THE IMAGE IN POWER: VILÉM FLUSSER AND THE CRAFT OF ARCHITECTURE

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The use of 3D renderings – computer-generated images which can look very realistic, some of them being easily mistaken for photographs – is widespread in both architectural practice and education. At first glance, these images seem to be incredibly useful for the communication between architects, clients and the general public, since they appear to offer a very clear and detailed vision of the final 'product.' However, my experience as a practising architect led me to believe that this apparent accuracy is misleading, and that it can actually be counter-effective. The *realism* of these images forces architects to be highly precise about aspects that were only supposed to come up at later stages, and they can also trick clients into approving a "beautiful picture" instead of a clearly expressed architectural idea.

In addition to these concerns, the indiscriminate use of these images seems to reinforce the idea that a building – or *space*, in broader terms – is mainly something to be experienced visually, and that a good building or space is one in which our eyes are constantly looking at 'good pictures.' This picturesque understanding of architecture not only neglects the haptic experience of space, flattening volumes into surfaces and space into perspectives, but it also reduces the work of the architect to the composition of pictures. As an architect, I cannot feel at ease with this reduction, and this unsettling led me to pursue a deeper understanding of the way we experience architectural images.

In his 1985 book *Ins Universum der technischen Bilder*,[1] Czech philosopher Vilém Flusser presents,

> "THIS PICTURESQUE UNDERSTANDING OF ARCHITECTURE... REDUCES THE WORK OF THE ARCHITECT TO THE COMPOSITION OF PICTURES."

"a model of cultural history" consisting of five rungs that symbolize different moments, each one being defined by a specific medium which prevailed in, "the task of transmitting information crucial to society and to individuals."[2] At first, we could only express ourselves and transmit any kind of knowledge through our actions. Then, through the creation of objects, we could perpetuate these actions, leaving their imprints in artifacts which could still speak for us when we were no longer present. These objects have thus created culture, and were the first medium for transmitting and perpetuating it. Later on, images which depicted or symbolized objects and actions became even more relevant than the objects themselves. These images, such as cave paintings, are what Flusser calls *traditional images*. They were eventually supplanted, around 4000 years ago, by linear texts, which *explained* images, creating what he calls the "historical level." Much more recently, texts have collapsed, "into particles that must be gathered up. This is the level of calculation and computation, the level of *technical image*s," or images created by apparatuses such as cameras, computers and TV sets.[3]

This model gives us an image of a linear process in which Man is constantly stepping back from the direct experience of the world, going deeper and deeper into abstraction. However, though new rungs are added, the previous ones are not lost or forgotten – they are simply different worlds, created and shaped by different media. Figure 1 is an attempt to sum-up and illustrate Flusser's model.
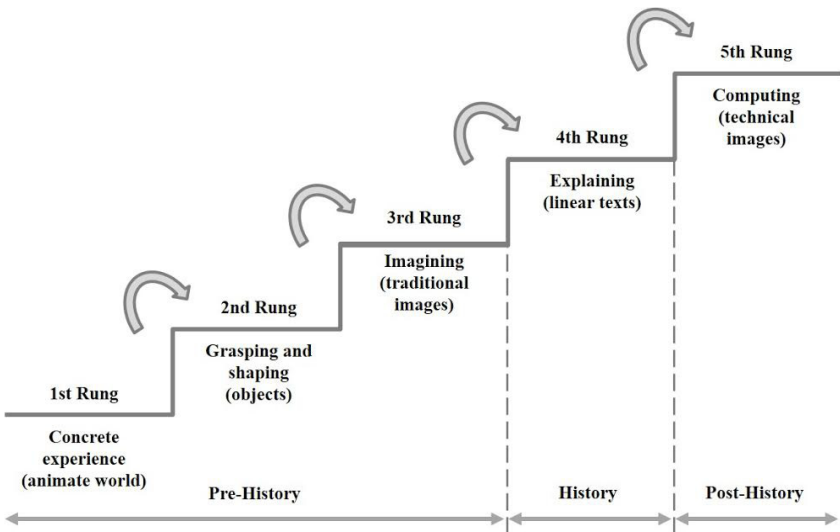

FIGURE 1: FLUSSER RUNGS.

Flusser calls the fifth rung, shaped by the prevailing of technical images, "a new, dimensionless level, one to be called, for lack of a more positive designation, 'posthistory.'"[4] The term "posthistory" rises from the notion that History was created by writing, whose linear logic shaped the dominant ontology of an era, and that the prevalence of technical images – which are non-linear, but rather two-dimensional – marks the end of History. Today, the logics of linear writing no longer apply to the way we experience culture, and this experience influences the way in which we perceive reality as a whole. Regarding the production of images, for instance, technical images are made by *envisioners*, whereas traditional images were created by *image makers*.

> *The gesture of the envisioner is directed from a particle toward a surface that can never be achieved, whereas that of the traditional image maker is directed from the world of objects toward an actual surface. The first gesture attempts to make concrete (to turn from extreme abstraction back into the imaginable); the second abstracts (retreats from the concrete). The first gesture starts with a calculation; the second starts with a solid object.[5]*

Photographers, for instance, work through an apparatus – a camera – and they, "can only desire what the apparatus can do. Any image produced by a photographer must be within the program of the apparatus."[6] The apparatus is itself a kind of medium through which the envisioner works and *thinks*, since, "not only the gesture but also the intention of the photographer is a function of the apparatus. […] a human intention works against the autonomy of the apparatus from the inside, from the automatic function itself."[7]

Photography provides us with a great example of how we work *through* and *with* apparatuses in order to create technical images, but it also gives way for a confusion regarding the essence of these

" THIS MODEL GIVES US AN IMAGE OF A LINEAR PROCESS IN WHICH MAN IS CONSTANTLY STEPPING BACK FOR THE DIRECT EXPERIENCE OF THE WORLD "

images. Photographs can be seen as snapshots of reality, which arise, "through the capturing and holding of approaching particles or waves from the environment," but these depictions are essentially different from those made through traditional images.[8] This can be easily understood if we consider their essential similarity with computer-generated images:

> *The photographer visualizes a house as houses seems to be in the outside, objective world. Then he takes an apparatus in hand to "grasp" (with concepts such as "perspective" or "shutter speed") what he has visualized. The apparatus calculates these concepts automatically, and the photographer presses a button to release the machine to carry out these calculations, making the vision of the house into an image. The computer operator visualizes an airplane as one might be found in the outside world. Then he takes an apparatus in hand […] to "grasp" what he has visualized […]. The apparatus calculates these concepts automatically, and the computer operator presses on the keyboard to make the apparatus carry out these calculations, making a visualization of an airplane appear on the screen. The same power to envision is at work in both cases, that of the photographer and of the computer operator, only it is more evident with the computer operator, who is more conscious than the photographer of this power.[9]*

At first, these two kinds of images seem to be very different: the photograph of the house can be seen as a *depiction*, while the airplane drawing could be understood as a *model*. However, *they are both models*. In the example above, Flusser is talking about an activity which was created by an apparatus – there were no photographers before there were cameras – and another which already existed, but that was re-created by the use of an apparatus. Architects and designers have always worked with handmade drawings, and now most of them use computers for drawing. We can say that the handmade drawings were traditional images, and that they were depictions of what the designer or architect had in mind – they were depictions of *visions*, and these image makers knew how to *build* these images. On the other hand, anyone can take a picture without understanding how a camera works, and how photographs are *built*. The camera is what Flusser calls a *black box* – a mysterious apparatus that blindly, "transforms the effects of photons on molecules of silver nitrate into photographs."[10] It is *opaque*, impenetrable.

Referring to his own work process, Flusser describes the functioning of his typewriter, which can be clearly understood and seen as an extension of his fingers: "I can watch as each pressed key sets a hammer in motion that strikes the intended letter onto the page and how the carriage moves to make way for the next letter."[11] The typewriter is *transparent*, and Flusser seems to believe that this transparency makes it adequate for the craft

of writing: "When I write, I write past the machine toward the text."[12] This happens because the typewriter is not a medium, but only a tool. The medium is linear text, which can be handwritten, typed, carved in stone, etc. The act of typing was obviously created by the typewriter, but apparently writers learned to use it as instinctively as their predecessors used their hands and tools. Writers have not become 'typists.'

On the other hand, an opaque apparatus does something, which we do not understand, in a way that is invisible to us. Its working has no connection or resemblance to human actions, only its interface can be recognizable. Analyzing the development of human-computer interfaces, Bill Verplank argues:

> *Piaget described three stages of learning. We are born with ENACTIVE or kinesthetic knowledge; we know how to grasp and suck. At a certain age we pay more attention to how things look; our ICONIC thinking is mistaken for example by a tall glass as "more." Only at a certain age do we understand conservation; then we are ready for SYMBOLIC thinking. […] The development of human-computer interfaces has followed the opposite path. The first interactive computers used teletypes (TTY) and the style of interaction was a dialog of symbols; I type and the computer types back at me. […] with the invention of mouse and bit-map display, the iconic graphical "direct manipulation" interface became the dominant style. This progression suggests that the next stage is enactive interfaces.[13]*

" THE CAMERA IS WHAT FLUSSER CALLS A **BLACK BOX** […]. IT IS **OPAQUE**, IMPENETRABLE. "

It is interesting to see that Flusser's model for cultural history is quite similar to Piaget's model for human development, and how human-computer interfaces apparently developed in the opposite way, becoming increasingly *intuitive*. With touchscreens and gesture recognition, this interaction seems much closer to the way we interact with concrete objects, but the process has become even more opaque, since we do not even have to know how

to operate the apparatuses – they can *read* us, understand our gestures, decode and compute them. The apparatus offers a field of possibilities, through which we can browse by repeating recognizable gestures – thus, to a certain extent, it is the apparatus which operates us. It can capture and translate our apparently instinctive gestures, but we have to 'speak' its language.

The 'direct manipulation' interface is still dominant, and the opaqueness of the apparatuses is transferred to the images they generate. Flusser states that technical images can never be true nor false – they can only be regarded as *probable* or *improbable*. This notion becomes quite clear if we consider how easy it is to manipulate technical images. With Photoshop and other similar software, photographs can be edited in a radical but imperceptible way. We can only tell that a photograph was edited when the editing goes too far, making it look *improbable*. This reveals how the "reality" of technical images is misleading, which led Flusser to state that "the basis for the emerging universe and emerging consciousness is the calculation of probability. From now on, concepts such as 'true' and 'false' refer only to unattainable horizons, bringing a revolution not only in the field of epistemology but also in those of ontology, ethics, and aesthetics."[14]

This revolution has surely affected architecture in many different ways. In his 1982 essay *Architecture as Drawing*, Alberto Pérez-Gómez describes the development of architectural drawing throughout history, focusing on the Renaissance notion that architectural drawings were images of an architectural *idea*, "implying 'look', 'semblance', and 'form.'"

> *While the traditional builder, a primeval poet (from the Greek poiesis, to make) made his thoughts into building through the implementation of an operational geometry (in the original sense of giving human dimension to external reality), the Renaissance architect articulated the necessarily "abstract language" of walls, openings, and columns in architectural drawing, by means of plans (ichnographia), elevations (orthographia) and profiles or sections.[15]*

These drawings were never understood as *pictures* of the future building – they represented an idea, "to be fulfilled in the building." Since most architects were deeply involved in the construction process, they were also responsible for turning this idea into reality. Thus, architectural drawings formed, "an autonomous realm of expression," somehow independent from architecture itself - but always aiming for it.

During the 18th century, the development of descriptive geometry allowed architects to elaborate geometrically *precise* drawings. Architects could then distance themselves from the building site, drawing, "universal

projections that could […] be perceived as reductions of buildings, creating the illusion of drawing as a neutral tool that communicates unambiguous information, like scientific prose."[16] We can thus say that descriptive geometry is the "mother" of photography, since these drawings created the same illusion created by photographs – that of an impartial, direct depiction of reality. These "realistic" drawings have freed architects from the craft of building, turning them into "efficient designers." Thus, the craft of the architect changed from conceiving an architectural idea – that could be communicated through the abstract language of drawings – and getting it built, to conceiving and creating drawings that illustrated how parts of a building should be built. This is why, following the development of descriptive geometry, architects like Boullée and Ledoux created another meaning for architectural drawings:

> *Their drawings constituted a set of theoretical projects that they assumed to be true architecture, in opposition to their actual buildings. Not surprisingly, both architects felt that architecture was deeply akin to painting. Thus architecture became primarily the making of the drawing (or the model), the same poetic act that has always magically revealed the truth of reality.[17]*

The emphasis on this relation between architecture and painting may signal an attempt to keep the craft of architecture close to *traditional imagery*, protecting it from the *proto-technical images* created through descriptive geometry. Thus, at this point, we can say that there were two kinds of architectural drawings: instructional drawings made for the construction site and poetic drawings made for the expression of "true" architectural ideas. Although the poetic drawings to which Pérez-Gómez refers illustrated utopian, sometimes "unrealistic" buildings, actual buildings were still conceived through similar images, that is, from images of architectural *ideas*.

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If we compare them with those made by Renaissance architects, the only difference would be that these images were now developed and divided into a set of instructional drawings which would guide the construction process.

Today, most architectural drawings are made through apparatuses, and even handmade drawings are inserted into a world dominated by technical images. Figure 2 below combines the process described by Pérez-Gómez with the model presented by Flusser. The visualization of this combination seems to highlight the fact that the current role of architectural images does not seem to be quite clear.
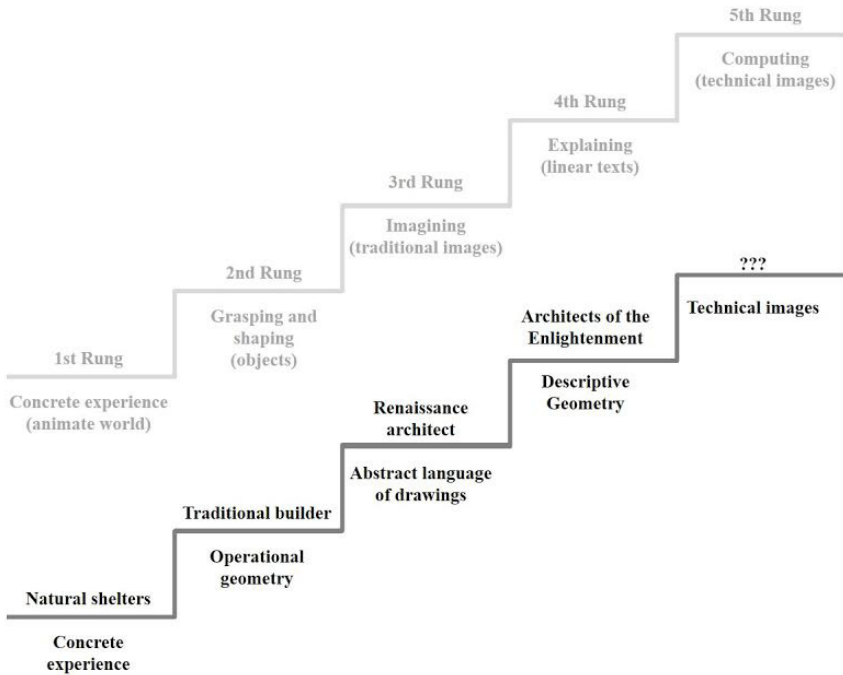
FIGURE 2: TIMELINE OF ARCHITECTURAL DRAWING.

In a 1990 lecture held in Budapest, Flusser states:

The idea was that image should document politics. But, in the first half of the XX century, and more strongly after the Second World War, this relationship began to change. All of the sudden, politics were made in order to get into an image. The purpose of politics was an image – the purpose of the Arabs hijackers of airplanes was to be taken in television. Politics is aimed at being taken in an image.[18]

To a certain extent, the same inversion happened to architectural images.

Now, it is the picture that generates the building. Photo-realistic 3D renderings "look" real, as if they were photographs taken in the future, after the building is complete. Thus, these images are "models for photographs," and not depictions of architectural ideas. While most architectural drawings aim to represent a building which will only exist in the future, these images try to represent photographs that can only be taken in the future.

In a *New York Times* article on the role of renderings in the real estate market, Elizabeth A. Harris states that "the real purpose of these drawings is not to predict the future. Their real goal is to control it."[19] This idea of controlling the future by providing an apparently objective vision of it can be traced back to the 18th century architectural drawings, and has reached its peak with the apparent photorealism of computer-generated images – which look even more objective and 'neutral.' However, to a certain extent, these images only exist as instructions to be interpreted by apparatuses. They have the same logic of the instructional drawings which made possible the creation of industrial design – they are a set of instructions, the numerical description of a composition. This is the logic of programming, the internal logics of the apparatus which is, at the same time, tool, surface, and frame.

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Becoming envisioners, architects have lost the connection to the craft of image-making. This affects the expression, representation and communication of architectural ideas, and also the construction of the ideas themselves. Descriptive geometry created the theoretical background for the emergence of photography, and technical images as a whole, since its "neutral" depiction is something like an apparatus; it is a system that is already somehow "outside" of the architect's mind, and through which he must work, keeping himself inside a limited field of possibilities.

The role of the architect, like we usually see it now, is still the one forged in the 18th century. By working through and with descriptive geometry, architects are almost like industrial designers, the main difference being that construction has remained a much less automated process. Industrial design, including not only the design of industrial products but of the machines themselves, was only possible after the creation of descriptive geometry – and, if we see it as a "mental apparatus," we can say that this apparatus has *created* industrial designers, as much as the camera has created photographers. After all, how could one conceive a machine to manufacture a product without being able to predict and translate the shape of the product with extreme precision? The machine had to be *programmed*.

Following the process described by Pérez-Gómez, we can sketch a progression that starts with the traditional builder, the *primeval poet* who worked directly on the building itself, develops into the role of the builder/artist/intellectual of the Renaissance, who worked with abstract drawings while still being deeply involved with building, and moves forward to the efficient-designers of the Enlightenment, who made instructional drawings in their studios, detached from the construction site. Figure 3 demonstrates a growing separation between thinking and building, which was mediated by drawing.

Now, we give instructions to an apparatus that "draws" instructional images, which will then be interpreted by the builder. However, with 3D printing, another apparatus is responsible for the production of the

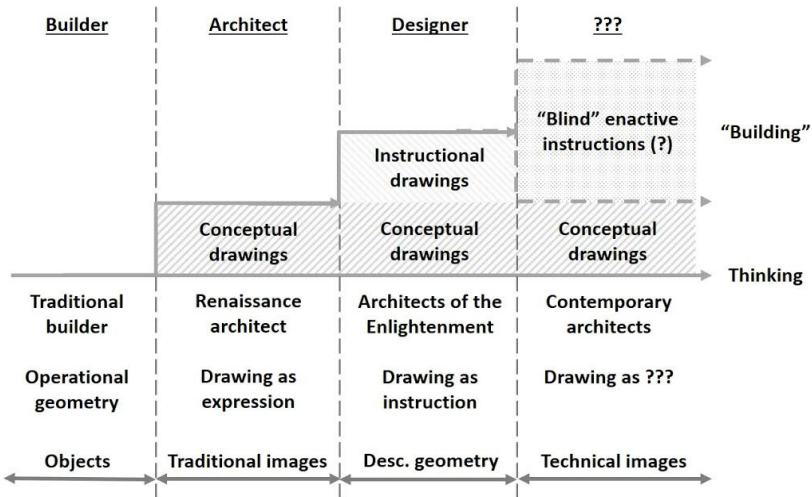| Builder	Architect	Designer	???	
			"Blind" enactive instructions (?)	"Building"
		Instructional drawings		
	Conceptual drawings	Conceptual drawings	Conceptual drawings	Thinking
Traditional builder	Renaissance architect	Architects of the Enlightenment	Contemporary architects	
Operational geometry	Drawing as expression	Drawing as instruction	Drawing as ???	
Objects	Traditional images	Desc. geometry	Technical images	

FIGURE 3: ARCHITECTURE'S INCREASING ABSTRACTION.

object itself. In this case, a software – which can be the same the designer uses for drawing – decodes and transmits instructions for the apparatus which is going to mold, cut, or sculpt the object. Thus, there is no need for dialogue between different people – architect and builder, or designer and production engineer; the dialogue happens between apparatuses, and it is obviously *opaque* to us. All the designer needs to do is to give instructions to the software. Thus, we can say that this technology frees designers from having to create instructional drawings – they can focus exclusively on the creation of the object, of its *form*.

In a fairly near future, 3D printers may become widespread, so that anyone will be able to design and print (build) objects. Thus, no instructional images will be needed at all. Would anyone need designers then? Or should we expect designers to be the ones creating the best conceptual models for printing? The dialogue between apparatuses may free architects and designers from the need to create instructional images, but can this freedom be demeaning to their practices? Bill Verplank believes that the development of enactive interfaces can bring us closer to the objects we shape, like the traditional builder mentioned by Pérez-Gómez:

> *This direct engagement with the materials, producing immediate results, is what makes for a craft tradition. There is no time to step back and plan or abstract and analyse. We need no principles, textbooks or classrooms, only studios. Masters pass on their practices to apprentices; the only learning is by doing.*
>
> *The introduction of architecture and engineering as distinct from construction and manufacture made explicit the role of drawings and design. Are we returning to craft and forgetting design?* [20]

Verplank seems to consider *craft* as a practical skill learned through imitation and repetition, and design as an intellectual activity for 'anticipation and reflection.' Many of us may share this notion,

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only using the word "craft" when talking about a hands-on activity such as woodworking or shoemaking. These craftsmen use different tools and different gestures, whereas computers are now the main – if not the only – tool for intellectual work. Architects, engineers, lawyers and accountants work in similar workstations – desks with computers – and repeat the same gestures – typing and clicking. Thus, in *physical* terms, these activities have been leveled. These professionals work with different software, which provide different possibilities, but they are all *envisioners*. Their work is seen as a set of intellectual activities that can be reduced to the logics of programming – to information processing, to computation. Thus, while working, they can only imagine what was already imagined by the programmer, and this limitation can be really damaging to the *poetic* dimension of creative work.

Brazilian philosopher Olavo de Carvalho has developed the "Theory of the Four Discourses," which consists in the idea that "human discourse is a unique potency which can be actualized in four different ways: poetics, rhetoric, dialectics and analytics (logic)."[21] This theory is based on his interpretation of the overall structure of Aristotelian philosophy, considering that the differences between the four discourses lie in the human intentions behind each one of them. Like Flusser, Carvalho also provides a model in which different eras were created by the prevalence of one of these discourses, which had, at the time, a recognized authority
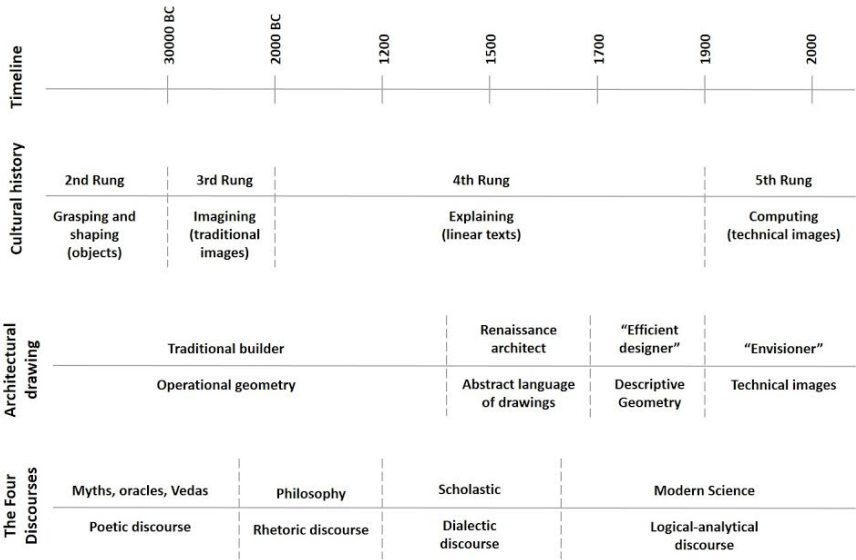
Timeline	30000 BC	2000 BC	1200	1500	1700	1900	2000

Cultural history	2nd Rung	3rd Rung	4th Rung			5th Rung	
	Grasping and shaping (objects)	Imagining (traditional images)	Explaining (linear texts)			Computing (technical images)	

Architectural drawing	Traditional builder		Renaissance architect	"Efficient designer"	"Envisioner"
	Operational geometry		Abstract language of drawings	Descriptive Geometry	Technical images

The Four Discourses	Myths, oracles, Vedas	Philosophy	Scholastic	Modern Science	
	Poetic discourse	Rhetoric discourse	Dialectic discourse	Logical-analytical discourse	

FIGURE 4: THREE MODELS.

over the other three. This model also illustrates an increasing abstraction, a distancing from concrete experience which follows towards an analytic worldview, "scientific reason emerges as the supreme fruit of a tree which has poetic imagination as its roots, planted in the soil of the sensible nature."[22]

This does not mean, however, that we live in an analytical age devoid of poetic discourse. In fact, this gradual movement from the poetic imagination all the way to logical 'certainty' pervades all creative work. Carvalho argues that "Poetics correspond […] to the 'first level', to the connection between the data captured by the senses and the universe of discourse. The bridge between 'world' and 'discourse.'"[23] Thus, when we are *creating*, we are turning our impressions of the world into discourse, that is, into something that can be *thought* and communicated. This is why Carvalho states that "Poetry belongs, therefore, to the genre of *mimesis*, it is a form of imitation, and its specific difference is that it does not imitate what has happened (like History, for instance), but what is possible. The imitation of *the possible* is the definition of poetic work."[24]

We can then say that all creative work begins with the imitation of the possibilities in which the work will develop. Architects and designers begin their work not by envisioning images or manipulating form, but by discovering and selecting possibilities in which – and *with* which – to work. We can only discover possibilities by imagining them, and everything that can be imagined can become a possibility. When working with black boxes, we can surely use our imagination to discover possibilities inside those provided by the apparatus, but we are necessarily limiting our imagination, which was open to the whole of reality – as captured by our sensitive nature – to the program of the apparatus.

When we draw through apparatuses, we are

" WHEN WE ARE CREATING, WE ARE TURNING OUR IMPRESSIONS OF THE WORLD INTO DISCOURSE "

necessarily creating a gap between thinking and drawing. Actually, we are not really drawing, but only giving instructions to an opaque, mysterious black box which will draw for us. Even though enactive interfaces can make this process more direct and intuitive, there is still this gap, this barrier – we are still losing something along the way. Pérez-Gómez refers to the platonic concept of *Chora*, which is, "both cosmic place and abstract space, and is also the substance of human crafts. […] It is the 'region' of that which exists."[25] When we design through apparatuses, the computer is not just a substitute for the pencil – it is actually a substitute for the pencil, the paper and, ultimately, a "virtual" substitute for *Chora*. Apparatuses try to create a virtual *Chora*, an immaterial region for that which exists – but only exists as information, as numbers which can be rearranged into images. Its hidden functioning emulates the aura of mystery that one can sense in the dimension of *the possible*, but it cannot really emulate the complete realm of possibility, the reach of the imaginable.

In any creative work, the process of imagining never stops, and it is actually made not only through thinking, but also through testing and prototyping. Architects and designers draw to visualize what they imagine, and to test possibilities. These drawings are not "printed ideas" – snapshots of what they are envisioning in their minds – but part of the process of imagining, of unraveling possibilities. Irish architect John Tuomey, for instance, draws inspiration from the 'constellations' of drawings made by Carlo Scarpa, who filled pages with small conceptual sketches in which he tested many variations of the same solution. Scarpa stated: "I want to see things, that's all I really trust. I want to see, and that's why I draw. I can see an image only if I draw it."[26] Palladio's sketches for the reconstruction of the Baths of Agrippa, for instance, are of the same *nature*. These drawings have 400 years between them, but their similarities allow us to believe that the process behind them was fairly the same. At least in this conceptual stage, Palladio and Scarpa worked in a very similar way – they were not thinking and drawing, but thinking *through* drawing.

Computers and 3D printers may seem to free us from a secondary activity which is – or at least was – part of the intellectual activity of design. However, this activity is not secondary – it is actually what makes design a *craft*. There is no design without drawing, especially without the kind of drawing which works as a way of thinking, "imagining, shaping, seeing, all at the same time."[27] This kind of drawing can never be delegated to apparatuses, since these black boxes can never be *poetic* in the sense of making reality transparent to us. Architecture does this in a deep and direct way, by shaping the world in which we live.

The emergence of *parametricism* may lead us to believe that, in the future, the work of an architect can actually be reduced to just inserting data into a software, which will then create *forms*.[28] However, architecture cannot be reduced to a set of choices, to data processing. Any creative work develops in what Jorge Luis Borges calls, "the ambiguous time of art," or, "In real time, in history, whenever a man is confronted with several alternatives, he chooses one and eliminates and loses the others. Such is not the case in the ambiguous time of art, which is similar to that of hope and oblivion. In that time, Hamlet is sane and is mad."[29]

Architectural design is a creative, poetic activity based on reflection and synthesis, and achieved through drawing and visualization. Apparatuses can surely be very useful for architects, as long as they do not let themselves be "tricked" by the apparently unbiased, objective outputs made by these devices – and they also should not use them for tricking others. As Flusser puts it: "From the standpoint of so-called common sense, technical images are objective depictions of things out in the world. The critical project is to show that in defiance of common sense, they are not mirrors but projections that are programmed to make common sense appear mirror like."[30] Architecture is indeed a craft, responsible for creating a connection between our lived-world and our culture, making some aspects of reality transparent to us. Its scope is that of the imaginable. This scope should not be reduced, and it just cannot be *programmed*.

ENDNOTES

1. Vilém Flusser, *Into the Universe of Technical Images* (Minneapolis: University of Minnesota Press, 2011).

2. Ibid., p. 5.

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4. Ibid., p. 15.

5. Ibid., p. 21.

6. Ibid., p. 20.

7. Ibid., p. 20.

8. Ibid., p. 42.

9. Ibid., p. 43.

10. Ibid., p. 16.

11. Ibid., p. 24.

12. Ibid., p. 36.

13. Bill Verplank, "Interaction Design Sketchbook", p. 22, accessed August 09, 2014, http://www.billverplank.com/IxDSketchBook.pdf

14. Flusser, Into the Universe of Technical Images, p. 17.

15. Alberto Pérez-Gómez, "Architecture as Drawing", JAE, Vol. 36, No. 2 (Winter, 1982): 2-7.

16. Ibid.

17. Ibid.

18. "Vilém Flusser - Television Image and Political Space in the Light of the Romanian Revolution", YouTube video, 24:32, posted by "Klenov Vasiliy", May 31, 2011, https://www.youtube.com/watch?v=QFTaY2u4NvI

19. Elizabeth A. Harris, "Idealized or Caricature, Architectural Renderings Are Weapons in Real Estate", *The New York Times*, August 26, 2013, accessed August 09, 2014, http://www.nytimes.com/2013/08/27/nyregion/architects-renderings-as-a-weapon-in-real-estate.html?hp&_r=1&

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21. Olavo de Carvalho, *Aristóteles em Nova Perspectiva: Introdução à Teoria dos Quatro Discursos* (São Paulo: É Realizações, 2006), p. 26. Translation by the author.

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23. Ibid., p. 105.

24. Ibid., p. 137.

25. Alberto Pérez-Gómez, "Chora: The Space of Architectural Representation", in *Chora Volume One: Intervals in the Philosophy of Architecture*, edited by Alberto Pérez-Gómez and Stephen Parcell (Montreal: McGill-Queens University Press, 1994), pp. 1-34.

26. Carlo Scarpa, in *Carlo Scarpa*. The Complete Works, edited by Francesco Dal Co and Giuseppe Mazzariol (New York: Rizzoli, 1985), p.

164. Cf. John Tuomey, *Architecture, Craft and Culture* (London: Gandon Editions, 2008), p. 14.

27. Bill Verplank, *Interaction Design Sketchbook*, unpublished ms. dated December 1, 2009, retrieved August 09, 2014, from http://www.billverplank.com/IxDSketchBook.pdf.

28. See Patrik Schumacher, "The Parametricist Manifesto", presentation at the 2008 Venice Biennale, retrieved August 10, 2013, from http://archpaper.com/news/articles.asp?id=4623.

29. Jorge Luis Borges, "The False Problem of Ugolino," in Selected Non-fictions. Volume 1 (New York: Viking Penguin, 1999), pp. 277-281.

30. Vilém Flusser, *Into the Universe of Technical Images* (Minneapolis: University of Minnesota Press, 2011), p. 49.