

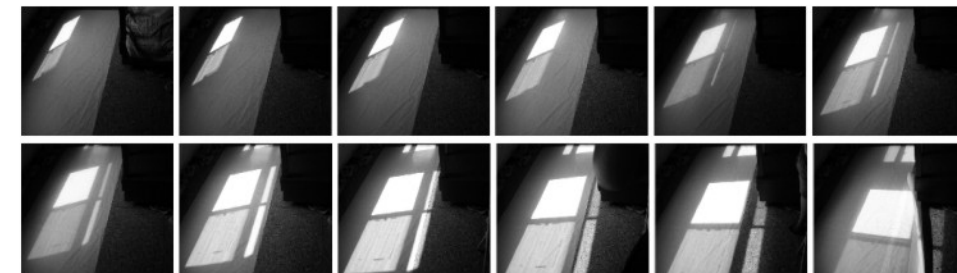
Passage of Sunlight - Architecture Non-standard

/Studio Work of Architectural Design/

Fall, 2005
Tutors: Kyle C. Yang, Shichieh Lu

/ PROLOGUE /

Gaudi's interest in second order geometry wrapped surfaces has only become widely understood since his death in 1926 through the continuing efforts to complete his master piece, [The Sagrada Familia Church] in Barcelona. Depart from his early stage of design rationalities, which are mostly based on his masterly eye and his on-site design process reminiscent almost master- sculptor-like way of working, the rational geometry was no doubt occasioned by philosophical, mathematical, and practical motives. There are three basic types that Gaudi implored, helicoids, hyperbolic, paraboloids and hyperboloids of revolution. Many of these forms occur in nature, and Gaudi was definitely interested in the relationships between the natural form, structure, and geometry. Frei Otto, Germany architect in the 50's and 60's, has created light weight structure systems that are innovative and in-formal, through a very precise set of operations. We may describe these kinds of architectures as "soft" architectures. Inspired by masters in the 20th century, as well as modern thinking such as informationalism (American sociologist, Manuel Castell's term), the design project is interested in exploring the difference between rational and irrational, informal and formal, as well as in-determined and determined in architectural design processes.



TRACING SHAPE OF LIGHT THROUGH WINDOWS

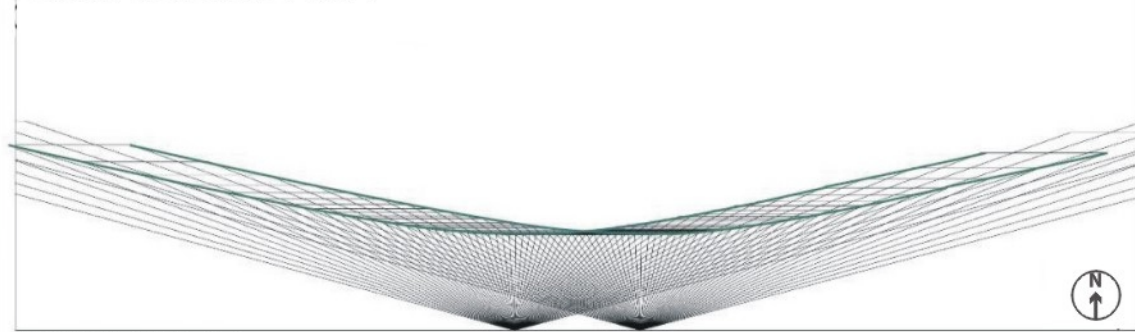
In the beginning study of traces of sunlight, I measure the transform of shadow and find out a variable to set up a system as a frame of reference for the design process afterward. Through that system referring to angles of sunlight, the elements of architecture such as walls would transform and being shaped to imply what the designers want to present and mark. Setting into the site located on the main entrance of an metro station, this design programmed as an stair passage presents the movement of time by the projection of sunlight and shadow in a period of specific time. The main concept of this project comes from the change of angle in sunlight, and also the variables, so that the design process can be determined through a precise reference of operation.



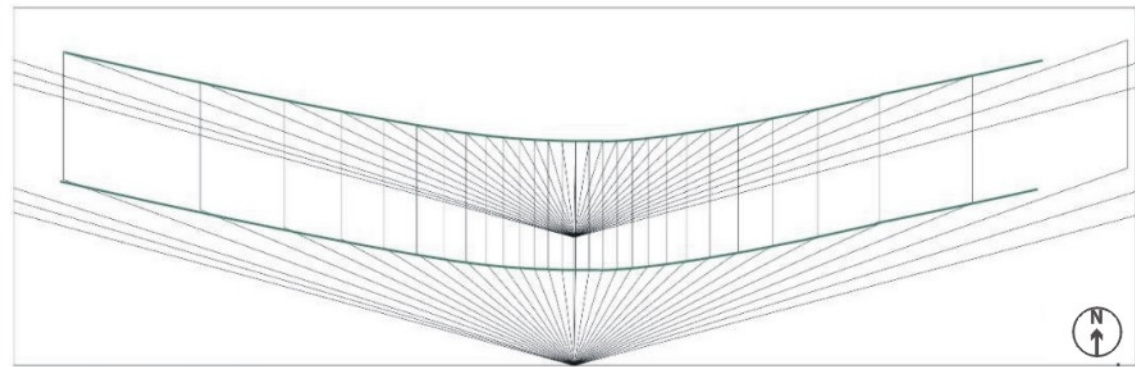
/ CATEGORIZING /

When trying to categorizing what we have observed, at this stage, we could consider what is hard as a closed system, as a static process, and what is soft as an open system, as a dynamic process, so that the movement would be understood more precisely with an important factor-time. Or I would also regard what is soft or hard as a modifiable or unmodifiable process in this project. The unmodifiable process can be manipulated with two factors that correspondent with each other and changing with time.

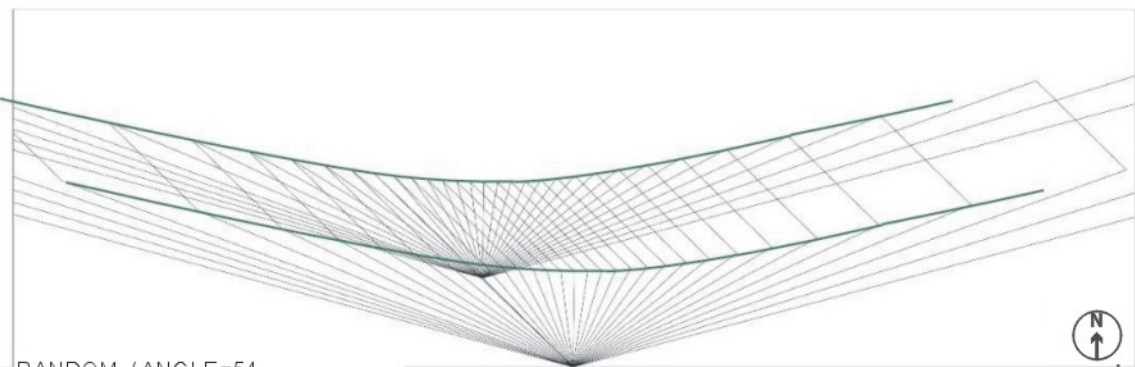
ORIENTATION OF RECTANGLE



HORIZON / ANGLE=0

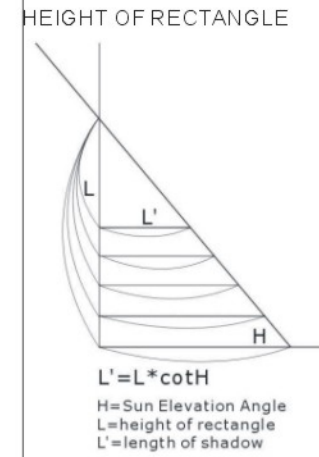
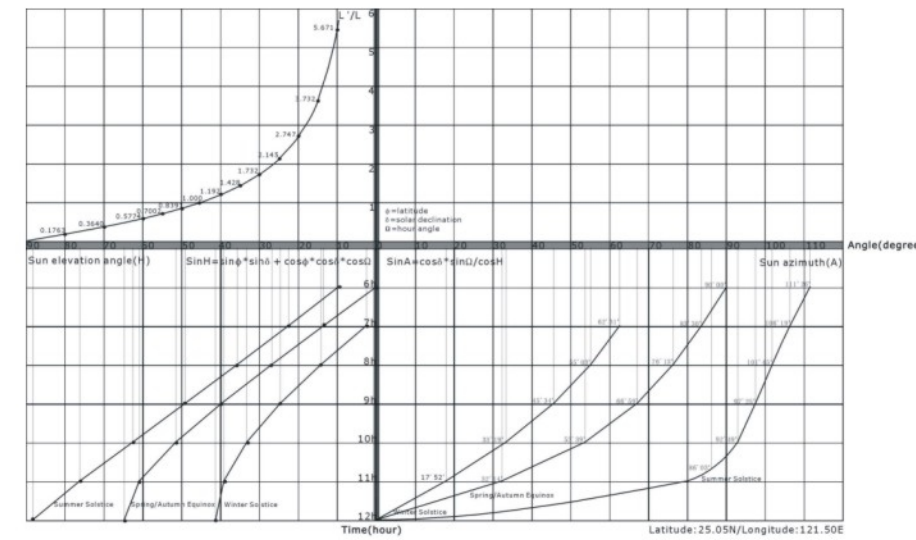


VERTICAL / ANGLE=90



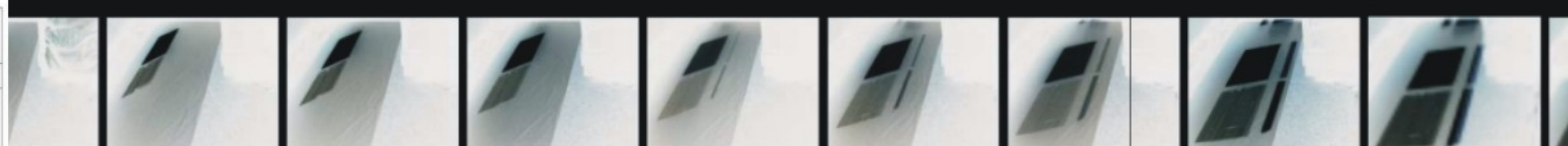
RANDOM / ANGLE=54

FORMING OF LIGHT RELATIVE TO THREE FACTORS- SUN AZIMUTH /SUN ELEVATION ANGLE/HEIGHT OF OBJECT



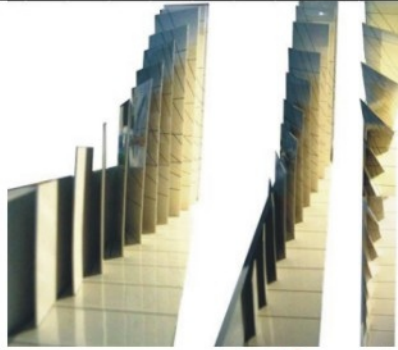
/ RECORDING /

It seems that only the sun does the most precisely movement in the climate related field: when, where, and what. Among those factors in the climate conditions putting influence on exterior environment, the result causing by the sun, in some ways, performs more obviously than the atmospheric system, like the wind and the clouds.



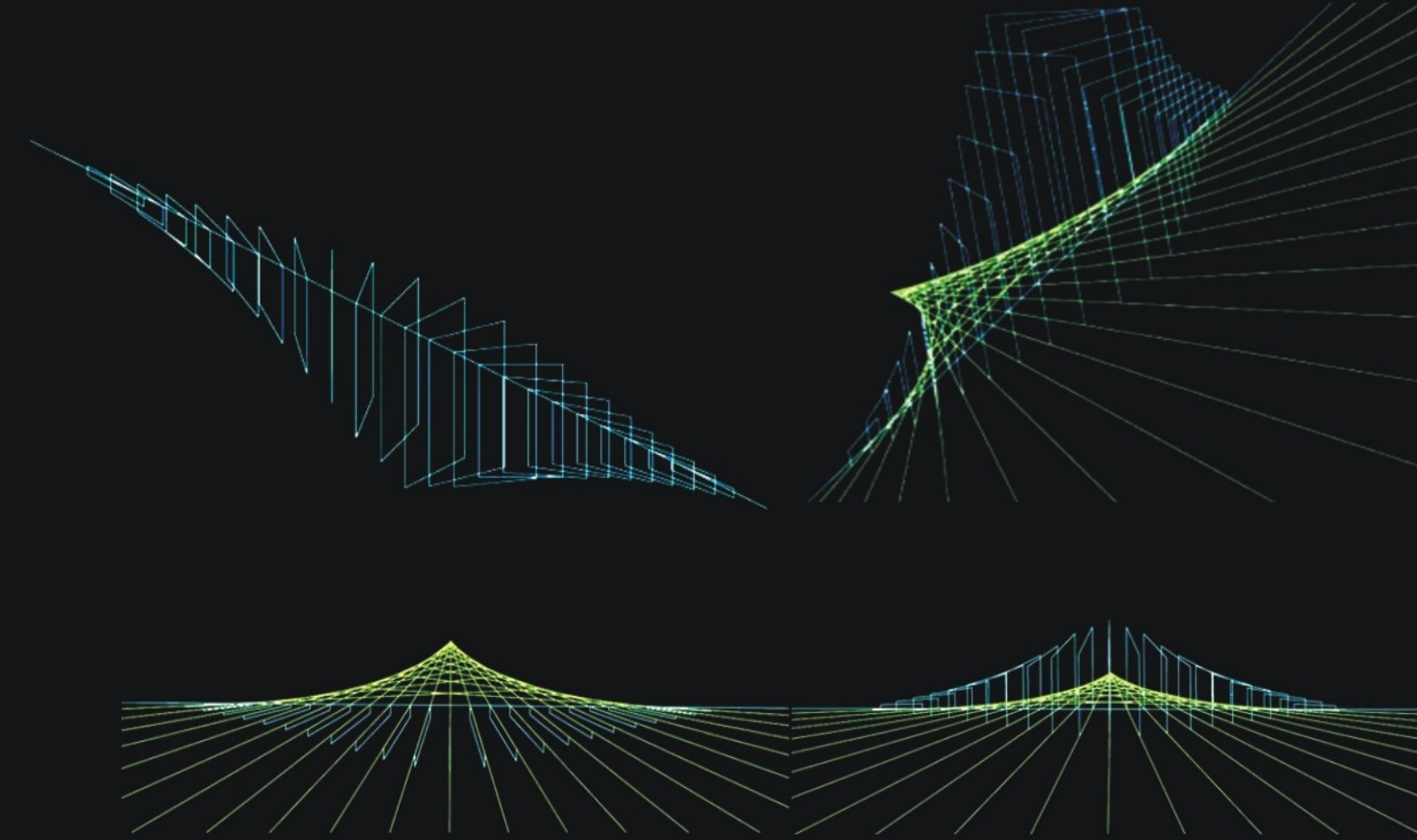
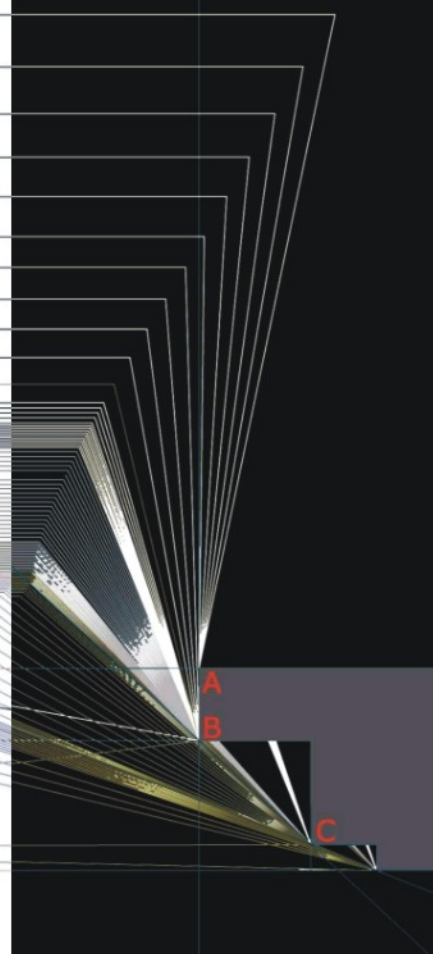
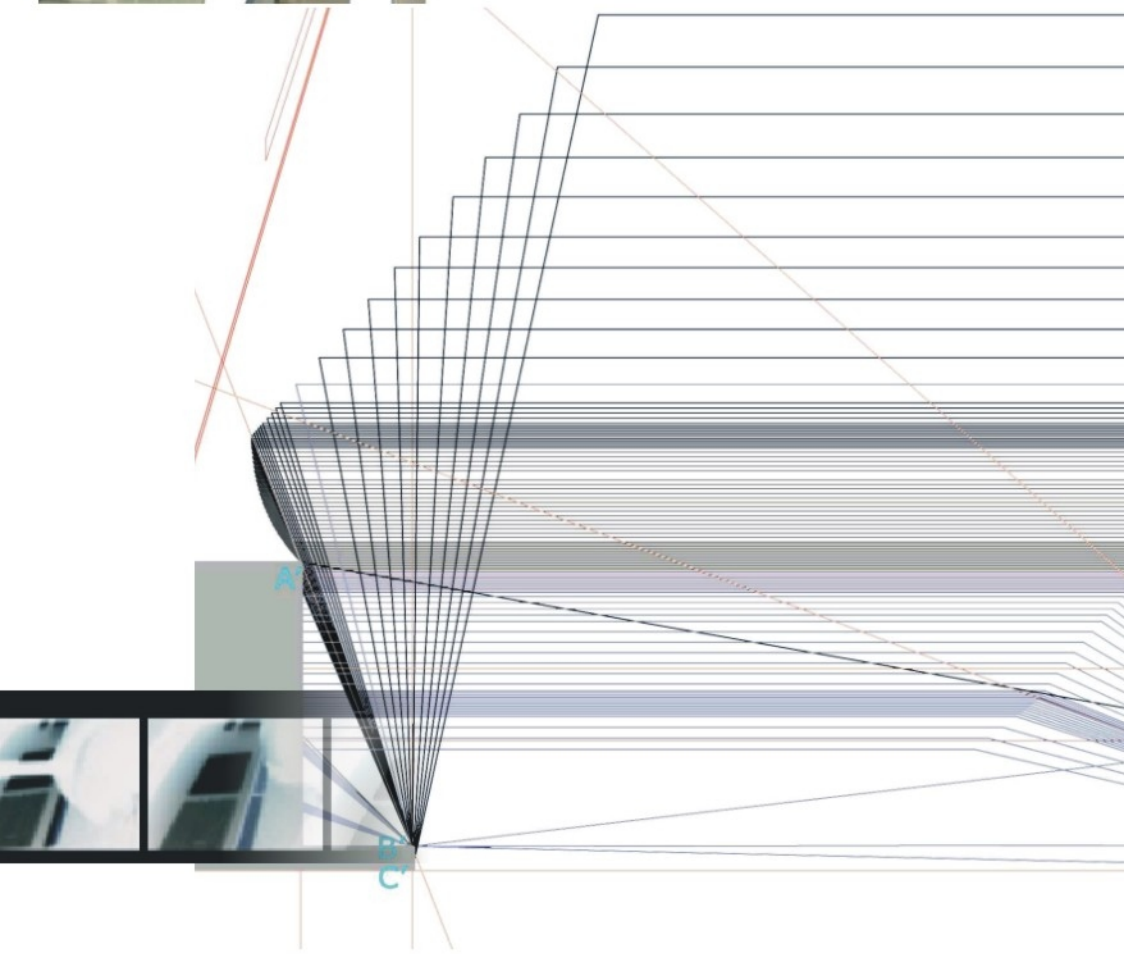
Sun-shadow are performing in an unmodifiable process, according to the celestial movement, as a linear relationship; object-projection are performing in an unmodifiable process, according to the geometry, as a linear relationship. When two processes connect as an entire that object turns into a passing medium between sunlight and shadow, each object moves individually but the whole process of the ensemble interact in succession and can be regarded as a modifiable process.

The shaping trajectory of shadow can be regarded as the composition of trajectory formed by each point of the object. For rectangle, the trajectory of shadow are composed by the projection of its two top points, that means the shadow of rectangle is controlled by that points. It is effected in three aspects-the height, the orientation toward north and the angle of tangent.



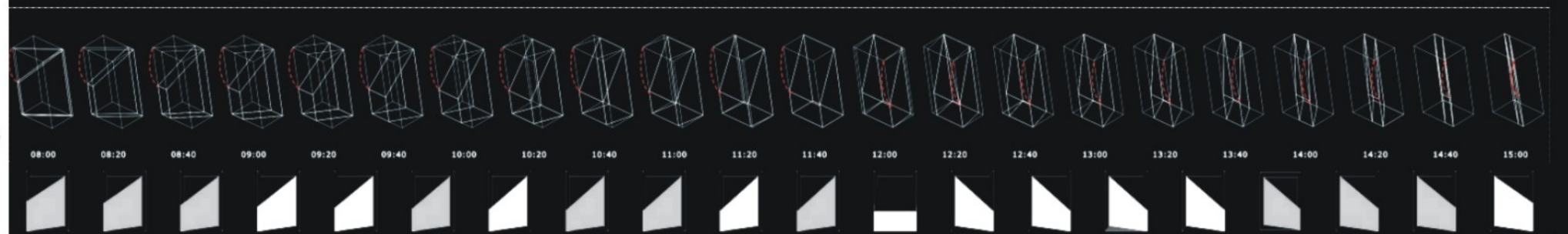
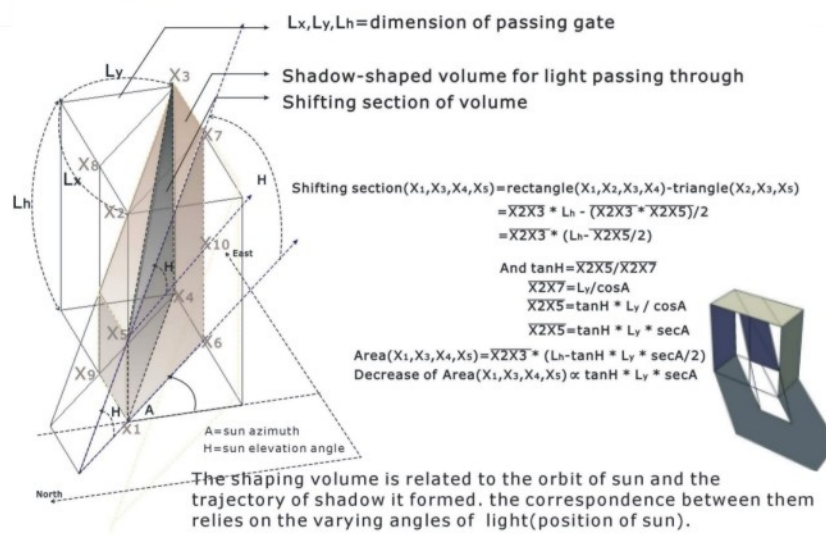
/ DIFFERENTIATION /

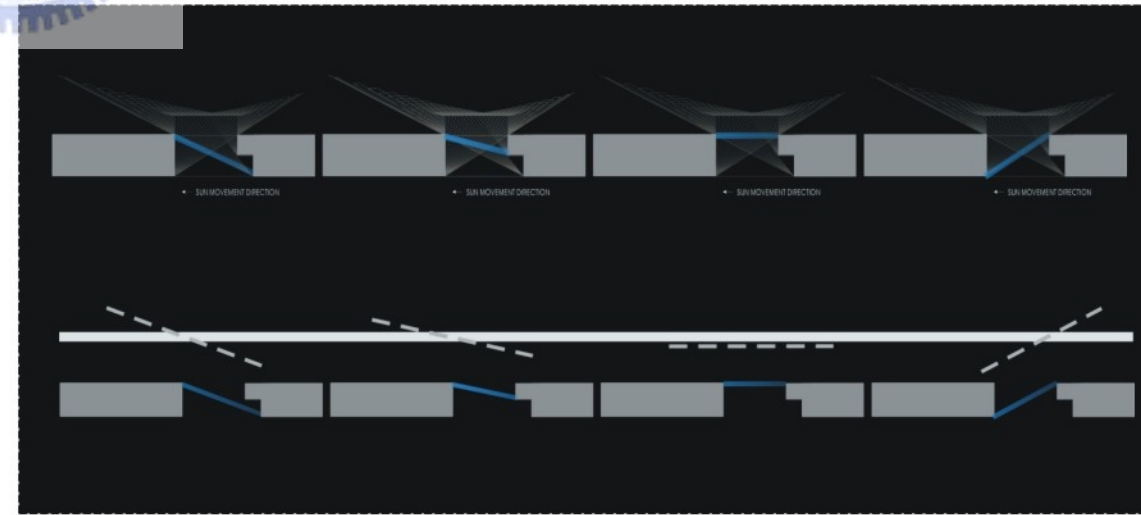
As the two processes connect into an entire, the medium turns into a passing gate, mediating the sunlight from outside to inside. By manipulating that gate, as a controlling throttle, the whole process of the ensemble interacts in succession and performs variably.



/ DIFFERENTIATION TO REVERSE /

Dynamic forming of the process to reverse volume for generating the unchanging, fixed shadow.



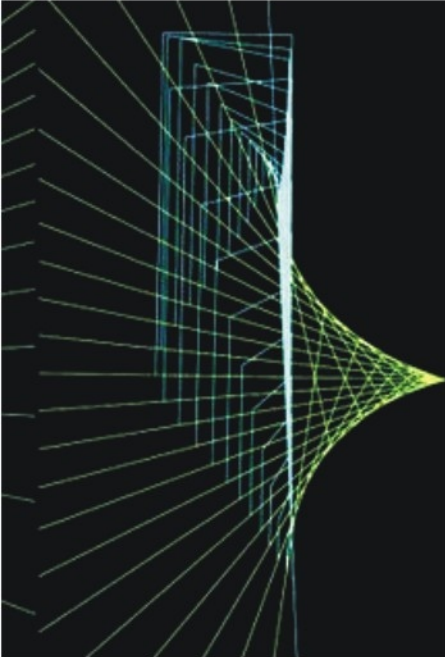
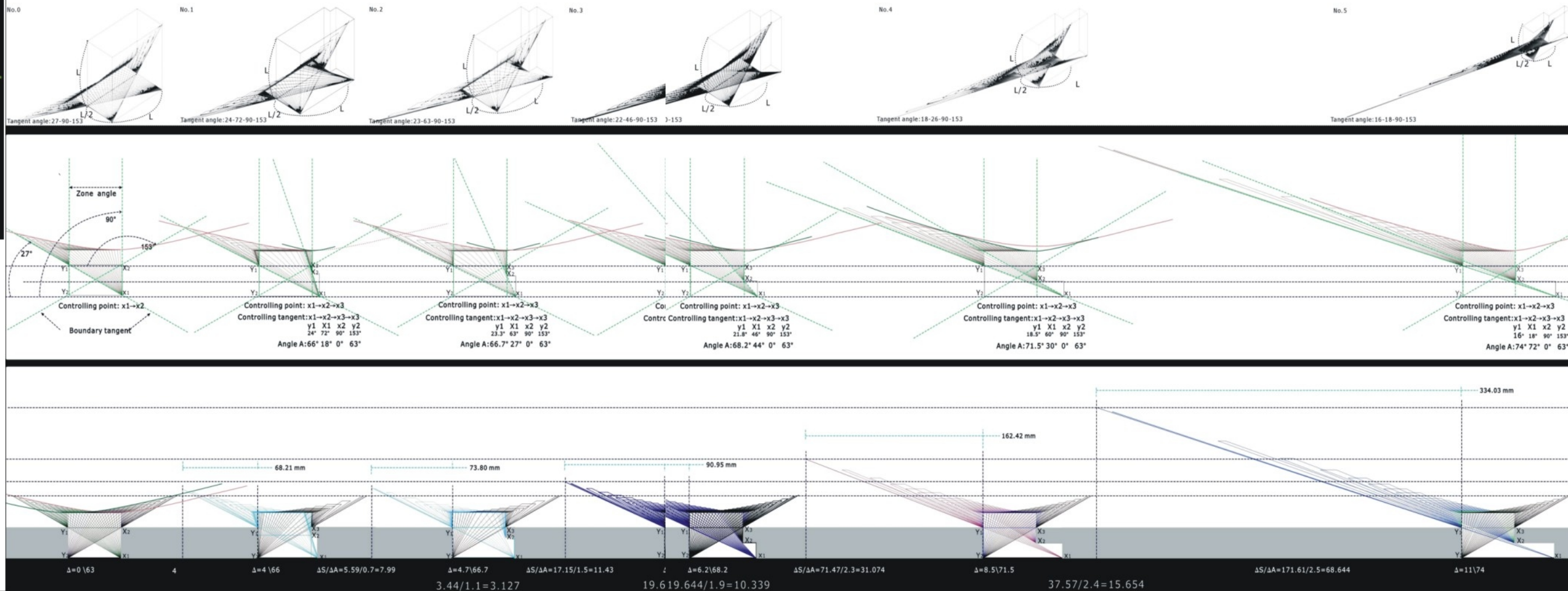


DIFFERENTIATION IN SECTION

/ALGORITHM /

Passing gate of sunlight
[As a throttle controlled by tangents of boundary]

5 examples of boundary in different tangent variation





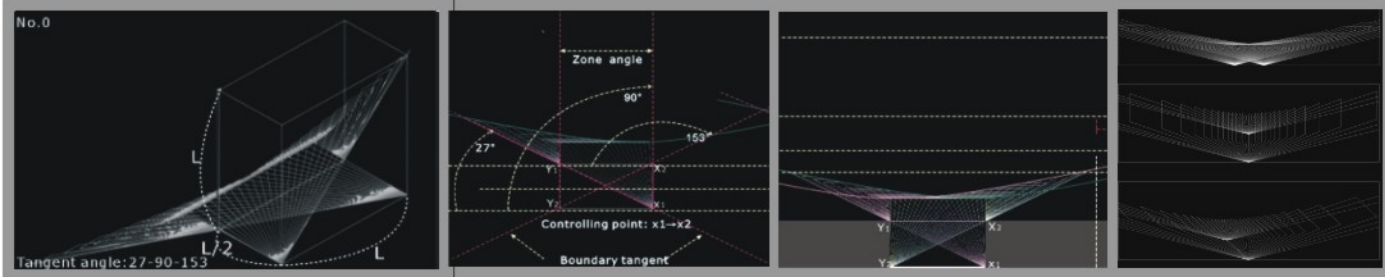
/ ENLARGEMENT /

Following the moving rule through the window, the re-setting crisis of the opening performs specific showing of sunlight as a scenario representing of time.

Interruption→passing gate

By reforming the voids on the surface, playing the part of a throttle filtering the sunlight from outside to inside.

Translation by the sequence of connection
 [Union→opening • composition→surface]



Text

- Prototype→performing from the sun
- H-elevation angle→unit variation
- A-sun azimuth→sequential variation

Grammar

Unit=word
 Unit+unit= words=sentence
 sentence+sentence=paragraph
 Unit-angle
 Unit+unit= angles in a day(A)

Sentence grammar

Maxima words :max(A)= 111/108/90/65/62 -
 (maxima sun azimuth in a day)
 Word-word: same letter Ex: chagrin-nescient

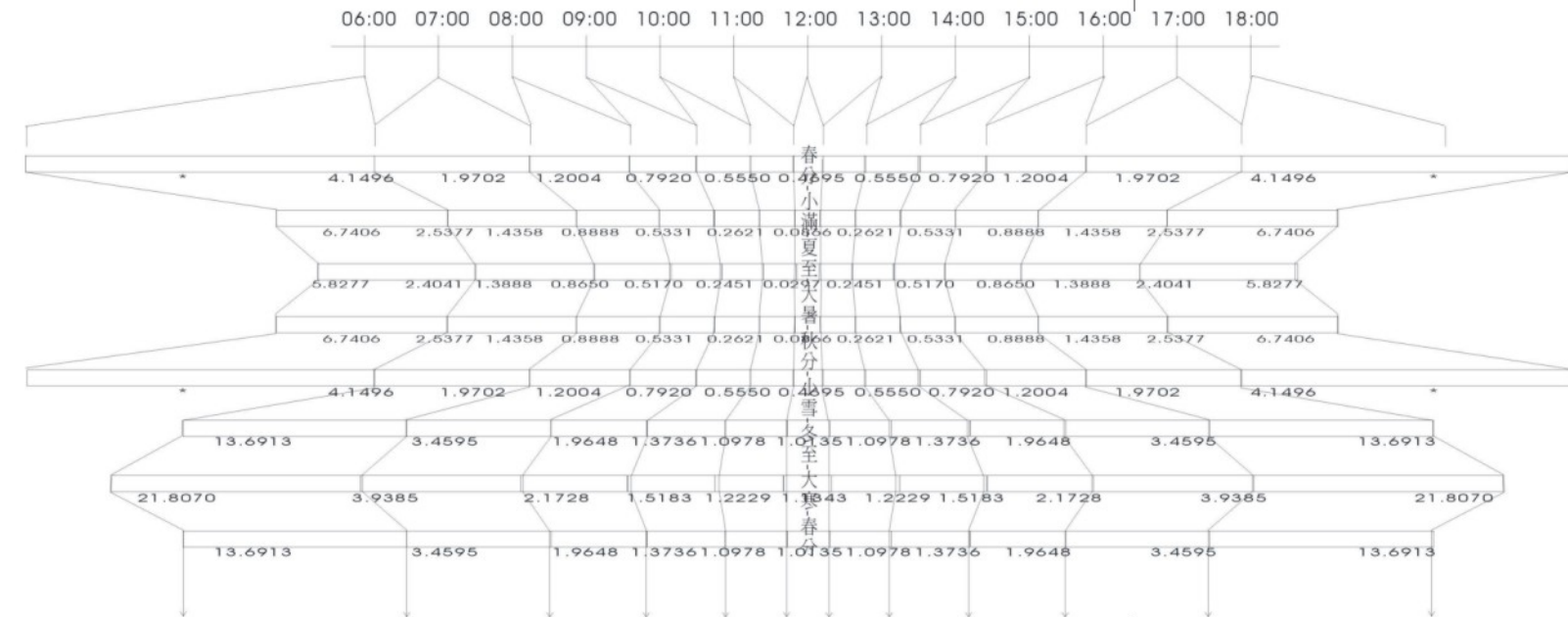
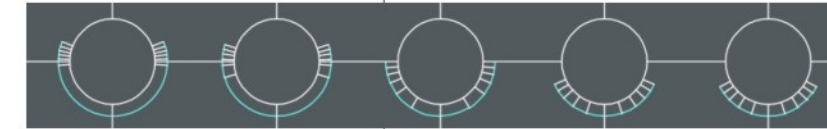
Paragraph structure

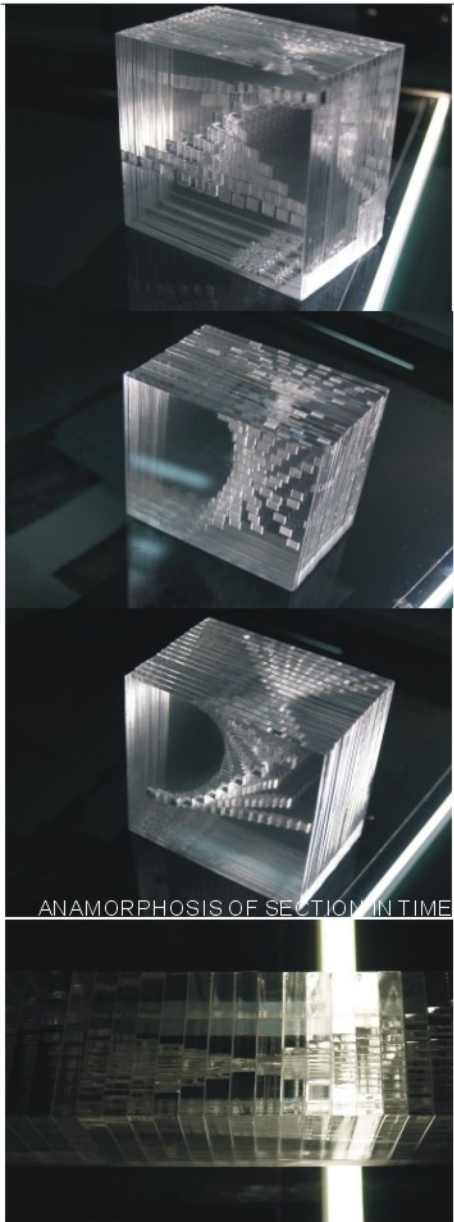
Spring Equinox=Autumn equinox=1
 Grain buds=Great heat=2
 summer solstice=3
 Great cold=Light snow=4
 winter solstice=5

1 →2 2 →1 4 →1 3 →2 5 →4
 →4 →3 →5

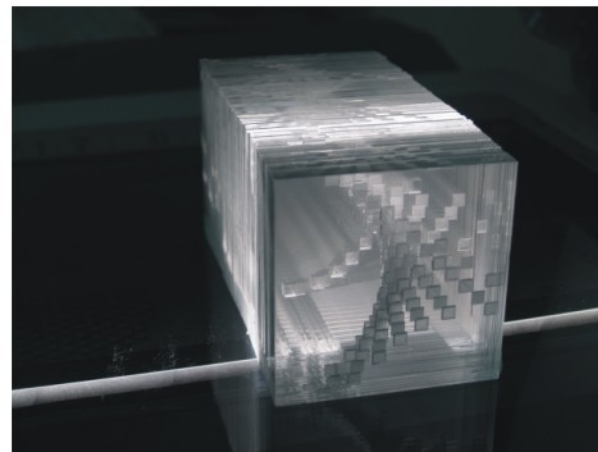
/ ANALOGY /

The vocabulary list is defined by the variation of shadow length in every period of time.



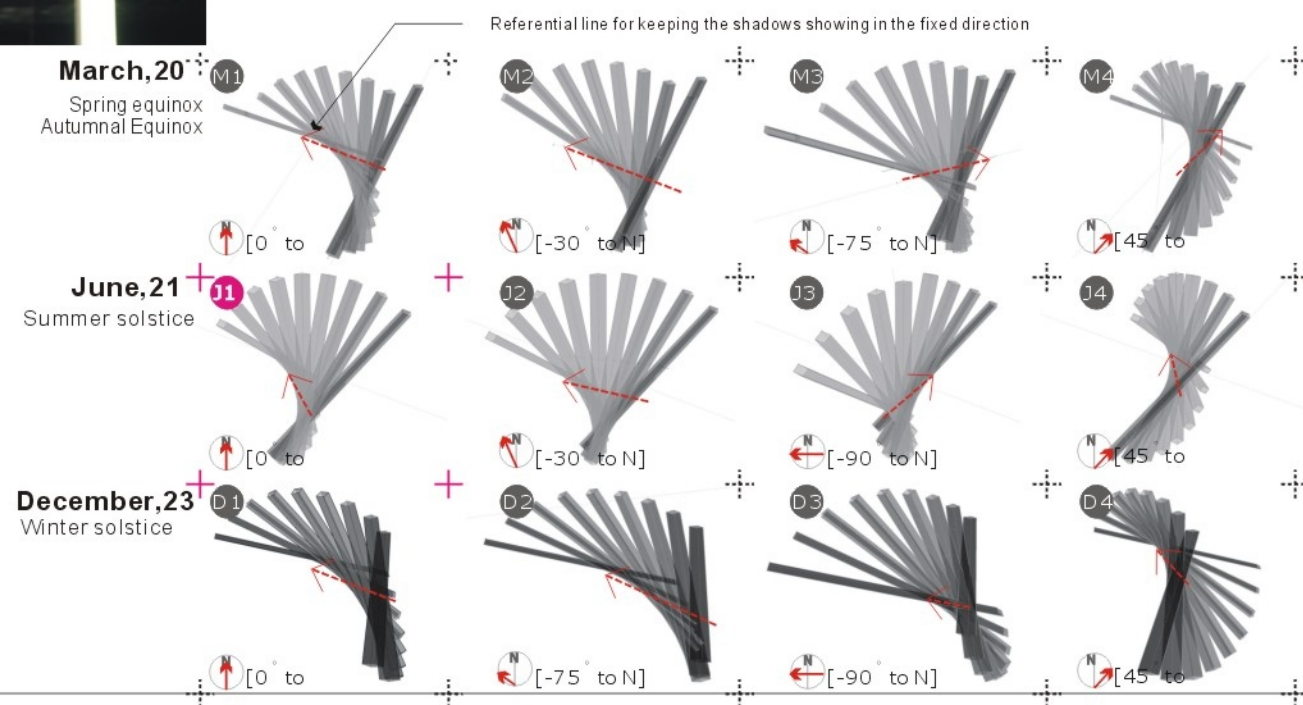


ANAMORPHOSIS OF SECTION IN TIME



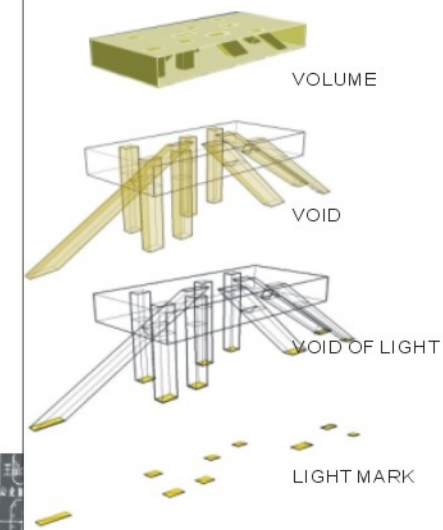
/ TRANSFORMATION /

Prototype list (of specific date) -The transformation of vocabularies



/ CONCEPT /

Architecture renders the identity of days, character of seasons.



the site located on the main entrance of a metro station

At the final stage, I choose one of the prototypes-the J1-to develop and form the space. By setting into the site, this design programmed as a passing space, a public stair, presents the movement of time by the projection of sunlight and shadow in a period of specific time.

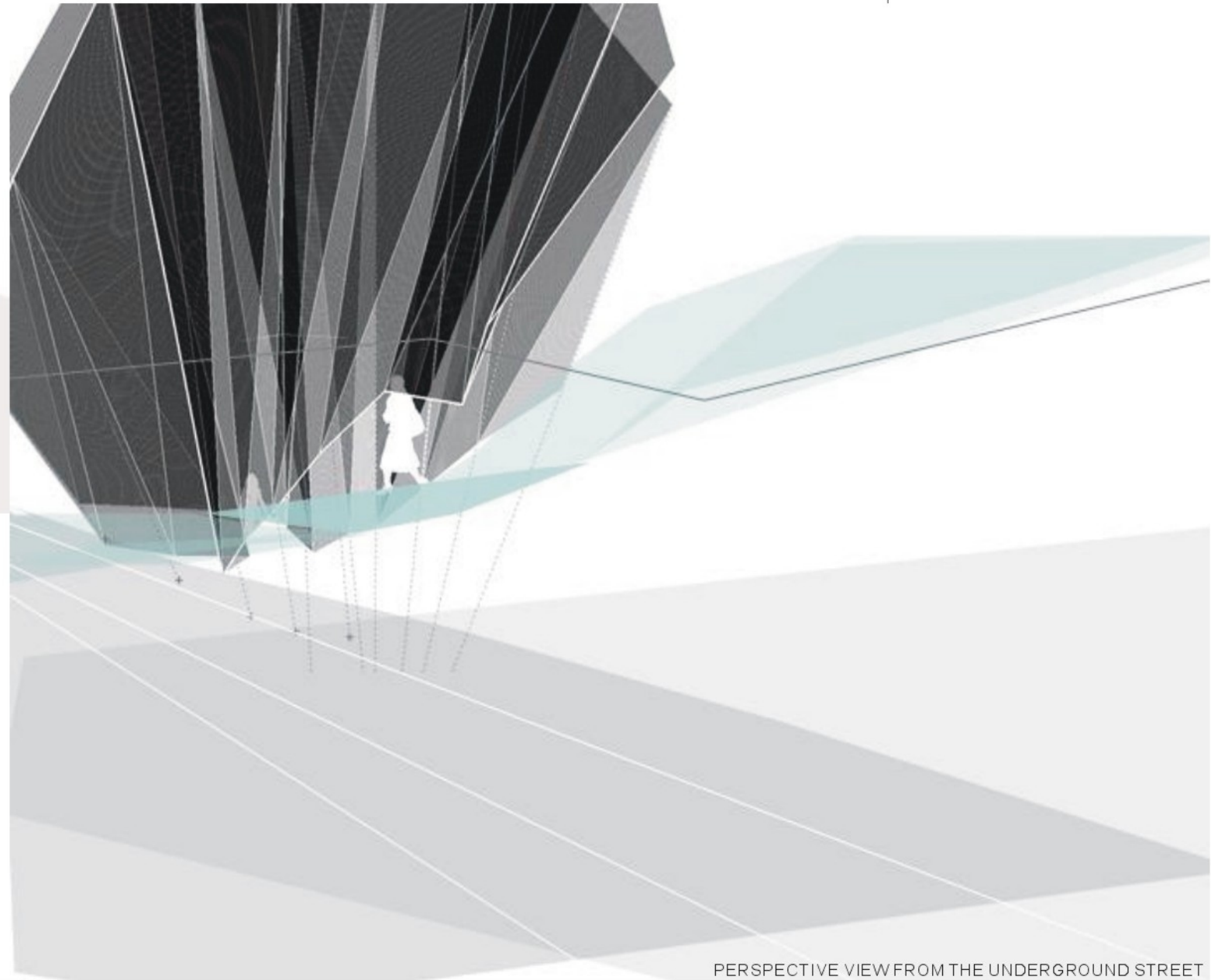
On the summer solstice of every year, from 8:00am to 4:00 pm, the voids on the top of the stair would light up the stage, one by one, for an hour.

Playing as a time marker, the space renders a look of invisible time and, at the same time, generates itself by that.

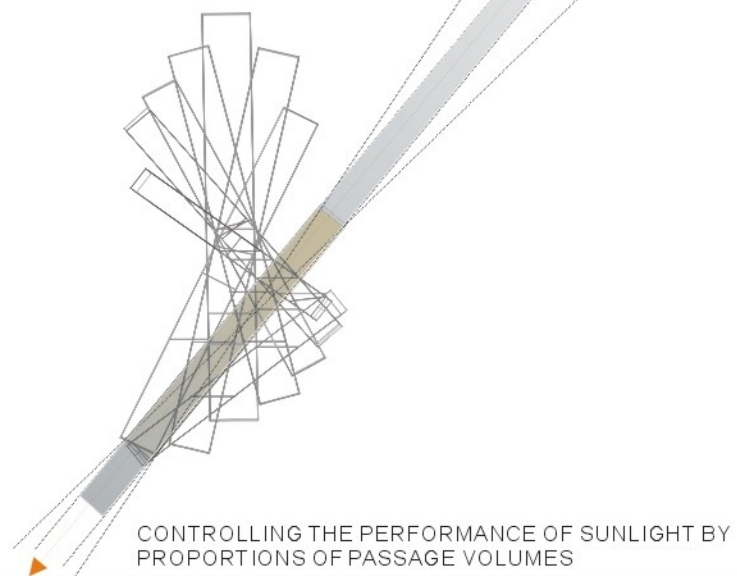




PERSPECTIVE VIEW FROM THE DOWN STAIR



PERSPECTIVE VIEW FROM THE UNDERGROUND STREET



CONTROLLING THE PERFORMANCE OF SUNLIGHT BY PROPORTIONS OF PASSAGE VOLUMES

