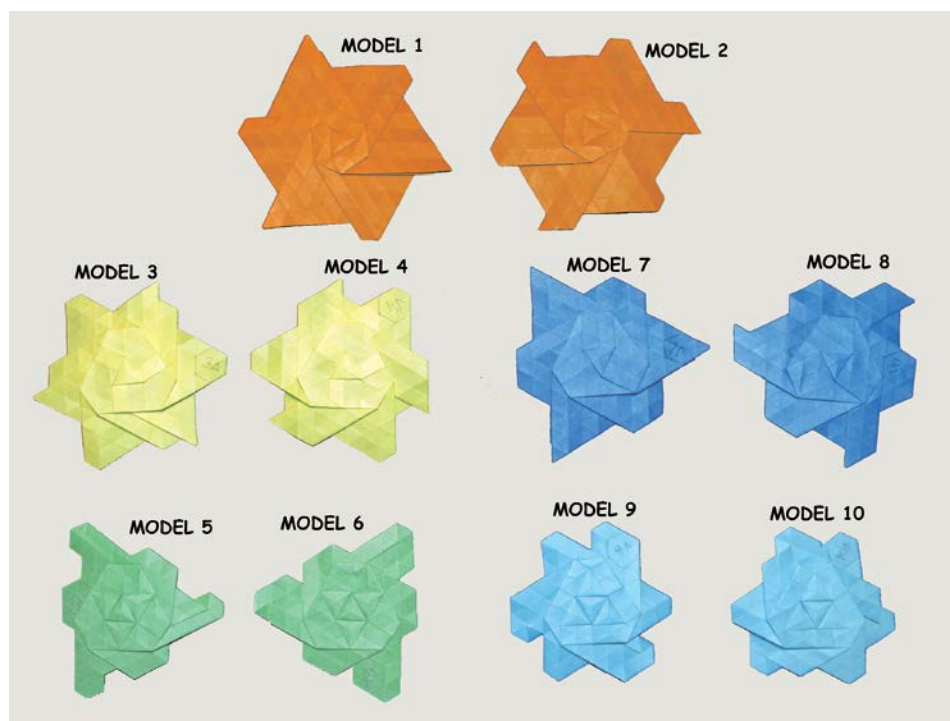
# TWIST ANALYSIS

As I mentioned in the initial chapter, after my experience in the creation of tessellations and reviewing the models that make up my first book, my interest in analyzing combinations of twists was awakened.

In the first place, it was a matter of choosing which twist or twists to start the combinations with. As almost always in my creative process, playing with the paper in my hands led me to choose one main twist: the closed triangle twist.

Thus came the first combinations, with one or more triangle twists above and other different twists below: hexagon and what I called "nexagon" (a semi-regular hexagon formed by 3 long and 3 short sides).

The result of all these combinations and many tests to confirm that the combined molecules could be transformed into tessellations, is what it is shown in this chapter, giving rise to what may be a much broader catalog of twist combinations.



This was the origin of the first article in OUSA. In addition to a closed triangle twist above, I tried using various multiple triangle twists.



After that set of combinations, the next step was to use another different twist above (the closed hexagon twist), along with other different twists below: double-sized triangles and teardrop twists. The result was the second article in OUSA.

And not only these types of combinations. As a continuation of this analysis, other models of tessellations arose, similar but different at the same time:

- Molecules combining twists above and folds without twist below.
- 3D molecules, combining twists above and pleats underneath.

First, the simple twists that are used as the base will be shown, and then the various combinations of those twists with other twists underneath.

Designing combinations other than those shown is a challenge that will remain for other folders and creators and of course for myself. As I write this chapter, my hands are already playing with the paper to find new designs.

# SIMPLE TWISTS

In this first part of the chapter, we are going to review the simple twists, some of which were used in the models of the first book.

Although not all of them will be used in the subsequent combinations, the idea is to have all the twists used in my tessellation models in one place. There are others, designed by other creators, that are not in this list.

Before I begin, I would like to dedicate a few words to the creators who discovered origami twists and especially their use in tessellations.

Even though there are different opinions, many of the artists consulted agree that Shuzo Fujimoto was the first creator to use twists, possibly in parallel to Yoshihide Momotani.

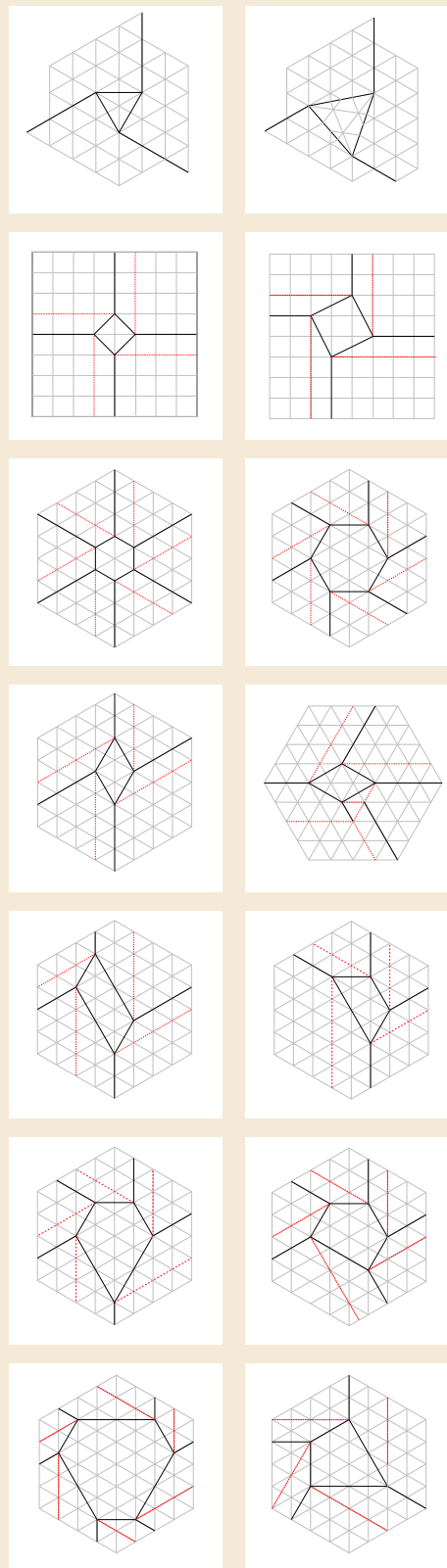
Probably the first fold with a twist was the square twist. After that one, the rest was discovered independently by many creators and applied in different origami techniques.

For further information, there is a very interesting article written by David Lister on the website of the British Origami Society: "When did origami tessellations begin?".

It will be shown, with step-by-step diagrams, how to fold said simple twists. Thus, in the diagrams of combined twists, it will not be explained how to fold the initial twists, starting directly from the corresponding simple twist that was already folded.

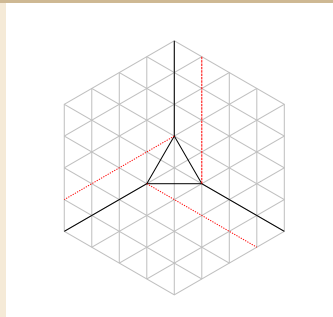
They are ordered by the number of sides of the polygon used and/or by similarity of the final shape (teardrop twists). Although there are some simple twists (square and hexagon) that have 2 options for folding, only one of them (based on twists) will be shown, the other (based on folds) being detailed in my first book.

## Selection of single twists

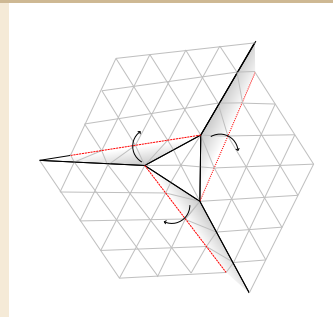


# DETAIL OF SIMPLE TWISTS

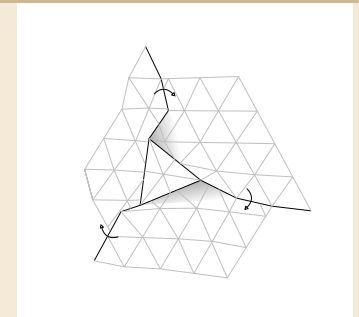
## Closed triangle twist



1 Pre-crease the 3 sides of the triangle.

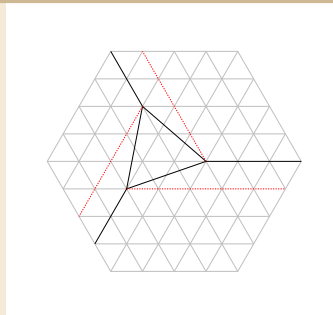


2 Pinch the 3 folds and twist them in the chosen direction.

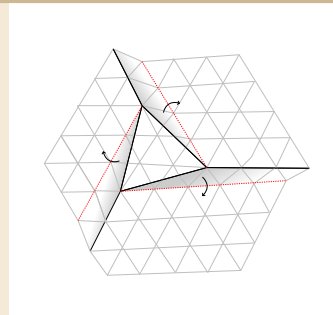


3 Force the twist to flatten the model.

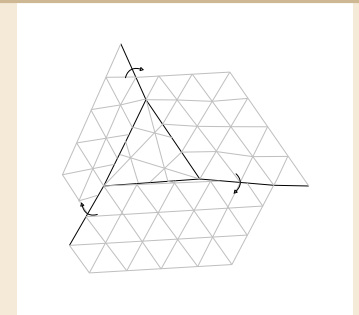
## Open back triangle twist



1 Pre-crease the 3 sides of the triangle.

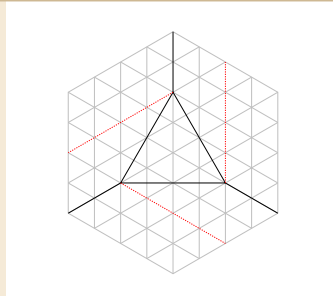


2 The process is similar to that of the closed twist.

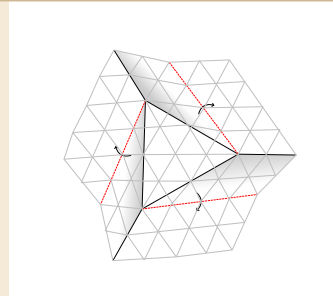


3 In process.

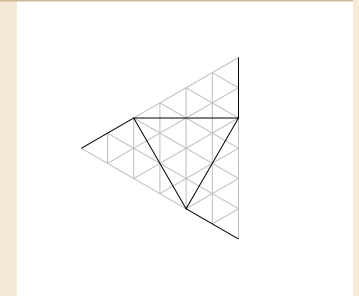
## Double size triangle twist



1 Pre-crease the 3 sides of the triangle.

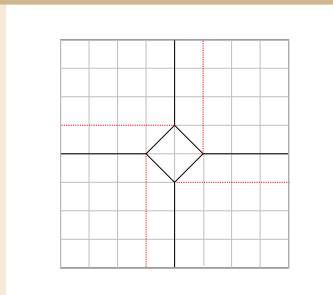


2 Twist in process.

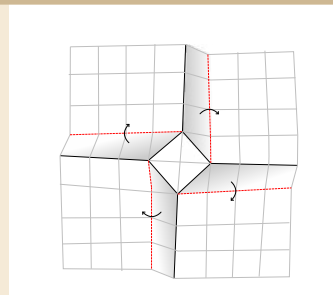


3 Finished twist.

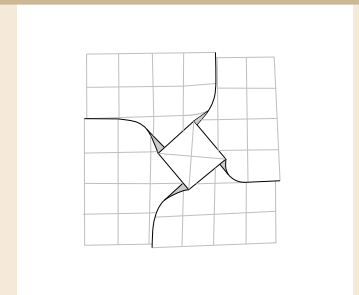
## Closed square twist



1 Pre-crease the 4 sides of the square.

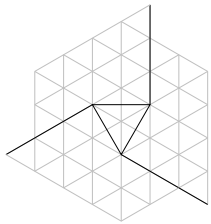


2 Pinch the 4 folds and twist in the chosen direction.

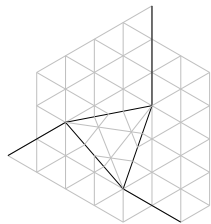


3 Continue flattening the edges, forcing the square to twist.

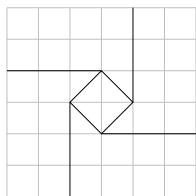




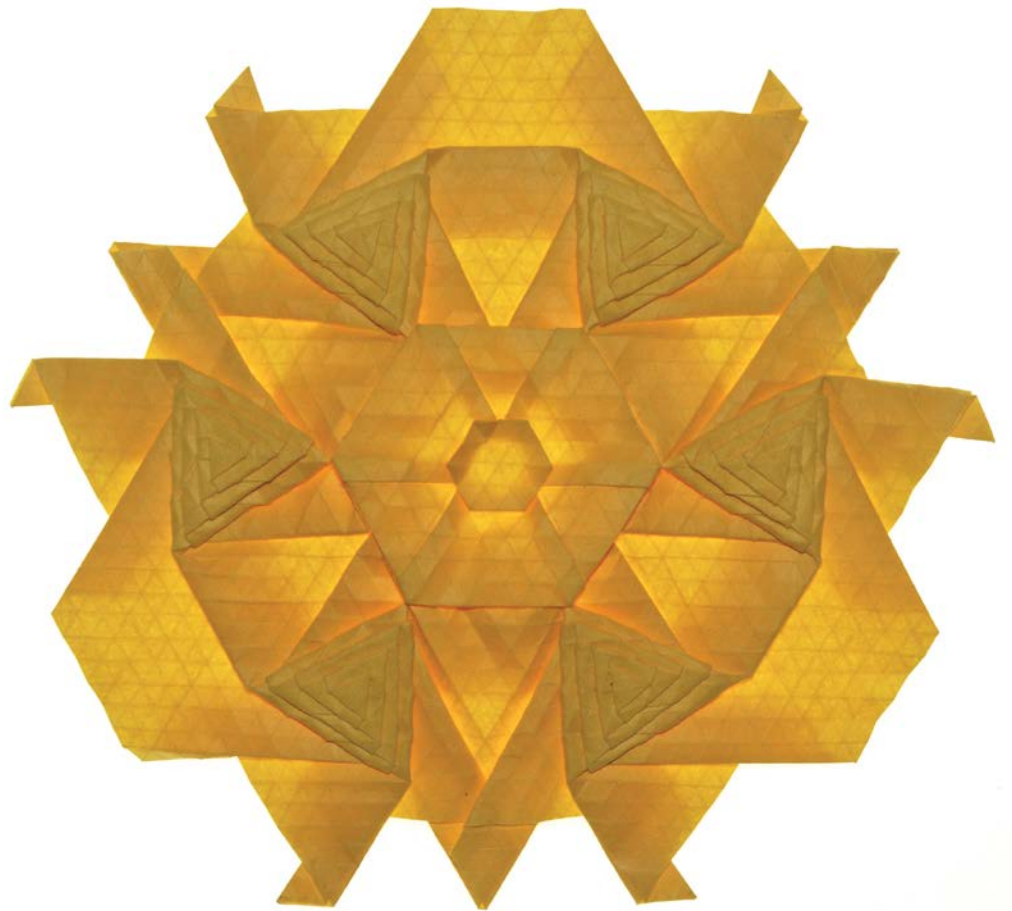
4 Finished twist.



4 Finished twist.

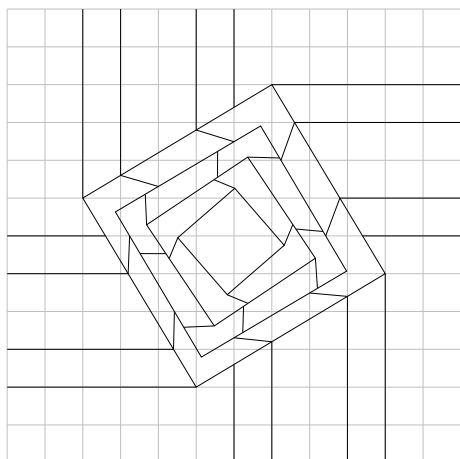


4 Finished twist.

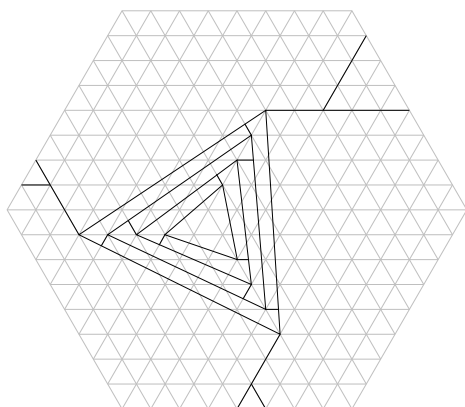


Himalayan summits

# STACKED TWISTS



4 open back square twists



4 open back triangle twists

The purpose of this analysis is to provide folders with the necessary basis and tools to be able to create their own models.

- Simple twists
- Stacked twists
- Combinations of twists and overlapping twists

This chapter contains all the combinations generated during the last two years. During the preparation of this book, I have continued to create new models with different combinations, which have been incorporated into the catalog, up to the time of the final edition.

As can be seen in the overview tables (pages 28 and 41), there are many combinations that have not been tested until this moment. Some of them, in principle, seem physically impossible to make, but as many of us have been able to verify, there is always some creator who makes the impossible possible.

The idea is to create new challenges and encourage other creators to complete the tables.

## Challenges that arise when combining twists

To address the challenge of combining twists it is necessary to take into account some details that are not as important in the case of tessellations with simple twists.

- In the book, only models with at least 1 twist on top are analyzed, not combined molecules without twists.
- The correct choice of paper is very important in this type of model, because of the overlapping folds that are produced. Although Elephant Hide paper can be used, in certain models it would be preferable to use papers with lower weight (Tant, Alios kraft).
- If you want to make extended models, grids with more divisions (64, 80, 96) are necessary.

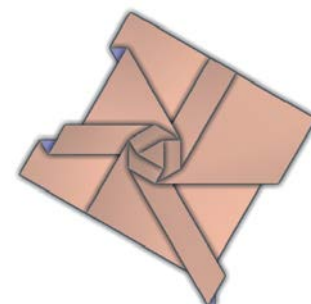
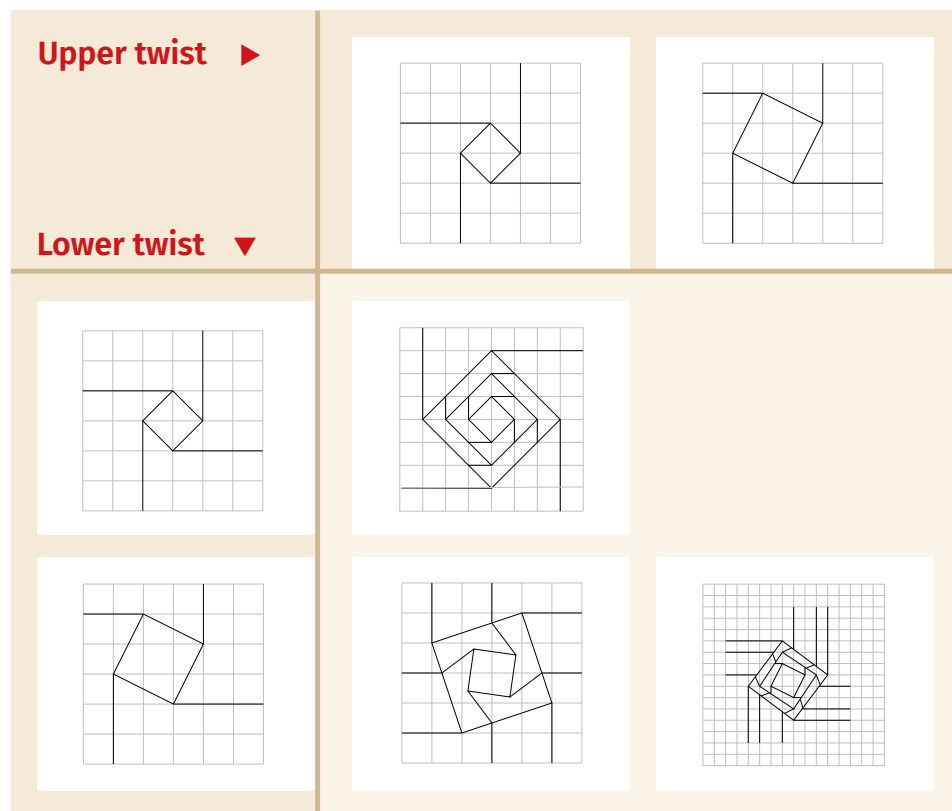
- In the overlapping of open twists (triangular and square), it must be taken into account that in order to flatten the models, each twist goes in the opposite direction to the previous one.

- In many of the combinations of twists there are variants, changing the direction of rotation of the lower ones with respect to the upper one (clockwise or counterclockwise, as seen in the 2 examples of molecules).

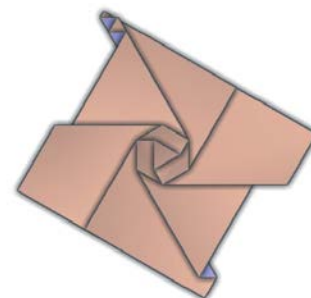
- Due to the accumulation of folds, the center of the models (where the molecules are joined) is more complex and sometimes it is not possible to flatten it.

- For the same reason, the creation of special centers for a more attractive appearance is very important. In some models, these joint centers are subsequently converted into new tessellations.

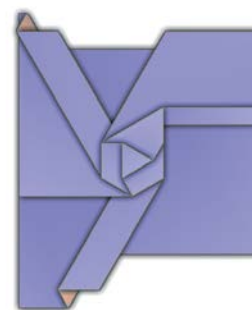
## Twist Combinations



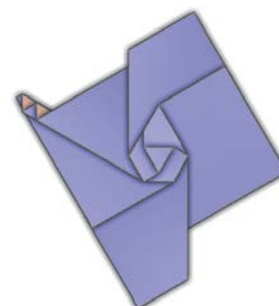
Twists in opposite direction



Twists in the same direction



Twists in opposite direction

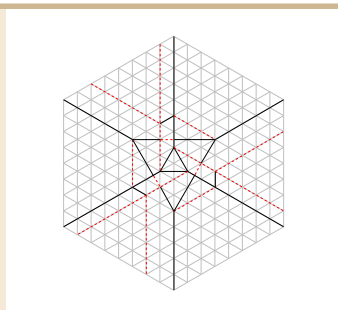


Twists in the same direction

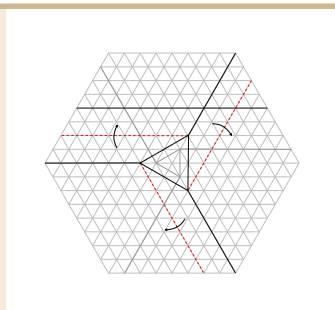


# CLOSED TRIANGLE TWIST ON TOP

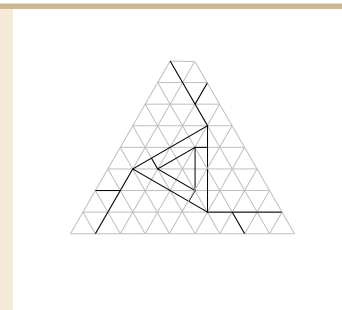
## Double triangle (parallel)



1 CP – closed triangle twist.



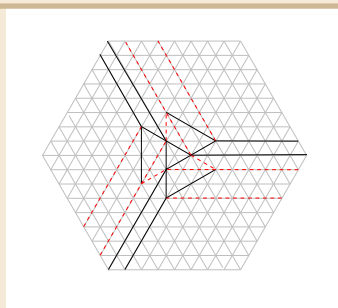
2 Double triangle twist in the opposite direction.



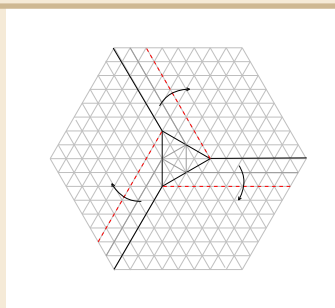
3 Final molecule.

## Double triangle (rotated)

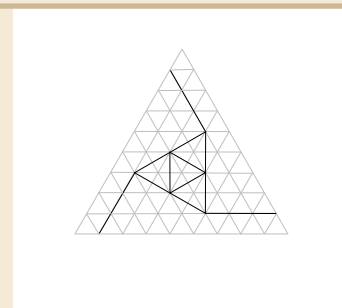
Pyramid wheels  
(page 77)



1 CP – closed triangle twist



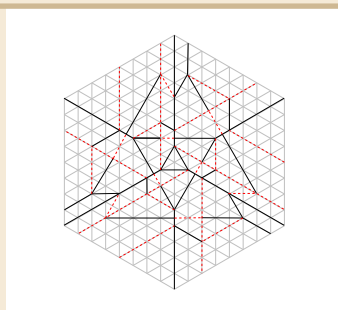
2 Double triangle twist in the same direction



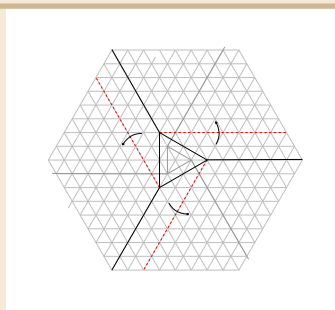
3 Final molecule

## 3 Stacked triangle twists

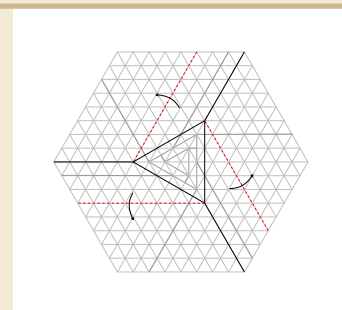
Pyrenean summits  
(page 81)



1 CP – closed triangle twist

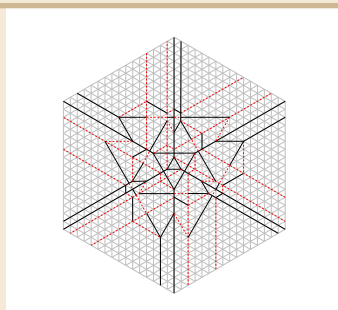


2 Double triangle twist in the same direction

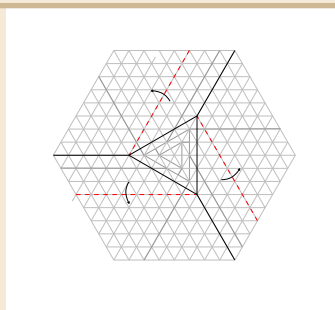


3 Triple triangle twist in the same direction

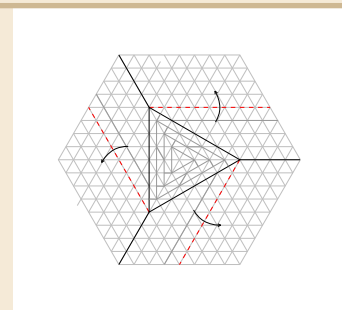
## 4 Stacked triangle twists



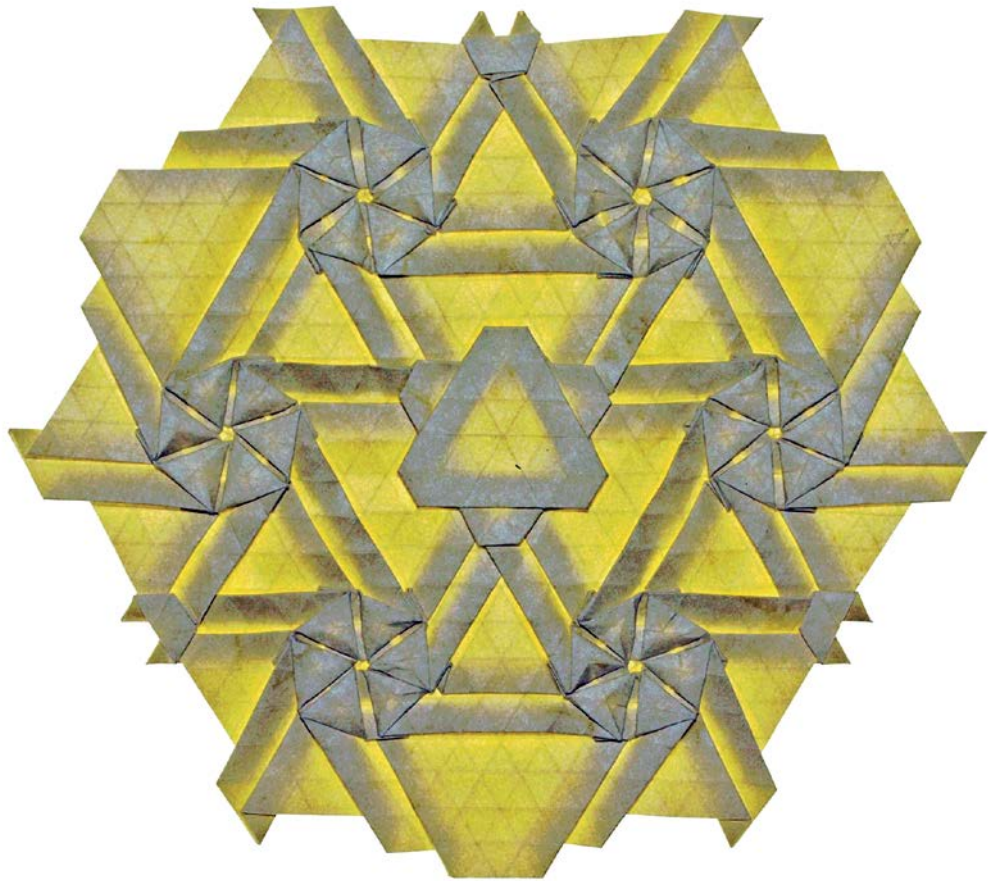
1 CP – 2 triangle twists, the same as the previous one



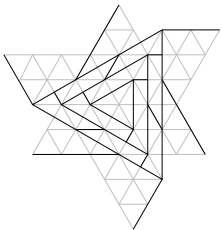
2 Triple triangle twist in the same direction



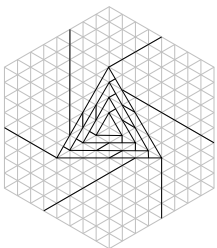
3 Quadruple triangle twist in the same direction



Hexagonal windmill



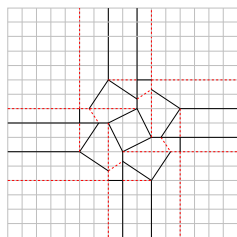
4 Final molecule



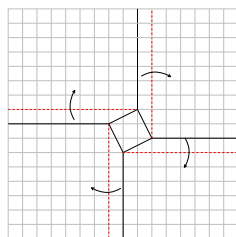
4 Final molecule

# OPEN BACK SQUARE TWISTS ON TOP

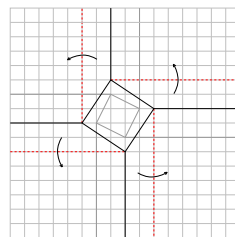
## 2 open back stacked square twists



1 CP – pre-crease inner square.



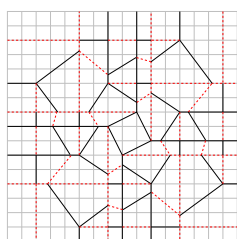
2 Open square twist.



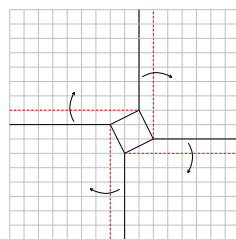
3 Pre-crease square on the outside. Twist in the opposite direction.

## 3 open back stacked square twists

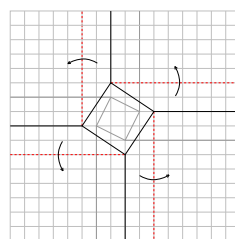
Revolving open towers  
(page 107)



1 CP – pre-crease inner square.

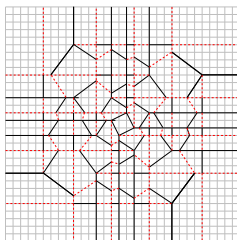


2 Open square twist.

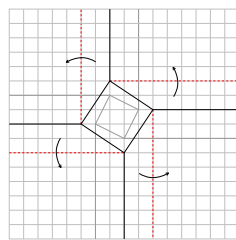


3 Pre-crease next square. Twist in the opposite direction.

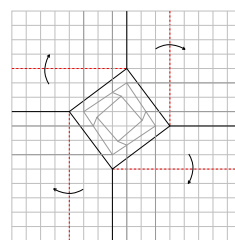
## 4 open back stacked square twists



1 CP – open square twist

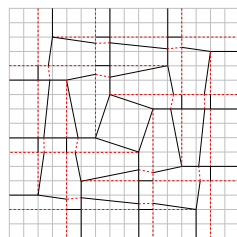


2 Pre-crease next square. Twist in the opposite direction.

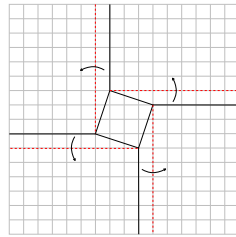


3 Pre-crease next square. Twist in the opposite direction.

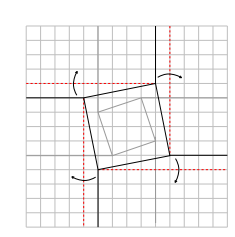
## 3 open back double sized stacked square twists



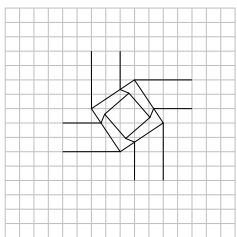
1 Pre-crease only the central square.



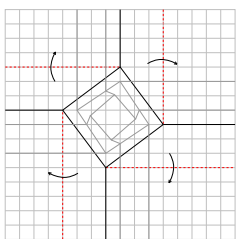
2 First twist.



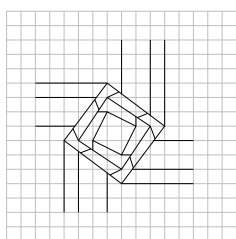
3 Pre-crease and twist in the opposite direction.



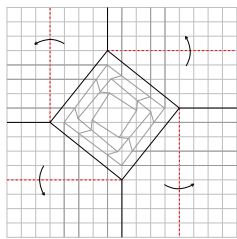
4 Final molecule



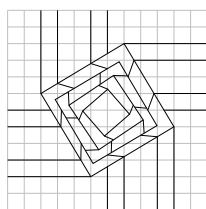
4 Pre-crease third square. Twist in the opposite direction.



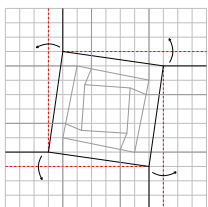
5 Final molecule



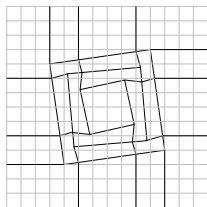
4 Pre-crease last square. Twist in the opposite direction.



5 Final molecule



4 Pre-crease and twist in the opposite direction.



5 Final molecule

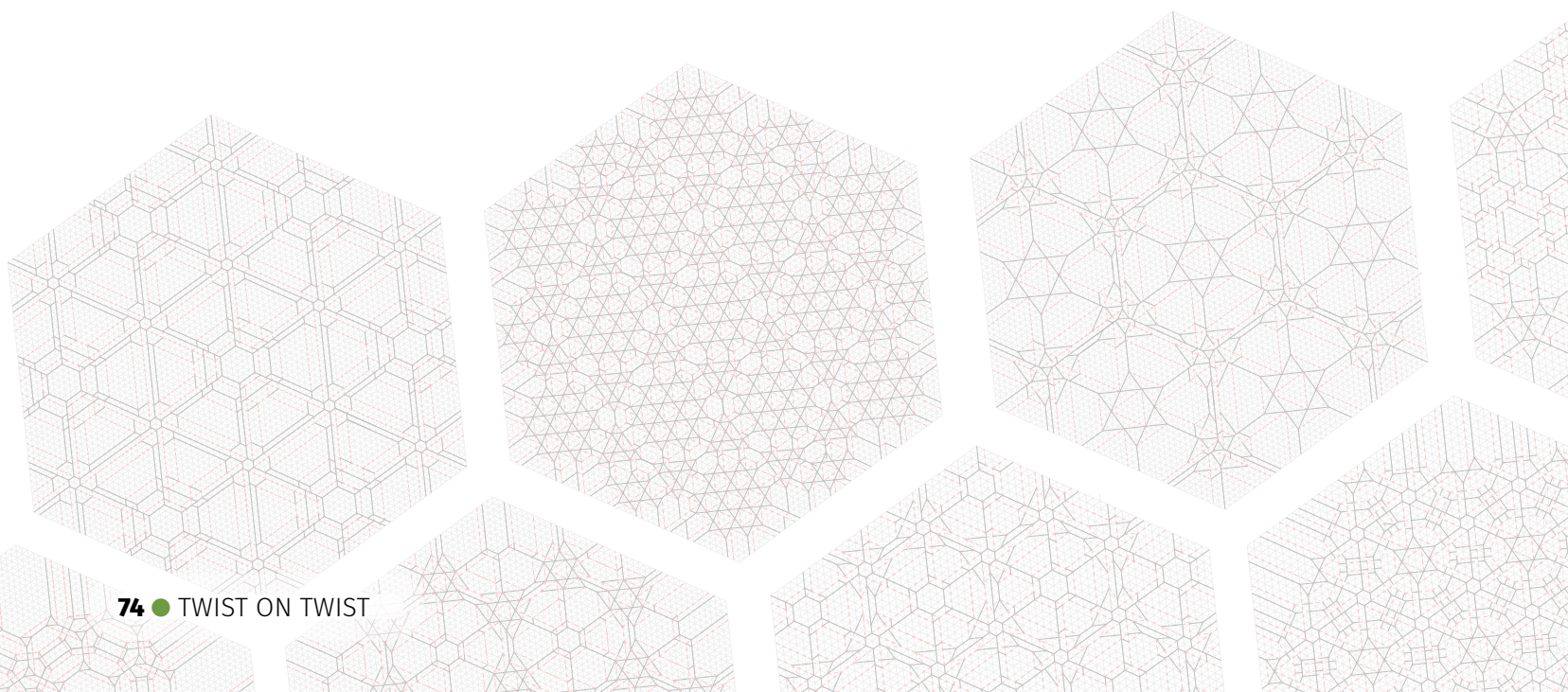
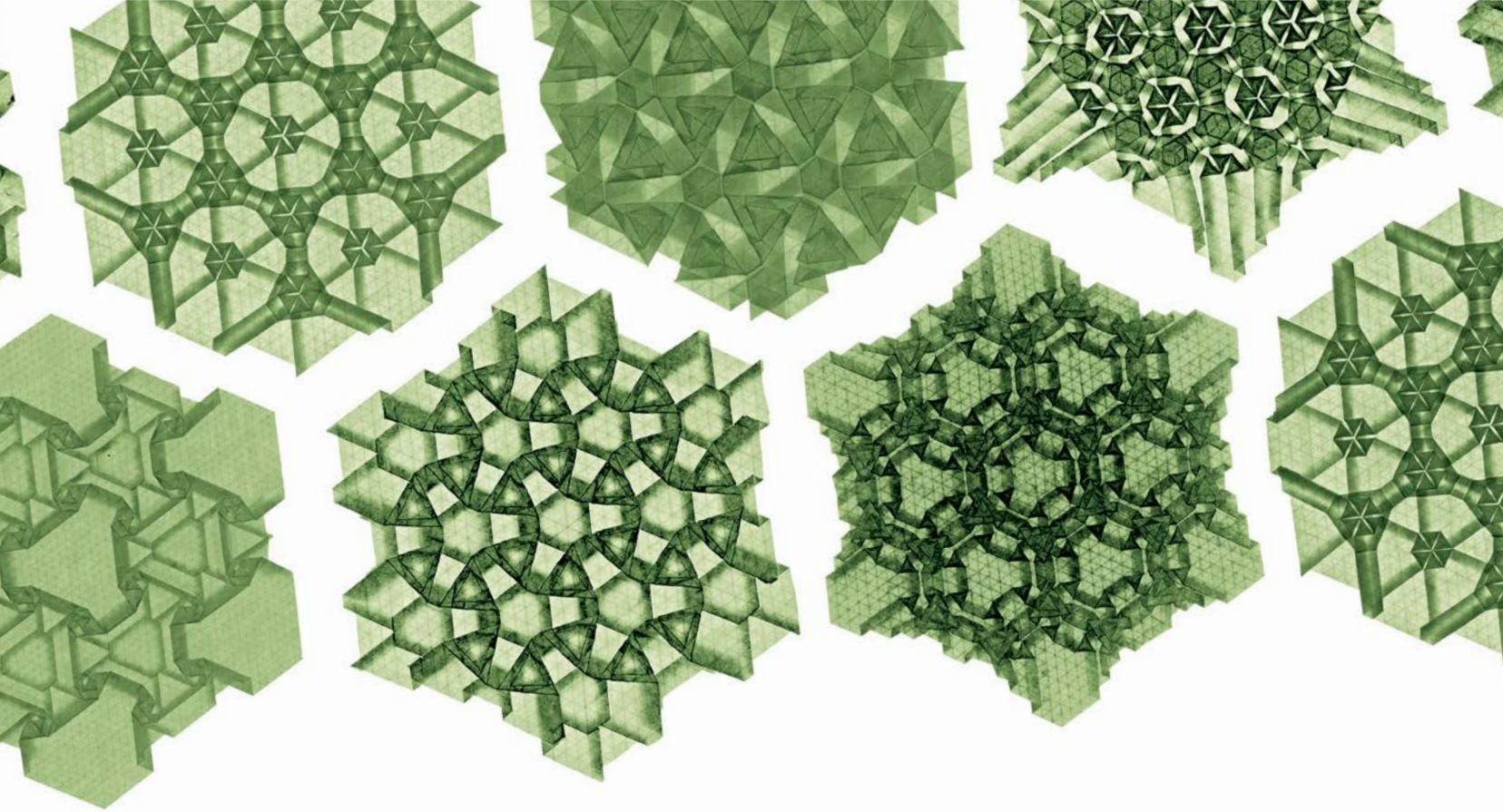


Alpen summits

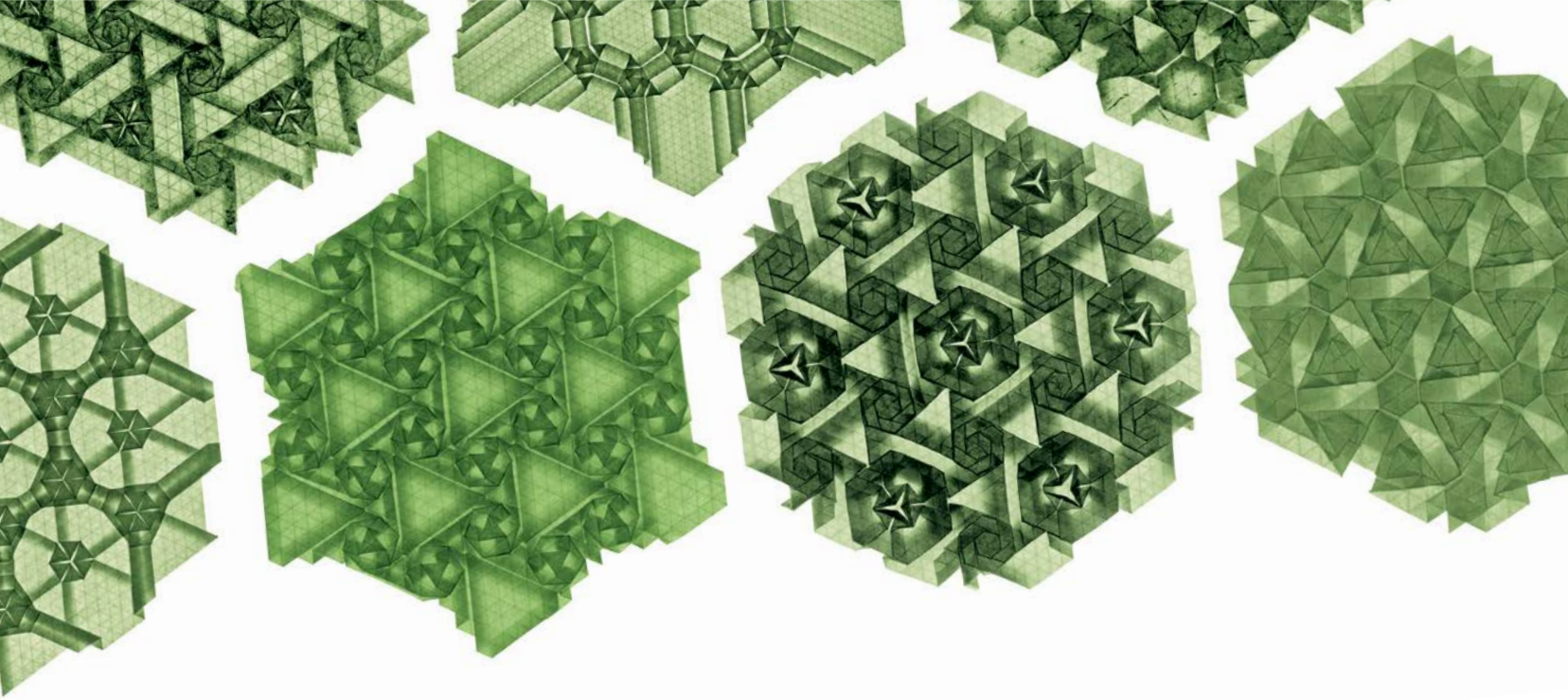


Spotted teardrops compact

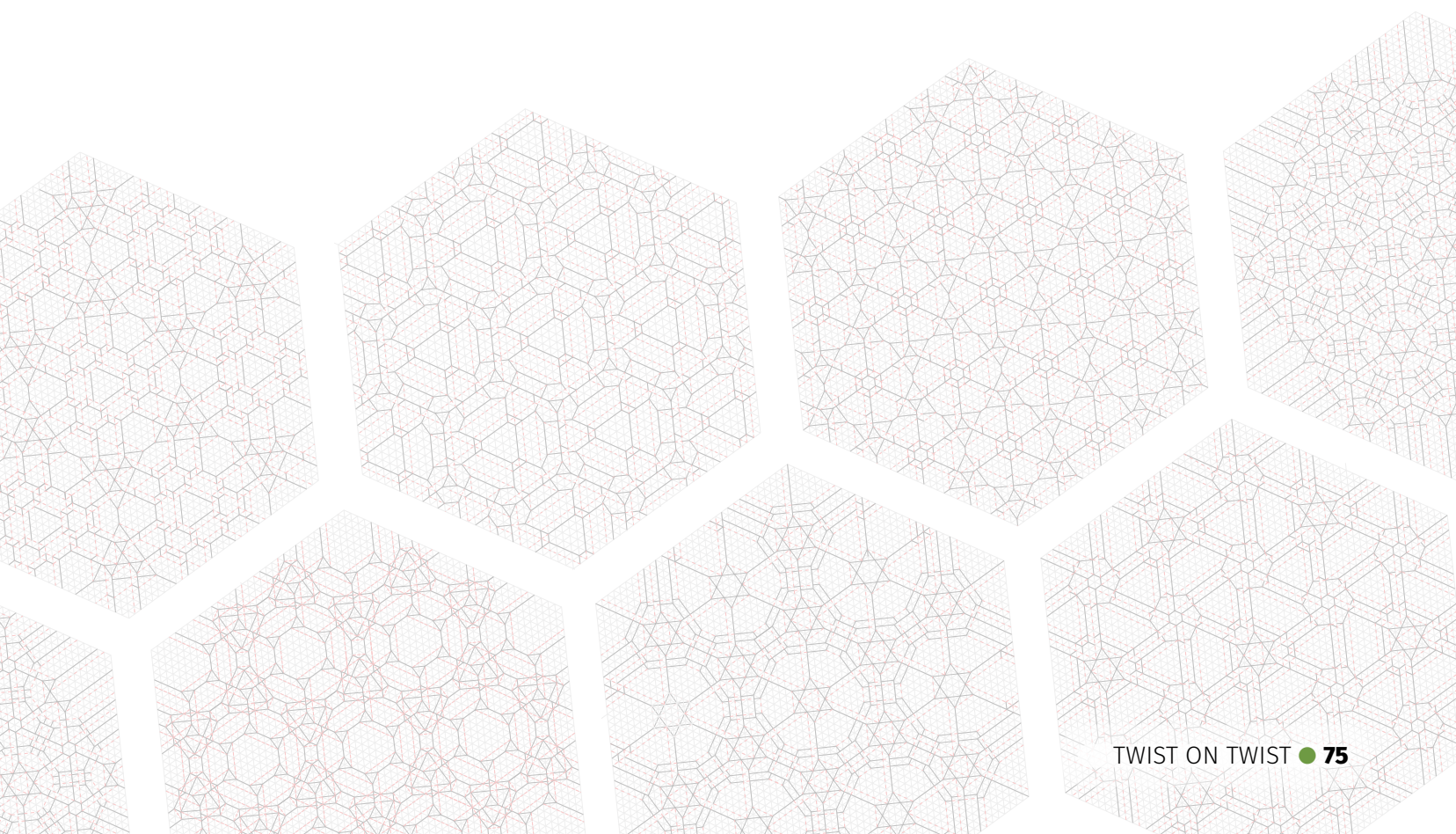




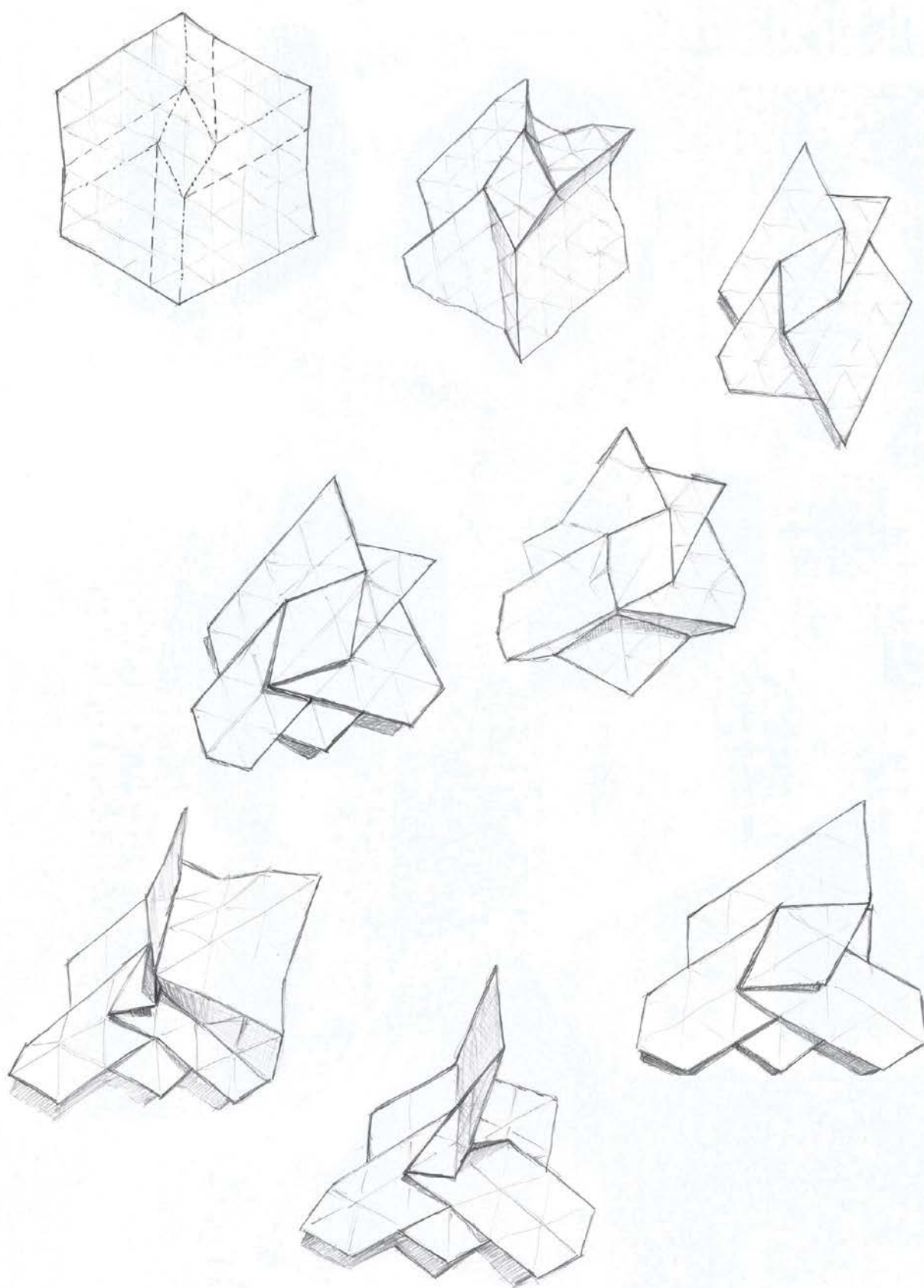




# TESSELLATIONS





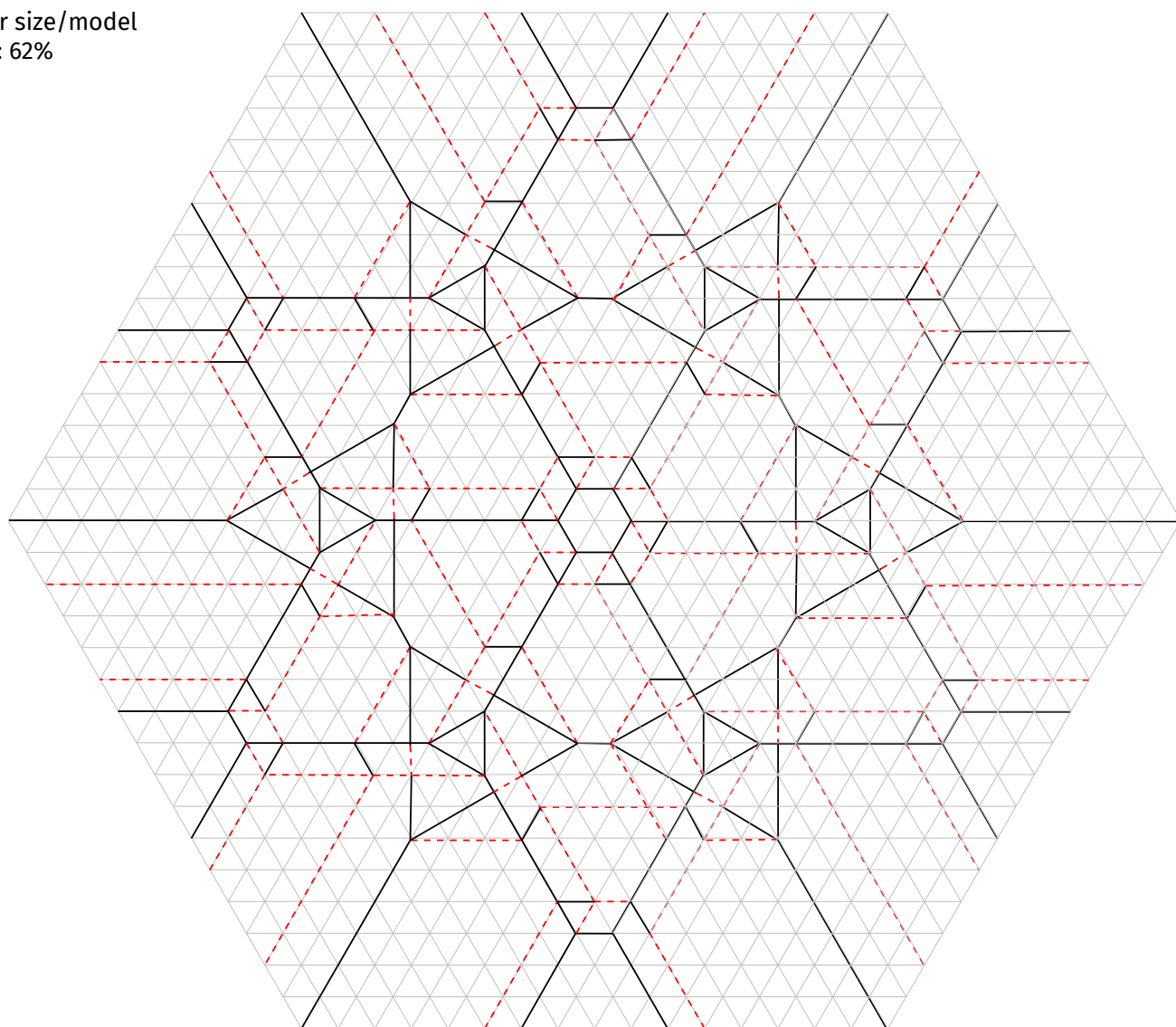


Single twist: rhombic twist with arms.

# PYRAMID WHEELS

*The name comes from the molecule used in this model, which resembles a stepped pyramid reminiscent of those in Egypt.*

Paper size/model  
ratio: 62%



CP on a 32-division grid.

The **basic molecule** is composed of one closed triangle twist, over another double sized triangle twist. The model is a variation of a previous one. In this, all the closed twists go in the same direction, making it necessary to fold a hexagon twist in the middle of the molecules.

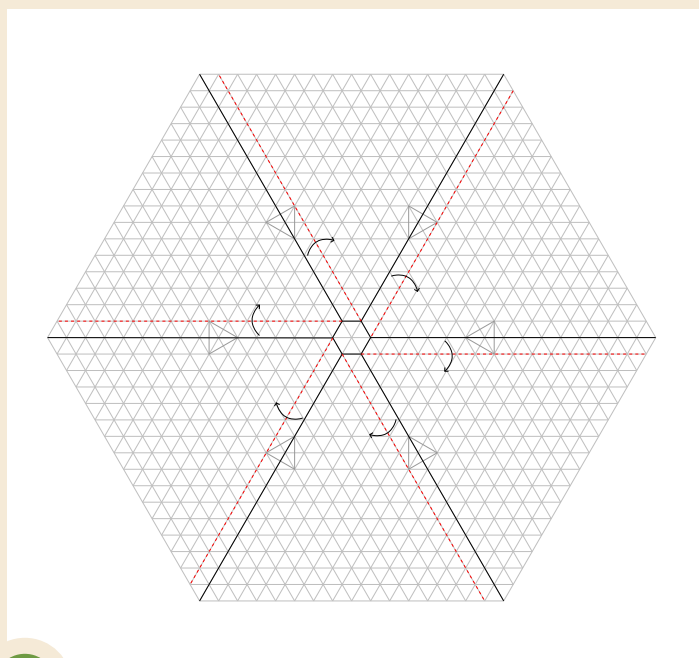




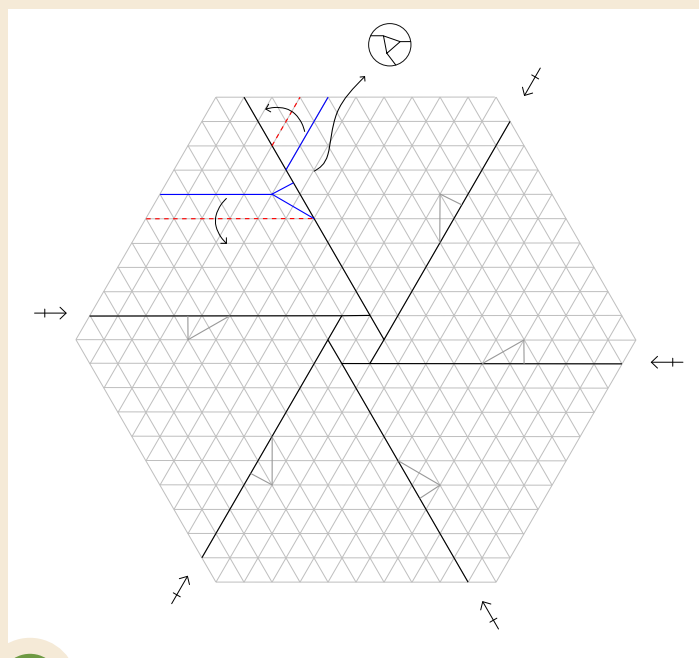


## FOLDING PROCESS

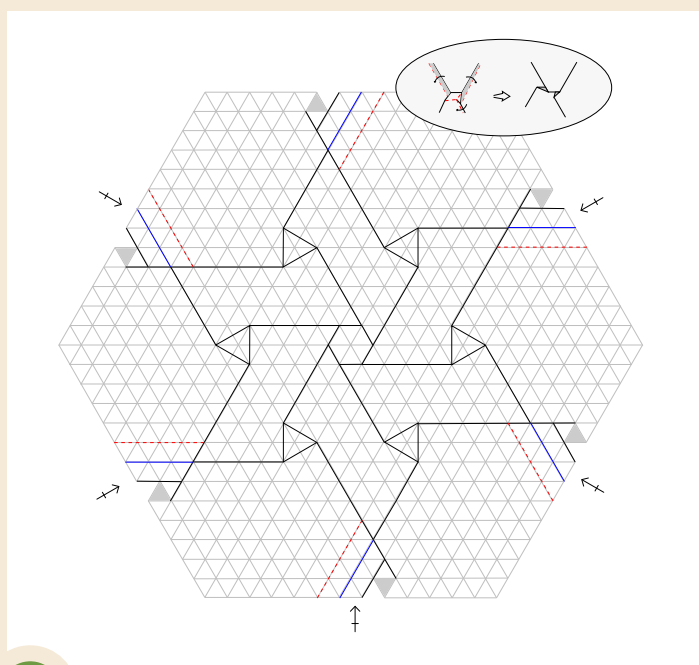
Pre-crease the single triangle twists all over the paper.  
The double twists are creased after folding all the previous ones.



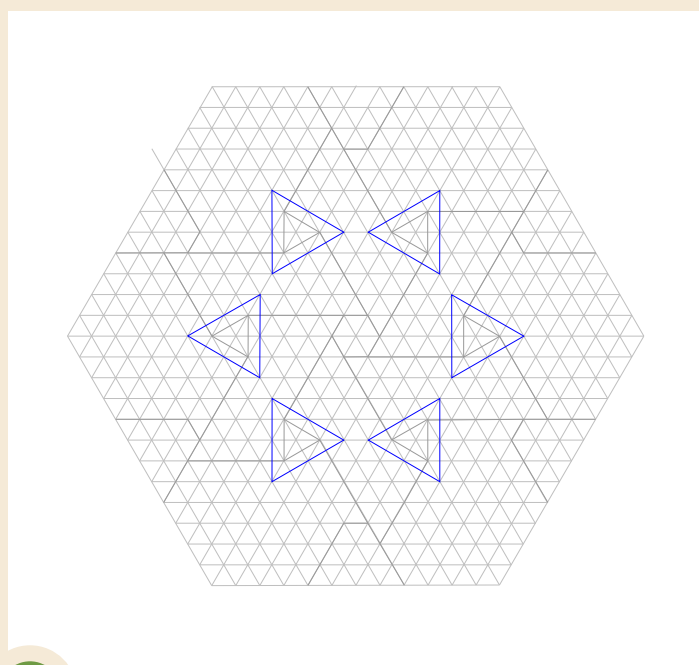
**1** Make a closed hexagon twist in the middle.



**2** Open the paper to make the closed triangle twists. All in the same direction.



**3** When folding the twists, the hexagon twists (not complete) of the edge of the paper must be formed.

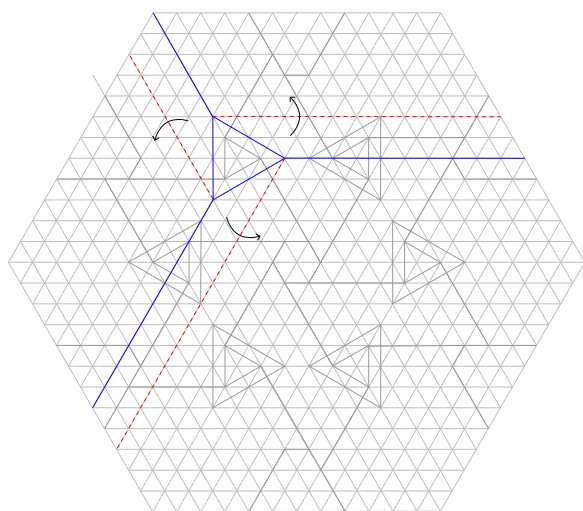


**4** Pre-crease the external triangles (in mountain), marked in blue.

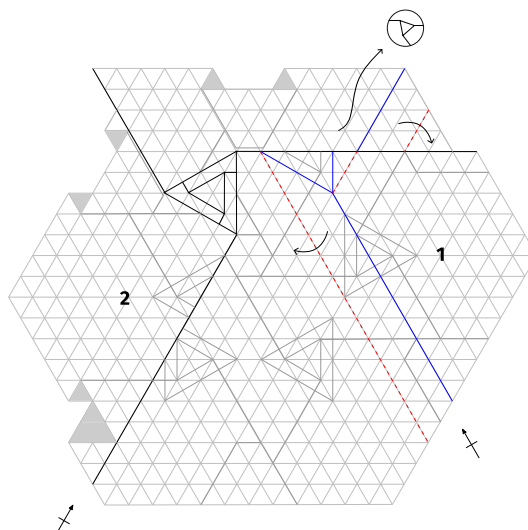


## TWISTS AND PLEATS USED

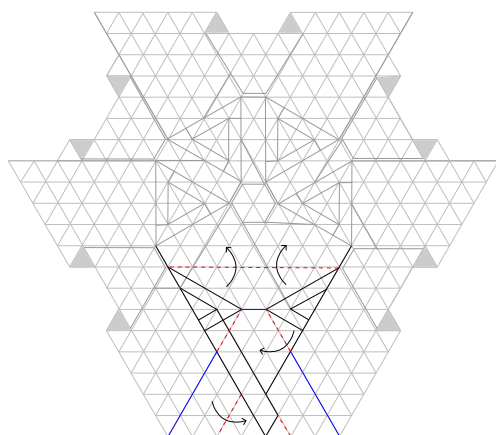
- Triangle twist
- Double sized triangle twist
- Closed hexagon twist



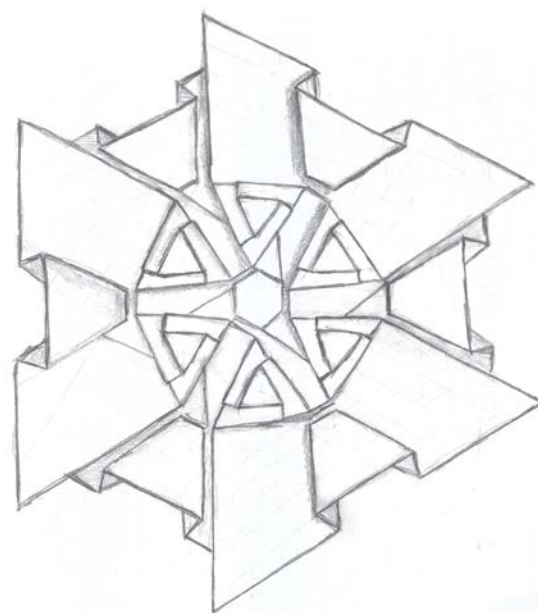
- 5** Make the first double sized triangle twist, using the marked folds.



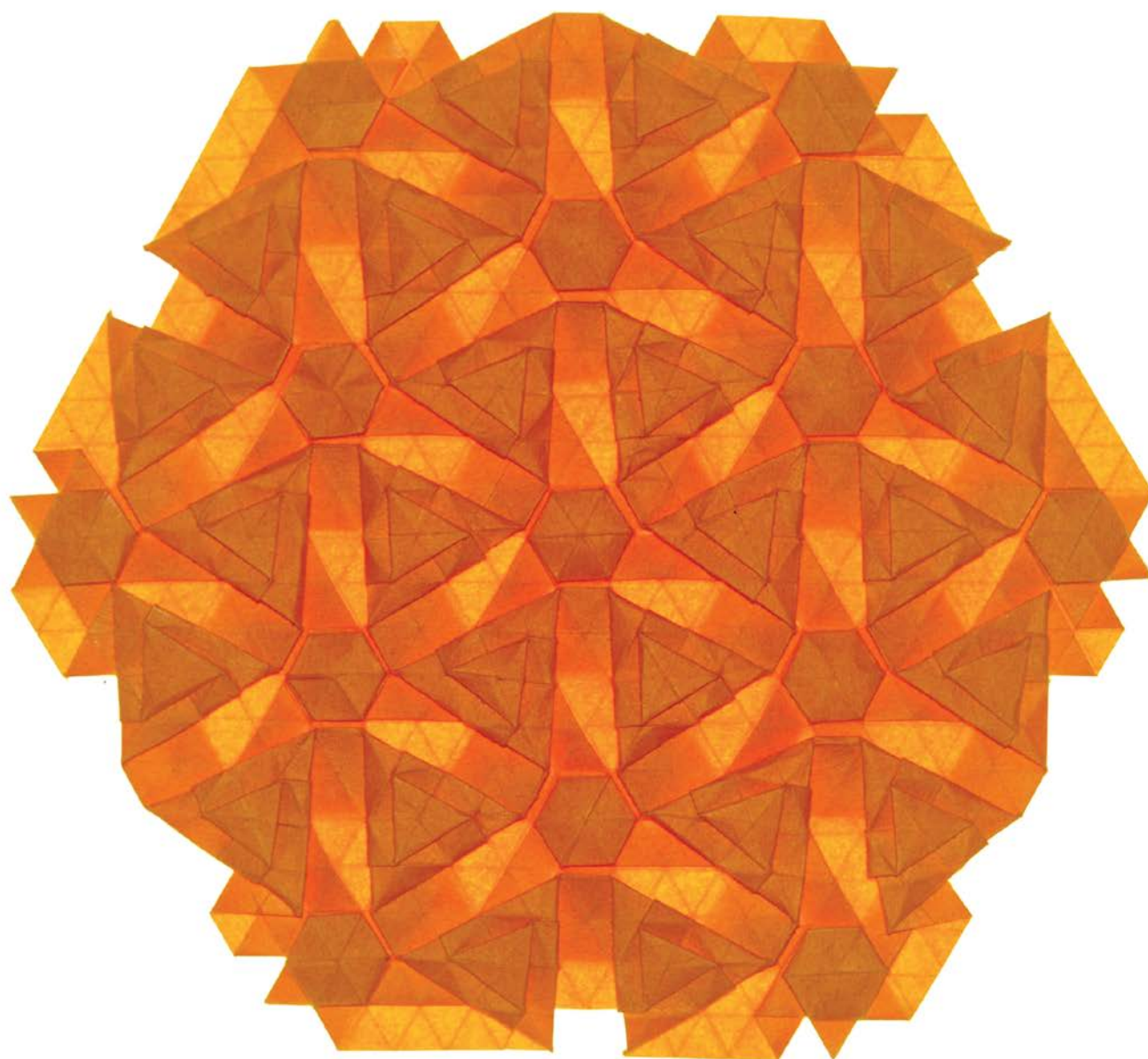
- 6** Open the paper and make the second twist in an opposite direction. Continue with the next two in the indicated order.



- 7** Folds required for the last two, which are recommended to be done simultaneously.



- 8** Finished model.

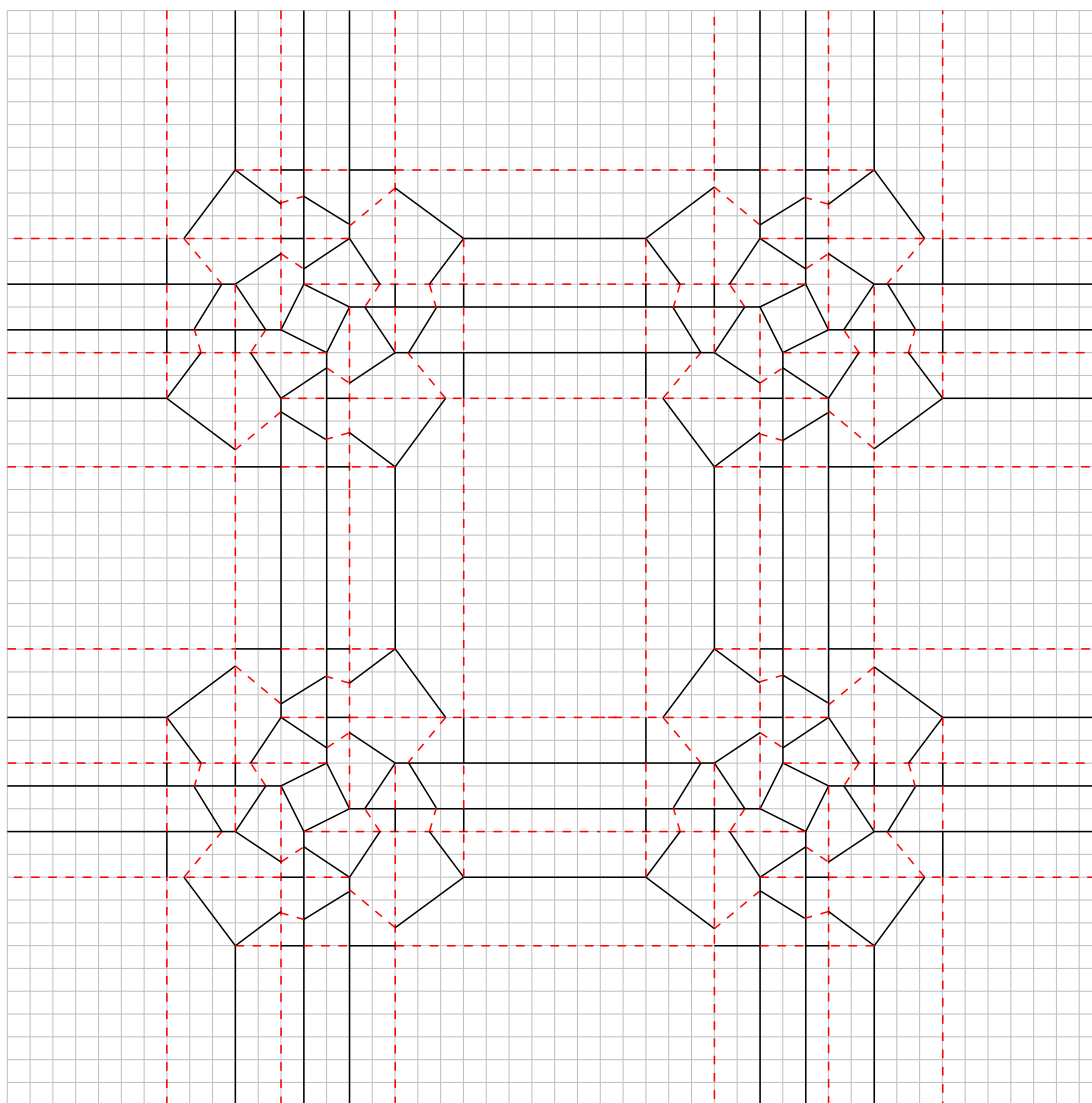


Finished model, on a 48-division grid with Tant paper.

# OPEN TWISTING TOWERS

*I chose the name when I finished folding the model. It is related to my “Hanoi Tower” model. In this case the centre of each molecule is visible (open) when backlit.*

Paper size/model ratio: 75%



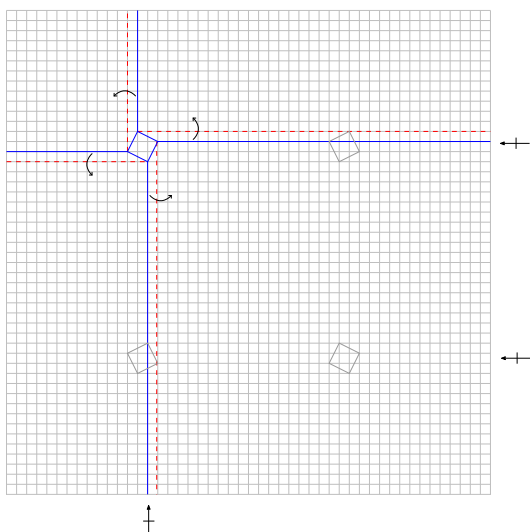
CP on a 48-division grid.

The **basic molecule** is composed of 3 open back stacked square twists. Each twist is made in the opposite direction to the previous one, in order to flatten the model.

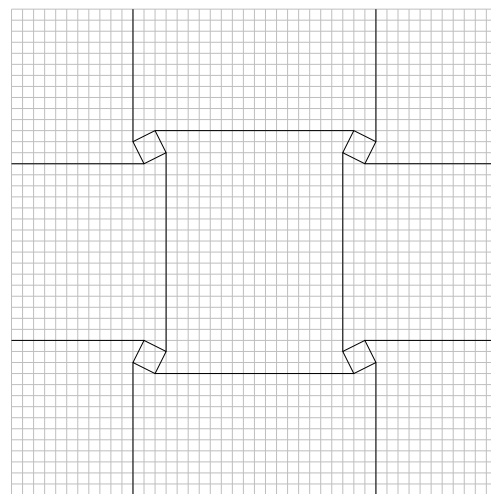


# FOLDING PROCESS

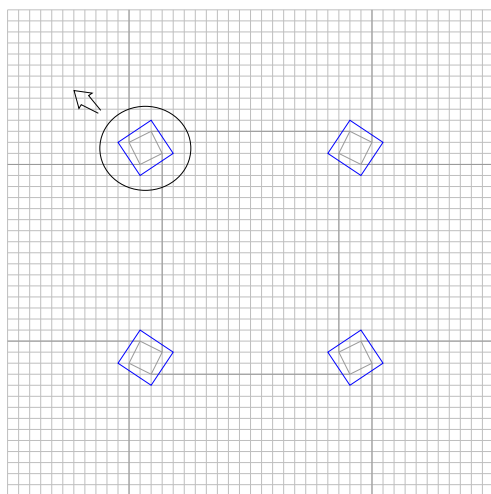
Pre-crease the open back square twists all over the paper.  
The next twists are marked in other steps of the folding process.



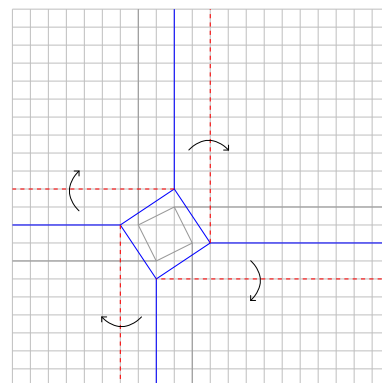
**1** Make the first open back square twist.



**2** Repeat on the rest of the model.



**3** Pre-crease the second square (the sides are not parallel to the first one).

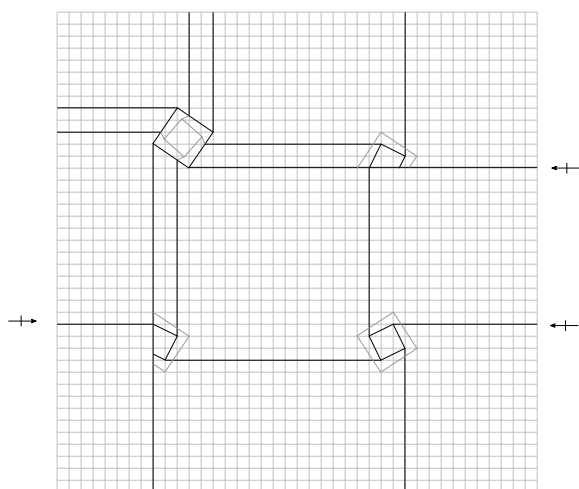


**4** Zoom in to see the second twist. Make it using the indicated folds.

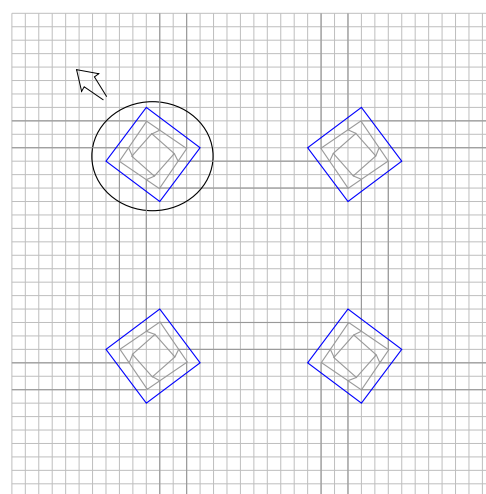


## TWISTS AND PLEATS USED

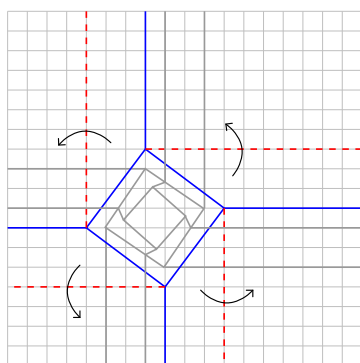
- Open back square twist
- Stacked open back square twists



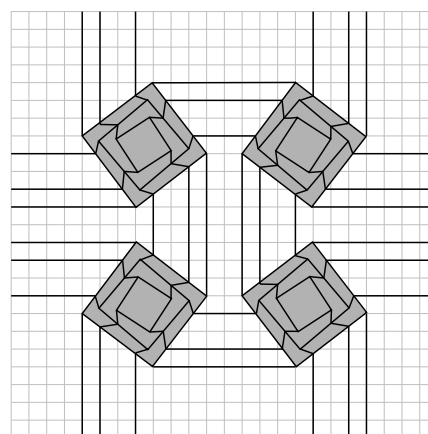
**5** Repeat on the rest of the twists.



**6** Pre-crease the third square (it is not parallel to the second one).

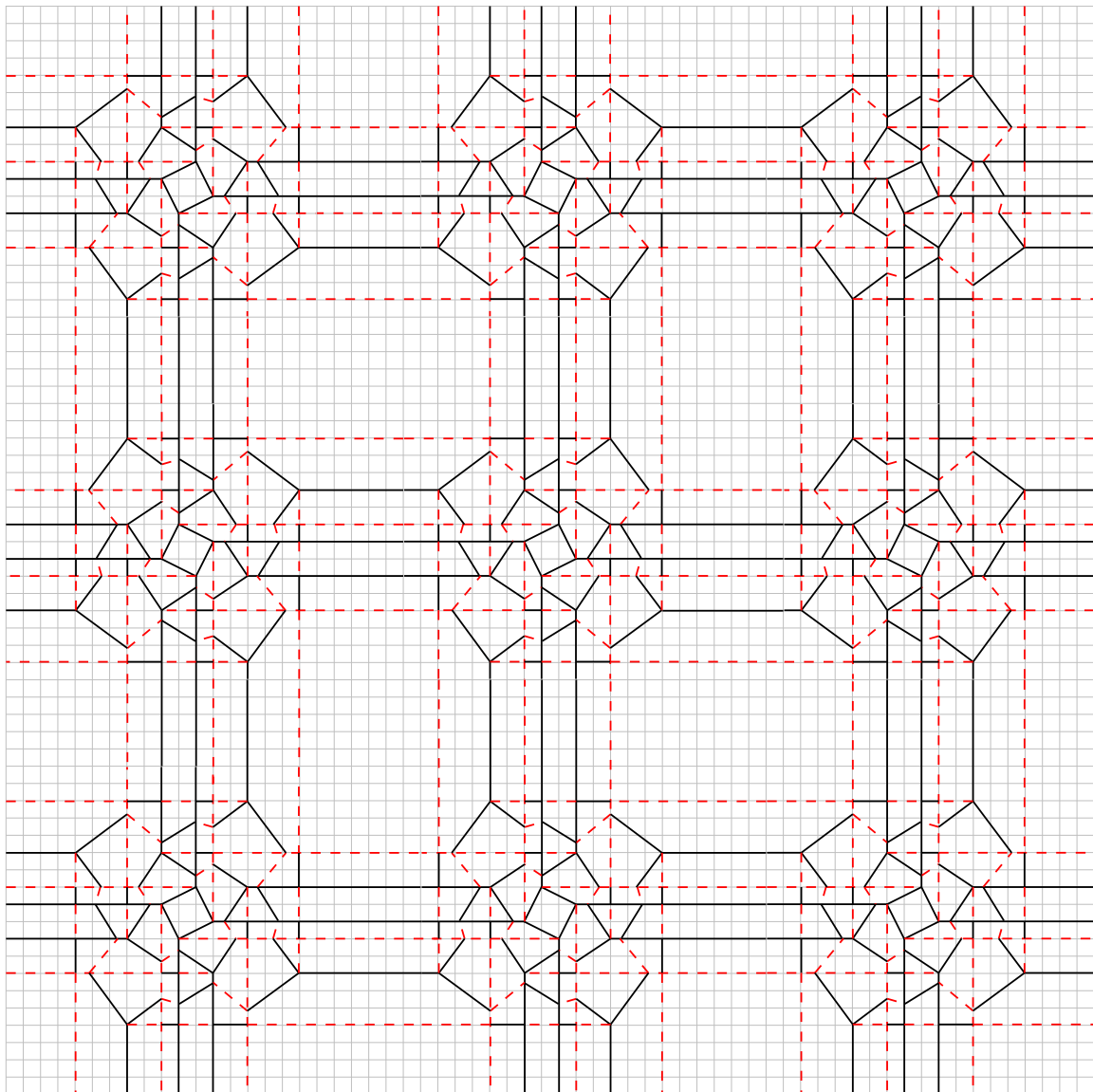


**7** Make the third twist using the indicated folds. Repeat on the remaining three.

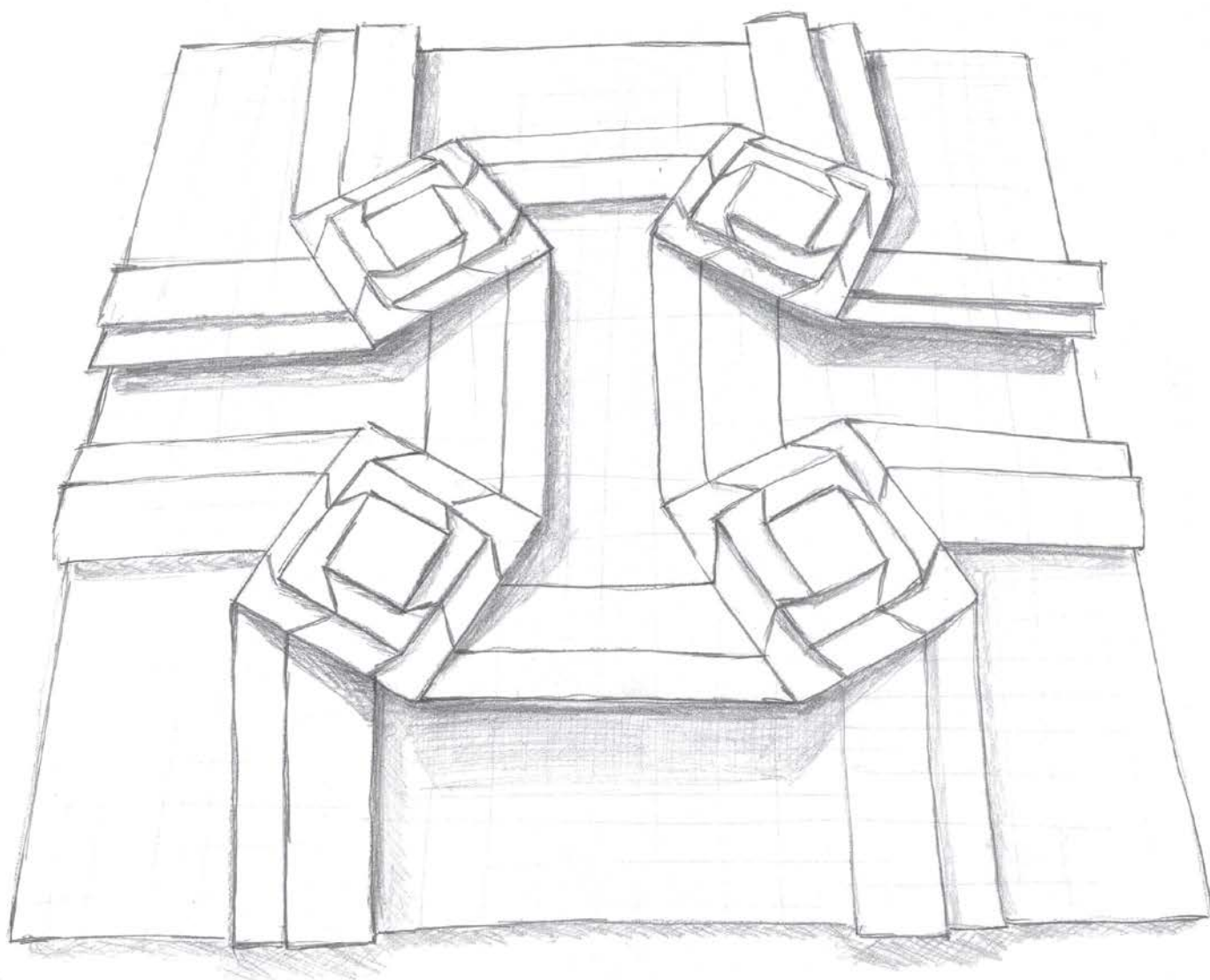


**8** Finished model.



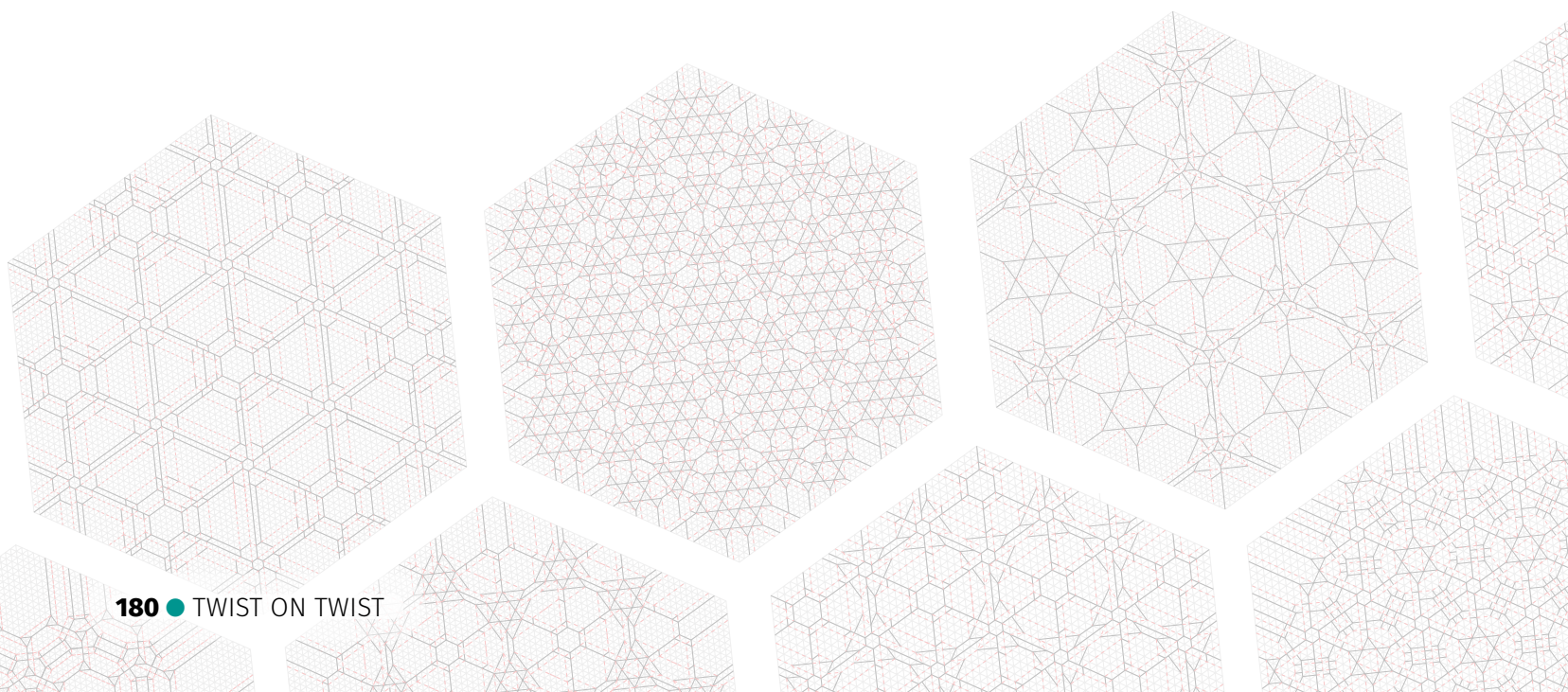
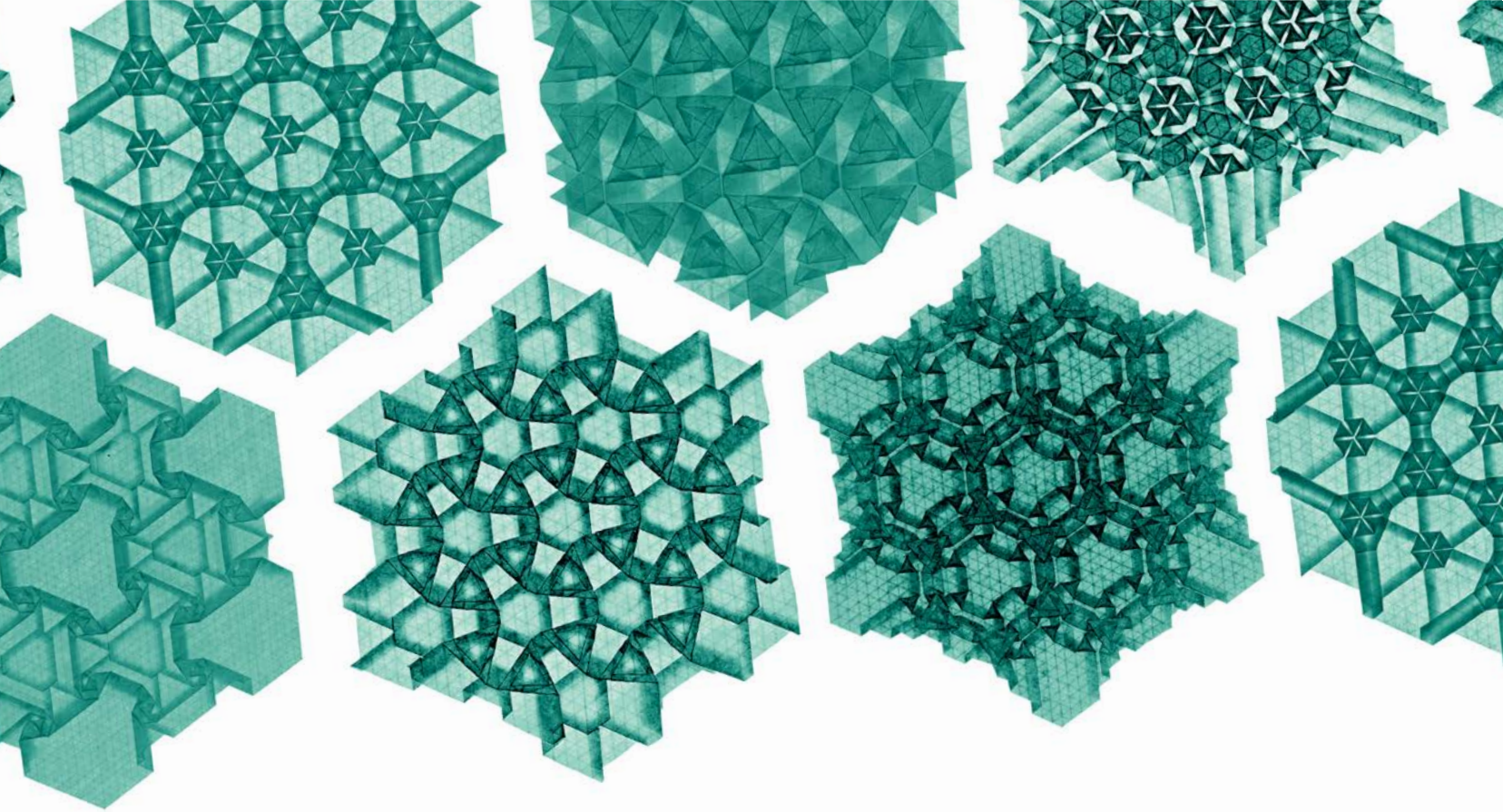


CP on a 63-division grid. One row and column are cut, once the 64-division grid is made, to achieve the symmetry of the model.

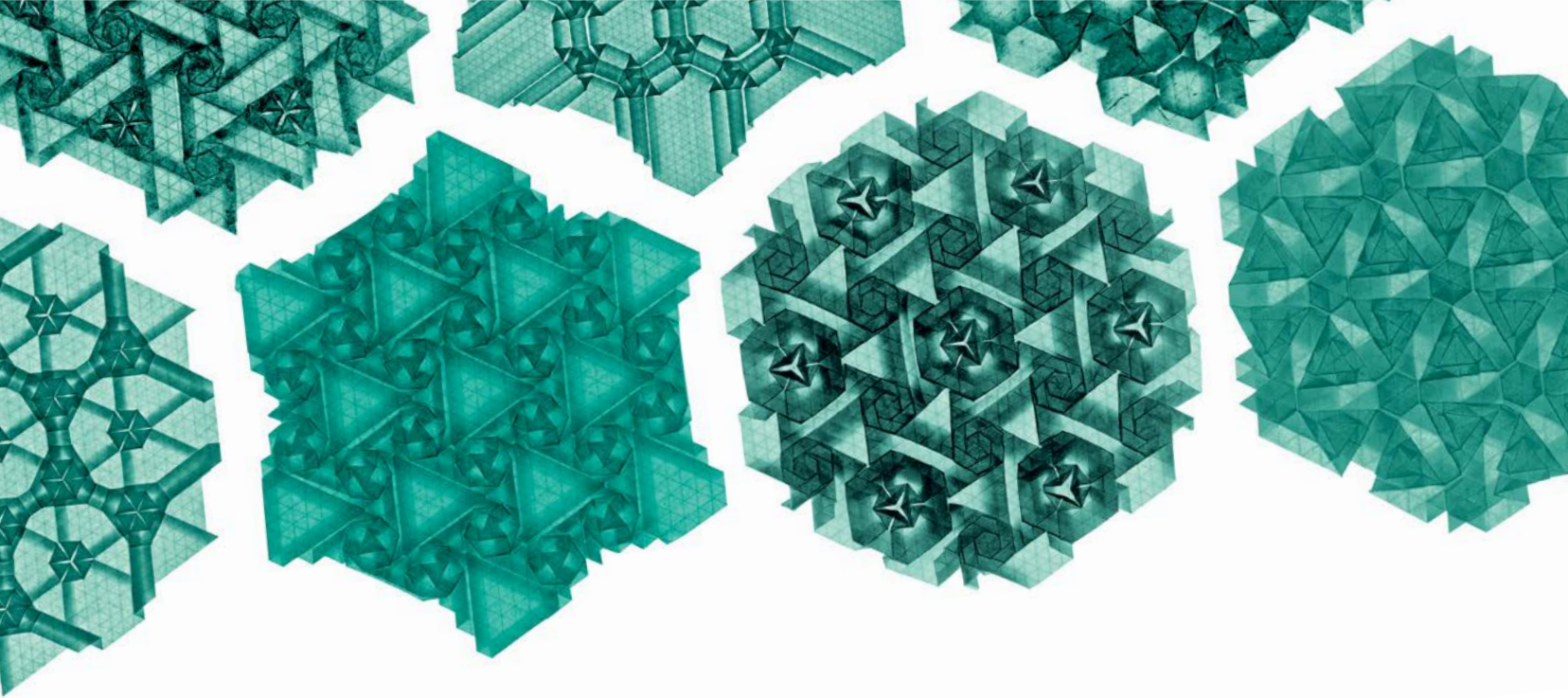


Open twisting towers.

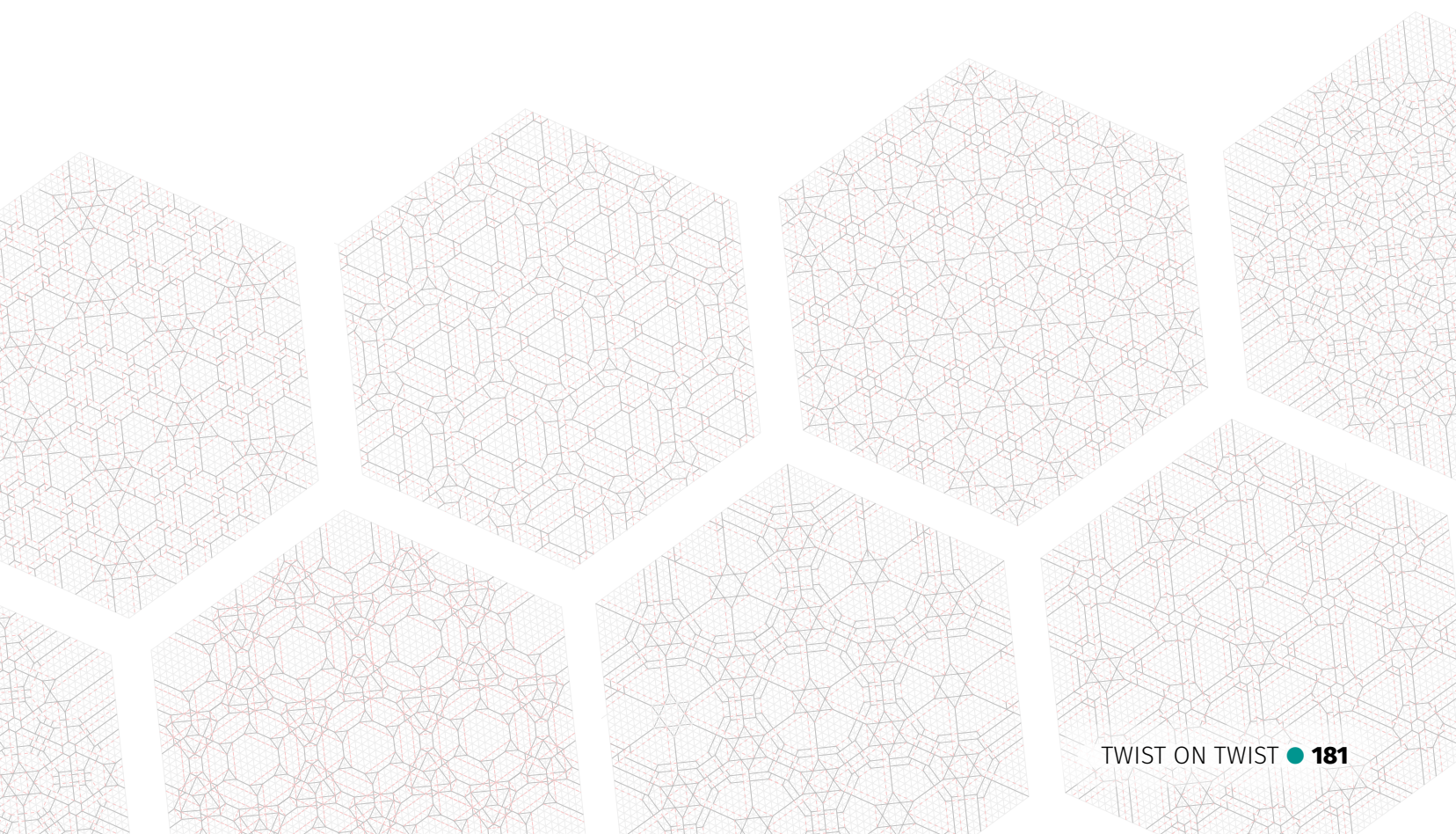


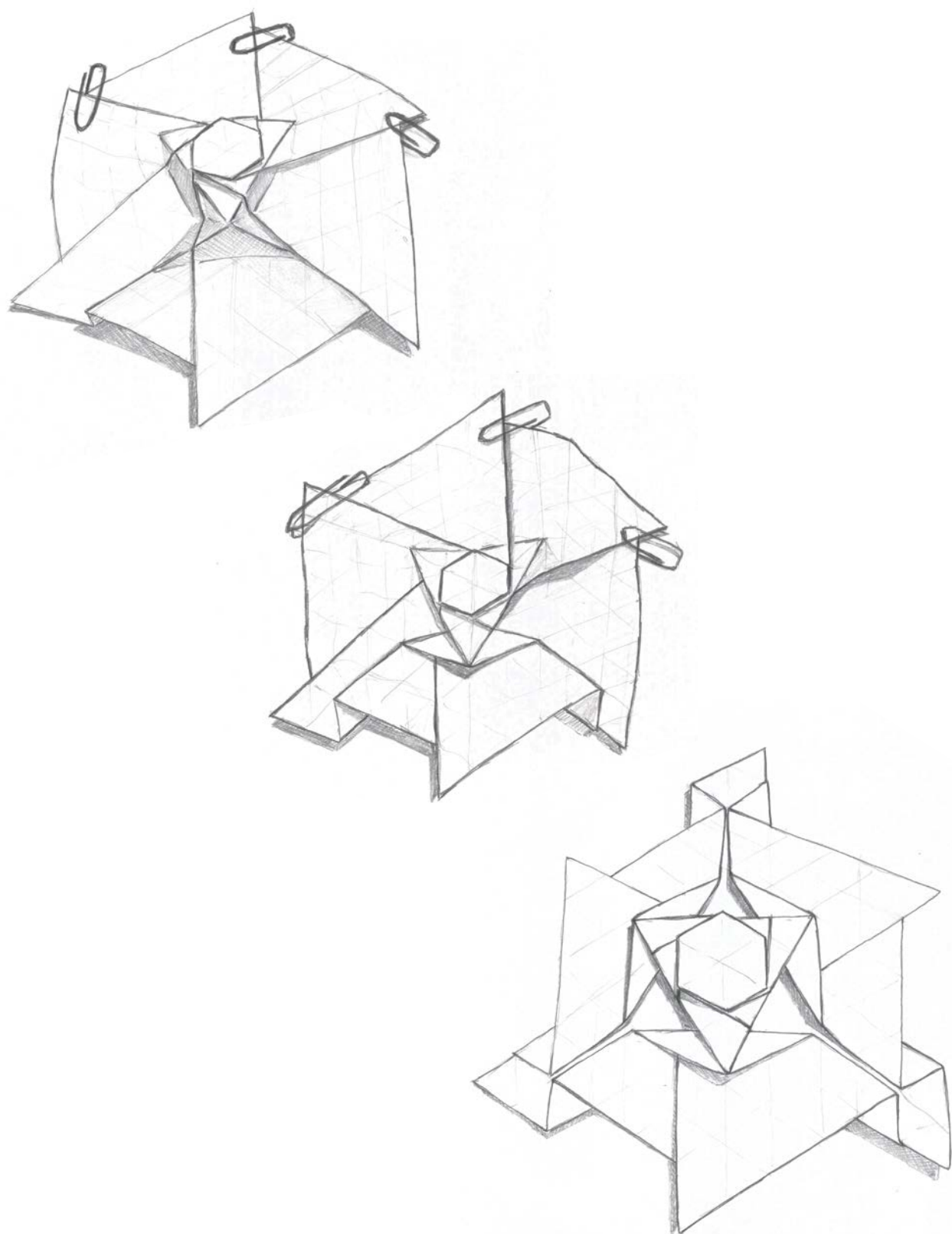






# BOXES





Molecule: closed hexagon twist on double size triangle (page 66).



# BOXES WITH TESSELLATIONS

In a similar way to the first book, I have included this chapter as part of my designs related to tessellations.

The lid of these models has a part of a tessellation (usually a molecule), while the box is made with only one paper, adjusting the size to the corresponding lid.

First, how to fold the box is explained and the recommendations when sizing and folding it.

And then the folding sequence of the lid is detailed for each model, similar to tessellations.

As suggestion regarding the papers used, we can point out the following:

- **Types of paper:** the same as the ones for tessellations.

The transparent papers such as Alios Kraft produce very good results, and in opaque, I recommend tant or elephant hide.

- **Paper size:**

- I generally use 24x24 cm paper for the lid, cutting the inside hexagon.
- For the box, I recommend 20x20 cm paper, cutting the inside hexagon.

- **Grid:** depending on the model, 24, 32 or 40.

To fold these models, it is advisable to use clips or tweezers in the final phase of collapsing and folding of the flaps..

## SUGGESTION

To improve the inside termination of the lid and boxes, it is recommended to dry iron their inner corners with caution.



Crowned triangles

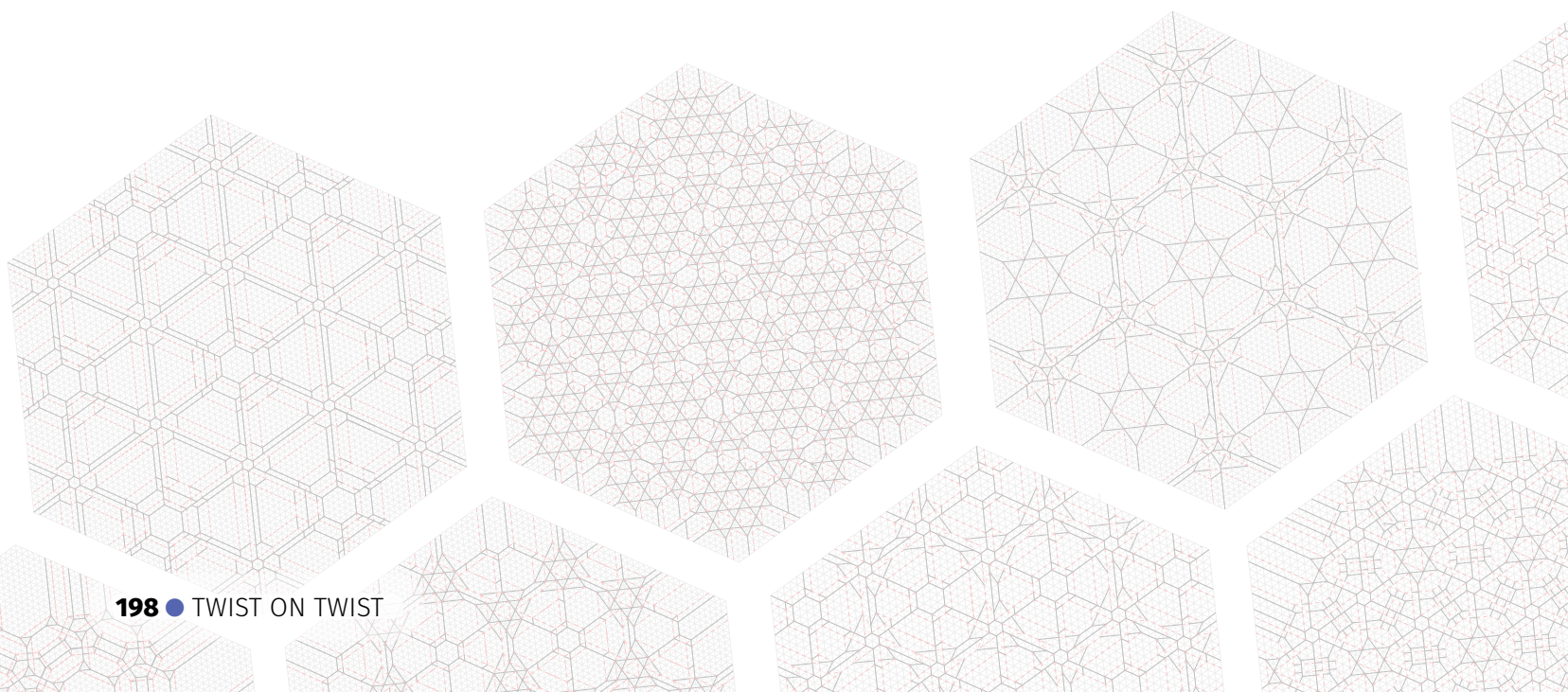
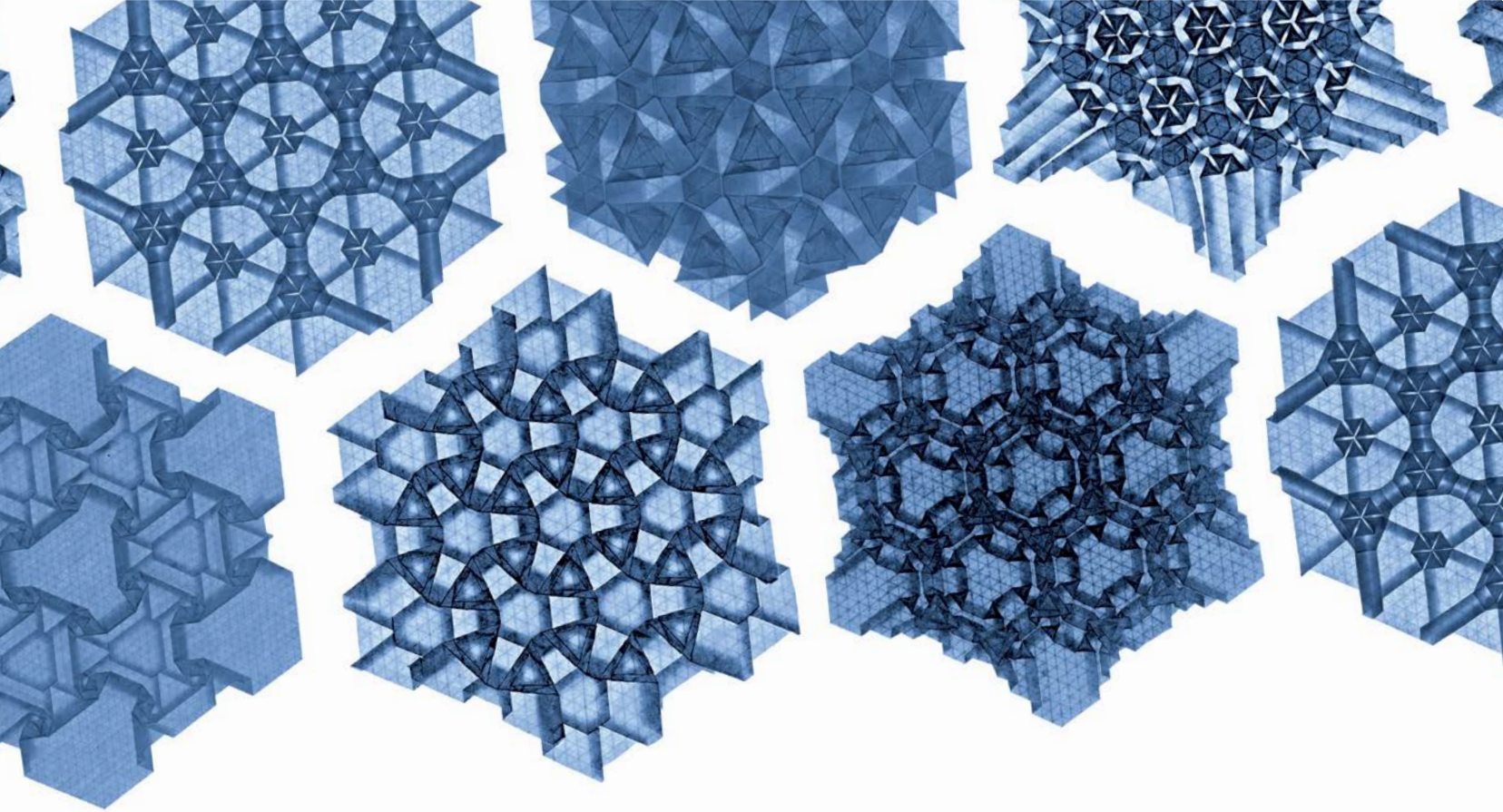


Himalayan summits

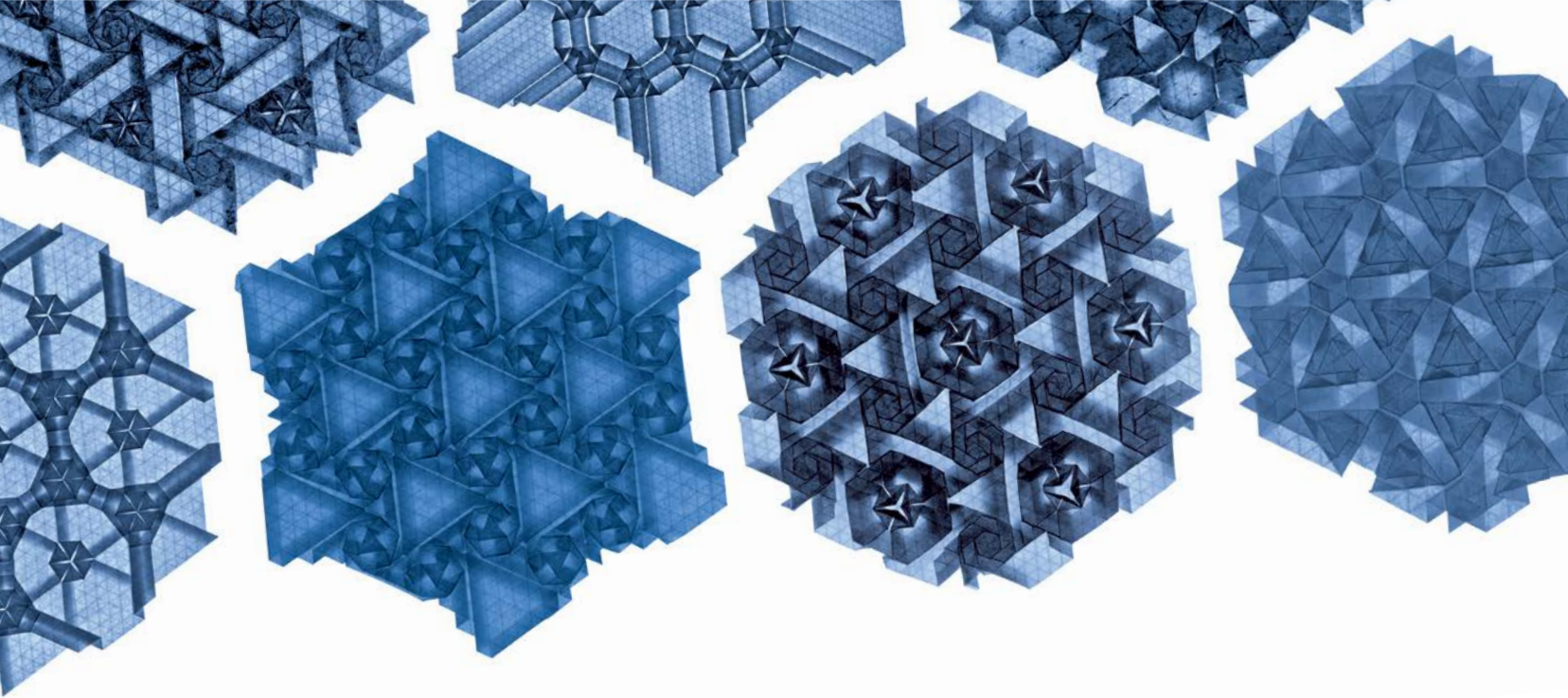


Hexagon on nexagon

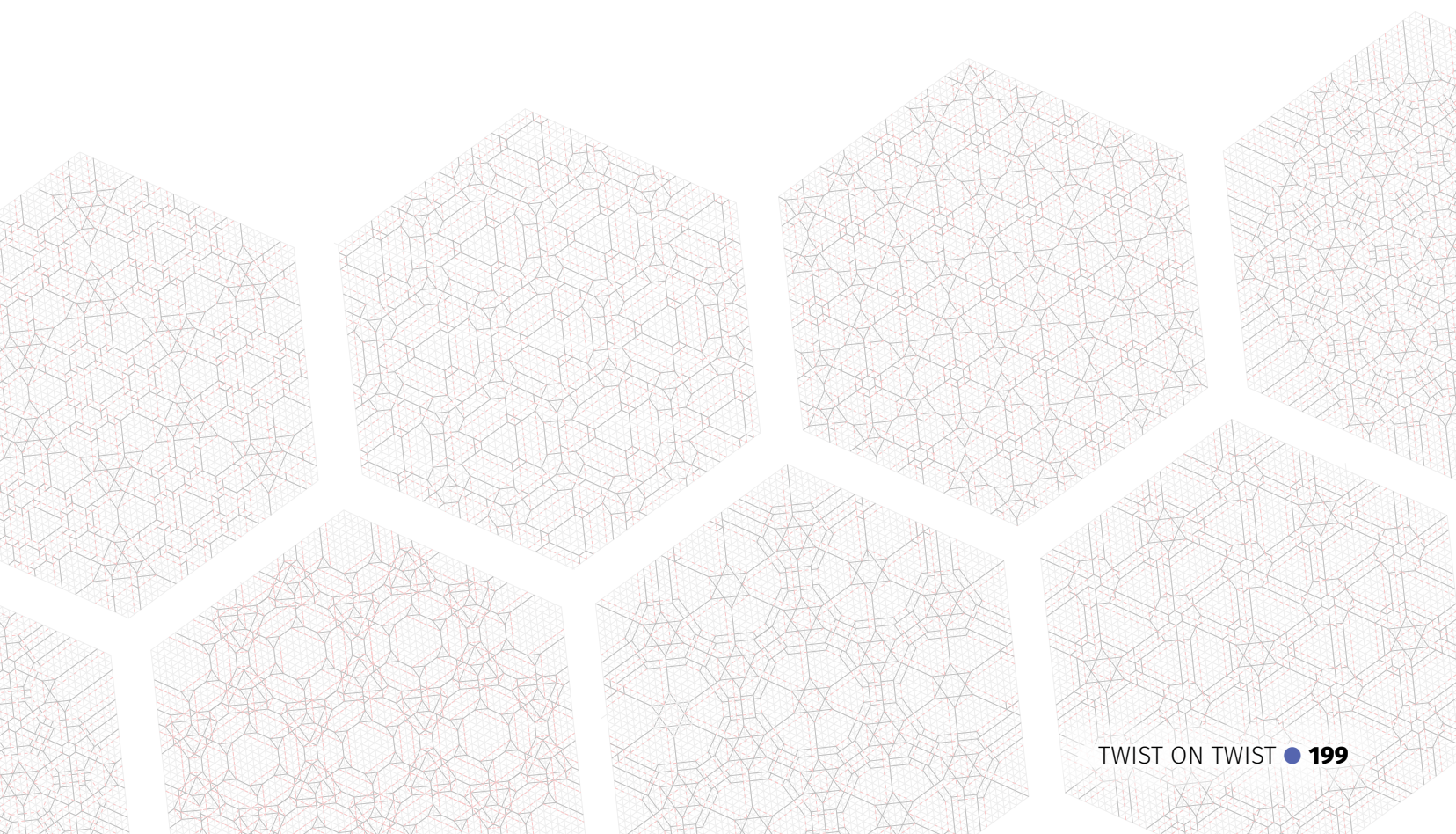


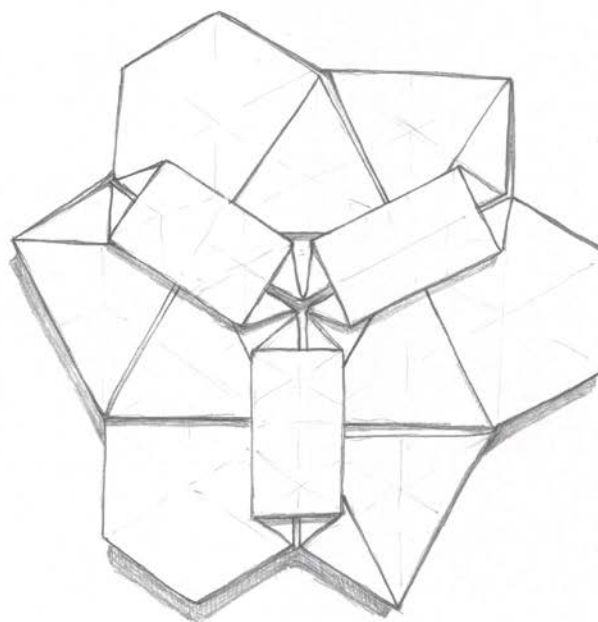
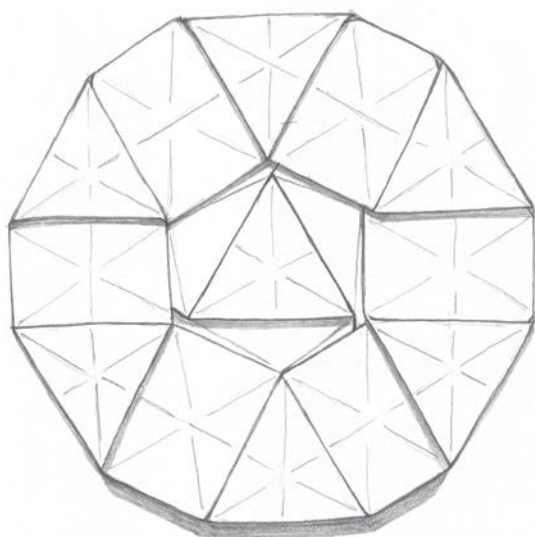
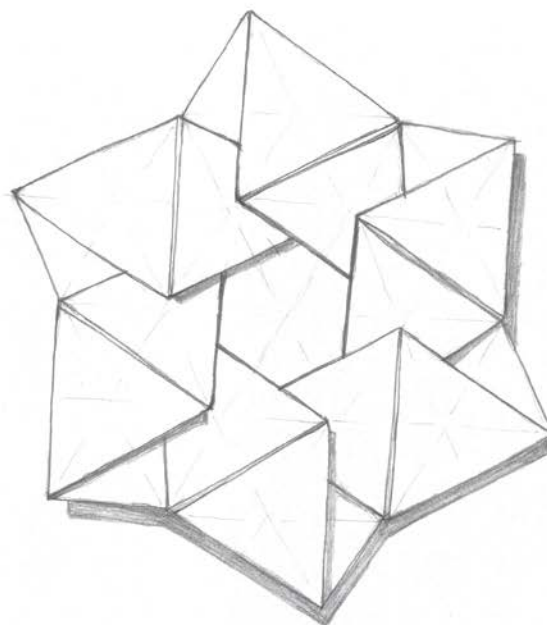
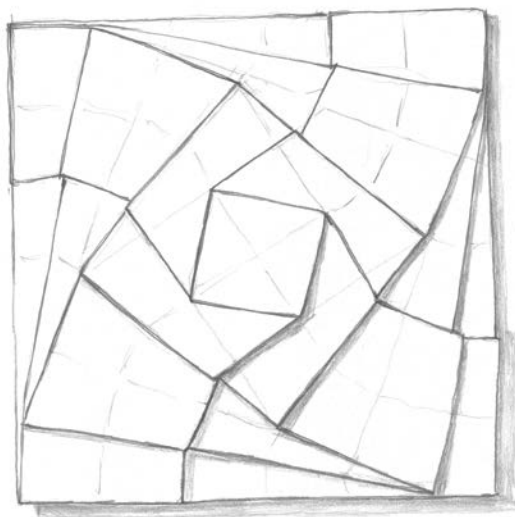






# BROOCHES





Composition of several finished brooches.



# BROOCHES WITH TESSELLATIONS

We are following with an additional chapter of my tessellation analysis.

In the previous book, there is a chapter dedicated to “Omiyage/ Tato”. In those models, the paper with a tessellation (one molecule), is folded to form a tato (closed envelope).

If instead of closing the paper towards the front, we close it towards the back (in a similar way to the box), we form what I call a Brooch.

As an introduction to this type of designs, I will show the folding of a model. All of them come from a previous tessellation, like the boxes and tatos.

As suggestion regarding the papers used, we can point out the following:

- **Types of paper:** the same as the ones for tessellations, although I recommend tant (elephant hi is too heavy).
- **Paper size:** I generally use 15x15 cm paper for the lid, cutting the inside hexagon.
- **Grid:** depending on the model, 16, 20 or 24.



Triangulum Australe



Open twisting towers



Dancing in circles