

10.4 Design exercise: the construction of a dynamic sculpture

Objective

This exercise illustrates the importance of creating tension and balance between the elements of a composition. Your task will involve transforming an image into a dynamic three-dimensional sculpture.

Background

'The sublimation of a tree in the wind'. This is how Marcel Duchamp described the suspended forms swayed by the air movements created by Alexander Calder (1898–1976), an American sculptor well known for his innovative kinetic sculptures called 'mobiles'. Mobiles are dynamic, ever-changing arrangements of balanced shapes moving in response to the world around them (fig. 10.4a). An intriguing characteristic of these sculptures is that they move depending on the observer. The light breeze and the temperature gradient created by a visitor approaching a mobile causes the suspended shapes to float in the air in graceful, elegant, and delicate ways.

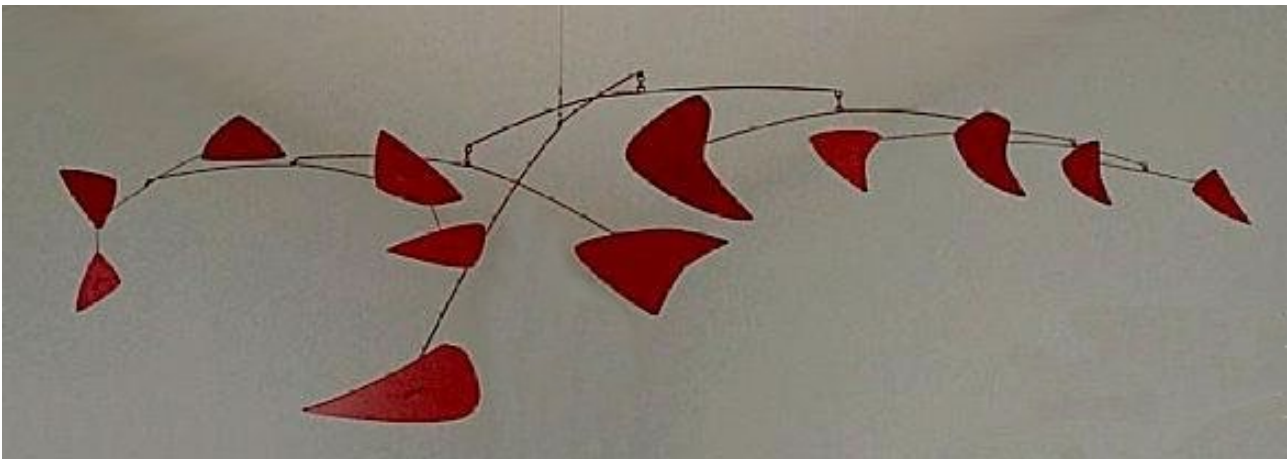


Fig. 10.4a - Redmobile, Alexander Calder (1956).

Clicking on the following links you can admire some more examples of mobiles:

The Nineteen White Discs (1961) hosted by the Chicago Museum of Contemporary Art, <https://calder.org/works/hanging-mobile/nineteen-white-discs-1961/>
Big Red, 1959, Whitney Museum, <https://whitney.org/collection/works/2826>

The inspiration to create these works came to Calder while visiting Piet Mondrian's studio. Fascinated by Mondrian's abstract works, he thought to adopt the same approach with sculpture. However, unlike traditional sculptures, characterized by static and immutable forms, Calder's creations reacted to the surrounding environment.

The mobiles are based on an elegant system of weights and counterbalances, which reflect Calder's training as an engineer. While mobile equilibrium results from the accurate calculation of the size and weight of the dangling shapes, mobiles exhibit an organic appearance and behaviour.

Calder has a synesthetic approach to his art and conceived movements in space as visual melodies. He often experimented with sound. His musical mobiles incorporated gongs of different pitches, while regularly spaced beaters produced musical notes. In 1963, the composer Earle Brown asked Calder to create a musical mobile capable of 'directing' a music piece Brown had composed for a percussion quartet. Three years later, Calder delivered his *Chef d'orchestre* (1966). The movements of the *Chef* determine the sequence and the speed of the music played by four percussionists (check this video to see how this works https://www.youtube.com/watch?v=mUOKDROw_uM) Since then, several musicians have utilized the *Chef d'orchestre* for their performances.

On the 50th Anniversary of the *Chef* creation, July 12th, 2016, the Calder Foundation presented the performance again at the Friends Seminary in New York. According to the curators, 'tension and excitement in the room were palpable as the musicians struck the mobile, whose sound boomeranged from airy gossamer to resounding boom, depending on how and where it was impacted' (Calder Foundation, 2016).



Figure 10.4b - Floating acoustic clouds, Alexander Caldwell (1953).

Another notable piece of Calder's work was the 'Acoustic Clouds' of the auditorium of the Central University of Venezuela in Caracas (fig. 10.4b). Calder designed the clouds to solve the problems

created by the poor acoustics due to the hall's design. The 'Floating Clouds' react to and modulate acoustic waves, making the hall one of the auditoriums with the best acoustics in the world.

The realization of these floating sculptures requires careful design. Moving parts have to be carefully balanced to react to small air movements, and the parts have to move slowly and harmoniously, as in a musical movement. This requires taking care of many details: the weight and shape of the moving parts, the length of the levers, the position of the attachment points, the type of hooks used to second only the desired movements.

Ramírez León (2015) provides a detailed description of another Calder's work, the *Mobils Estábil con hoja horizontal*, (1955) installed in the Sala de Exposición de la Facultad de Arquitectura y Urbanismo, Universidad Central de Venezuela. The dynamic sculpture consists of seven major parts and three junction elements. The first part is the base, fixed to the triangular-shaped floor with three plates. The second is an element suspended horizontally, and the five remaining parts can move supported by a vertical rod. The base of the sculpture, shaped like a triangle, consists of three iron slabs, which support the assembly of pipes, rods, and plates.

Instructions

This exercise involves transforming Watanabe's painting into a Calder machine. The exercise helps to learn how to create tension and balance between visual masses in the image and transfer the principles Calder used to create equilibrium in his mobiles to pictures, using Arnheim's concept of visual weight (1983).



Fig. 10.4c – 'Birds on a Branch', Seitei Watanabe (1887 ca.).

The exercise consists of analyzing the image in fig 10.4c to identify the system of tension that keeps the image in balance. The painting creates a feeling of fleeting harmony that we can experience at the moment, but that can disappear in the blink of an eye. Figure 10.4d illustrates a

possible way to achieve this objective. However, the solution is not unique, and you are invited to come up with a different approach.

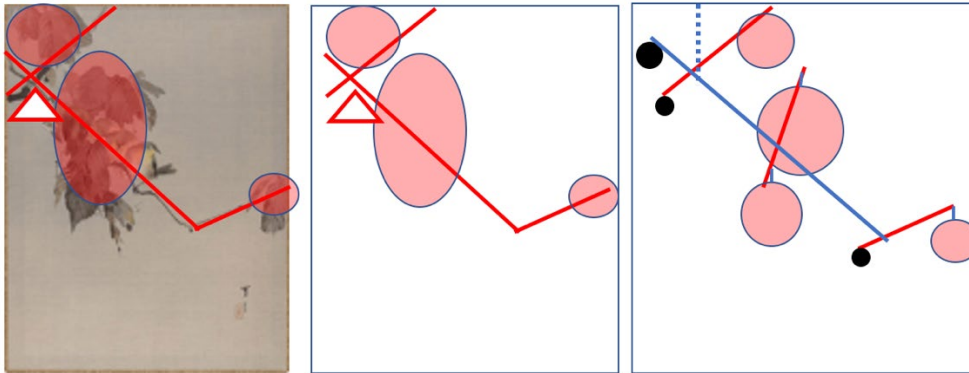


Fig. 10.4d - Steps to turn the image into a mobile.

Here are some hints:

1. Identify the main shapes in the image.
2. Identify the field of forces in the image (see chapter 7, the power of the centre) and the fulcrum. i.e. the point on which a lever rests and on which it pivots.
3. Break down the main shapes into secondary shapes (it is recommended that you use a basic shape, such as the circle).
4. Identify shape colours.
5. Try to think of the picture as an image in motion and identify potential movements.
6. Use wire, cardboard, and cotton threads to build a physical model.
7. Design all the components of the mobile before proceeding to construction (do not proceed by trial and error or improvise the shapes on the go).

References

Arnheim, R. (1983). *The power of the center: A study of composition in the visual arts*. 2nd edition. Berkeley: Univ of California Press.

Calder Foundation (2016), *On 50th Anniversary, Calder Piece Presented in New York City*, available at <https://www.artsy.net/calderfdn/article/calder-foundation-on-50th-anniversary-i-calder-piece-i-presented-in-new-york-city>

Ramírez León, Verónica Elena (2015), *La proporción áurea en las esculturas de Alexander Calder en la Universidad Central de Venezuela*, C.I.: 21.014.169, Tutor: Prof. Freddy Carreño, Caracas, Universidad Central de Venezuela, Facultad de Humanidades y Educación, Escuela de Artes, Departamento de Artes Plásticas y Museología