

## Exploring Wrong Perspectives

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# Education, Design and Practice – Understanding skills in a Complex World

AMPS, Architecture\_MPS; Stevens Institute of Technology  
New Jersey / New York: 17-19 June, 2019

## EXPLORING WRONG PERSPECTIVES

Fusing Geometry and Experience

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### INTRODUCTION

Our proposal should be considered as a reflective conversation between three different parties: an artist, a mathematician, and an architect – the first person storyteller. All three of us are involved in teaching (aspects of) drawing/ visualisation for architecture students and share a mutual interest in exploring the boundaries and extensions of perspective drawing.

I fondly remember Dirk's mischievous smile when he stated that he "*had found a geometrically sound method to construct 'wrong' perspectives* and by doing so he added, he could prove '*wrong' perspectives are also 'scientifically right'*". Hélène - our fellow drawing instructor - immediately objected that "*geometrical constructions of wrong perspectives risk 'providing a methodology' for 'wrongness', shortcutting intuition and straightforward discovery of 'finding' an intuitive value of a 'wrong' perspectives*". Doing so, she argued, runs the risk of turning the whole idea of inventing 'wrong' perspectives into a rigid system once again. I begged to differ with Hélène - especially when conceiving forms and spaces. For me, Dirk's methodology appeared to open up a way to understand, construct and perhaps more importantly, compare different kinds of perspectives beyond convention.

To fuel our conversation we started exchanging drawings. Dirk's series of explorations to geometrically construct '*wrong' perspectives* sparked Hélène to provide a visual critique upon a historical drawing to which I contributed a set of design-based drawings which attempt to visualise more than one can perceive.

### WRONG PERSPECTIVES

When a four years old child draws something on a sheet of paper exclaiming that it is '*a mountain in the rain*', we tend to appraise the endeavour. By indulging ourselves into the unlimited playfulness of children's drawing activities, we can easily accept children's imaginative endeavours. Yet things start to

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shift when our child grows older, when the drawings start to be evaluated according to their ability to “provide a visual account of the child’s intention”.

Our modern western way of looking and image making is founded upon the system of ‘vanishing point perspective’. The tendency to present linear perspective as a superior tool led sociologist and philosopher Bruno Latour to reflect upon its governance. Latour draws a link between how cultures make the world visible and how they understand that world. Because in the Western World the perspective drawing proved to be such a powerful tool, it was quickly adopted into the scientific world and additionally influenced science to go into a direction that further developed technologies of optical consistency.<sup>1</sup>

Since Brunelleschi, Alberti and their contemporaries (re)introduced the system, we have become accustomed to evaluate expressions by means of the kind of the static imagery they put forward.<sup>2</sup> Moreover, people are convinced that the system is the most accurate or even ‘the best’ way of depicting the world around us.<sup>3</sup> Since its Renaissance (re)introduction, deviant ways of depiction - not fitting the scientific model - were put away as primitive or infantile, depending on the source.

In “Real Spaces” David Summers states: “if we are accustomed to thinking of images as imitations of the appearance of things, then all images do the same thing, either well or poorly”. Summers goes on to argue that it is the historical task to distinguish the purposes of an image and their requisite conditions. In other words, we must explain both implements and images first by examining their conditions of presentation.<sup>4</sup>

According to psychologist James Gibson, linear perspective takes the central problem to be how one could see into the distance, while never asking how one could see into the past and the future. For Gibson, perception relates to the interaction of mind and body by stating that perception is a psychosomatic act of a living observer.<sup>5</sup> For Gibson it is obvious that a motionless observer can see the world from a single fixed point of observation and can thus notice the perspective of things but, he continues, it is “not so obvious but (...) true that an observer who is moving about sees the world at no point of observation and thus, strictly speaking, cannot notice the perspective of things”. Erwin Panofsky noted a similar thing when he stated “The structure of an infinite, unchanging, and homogeneous space—in short, a purely mathematical space—is unlike the structure of psychophysiological space: Perception does not know the concept of infinity.”<sup>6</sup>

Linear perspective has been questioned ever since its alleged invention. Leonardo da Vinci, writing only a few decades after Brunelleschi’s passing dismissed linear perspective as ‘*perspectiva accidentalis*’ and drew attention to the visual distortion of the various visual manipulations and elisions that occur from moving the vanishing point in paintings and drawings.<sup>7</sup>

## WHAT DO WE SEE AND WHAT DO WE DRAW?

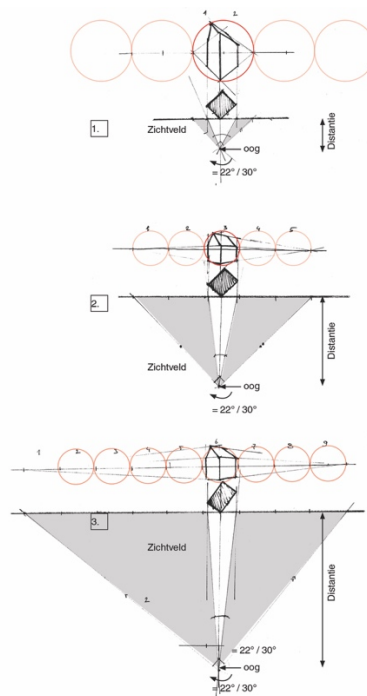


Fig.HA1: when looking into space with one fixed eye, one can only see a small part of the space in front of us

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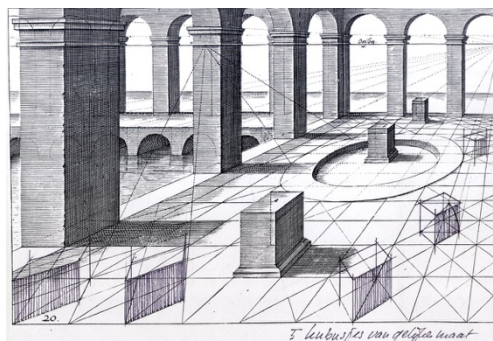
Hélène shared a photograph to illustrate that when we look into a space with one fixed eye, we can only see a small part of the space in front of us undistorted – no more than a stretched hand (fig.HA1). Still the fixed eye is the starting point to explain how to draw perspective. For the untrained drawing scholar, Hélène argued, this can be very confusing because there is a discrepancy with what one sees and what one is challenged to draw - from (so called) observation.



*Fig.HA2: The relationship between distance of the observer and the horizontal distance between the vanishing points.*

We, drawing instructors, go at lengths to explain the relationship between the distance of the vanishing points and the relative position of the observer. There even exist some rules for constructing non-distorted perspectives, which is based on a maximum angle of vision of 30 degrees or even stricter, 22 degree (fig.HA2). The maximum size of the drawing itself should fit at least five or six times between the two vanishing points.

The problem with these rules of thumb is that they depart from a tightening of the focal point. For someone who unconsciously looks into the world this again is confusing, because - only freaks look into a frozen world with a stiff neck and one eye closed.

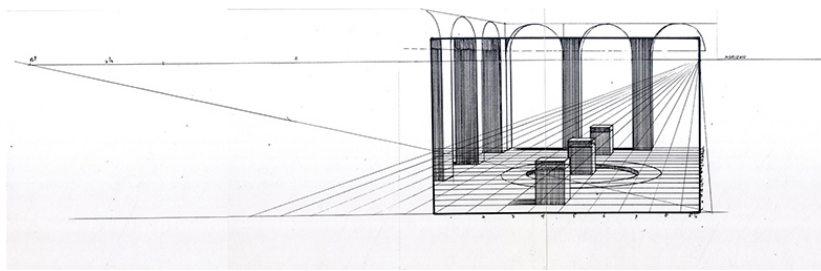


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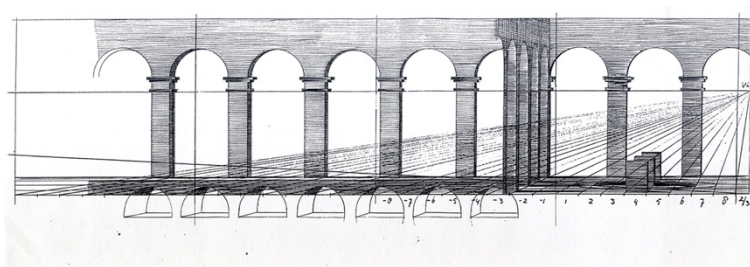
*fig.HA3: Analysing a historic Hans Vredeman de Vries perspective*

To illustrate her point H el ene send us an analysis of a historical Hans Vredeman de Vries perspective drawing.<sup>8</sup> At first glance the original looks like a meticulously constructed drawing of an architectural space. But as H el ene started adding cubes to the Vredeman de Vries construction, diagonal distortions started to surface. Close to the horizon H el ene's cubes look rather okay. But at the right side of the bottom line H el ene's new cube doesn't confine to what we normally can see. The angle on the foreground is a 90 degree angle, which corresponds with a point of view of hanging straight on top of the cube. From this position one is not able to see the vertical planes of the cube at all. More to the left the angles of H el ene's two "cubes" even become smaller than 90 degrees, which is essentially impossible to see (fig.HA3).



*Fig.HA4: Reconstructing Vredeman de Vries using the rule of thumb (first attempt)*

H el ene decided to reconstruct the Vredeman de Vries drawing. The reconstruction departs from a plan analysis of the situation, redrawing the grid, using our rule of thumb concerning the relative distance between vanishing points previously mentioned in figure HA2. This resulted in a drawing which only shows the right part of the original view (fig.HA4). A second reconstruction shows the whole scene, drawn with the vanishing points 5 times between the maximum size of the image (fig. HA5). In this image you can hardly see the floor's tiles. Turning the drawing into a kind of a fa ade with a very little foreshortened floor in front of it.



*Fig.HA5: Reconstructing Vredeman de Vries using the rule of thumb (second attempt)*

Analyses such as H el ene's illustrate a genuine contradiction in drawings such as those of Vredeman de Vries, because in reality the human eye is not able to perceive what is depicted in these images. In that sense Vredeman de Vries' drawings are geometrically 'correct' but appear to be visually 'wrong'. Reflecting on this issue I observed that Vredeman de Vries' drawing seems to depict more than the eye can see. This reminded me of a quote from a Chinese master draughtsman: "*Why should we restrict ourselves? Why, if we have the means to depict what we know to be there, paint only what we can see from one viewpoint?*"<sup>9</sup>

## WRONG PERSPECTIVES IN GEOMETRY

In "Perspective as a Symbolic Form" Panofsky questions linear perspective's universal validity as an accurate description of natural vision calling linear perspective "*one of those "symbolic forms"*" in which

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“*spiritual meaning is attached to a concrete, material sign and intrinsically given to this sign*”.<sup>10</sup> Panofsky argues that Antique perspective is the expression of a specific and un-modern view of space and even of the world.<sup>11</sup> Panofsky argues that in linear perspective the psychophysical space was translated into a mathematical space and, as such objectified the subjective.<sup>12</sup>

From the above we could easily conclude, that we should move away from geometry’s systematic reading of space and return to a more discontinuous reading of space - pre-mathematical space if you will. If one agrees that geometry will always reduce the world to its measured spatial coordinates, it is easy to discard spatial geometry in favor of more experiential and intuitive frameworks of drawing and perception. To counter this conclusion Dirk sent us an analysis of a 20th century Popular Congolese painting, claiming that the laws of geometry can also be extended.<sup>13</sup>

African perspective, Dirk argued, can be understood as an appropriation of European and African visual systems. Compared to Alberti’s “*Costruzione Legitima*” the represented perspectives are completely ‘wrong’. But the African example reminded Dirk of the constructions of the so called Flemish Primitives and he sent us an analysis of Jan van Eyck’s Dresden Triptych. In his analysis Dirk had reconstructed the perspective grid, revealing that Van Eyck’s parallel sight lines do not all converge towards a central vanishing point, but on a vertical vanishing line.<sup>14</sup> Because the lines form a skeleton, rather than one focal point, Panofsky referred to these kinds of perspectives as ‘fishbone perspectives’.

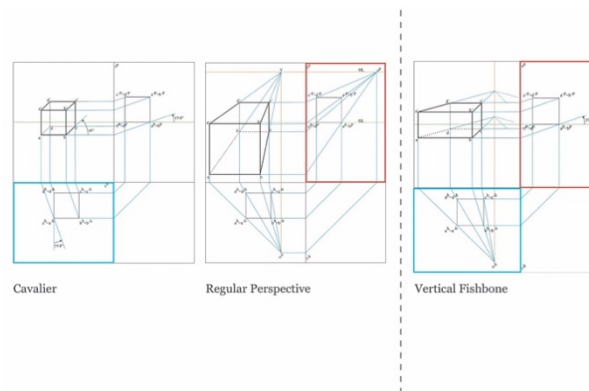


Fig.DH1: Geometric construction of a Vertical Fishbone perspective

Dirk started looking for a rational method in Van Eyck’s alleged symbolic ‘fishbone’ perspectives. In a series of constructions Dirk explored ways to project ‘wrong’ perspectives. In these, he reconfigures the conventional geometrical techniques as introduced by Gaspard Monge (fig.DH1).<sup>15</sup> To construct a vertical fishbone similar to Van Eyck’s depiction, Dirk fused the top view and construction of a cavalier projection (blue) with the side view and construction of a regular perspective construction (red) to arrive at a fishbone construction. As opposed to Panofsky’s symbolic form, we now have a practical form which can be explained to other people. An interesting aspect of Dirk’s approach is that we suddenly can shortcut art history and visual analysis by re-constructing different, alleged ‘wrong’ perspectives, geometrically.

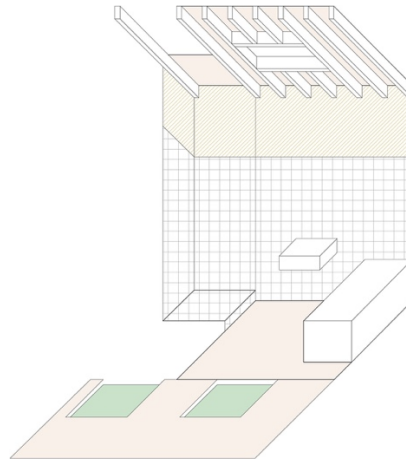
Dirk’s research resulted into an intriguing collection of geometrically re-constructed historical ‘wrong’ perspectives. Think of reverse horizontal fish-bones and reverse vertical fish-bones, and everything in-between. His explorations also challenge us to transcend their historicity. Dirk’s constructions are of interest to us - designers and architects - because they imply that by fiddling with points of view, perspective systems and projections, we are able to extend or surpass the convention, while still remaining measurable. A logical next step was to explore Dirk’s research in an actual design process.

## 8. WRONG PERSPECTIVES IN DESIGN PROCESSES



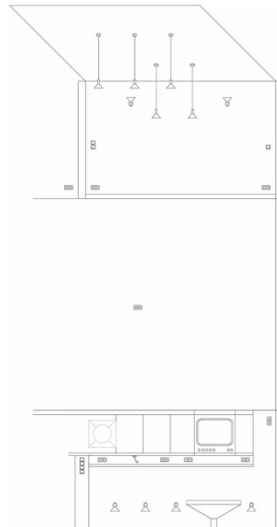
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*Fig.RS1: Digital sketch of a bathroom lay-out combining different parallel systems*

With Dirk's collection and suggestions in mind, I started rethinking the design drawings for the renovation of a single family house. In a first attempt (fig.RS1) I reconfigured a cabinet projection in order to make walls, floor and ceiling visible in one drawing. I turned to this 'wrong' projection with a purpose, to visualise more than convention allowed me to, while still remaining measurable. After communicating this drawing to the client and carpenter, I discovered they didn't question the appropriation of different projective systems at all.

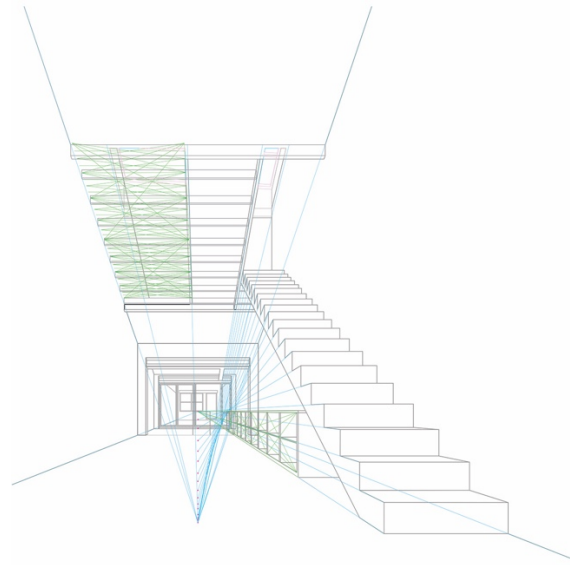


*Fig.RS2: Digital drawing of electricity lay-out of a kitchen*

Inspired by the previous experience I decided to communicate the kitchen's light and socket lay-out to the electrician with a similar projection (fig.RS2). The drawing uses a combination of an unfolded plan, section and cabinet projection. Architects rarely draw elevations of electricity fittings, but in this drawing I drew all surfaces of the space and tilted the ceiling to reduce the drawing area. This decision added a certain spatiality to the drawing. But the most important discovery of the drawing is that this awkward drawing helped us to discuss the technical particularities of the lay-out. It also surpassed a conventional electricity plan by making all surfaces available in one drawing. Both drawings revealed to be equally - or even more - communicative compared to traditional representations.

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*Fig.RS3: Wrong Perspective of the main space of renovation project.*

The previous drawings remain metrical. They are ‘wrongly’ according to the rules but still avoid perspective. As I wanted to explore the concept of ‘wrong’ perspectives I still needed to explore an instance, which required the stretching of the perspective grid. In a following drawing I tried to visualize the effect of having a very deep horizontal view (30 meters), and a vertical view towards the large sky (fig. RS3). Single point perspective resulted in similar visual restrictions, H el ene mentions when she reconstructed the Vredeman de Vries drawing. In line with Dirk’s constructions I started stretching the perspective on a vertical line. At first I did not think much of the attempt, but this changed when during construction the stairs were installed and the mezzanine was opened. When I entered the project, I looked into the distance and then upwards, which reminded me of the drawing I made. I observed, the drawing evokes a similar effect: looking horizontally and vertically by moving one’s head up and down. Later I realised that the drawing’s focal points are the points where the light comes into the project, leading me to suggest that the drawing evokes a natural (head) movement towards the luminous parts of a space.

## DISCUSSION

As drawing teachers we more often than not observe, that rigid conventional instruction tends to trick our learners into thinking that there is only one way of drawing (and perceiving). This kind of thinking actually limits our learners’ creative and imaginative possibilities. In that sense, our research is about inclusion: uncovering multiple ways of drawing, so that our learners can investigate their own ways of imagining spatial proposals. Our role as teachers, is to explore *the how* and simultaneously illustrating where and when it can be applied during design reasoning. In other words, that ways of seeing and drawing can provide additional and valuable, spatial insights, which enhance the quality and language of spatial reasoning. Otherwise the research is of little value to (the nascent) designers.

When we refer to ‘wrong’ perspectives we refer to ways of perspective drawing that consciously draw/reveal more than we can see. ‘Consciously’ is an important word here. If we agree that learning how to draw is a matter of ‘noticing’ related to observing well - architectural drawing courses should incorporate ‘ways of seeing’ coupled to ‘ways of drawing’.

We are convinced that this kind of research also implies introducing the epistemological aspects of drawing in order to help the learners to position their quest for ways of drawing. Exploring the epistemological resides outside the scope of this paper and also implies redefining the pedagogical frameworks of our courses.



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In some way or another we also have to inquire whether discarding convention is the proper point of departure for an initiation into architectural drawing. While learners have to internalise the rationality of the spaces, they imagine they also have to become aware that visualising imagination involves more than providing an accurate account of the dimensions of a space. It is important that our students have to let go of preconceived aesthetic schemas and ideas of the correct. However, correctness is very much determined by the visual schema's we learn from others, rather than from our own observation.<sup>16</sup>

Perhaps scripting the mathematical foundations of Dirck's constructions can provide new points of departure for our research. Departing from the proportions of a given – or imagined space - such scripts should be able quickly to generate different series of complementary 'wrong' perspectives. The resulting variety of perspectives could allow to study their properties vis-à-vis their spatial qualities.

Finally we have to keep Hélène's preliminary remark in mind: it is important that (nascent) designers are aware of the particular expression - or experience - they want to get across and construct drawings according to their spatial needs. Otherwise we run the risk of proposing yet another frozen system.

## CONCLUSION

The 'Wrong Perspective' project is an attempt to re-approach some of the skills needed to instruct architectural drawing. In a sense our 'dialogue' fuses two opposing concepts: "Visual Geometry" and "Visual Experience". The aim is to broaden the pictorial scope of designers and architects beyond the existing ones, by testing them in design and creative processes. Consider our attempt - not as an attempt to generalise the differences, but to make them accessible and applicable in various areas.

In our research we hope to prove the value of deviating from the conventional paths of depiction, so that learners might use them in their design processes. The main idea is to figure out ways to draw more than we can see and apply these to the pedagogy of architectural visualisation in design processes. When Panofsky turns to etymology to state that perspective is "*the art of seeing through*"<sup>17</sup> we should acknowledge that in design and creative processes perspective is the '*art of seeing forth*'!

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