CHRIS NOTES on

Yve-Alain Bois' METAMORPHOSES of AXONOMETRY a.k.a. VORMVERANDERINGEN van de AXONOMETRIE

Chris NOTES

Metamorphoses of Axonometry. Yve-Alain Bois

In this essay, Mr. Bois addresses how the axonometric drawing, a drawing in which one can see three sides of a building or object simultaneously at true scale, re-emerged in the early twentieth century. Along the way, he gives the reader background on some of the drawing types architects have used throughout history. The article is from a larger collection:

- BOIS, Yves-Alain. "Metamorphoses of axonometry", De Stijl: Neo Plasticism in Architecture. Delft University Press, Delft, 1983.

These two web pages will really clarify some ideas graphically, and it might be a good idea to check them out prior to reading the article:

http://en.wikipedia.org/wiki/Architectural_drawing

http://wapedia.mobi/en/Axonometric_projection#4.'

Page 146.

The article begins with a quotation by Claude Bragdon, an architect born in Oberlin, Ohio who practiced in Rochester, New York. He was a capable designer, with initial stylistic leanings similar to those of Louis Sullivan. However, Bragdon was absolutely enamored with the Art Deco and Gothic Styles, which he saw as natural and organic.

What is interesting about his quote: Bragdon points out that axonometric is how the building is conceived in the minds' eye. True! Because it is difficult...if not impossible...to actually SEE a building in axonometric. Buildings are naturally seen with parallel lines converging away from them, so that parts of the building that are far away look smaller. In axonometric, all lines are correctly aligned and, depending on the type of drawing, often the correct relative size.

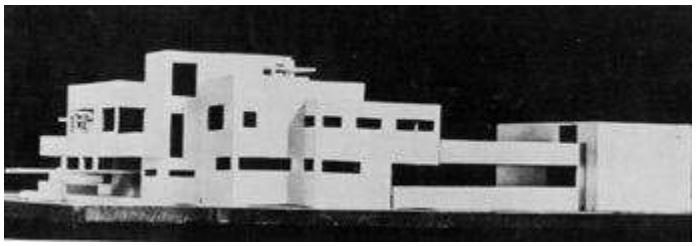
Bois goes on to talk about how no one today has an appreciation for the origin of the axonometric drawing, and cites numerous times it has been used, and for what purposes over the centuries. It had been commonly used for battlements, mechanical drafting, geometry, and painting, but never was a mainstream player in architecture. It was known, but not really embraced.

Page 147.

This part is really an eye-opener. We know the specific date and time that axonometry hit the big time! Two Dutch architects, Van Doesburg and Van Eesteren, showed off drawings at the De Stijl exhibition in 1923 in Paris. De Stijl means "THE Style" (but it is assured that these Dutch guys didn't think it was the ONLY style!)

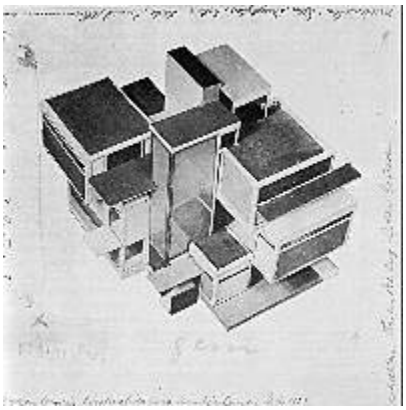
Bois wants us to know about the intellectual exchange that was occurring between painters and architects at the time, and how important this was for their creative advancement. Painters showed architects how powerfully axonometry could render their ideas.

On this page, you'll find some examples from that exhibition.



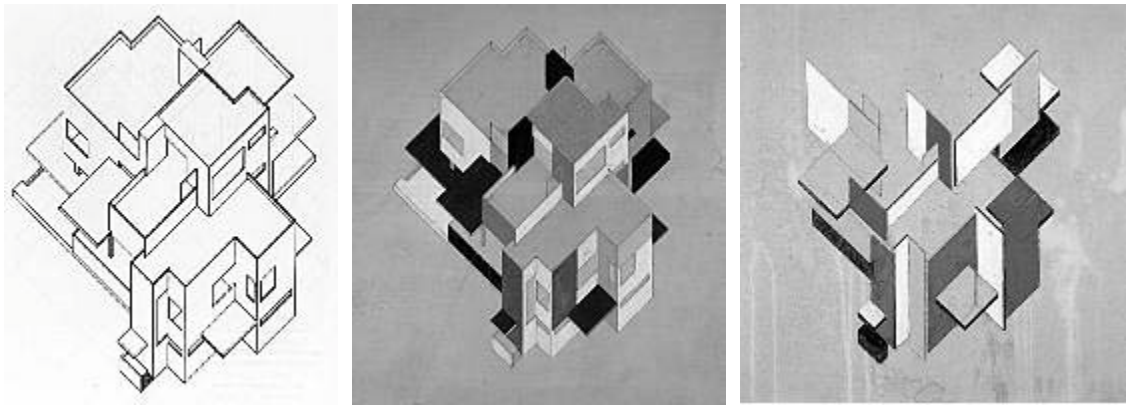
Van Eeesteren and Van Doesburg.
Model for Maison Rosenberg, 1923.

(PHYSICAL MODEL)



Van Doesburg and Van Eeesteren.
Model for Maison d'artiste, 1923.

1 2 3



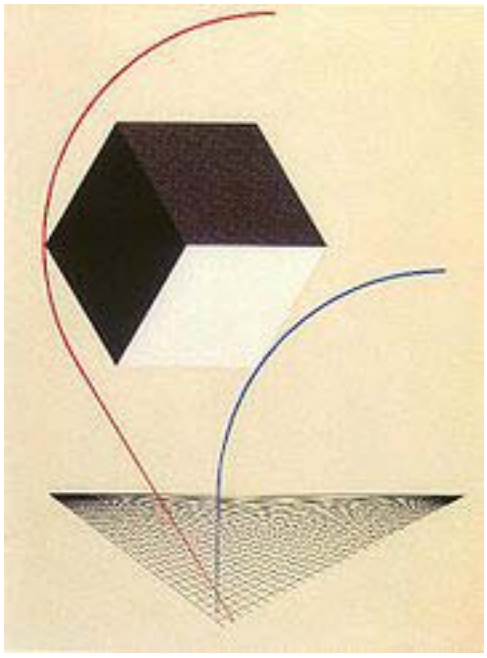
Van Doesburg:
Maison Particulière, 1923

I found these images grouped together on one site, which I presume is a school in Zurich, Switzerland. You can reference them and other similar ones here, along with notes about the De Stijl style.

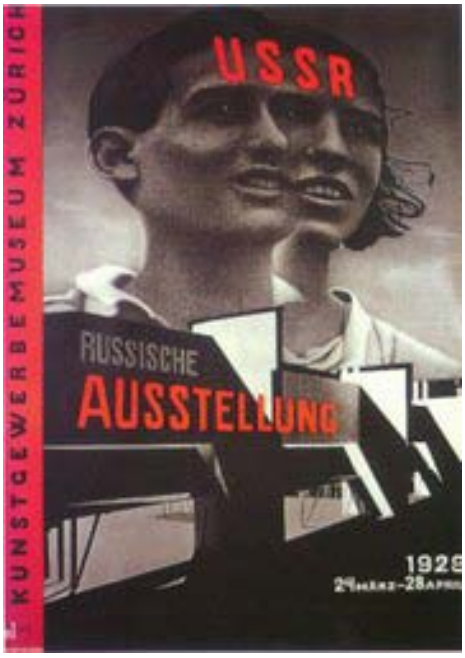
http://caad.arch.ethz.ch/teaching/nds/ws96/script/object/st-object2.html

To continue, Bois talks about the Russian artist and architect El Lissitzky and his view of "suprematist space." Some background, among other things, this guy made a lot of geometric shapes on big sheets of canvas. He was a communist, but his primary love was geometry. He liked to portray his ideas through powerful geometric shapes.

Here are some of his artworks:



A Proun, 1925



Poster for Russian Exhibit in Zurich

Suprematism was an artwork about feeling, purpose, personal meaning...
but it was expressed through geometric forms in dynamic arrangements.

How does it relate to axonometry? Lissitzky saw the canvas as extending infinitely on all sides, and in the foreground and background.

Page 148.

Now, before we get into the study of Renaissance perspective, Bois points out some flaws that became apparent to art historians who studied this kind of representation. The main problem: it only works when you stand still and look in one direction. They are fixed images frozen in stone. For some of the artworks, you actually have to be standing only in one specific place for the illusion to work.

Triumph of the Jesuits
Ceiling of the Church of Saint Ignatius, Rome
Andrea Pozzo
1691-1694

Then Bois talks about some theological implications of perspective, and from these one can garner how important people in the Renaissance considered the correct depictions of their world and ideas.

To reinforce: in ordinary linear perspective, the left and right vanishing points meet at an infinite distance away. And the locations of the points can be ascertained! In axonometric, all edges are parallel, so the vanishing points are nowhere to be found.

Page 149.

Bois talks about some key figures and their thoughts on the "proper" sets of architectural drawings. He also mentions who agreed with these great artists and thinkers, and how they utilized their methods.

Vitruvius - Plan, Elevation, and Perspective

Alberti - Orthagonal, Plans and Elevations. Must occur on different sheets of paper.
Must be accompanied by a Model!
Never use perspective! That is for paintings, not architecture...
It is a false representation.

Page 150.

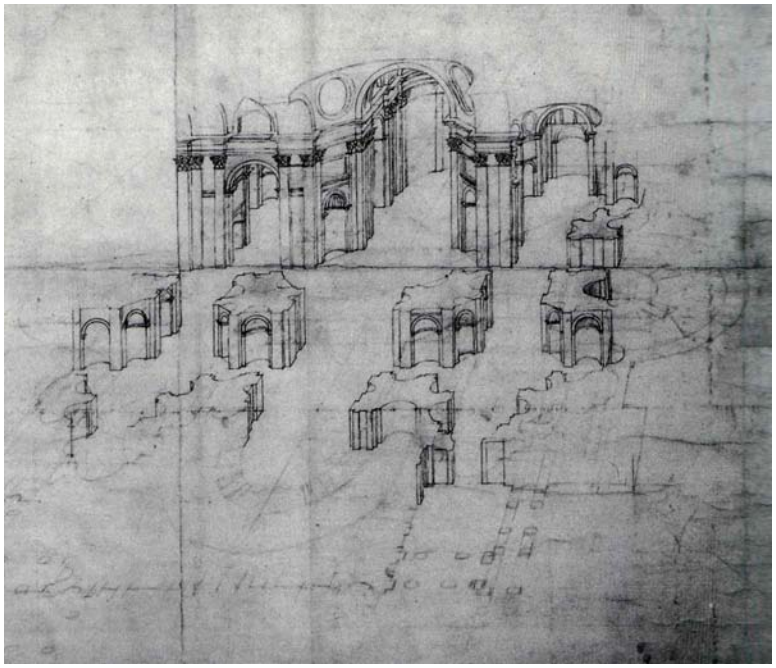
Raphael - Plans and Elevations. Also, Raphael introduced SECTIONS...for the first time.

As you can see, he had a strong understanding of linear perspective.
In this painting, the School of Athens, 1510-1511, he uses a one-point perspective method

Something rather curious...architects did not figure out how to show plan, section, and elevation on one page in a logical way until 1738, when the Frenchman Amedee Francois Frerier did so.

Presumably, it was known how to establish guidelines between drawings through orthographic projection as we do today, but this was not codified until Frerier. He worked in architecture but was primarily a military engineer and mathematician.

Bois draws our attention to a special drawing by Baldassare Perruzi, a prospective view of Saint Peter's. This is an unusual drawing, unique in its time. Note that the perspective converges to a far away vanishing point. No one even dared to try this method thereafter.



Perspective of Saint Peter's , 1530

Capital, Temple of Mars-Ultor

Bois goes on to name a few more early axonometric trailblazers, but these were not widely followed.

Page 151.

Bois continues going down through the names and places in the history of axonometry. A reason that axonometry was averted in the late 18th Century was the introduction of shading on drawings. This was taught at the Academy of Beaux Arts in Paris, and allowed two-dimensional elevations and plans to read with considerably more depth.

He mentions how Jesuits utilized axonometry for military purposes. Ad Majorem Dei Gloriam, I guess...

He then describes how Louis the XIV's minister used axonometry to examine and describe French handicrafts and manufacturing. These end up in a book entitled Descriptions des Arts et Métiers

There are an amazing number of images in this book, including:

- Building construction
- Shipbuilding
- Woodworking
- Pipe-organ making
- Metal working
- Turning and lathe work
- Scientific-instruments
- Mining and metallurgy
- So forth

In all, the series comprises 13,000 pages and 1,804 plates.

You can find them at this link, at a site run by the French National Library, but unless you know French, it will be a real challenge to navigate.

http://gallica.bnf.fr/ark:/12148/bpt6k107853f.r=Descriptions+des+Arts+et+Métiers.langEN

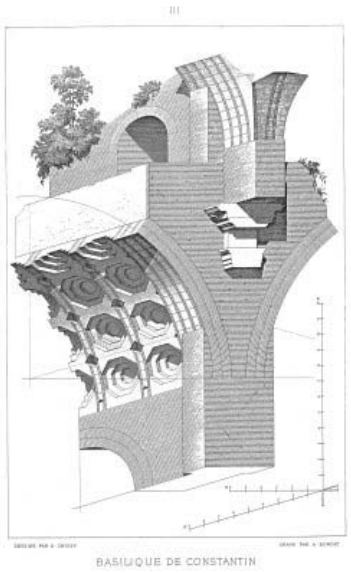
A few other men of letters are described next:

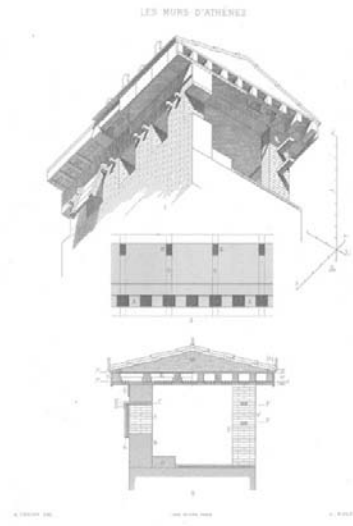
William Farish described Isometric drawing to Cambridge professors, and encouraged its use in a range of professions, including architecture.

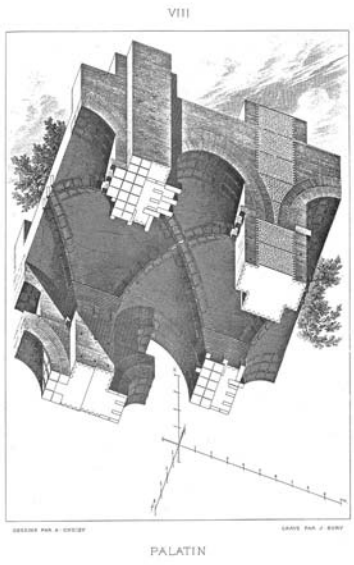
Thomas Sopwith introduced axonometry to mining.

Joseph Jopling, an architect, utilized axonometric to describe a set of agricultural buildings. (Incidentally...he also wrote a thorough and insightful analysis of the proportions of the Parthenon! Just brilliant! The **entire book** has been digitized by Google and is available right here. LINK HERE)

Jules de la Gournerie was a French mathematician who called axonometry "rapid perspective." One of his students was Auguste Choisy, who drew these details, which are beautiful and sublime. Quite a few are in "frogs-eye view" however...which is an odd way to look at things.







Page 152 and 153. The author here writes an overarching concluding statement. Of interest here: Bois mentioned that drawings by "THE FIVE" are often illegible (or unusual). Who are these Five?

They are modernists commonly known as the "New York Five." Their work appeared in the Museum of Modern Art in 1967. They consist of Peter Eisenman, Michael Graves, Charles Gwathmey, John Hejduk, and Richard Meier. Where can you find a few examples of their work?

Peter Eisenmann
Wexner Center for the Arts
Ohio State

Michael Graves
Denver Public Library

Gwathmey (and Siegel)
Akron Public Library

John Hejduk
Wall House II
Groningen, The Netherlands

Richard Meier
The Getty Center,
Los Angeles

Bois closes with a poetic, mythological metaphor.

(I will illustrate it using images from the 1981 blockbuster adventure film **Clash of the Titans.** It is the best movie ever to be made about Perseus capturing Pegasus and fighting Medusa in order to save Andromeda from a Kraken).

To paraphrase:

Fixed linear perspectives (like those drawn in the Renasissance) are like Medusa, The Gorgon. She casts the viewer in stone...he can only look from one vantage point.

Here is Medusa. Yikes.

Axonometrics, usually seen from above, are like the winged horse, Pegasus

Here is Pegasus, as seen before Perseus captures
him to save the Princess.