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In our manner we'll transport our topic into another world — linked to math: geometry. We'll delve into the expressive potentiality of the geometric directory as explored by Vutemas, De Stijl, the Bauhaus and... artists of all times.

PHOTON PROPAGATION

JEAN-MAX ALBERT

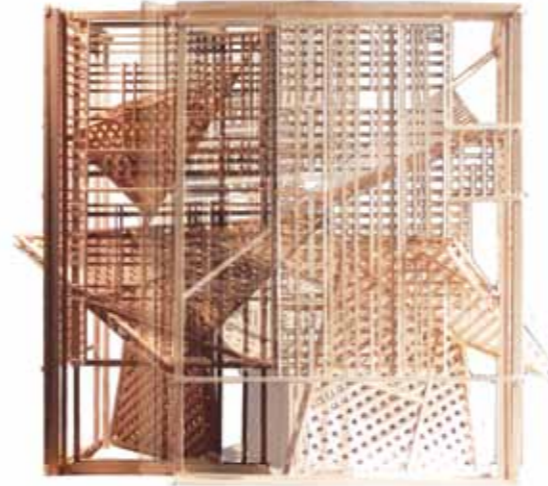


Fleeting White Space

Photon propagation

The probability of a spectator spontaneously making a relationship between the treillis structure shown here and the spread of the particle of light is slight... The role of a title is to propose a bridge between what is seen by the spectator and the artist's intention. "Nativity"; "Sacrifice of Abraham", "Girls with a Turban", «Red square on Blue», do not say a lot more than what is seen, but a title such as Rebecca et Eliezer offers, in plastic terms, a formulation of the dialectic of a biblical myth (1).

With «abstract» subjects, relationship between title and picture can be particularly rich, as in Paul Klee's work. If Photon Propagation is not of an abstract phenomenon strictly speaking, the notions carried by the physics of particles can be easily considered as such — and may need a development.



Light

In antiquity, light was represented as a jet that poured from the eyes, as water from a hose ; the idea was that one saw an object by directing this stream of light. Modern theory however, already advocated by Pythagoras, envisages that light enters our eyes instead of exiting. Light emanates from every luminous body in all directions bouncing off everything until it reaches our visual perception. Immediately, come thousands of questions. Does light have a form? A size ? What is its speed? Does it change the objects it strikes? Then



arises the question of its consistency with a first theory : light, as fragments of a bomb that endlessly explode, composed of myriads of small particles, thrown in all directions. Representation of light was always schematized by straight lines, sometimes with little hands, or arrowheads, or sequenced like Giovanni di Paolo's wonderful interpretation. Then we came to a quantum named photon and its behavior with a new question : Is light a particle or a wave ? (2) New visual formulas are offered in magazines. The rationality of diagrams brings a certain efficiency but they are mostly constrained in conventional trends and heavily conformist iconography.

Anyway, we are warned, as early as 1935, that : « A sub-atomic phenomenon is inevitably invisible : non-optical. Only mathematics can describe it.» It is a founder of quantum physics, Erwin Schrödinger, who advises : "A satisfactory model is not only inaccessible in practice, it is not even thinkable." (3)

Now that we are facing — if one can say —, the non-representable photon, then, taking it as a subject for a visual artwork would be leading to nothing... Precisely : where light propagates, in this space between our eye and what we are looking at, we are used to consider that there is nothing! Let us hypothesize. If this phenomenon has an existence — let alone light...! — then, something of it can be evoked. The artist reassures himself : nobody asked him to provide anything in terms of a scientific model — not that anybody ever asked something in the first place...

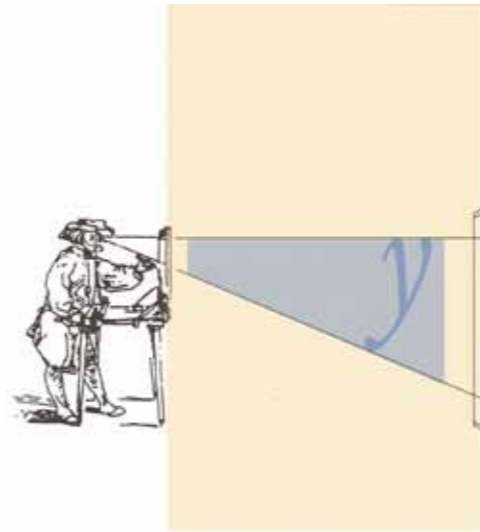


Invisibility

To have a world appearing involves three factors : first, we obviously need a world, then people supplied with organs susceptible to interpret light effects, then a photon spread that will make the first appearing to the second. As effects of the wind on a sail are seen without seeing the wind, the stream of photons that makes the world visible, is invisible. This light flow is situated between us and what we see. For a painter, it is a «something» between a model and a canvas : an empty space, or at least considered so. This space, this «void» where light propagates is, (whatever we do!) in front of us, obstinately perpendicular to our eye It belongs to depth, a dimension, as Berkeley observed, that would only make sense to a viewer who see it laterally.

This statement may be evoked by a sectional drawing, but to consider de facto the beam of our view under another point of view one must have the gift of ubiquity.

Light itself — not what is lit — can be seen as incandescence, but its flow only materializes when crossing dust, fog, or water sprays. The impressionist light of the painter or sun sliver captured by a sprinkler gives a fragmentary idea of what is concerned here.



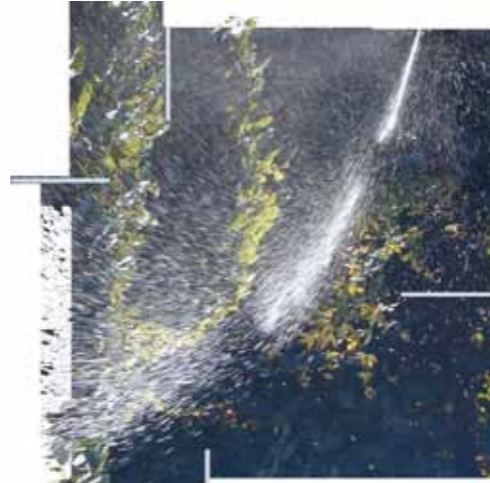
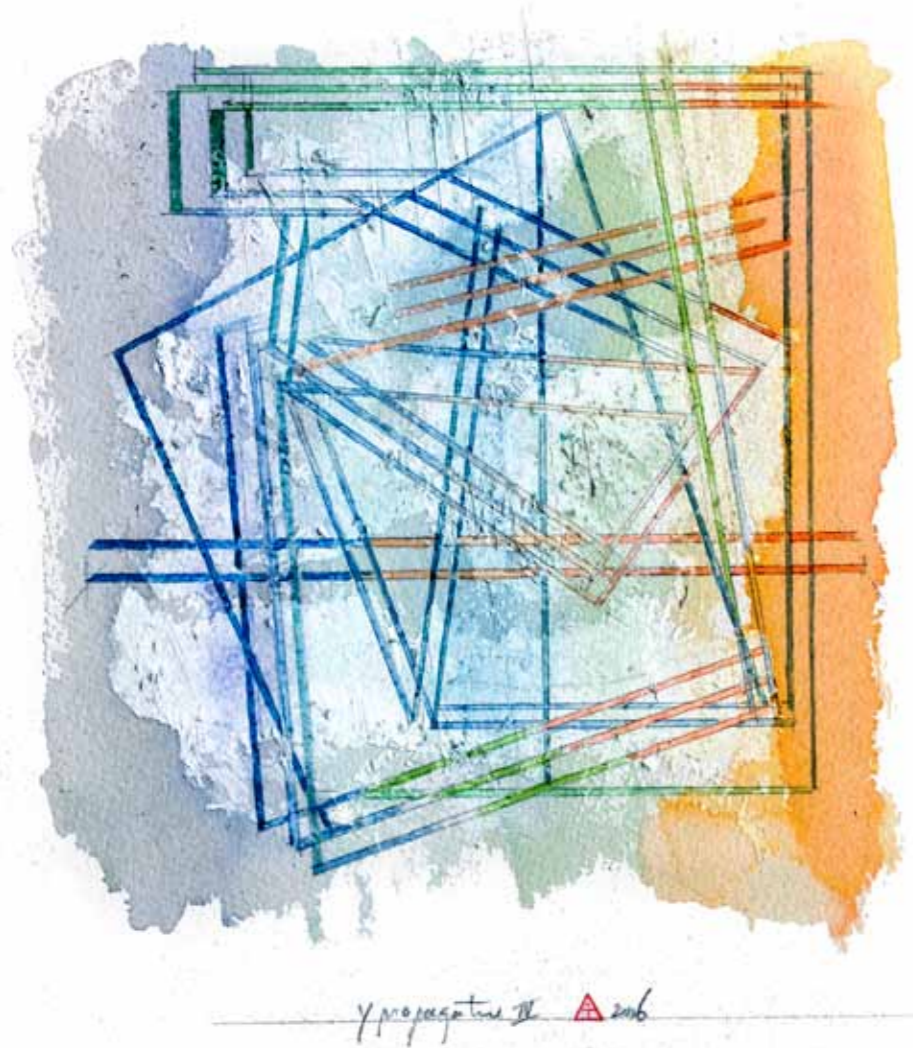
Structure

Paying attention to the physicist resorting to mathematics, we remember that a mathematician doesn't study objects themselves but relationship between objects : replacing an object by another is indifferent if the relationship doesn't change. Matter doesn't interest them, only form.

We certainly renounce the idea of representing a photon itself but we can consider its relationship with objects, its behavior, its omnipresent trajectories. In other words, and a totally different scale : considering a waterfall or a drop of water. A cascade may take extremely diverse forms but keep a constant basic structure. Alfred Korzybski advanced the idea that “to be effective a language must be similar in its structure to the structure of the event it wants to represent”.

So, to represent such a spatial and invisible event, do we need a visually light structure that would let simultaneous space movements visible. There is a building material — and only one — that has the property to define a plan without closing the space within its three dimensions : trellis. (Glass is only transparent: it does not tangibly indicate the plan it occupies). Depending on the point of view, the trellis allows a viewer to see what lies beyond. Both continuous and discontinuous, this structure, you might say — and in a very elliptical way, — replies to the reticular wave train of photon propagation.





Geometry

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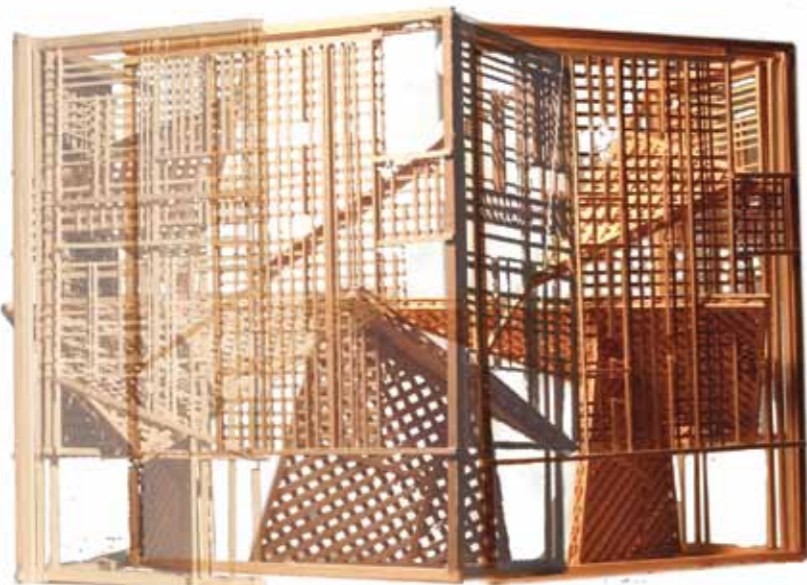
Triangle is a figure that offers an equivalent structure to photon's straight rebonds. Both static and dynamic, the triangle represents a kind of movement without displacement that reminds us of the fast spread of photons, like a river of static appearance.

Photon propagation is a priori unlimited in space. It has no other contours than those of the solids which it strikes. This disposition of photon flow and their meeting with the solid elements of the world is transposed by the confrontation of triangle dynamics with verticals





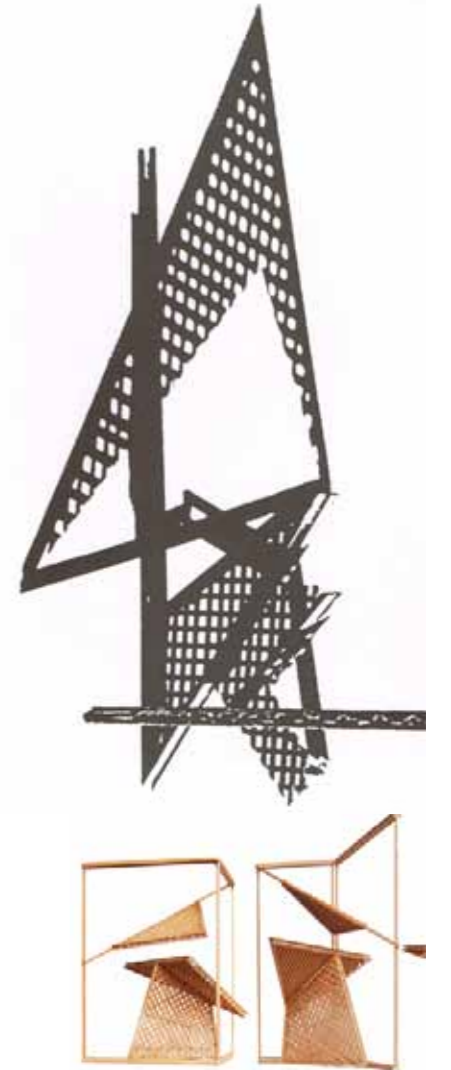
Superposition of simultaneous different angles emphasizes the complex variety of exchanges between photons and a given environment



rectangles, symbolic of a built space — say architectural.

This suggestion of infinite articulations and inflections provoked by photon propagation implies considering only a fractional part of them : to materialize all the trajectories would correspond to recreating a filled volume, like a mold of the space, then obscure... The choice of a few trajectories will be imagined according to the gaze of our mind in an inevitably naive approach, at the model of primitive artists attempting to show the invisible. Now, photon propagation materialized in the form of a treillis architecture, remains an essay of transposition which has nothing scientific but the interpretation of the actual informations describing the phenomenon.

“As the gaze of our mind becomes able to perceive much smaller distances and much shorter spaces of time, we find that nature behaves in so radically different a way from what we observe in the visible and tangible bodies around us, that no model (according to our experiments on a large scale) can no longer be ‘true’» Schrödinger states.



«Both-And»

The confrontation of triangle and orthogonal elements with the variable intensities of a treillis structure lead us to a treillis architecture that could be monumental. This «architecture» joining the observation of architect and theoretician Robert Venturi who argues for a complex and ambiguous architectural expression : “Elements can be simultaneously open and closed, round and square, structure and space.» Venturi opposes the world of Both-And, to the One or the Other. Couldn't we see here the respective emblems of particle physics and classical physics ?

Doesn't propagation of light deserve a monument ? We could imagine this as that monument — In the absolutely different scale of our visible and tangible world, between the fluid shadows that we call space and time, light could come to play with its own monument.

Further, this structure could certainly make a fabulous support for plants, great friends of photons.



Notes

- 1 Claude Lévi-Strauss
Regarder, écouter, lire
Plon, Paris 1993
- 2 Banesh Hoffmann
L'étrange histoire des quantas
Le Seuil, 1981
- 3 Erwin Schrödinger
Physique quantique et représentation du monde
Le Seuil, 1992
- 4 Alfred Korzybski
Science and Sanity
IGS, 1994
- 5 Robert Venturi
Complexity and Contradiction in Architecture
The Museum of Modern Art, 1966

Ouvrages Consultés

Jean-Marc Lévy-Leblond
De la matière
Le Seuil, 2006

Etienne Klein
Petit voyage dans le monde des quanta,
Flammarion, 2004