Drawing and building. The mixed case of architecture

ABSTRACT

In the discipline and practice of architecture, there is a codified relationship between drawing and building. But what is the nature of this relationship? While there are some similarities between architectural representation and pictorial representation, the relationship drawing to building does not seem to be one that relies on resemblance, or ontological identity as some would claim photography does with the object being photographed. Nor is it entirely abstract or notational like music, which holds no resemblance at all between the score and the musical outcome of the score being performed. The case of architecture seems to be different from that of music and different from other visual practices such as photography, painting and sculpture.

Drawing primarily from readings by Nelson Goodman's *Languages of Art*, this paper aims to consider the *mixed case* of architecture. The distinction between allographic and autographic practices made by Goodman will be the starting point to further delve into the particular and difficult-to-classify condition of architecture and architectural representation, as well as its relationship to the digital and analogue. More importantly, it will allow an initial opening into the relationship and interaction between drawing and building.

In the first part of the paper I will introduce the main terminology from Goodman's work in order to tackle, in part two, how these considerations might shed some light onto the *mixed case* of architecture and the relationship between the built and the drawings that make it possible. Here I will consider the relationships with the paradigmatic case of allographic arts, music, and autographic artforms, painting. In part three, I will extend the parallels to photography and touch on how architecture's particular relationship between drawing and building tie into the debate of mechanically reproduced artforms, by considering digital production. Lastly, I will consider how the assumptions made in the paper's main thesis might be objected upon, and possible responses to such objections.

I. THE MIXED CASE OF ARCHITECTURE

1.1. Allographic and autographic practices. The role of notation.

The distinction made by philosopher Nelson Goodman in his seminal work *Languages of Art* between practices understood as being *autographic* versus those that are *allographic* is of particular interest when tackling architecture, understood as an artistic practice.[1] According to Goodman, *autographic* arts are those that rely on the direct contact of the author with the artwork for its authenticity. This is the case of some visual arts such as painting and sculpture, where the uniqueness of the art piece is important as is the knowledge of its history and particular conditions of production. Any reproduction of a work of art from the autographic group would be considered a replica or copy, and thus not authentic. The distinction between an original and a forgery only really make sense in autographic arts, where it is indeed critical for the painting by Rembrandt to actually be the original, or it will no longer have its original artistic and historic value. So, the history of production is important in the identity of autographic work: "a work of art is autographic if and only if the distinction between original and forgery of it is significant."[2] This is true of painting and sculpture where there is only one instance of a work, but also in other art pieces where there could be multiple instances of the same work, such as with etchings. All the pieces where aspects of the work's history of production are essential to the identity of the work, are autographic.

At the other end of the spectrum are artistic practices with outcomes where the uniqueness of the piece does not matter because it can exist in many copies and does not rely on the direct intervention of the author for its production. This is the case for music, poetry, dance and theater, and is what Goodman calls the *allographic* arts.[3] The notion of authenticity acquires a different meaning in allographic arts, because they are capable of being produced at a distance from the author. Music is a particularly clear case of an allographic art for Goodman, because despite differences that may occur in a performance, every performance of a particular music composition will count as an authentic

[1] Architecture is a discipline with a significant technical component but in this paper, and in Goodman's work, it is nonetheless understood as an artistic practice. Also, there is a difference between the practice and the discipline of architecture but differentiating between the two in the light of the topic of this paper, will not be of much relevance.
[2] Nelson Goodman, *Languages of Art*, p.113
[3] While Goodman coined this distinction as applied to artistic practices, he works off of the existing English terms of *allograph* and *autograph;* the former refers to a document written by someone other than those signed it, the latter is the unique signature of one person.

instance of that work and copies or forgeries of, for example, Franz Joseph Hayden's original manuscript will not affect the authenticity of the score[4]

While the history of production really matters for autographic artworks, in terms of when it was made and by whom, in allographic works it does not hold as much relevance because the work can be produced at a distance from the author. So, the uniqueness that is so important in autographic becomes somewhat irrelevant in the case of allographic arts. The production of a piece from a practice that is allographic, relies on something other than the hand of the author of the piece, it relies on *notation*:

> *an art seems to be allographic just insofar as it is amenable to notation, (...) Amenability to notation depends upon a precedent practice that develops only if works of the art in question are commonly either ephemeral or not producible by one person.*[5]

For Goodman the distinction between autographic and allographic arts allows for a rigorous discussion on notation and the development of his particular *theory of notation*. He lays out five basic conditions required for a symbol system to be notational, two of which are *syntactic* rules (that is, they pertain to the formal properties of the reproduction) the three are *semantic* (pertaining to the content of what the representation refers to). The five rules can be regrouped into the following three categories.[6] Firstly, *representations should be unambiguous*. A representation is something that stands in for something else, so for it to be a notational system it cannot have a character that stands in for more than one thing. Secondly, representations must have *syntactic and semantic disjointedness*. In other words, every mark used must be unique both formally, in terms of its physical identifying properties such as form/ shape, and in meaning, in terms of what it refers to. Thirdly, representations must have *syntactic and semantic finite differentiation*. This implies that there must be a finite number of choices for the character or mark in a notational system, both in terms of its shape and in what it is referring to.

If we look at the case of music, and a musical composition in the form of a score, we see that it complies with these rules: it is unambiguous (anyone who knows how to read music would be able to identify the notes and perform them with a musical instrument), it is disjointed syntactically and semantically (each notes and symbol on a score is unique and mutually exclusive), and it is syntactically and semantically finite (there is a finite number of notes that can be used on a score). What about the case of architectural representation? Initially technical architectural drawings, such as plans, that follow

[4] To quote Goodman directly: "There are, indeed, compositions falsely purporting to be by Haydn as there are paintings falsely purporting to be by Rembrandt; but of the London Symphony, unlike the Lucretia, there can be no forgeries." *Languages of Art*, p.112
[5] Goodman produces a theory of notation, that differentiates types of artistic practices. *Languages of Art*, p.121.
[6] Nelson Goodman. *Languages of Art,* p.156

conventional rules of representation would appear to comply with these rules[7]. However, for Goodman architectural drawings present a "curious mixture."[8] To explore this curious nature of architectural representation further, it is key to consider Goodman's distinction between digital and analog representations, that allow him to further elaborate on the distinction between artistic practices as allographic or autographic.

1.2 Score, sketch, script and digital- analog modes of representation

The classification of painting, sculpture, music, poetry, dance, and theater as allographic, while presenting nuances[9], seem to be quite uncontroversial for Goodman. However, when he comes to architecture, unique complications emerge that put the clarity of the distinction between allographic and autographic arts into question. While he gives a relatively extensive account of music, painting, literary arts and dance, he leaves the case of architecture as somewhat unclassifiable, claiming it to be a "mixed and transitional case":

> *In that architecture has a reasonably appropriate notational system and that some of its works are unmistakably allographic, the art is allographic. But insofar as its notational language has not yet acquired full authority to divorce identity of work in all cases from particular production, architecture is a mixed and transitional case.*[10]

In the above quote he seems to suggest that the relationship between the notational system of architecture (drawings) and its production (building) is not the same as the relationship that other allographic practices have between their notational system and the instantiation of their production. Goodman points to this as being a reason because architecture is not ephemeral like the other arts of dance and theater and music; once a building is built it is there and exists independently of the drawings that were used to make it.

However, while this is an important point for reasons that will be developed in the next part of the paper, Goodman initially stresses that architecture is a curiously mixed case, because the modes of representation used are a combination of different kinds of representational techniques, which include the discursive as well as the pictorial.[11] This is what Goodman calls a "curious mixture":

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[7] a) unambiguous, b) the marks represent unique features in terms of content and surface, and c) there are a finite amount of marks that can be used. This isn't entirely the case however, there are some marks that are ambiguous depending on the context of the drawing will mean one thing or the other, often also relying on annotations to be clarified. But there is a bigger picture worth tackling before getting into the specifics on this type of drawing.

[8] Nelson Goodman, *Languages of Art*, p.218

[9] The case of dance for instance is interesting because there is no canonical form of notation, even though the finding of one has certainly been attempted - (the most known being Labanotation invented by Rudolf Laban). But as it is an "ephemeral art" it fits into Goodman's definition of allographic art, quotes in the previous page.

[10] Nelson Goodman, *Languages of Art*, p.220

[11] However, Goodman does not use the term "pictorial", instead he refers to it as "sketch"

> *The architect's papers are a curious mixture. The specifications are written in ordinary discursive verbal and numerical language. The renderings made to convey the appearance of the finished building are sketches. But what of the plans?*[12]

An architectural plan, for instance, has this mixed status because it is often a combination of graphic representation, in form of lines and hatches, and non-graphic representation such as dimensions, in the form of numbers, and specifications, in the form of text.

> *Thus, although a drawing often counts as a sketch, and a measurement in numerals as a script, the particular selection of drawing and numerals in an architectural plan counts as a digital diagram and a score.*[13]

From the above quote we can pull out three key terms Goodman uses to classify an architectural plan, that are actually different representational techniques: a *score*, a *sketch*, and a *script*. Even though a score refers to music, a sketch refers to painting and a script to literary arts, Goodman expands the notion of *score* to characters of any notational system[14] not just music, and expands the term *script* as something not confined only to the work of playwrights and film writers. "A script, unlike a sketch, is a character in a notational scheme and in a language but, unlike a score, is not in a notational system."[15] And a *sketch* is different from a score or a script in that it does not function as a notational language at all.[16]

Architectural representations seem to be a combination of the pictorial, in the form of *sketch*, and the discursive, as *script*, but Goodman claims that it is most like a "digital diagram and a score." What does he mean by "digital diagram"? To start addressing this question it will first be important to point to the distinction Goodman makes between *digital* and *analog* representational system, and the term *diagram* will be explored in the next section.

While Goodman warns us against "loose talk" when dealing with the digital-analog distinction[17] one claim we can make is that allographic arts, insofar as they use notation, are *digital* forms of representation. This clearly has nothing to do with producing something aided by a computer[18] as is commonly associated by the term. Thus, digital representation is notational, and

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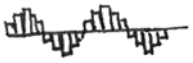
[12] Nelson Goodman, *Languages of Art*, p.218
[13] Ibid., p.219
[14] "A score is a character in a notational system." Nelson Goodman, *Languages of Art*, p.177
[15] Nelson Goodman, *Languages of Art*, p.199
[16] This is because language does not fulfill the 5 rules for a notational language; it is not unambiguous (english language has plenty of words that mean different things in different contexts), and it is not semantically disjointed.
[17] "Since the misleading traditional terms "analog" and "digital" are unlikely to be discarded, perhaps the best course is to try to dissociate them from analogy and digits and a good deal of loose talk, and distinguish them in terms of density and differentiation- though these are not opposites.
[18] This is a very debated difference in architectural criticism, as some traditionalists value the craft of the hand over drawings produced on the computer. We will return to this point later in the paper.

thus complies with the five rules of notation stipulated earlier, and analog representation is non-notational. More specifically, Goodman relates the analogue -digital distinction to the notions of *density* and *differentiation*[19]; digital systems are distinguished by being *differentiated* while analog ones are *dense*[20]. The *density* of analogue systems deals with notions of continuous variation, in such a way that given any two marks, there is always a possible third character between them. By contrast, digital systems are always differentiated and have a precise reading of what the representation refers to.

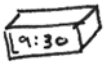
analog



digital

A good visual example is a digital and analog clock, where the hour and minute hands in an analog clock are always in a state of motion. Reading from an analog clock will always be ambiguous and open to interpretation, while on a digital clock there is always a definite precise time that it is, there is no ambiguity: "Digital computers are sometimes said to be capable of complete precision while analog computers can achieve at best only a good approximation."[21]

analog



digital

For Goodman, music is the paradigm case of a digital (notational) representation, while painting is the paradigm medium of an analog (non-digital) representation. Similarly, music is the paradigm case of allographic artistic practices, as painting is for autographic practices. So where does this place the case of architecture?

1.3 Diagrams and Models

Rather than understanding plans as a reduced version of the real thing yet to be built, Goodman emphasizes the mixed status of architectural drawing in that it is both notational and non-notational, digital and analog, insofar as they combine both pictorial representations (*sketch*) and annotations in text (*script*) and numerals[22] but he also claims plans are more akin to being classified as a "score or a digital diagram." Here it is worth clarifying what is he means by a *diagram*, and see how it might be useful to think about the mixed case of architecture and the relationship between drawing and building.

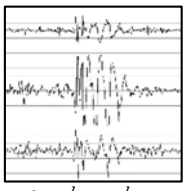
[19] Although he claims that differentiation and density are not opposites of each other, even though analog and digital are opposites. Nelson Goodman, *Languages of Art*, p.161

[20] "a system is analog if syntactically and semantically dense" Nelson Goodman, *Languages of Art*, p.160

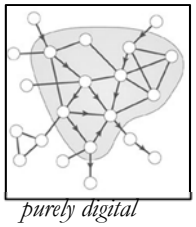
[21] Nelson Goodman, *Languages of Art*, p.161

[22] Goodman's theory of notation is more elaborate than this statement, he 5 identifies five different aspects that make a notation a notation, but for the purposes of discussing the mixed case of architectural representation and keeping the argument more focused we are not engaging in the elaboration of Goodman's theory.

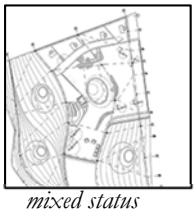
Diagrams are not by definition either digital or analogue. For Goodman, what matters in a diagram is how we are to read it and depending on how the information contained in a diagram is shown, it becomes digital or analogue. A seismograph would be a case of a *purely analogue* diagram because its reading is not reliant on any notational system - its lines are the result of the motion of the earth and can be understood without added notation. A *purely digital* example would be that of a topological diagram, which relies on a notational system. In many cases, diagrams can hold a mixed status. For instance, ordinary road maps, are a mixed case, containing both analogue and digital elements. Most architectural drawings will also have this mixed condition of being both analogue and digital, because there will be some sort of spatial quality that can be understood without the use of any notational device, but there are also symbols and conventions of drawing that may not be internal to the drawing itself. These either rely on shared conventions, or a specified indexical system on the drawing.



purely analog



purely digital



mixed status

Models are diagrams[23], that tend to have more than one dimension and could have moving parts. Certainly, architectural models are three dimensional and often can be taken apart or have lift-able components that allow the viewer to see inside the space for example. An architectural model is analogue with respect to spatial dimensions, but if chipboard is used to denote concrete walls, and acrylic to show glass, then it is digital with respect to its materials, because the materials used for the models are standing in for the actual materials, they are *representing* them.

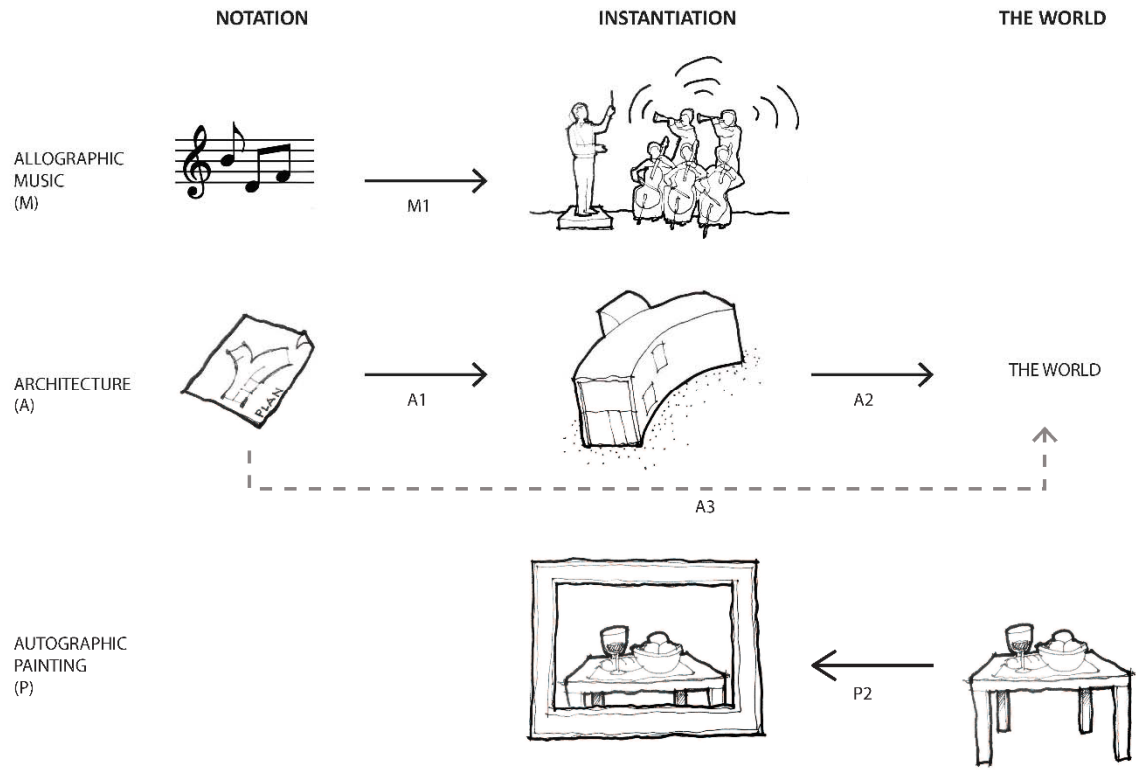
Architectural representation, performs as a "diagram" in that it has this mixed status of being at once digital, hence notational, but also analog, pictorial, akin to painting and thus non-notational. This is one of the main reasons Goodman gives for architecture being a mixed case; its representation can be notational and non-notational, digital and analog. However, while he admits architecture being a "mixed and transitional case", the case of plans is a "particular selection of drawing and numerals" which he considers being a "digital diagram and a score", closer to music and therefore allographic. However, what is of interest for the purposes of this paper it is the particular relationship between the representation and the built manifestation of the representation in architecture. To recall Goodman's point on this, we see that this relationship puts the allographic quality of architecture into question:

> *insofar as its notational language has not yet acquired full authority to divorce identity of work in all cases from particular production, architecture is a mixed and transitional case.*[24]

[23] "*Diagrams are flat and static models*". Nelson Goodman, *Languages of Art*, p.173
[24] Nelson Goodman, *Languages of Art*, p.220

This relationship does not seem to be the same kind of relationship that binds the notational language of other allographic arts with their means of production. Nor is it similar to the relationship that pictorial practices have claimed to have with the object of representation, because it usually doesn't represent something already existing. Indeed, architecture seems to have a fluctuating relationship between its notational systems and the produced artifact, as well as with the 'reality' or 'the world' that it intervenes in.

From the diagram below, we see how classical conceptions of painting and photography are representations of things that are already in the world (P2: *representation* ← *world*) while architectural representations are usually of something yet to be realized. (A1: *representation* → *instantiation*).



It is from this point, using the above diagram as a road map, that I aim to elaborate on architecture's mixed status by exploring the relationship that Goodman mentions but does not develop further, namely between the architectural drawing[25] (what Goodman calls "notational language") and the building (Goodman's "particular production") in architecture. As well as a relationship which I will claim is unique to architecture; the relationship between the representation and reality, or the world (A3: *representation* → *world).*

[25] in its broader sense, including models and other modes of representation

II. DRAWING AND BUILDING

"Architects don't make buildings, they make drawings of buildings."[26]

While architecture is understood as the art and science of building, architects often find themselves removed from the actual act of construction. This is much like a composer may be removed from the performance of the piece composed. Even temporally, the work of architects and composers may be instantiated outside of their own lifetime.[27] This is not the case with other pictorial practices such as painting or photography. These practices require the direct involvement of the author as well as 'a world' from which they are drawing inspiration to produce their work.

Using the framework set up thus far, in this section I will delve more specifically into the relationship between architectural representation, it's instantiation in a building, and its relationship to the world, in relation to other artistic practices such as music and painting.

2.1 Is drawing to building like score is to music?

We have seen in the previous section that the main element that distinguishes an autographic from allographic artistic practice is the existence of a notational system[28] as well as the direct or indirect involvement of the author in its production. In addition, uniqueness and authenticity which are important in autographic works are not relevant in allographic ones. While Goodman provides a very rigorous theory of notation, his take on architecture as allographic is fairly loose: "architecture has a reasonably appropriate notational system" and "some of its works are unmistakably allographic."[29] Insofar as music is the paradigm case of an allographic artform for Goodman, it will be important to explore the relationship between musical notation and its actualization as music, in parallel with architectural notation and its actualization.

For the author of *Languages of Art*, architectural work has a close affinity with music because: "architectural and musical works, unlike paintings or plays or novels, are seldom descriptive or representational."[30] Indeed architecture and music do not concern themselves with depicting reality,

[26] Robin Evans, "Architectural Projection" found in *Translations from Drawing to Building*, p.21
There are exceptions of course, such as with the practice of "design-build" where the design and the building happen simultaneously. But this is only really possible in small scale architectural projects, which is but a particular type of architectural intervention, and therefore be used as a strong enough exception to the case.
[27] This is most obviously seen in the case of music where works from different time periods can be performed, but even in architecture this Hs sometimes happened. A recent example is the redevelopment of the southern tip of Roosevelt island in New York, which will be addressed in further detail later on in the paper.
[28] Importantly, Goodman defines what he means by notation through the 5 rules described earlier.
[29] Nelson Goodman, *Languages of Art*, p.221
[30] Nelson Goodman, *How Buildings Mean* p.642

as one could say painting and sculpture have traditionally.[31] Architectural notation, like musical scores, are artifacts that can be decoded, *read*, according to shared conventions in order to affect reality by creating something that was not there before. Like music, it is a set of instructions for realizing another artifact, sounds in the case of a musical composition, material production in the case of architectural drawing. Architectural and musical notation are *generative* in this way because they create new things; a musical score produces a performance of that music; architectural drawings help produce a built artifact.

While it is indeed the case that there are some affinities with music, the relationship between drawing and building in architecture is not like the one between a score and a performance. Why? One reason that Goodman points to is the fact that architecture is not ephemeral like music and dance, and therefore can exist independently of its notational system:

> *the work of architecture is not always as surely disengaged from a particular building as is a work of music from a particular performance. The end-product of architecture, unlike that of music, is not ephemeral*[32]

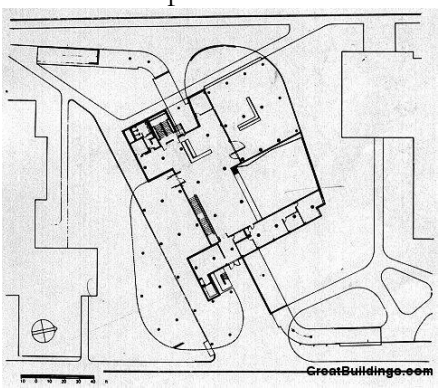
For the production of allographic arts such as music, dance and theater, the notation always need to be *performed* in order to exist, while in architecture the production of its notation (the building via the drawings) only needs to happen once and then it exists and is appreciated independently of the existence of its notation. Once built, architecture does not rely on the drawings to exist the way a musical performance may rely on the score to exist.

Goodman takes for obvious that a composition needs to be performed in order to be considered *music*, and that architecture needs the plans in order to be built and considered *architecture*, but he does not address what the role is of architectural notation if the building itself is not actualized. A score on its own, without ever being translated in some way into music, cannot be considered to be *music*. The question that arises here is can architectural notation (drawings) exist independently of whether it was built of not? Can we say that drawings are *architecture* in a more affirmative way than we can say a score is *music*?

This is one way that I would claim the relationship between music and its production is different from that of architecture and its production; architecture does not need to be built in order to be considered *architecture*, it can exist solely in its representations. I would argue that architectural representations, drawings, often become ends in themselves; a drawing can detach itself from the

[31] This comparison can also be seen as illustrated in the diagram on page 8 of this paper
[32] Nelson Goodman, *Languages of Art*, p.220

represented object to become an artifact in its own right, much like a painting. In these cases, it is no less *architecture* whether it has been built or not, but its history of production does become important.



Architectural representation is one of the first places where ideological changes manifest themselves. If we look at the drawings of Le Corbusier, for example for the Carpenter center, the relationship between drawing and building often exceed their purely notational function, because drawing does more than just act as a codified instrument for construction of the built. These drawings show things beyond the utility of what is represented; it illustrated Le Corbisier's theoretical stance; the ramp and column grid are not mere utilitarian elements to get places without steps or support the structure, they are the spatial organizers, that speak to movement and the change in perception through that movement; it is about the *experiences* that the architect anticipates a user having. This is an example of a project that was ultimately built, but the drawings have a certain autonomy of their own. Another example, is the work of Piranesi which is mostly unbuilt, but has nonetheless advanced the discipline via the representational tools at the disposal of the architect.[33]

Architect and author Stan Allen is critical of those who claim that the true power of architecture lies in the completed built artifact (a view which he labels as "conservative") as well as those who claim that architecture's real capacity lies in drawings and representations which remain uncontaminated by the compromises of construction[34] (this he labels the "experimental" view). Indeed, some might argue that built architecture is always plagued with the limitations of time and costs, and gravity, that affect the built artifact but do not affect the architectural representations of it. Allen claims that the relationship between the two is what will reveal the capacity that architecture has to intervene productively in the world, but that it is a paradoxical and counterintuitive relationship:

> *Paradoxically, the dry, unemotional form of notation, which makes no attempt to approach reality through resemblance, is better able to anticipate the complexity and unpredictability of the real.*[35]

The distinction between allographic and autographic practices made by Goodman points to the paradoxical character of the relationship between drawing and building. I would agree with Stan Allen's contention that for the advancement of the profession there is a demand for drawings to be

[33] These tools are not restricted to drawing, but encompass also text, not just in the form of specifications for the built (what Goodman refers to as "script"), but theoretical texts, and treatises.
[34] Stan Allen, *Mapping the Unmappable*, p. 31
[35] Ibid., p. 33

abstract and far removed from the complications of '*the real*' in order to have a productive and transformative effect on reality. I would also contend that drawings have an effect on reality whether it gets built on not. Indeed, as Goodman says, to assume notation to be an instrumental aid to production is to miss the fundamental theoretical role of notation.[36] Similarly, I would apply this observation to architectural representation -to drawings- and say that to assume that drawing is an instrumental aid to the production of the built is to miss the fundamental theoretical role of drawings and their capacity to advance the practice of architecture.

Goodman's loose analogy of plans to musical notation can become problematic when recalling that architectural representation encompasses plans (score), specifications (script) and renderings (sketch), in a way that musical notation is mostly a score and does not need script or sketch to be disambiguated. Even what Goodman calls 'plans' is a compendium of different types of drawings known as *orthographic* drawing, which encompasses floor plans, sections and elevations. Plans are not a singular entity like a 'score' which is able to communicate a musical composition. Even to restrict the term 'plans' to just orthographic two-dimensional drawings is a bit deceptive as architecture is communicated also in three-dimensions, with *paraline* drawing techniques which are precise measured three-dimensional drawings (much like two-dimensional plans, plan oblique and axonometrics maintain parallel lines true to how they actually are). This is not just to say that architecture is more complex than music and therefore necessitates multiple modes of representation, but it also points to the looseness with which Goodman refers to architectural plans, in a way that he does not of musical scores. In the previous section we have seen how music is Goodman's paradigm case for allographic art because it complies with the rules for notation. However, to my knowledge Goodman does not put architectural plans to the test.

2.2 Architecture as *allographic*

If we take the *looser* definition and understanding of allographic and autographic, in that architectural drawings use shared conventions, then architecture does seem to have a "*reasonably appropriate notational system"* and can be said to be allographic. In addition, it shares the allographic quality of being able to be produced at a distance from the author. But if we test its notation against Goodman own rules for notation we would have to show that: 1) it has a notational system that complies with the five rules 2) uniqueness and authenticity do not matter 3) the history of production does not matter.

[36] Nelson Goodman, *Languages of Art*, p.128

The first rule for notation (as discussed in part 1.1 of this paper) holds that it must be unambiguous. The English language, while complying with some of the other rules does not comply with this one because a single word could mean different things, depending on the context in which is used. Similarly, plans are not unambiguous. Notations used in plans can mean different things depending on the context, and need to be clarified by adding further annotations. For example, an arrow in a floor plan could mean up or down, unless it is clarified with annotations of UP or DN. There is also a limited amount of information that can be shown on plans, for instance the specific location of all the screws on a gypsum wall are not going to be drawn; there is going to be a fair amount of assumptions that need to be made both on the side of the people drawing the plans and those interpreting them. Orthographic drawings are often hard to read and need to be disambiguated with other representations, not only with specifications in the form of text, but also with three-dimensional representational systems that clarify the ambiguities that are necessarily present in two-dimensional representations of three-dimensional things.

Plans may have syntactic or semantic differentiation and disjointedness, but given that plans do not comply with the 'unambiguity' rule, begins to question their notational status, and thus the allographic status of architecture. It remains to be seen what the relationship is to uniqueness, authenticity and the history of production. Indeed, both drawings and buildings are mostly produced by more than one person, unlike the singular artist of autographic works. But does this make its outcome less unique? If we take a set of architectural representations and use them to build multiple instances of the building, at different times, and in different locations, are all of the built manifestations equally 'authentic'? Goodman again leaves it open as an indeterminate case: "Thus the question whether two buildings are instances of the same work, relative to the architect's total language, is an indeterminate one."[37]

Certainly, one could build suburban homes from the same floor plan in different places, which happens quite frequently. But what if we imagine some developer to take the plans for the Empire State building and rebuild it exactly as it is in New York, but in a different place, say in Newark. We would most likely all agree that the authentic one is the one in New York. Similarly, all the replicas of famous buildings that we can find in Las Vegas, for instance, are just that- replicas. We would never attribute authenticity to them. This is because the history of production is actually very important in the case of these buildings. The Eiffel tower was significant because it used very novel technology of construction with iron; it defied what was thought to be possible, which is not the case of the replica

[37] Nelson Goodman, *Languages of Art*, p.219

made for the "Paris" hotel of Las Vegas. Its significance and symbolic value have been completely altered.

If architecture were an allographic artform we should be comfortable claiming that that every instance of certain drawings will produce the same building. However, it is difficult to disassociate buildings with a certain level of uniqueness and notion of authenticity. Even in less controversial cases, the use of floor plans designed in onetime period, and then used in a different time period seem to be problematic. The recently completed redevelopment of the Southern tip of Roosevelt Island is an example of this. It was completed using the plans that Louis Kahn had produced prior to his death in 1974. These plans were never used to build anything else, so this is a genuine instantiation of these plans. Nevertheless, it seems wrong to use them thirty years later, when the island and the surrounding city have developed into something very different from what they were at the time of the plans' inception.[38]

These cases suggest that many works of architecture have a historic specificity, and a site specificity, that makes the history of production essential to their identification. They are not like music which can be instantiated at different time periods without affecting the authenticity of the composition. In this sense they are unique and closer to an autographic artform. Indeed, it seems that the architectural works we would call *autographic* are precisely those buildings we regard as works of art, unlike the suburban homes mentioned above which seem indifferent to their history of production. Just as that building a bank with a floor plan similar to that of the Pantheon does not produce architecture as a work of art, just a crude replica. So, it is not that it is or not allographic when replicated- it is just not to be considered architecture as an artistic practice, so should not enter into this debate.[39]

Thus, no matter how *notational* the architectural drawings might be, I would contend that the history of production, uniqueness and authenticity is important in architecture understood as an artistic practice. In almost all built work uniqueness and history of production matter: the site for which it was built and the historical context and critical. Does this make architecture autographic? Or should we consider architecture as allographic when it is not built, and exists just in its representation, but becomes autographic when built? Indeed, some have gone as far as to claim that architecture is

[38] these plans do not recognize the way that Roosevelt island had been used for the past 30 years, and the memorial completely destroyed the unique 360 view that was possible at the tip of the island in order to impose a concrete cube in commemoration to the holder of the island's name. The excessively symmetric aspect of the park and memorial, also do not recognize the differences that have emerged on both sides of the island.

[39] Goodman is considering the differentiation between artistic practices. This kind of construct would not be classified as architecture understood as an artistic practice. It's something else, mere construction, maybe. This is a topic for another paper.

allographic in the 'plan stage' but autographic in the 'built stage'.[40] While this poses complications for Goodman's account, it is a compelling possibility given the contention made earlier that drawings and building can be disassociated and have their own agency. While architectural drawings always have some contact with instrumentality they are not merely a means for the built. It is the very notational quality of drawings -their abstraction and lack of resemblance to reality- that allows them to "work on reality from a distance."[41]

2.3 Architecture and pictorial practices

While architecture holds many affinities with allographic arts as seen in the previous part, Goodman also affirms that: "an architect's plans seem a good deal like a painter's sketches; and painting is an autographic art"[42] He doesn't elaborate on why an architect's plans seem to be close to pictorial systems. However, while pictures are also part of a symbol system, for Goodman they represent not in virtue of any notion of resemblance, rather it is due to their being subject to the systematic rules of use, and to the idea of familiarity and habituation. [43] This is because for him there is no privileged relationship that a representation might have with the world, because there is no absolute thing called 'reality'. It all boils down to how habitually familiar we might be with the object being represented. As we have seen in the previous section, representational systems can be differentiated on the basis of his theory of notation and also what he calls habit or *inculcation*.[44] This can be seen also from his conceptions of perspective:

> *Pictures in perspective, like any others, have to be read; and the ability to read has to be acquired. The eye accustomed solely to Oriental painting does not immediately understand a picture in perspective.*[45]

This is a perplexing account of perspective, but ties into the lineage of notions of realism in the visual arts, particularly as they relate to the invention of perspective in the Renaissance. It is the system of perspective which has most of the similarity with our perceptual apparatus and as a consequence it is widely accepted as being a more *realistic* mode of depiction.

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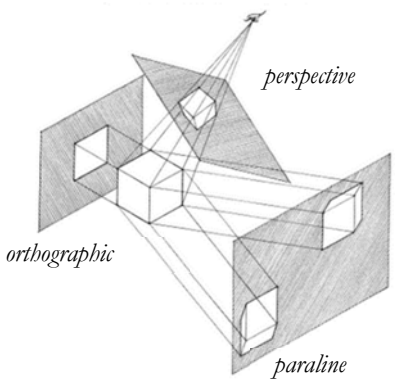
[40] "that architecture may be allographic in its plan stage but autographic in its second, built stage." Kirk Pillow, *Did Goodman's Distinction Survive LeWitt?*
[41] Stan Allen, *Mapping the Unmappable*, p. 40
[42] Nelson Goodman, *Languages of Art*, p.120
[43] For Goodman pictorial practices have "density" and are replete.
[44] "whether an object is 'really fixed' or a picture is realistic depends at any time entirely upon what frame or mode is then standard. Realism is a matter not of any constant or absolute relationship between a picture and its object but of a relationship between the system of representation employed in the picture and the standard system." Nelson Goodman, *Languages of Art*, p.38
[45] Nelson Goodman, *Languages of Art*, p.14

In architecture the development of perspective during the Renaissance emerged also a particular mode of representing architecture. It is worth recalling that perspective is one of the three large families of architectural representation, or projection systems, together with *orthographic* and *paraline* projection mentioned earlier. Drawings built in perspective produce a knowledge which is different from *paraline* drawings such as *axonometrics* which preserve the relationships that objects have to each other in a way that is measurable. In orthographic and paraline projection for example, physical properties of the object must be maintained, as they *are,* not as they appear to the naked eye; parallel lines in the object must be parallel in the drawing, for instance, even though they appear to the eye to meet at a point, which is what allows us to perceive distance. Indeed, one of the hardest things for students learning these drawing techniques is to not confuse what they *see* (perspective) with what they *know* (orthographic or paraline) of the object.



Perspective is the drawing technique that most closely resembles the way humans perceive: things that are further away appear to be smaller, and parallel lines in the world will appear to meet at a vanishing point in a perspectival representation. What we see is actually a distortion of reality that allows us to perceive distance; perspective is a distortion of reality. Perspective is not just a technique of drawing, it also puts the subject at the center of representation, that goes hand in hand with the shift of ideology that marked most of the artwork that was produced in the Renaissance period. Usually shown with the subject's static eye at the center, and perspectival effects unfolding out of it. One could argue that perspective not only affected architectural representation, it also affected architectural production. The term *production* here is not referring to anything akin to producing instrumental drawings for construction, rather it is intended to connote a way of generating *thinking* about and *imagining* architecture.

It is in this way that architectural representation is generative, it is able to produce new ways of imagining architecture -new realities.[46]

In architectural drawings, perspective is used mostly for renderings, which is what Goodman calls *sketches*[47]and are indeed most similar to pictorial representations. Renderings aim to show how the building would appear once built; to show a building in its context, affected by environmental

[46] This is also what Stan Allen claims.

[47] "The renderings made to convey the appearance of the finished building are sketches." Goodman uses the term *sketch* to denote an architectural *rendering*, so I am keeping this assimilation here but they are different things: a *sketch* is a drawing done in preparation for the final representation, while a rendering aims to *render* the scene in the same was as it would be rendered in real life, and it has a sense of finality to it that a sketch does not. (...) Realistic representation, in brief, depends not upon imitation or illusion or information but upon inculcation. Nelson Goodman, *Languages of Art*, p.218.

factors, the sun, wind, and by people moving in and around it.[48] In loose terms, renderings, or sketches, aim to give a glimpse into how the building might be *experienced*, and how the material selection might actually look. But while resemblance is important in renderings, the pursuit for realism in an architectural rendering is not uncontroversial. It certainly seems to be the aim behind renderings made for developers or real estate companies where the goal is to make the look of the representation as realistic and as appealing as possible for commercial purposes.[49] However, the value of the hyper-realistic architectural rendering for the discipline itself is highly contested, especially in architectural education.

The ability to produce highly-realistic renderings is enabled by computer aided rendering techniques. Prior to the computer, renderings were done by hand using colored pencils and techniques at the disposal of the hand of the renderer; a more or less skilled renderer could produce a more or less realistic depiction of the building in context, but these depictions would never be confused with the *real* building, in the way a computer-generated rendering might be confused with a *photograph* of the completed work. Indeed, prior to the computer, the notion of realism in a rendering was similar to the notion of realism in painting prior to photography; it was a goal for some artists, but rarely would we claim there to be an ontological identity between the representation and reality.

There is a compelling parallel between what the invention of photography has done to painting with what the invention and use of the computer has done to architecture. This ties into the debate around mechanically reproduced artwork, and the observations made by Walter Benjamin and others on what mechanical reproduction via photography and other means, has done to artforms such as painting. The next section will aim to tackle these relationships, by first briefly looking at photography, and its relationship to architectural representation. In so doing I will deviate from Goodman, for whom mechanical reproduction was not at all of concern in the classification of artistic practices.

In this section I have used the work by Goodman on allographic and autographic practices to explore the specific relationship between drawing and building in architecture. While drawing is to some degree *notational* [50] and instrumental for building, as a score is for a performance, architectural representation also has its own agency which allows it to be considered as a thing in itself, capable of affecting reality without instantiation in a built artifact.

[48] Since for Goodman, the mechanical reproducibility of a representation didn't really have anything to do with its authenticity, as it did for Walter Benjamin, for now I am leaving aside whether the rendering was produced by hand or with the aid of computer software. Even though I do not think it is an unimportant distinction.
[49] which may actually make some realistic, unappealing, elements not be shown
[50] Goodman assumed it is notational but we found that in testing it against his rules it does not comply. However, it is notational in Stan Allen's sense where it is abstract and far removed from aiming to represent through resemblance.

III. ARCHITECTURE IN THE AGE OF DIGITAL (RE)PRODUCTION

Walter Benjamin's pivotal text *Art in the Age of Mechanical Reproduction*, aimed to question the effect that mechanical reproducibility has on the artforms themselves. His contention is that mechanical reproducibility, enabled by the invention of photography and film, caused a real crisis and breakage in traditional artforms, such as painting and sculpture.

In architecture a similar question has been in the air ever since the computer was introduced as a means to produce and reproduce drawings. There is a belief that digital production is causing a crisis in architecture and the tradition of drawing. Thus, if we can sum Benjamin's main contention in a question: *what is the effect of mechanically reproduced artwork on the artwork itself*? Here I would like to address a similar question: *what is the effect of digitally produced architecture on the architecture that is produced?*

3.1 Architectural representation and photography

In photography, the common-sense account is that the photograph reproduces what is out in the real world; the relationship between the representation and the thing being represented is that of resemblance. We have seen how this is not the case for Nelson Goodman. However, in *The Languages of Art* he does not shed much light onto the specific case of photography. Other philosophers, such as Kendall Walton, have tackled the case of photography more explicitly.

While painting, drawing and photography are all techniques for producing pictures, for Walton photography cannot be thought of in the same way. For him, photography is tied to "the enterprise of seeing" and indeed he claims that the advent of photography has given us a "*new way of seeing"*. Walton's thesis of is a bold one: for him the viewer of a photograph literally sees the scene that has been photographed. He is very clear that we are to take him literally on this:

> *I must warn against watering down this suggestion (...) I am not saying that photography supplements vision (...) Nor is my point that what we see—photographs—are duplicates or doubles or reproductions of objects. My claim is that we see, quite literally, our dead relatives themselves when we look at photographs of them*[51]

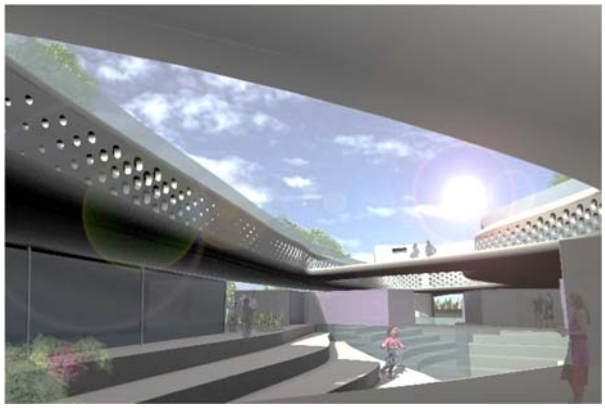
This is Walton's notion of *transparency,* that claims ontological identity between the photograph and object of representation in a photography. This is a difficult yet compelling claim.[52] In the context of

[51] Kendall Walton. "Transparent Pictures: On the Nature of Photographic Realism" p. 251-252

[52] for the purposes of this paper to tackle the veracity of these statements as specifically relevant to photography, I will take these as a compelling claim made about photography, and see if there is a similarity with architecture.

painting, no one believes in the ontological identity between the painting and the thing the painting aims to represent, but in photography Walton is not alone in such claims.[53]

This contention is actually in the background of why architectural renderings aim to look so realistic. I would claim that it is not mere resemblance that these representations are after; they don't just want to *look* how the building might be in reality, rather they aim to look like a *photograph* of the building. This is often achieved by introducing visual effects that occur as a result of the physical interaction of light with the camera's lens, such as the effect of *lens flare*. For professional photographers this effect may be undesirable because it results from light being scattered, or *flared,* in a lens system and points to material imperfections in the lens. Sometimes the effects added to the rendering actually make it look more fantastical and dreamlike, hence less real, but if they emulate physical effects that happen in photography, they are desirable. In an architectural rendering this effect is added as a means to make the renderings look like a photograph, not necessarily more *real*.




This is done not only because of the common assumption that photography is a faithful reproduction of reality, but mostly because in looking like a photograph, rather than a realistic rendering, it is as if it were *transparent* -like a photograph in Walton's account. If a rendering is sufficiently similar to a photograph, it will be as if we are looking at the real built building. This is because, we all know that images can be faked, but if something was photographed at some point that something existed.[54]

Therefore, in a sense, a rendering will look more realistic not by virtue of how much it resembles the real thing to be constructed, but rather how closely it provides the illusion of being a photograph of the real thing. In other words, photography elevates the status of an architectural

[53] Andre' Bazin seems to make this claim in an even more perplexing manner. But while this history of photography is fascinating, I am trying to keep these accounts as concise and focused towards the bigger topic of the paper. Hence, some simplifications have been made

[54] Photographs can of course also be faked, and Walton is very aware of this too. But in it being a photograph there will always be aspects of it that once existed.

representation that aims to emulate it, because appearing to be a photograph gives the rendering more validity, not by virtue of how realistic it looks but by of how much like a photograph it *looks*.

An interesting case which exemplifies this idea even further is the series of images produced by visual artist Xavier Delory called "photography pilgrimage on modernity". In this series the artist manipulated photographs of famous buildings, or rather, famous photographs of known buildings, and transformed them in such a way as to make them look vandalized, completely run down and dilapidated. This caused a curious commotion in the architecture community, many critics were outraged by the images. Even though it was known that they were *photoshoped* images from existing photographs, they looked so much like the photograph of the building that resided in the collective memory, that it was hard to disassociate the photograph from reality. The images were realistic in the sense that they resembled the original iconic photograph. It is almost as if those atrocities had happened to the building just by virtue of it being shown in a photographic-like image.

Photographs will always depict something that exists or has existed, independently of how realistic or non-realistic it may be considered. While architecture and music come into the world, or get produced by, their drawings or scores, a painting or a photography enter into reality by having reality produce *them*. A score or a drawing are a score of a drawing of something which may or may not come into reality. A photograph is always a photograph of something that at some point was in the world.[55] So there is a kind of an inverse relationship between the representation and the thing that is being represented in architecture and in photography. It is this relationship between photography and world which at times is of interest in architectural renderings, hence their wish to emulate the *look* of a photograph. This emulation was of course only possible after the invention of photography, and after the invention of computer aided design software that made emulating a photograph possible.

[55] This doesn't mean that a photograph cannot be imbued with ideology, and things that are ephemeral (beliefs) but it is a major difference between an architectural drawing and a photograph.

3.2 Drawing and building in the digital age

Many critics and architects claim that the discipline is in crisis now that drawings are produced mostly aided by the computer. Increasingly, architecture gets thought through, and produced, directly by drawing in three-dimensions, making the production of two-dimensional plans from the three-dimensional model very immediate. So, the two-dimensional drawings that were so painstakingly slow to produce accurately by hand emerge as a result of a *cut* in a three-dimensionally built digital model. There is still work to be done to these *cuts* for them to read as plans, but in the eyes of many, architects and non-architects, this ability to produce drawings from a digital model is detrimental to the discipline and is putting architectural representation in crisis. In academia, there are increasing complaints regarding students not knowing how to draw in plan and section anymore, given the ubiquity and reliance on the computer. Another concern is generated by the ability to infinitely zoom into a digital model, in a way that was not possible in hand drawing with the limitations set by the paper's surface and the thickness of the pencil's lead. This infinitely-zoomable capacity of digital drawing has resulted in a loss of control of the sense of scale, distances and sizes. In addition, modeling in perspective and relatively quick ability to output perspectival renderings, provides deceptive views of the object being represented.

The use of the computer has certainly made the production of drawings faster, and in some respects easier, and there has undoubtedly been some loss of traditional modes of drawing. I would say it has paralleled what happened to painting with the invention of photography; it is just easier and faster to capture details of texture, light-shadow, in a photograph in a way that would take much longer in painting. Therefore, rather than seeing it as a detrimental intrusion to the artform I see the introduction of new forms of production (and reproduction) as opening new possibilities for the artform. Photography liberated painters from having to work so attentively on realism, or slave for hours over the detail of how a drop of water reflected the sun at a particular moment in time. It spearheaded the work of abstraction and experimentation that pushed the possibilities of painting as an artform in new directions and produced new abstract ways of representing ideas. In the same way that photography liberated painting and allowed it to discover new directions; computer aided drawing should be viewed as liberating to the architect, who is not as bound to the drawing table with ink and vellum to produce precise drawings and representations. Although the production of these drawings is by no means obsolete, the computer has just permitted more exploration of the discipline's representational capacities, much like photography has not made realist in paintings obsolete.

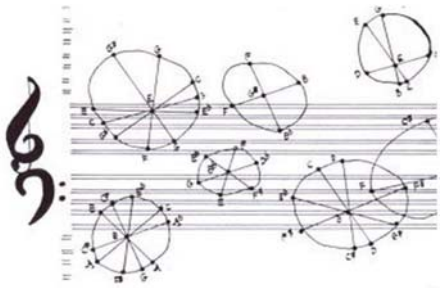
With each new technique that is discovered, new representational possibilities are uncovered too. This is also the case with the use of the computer. When digitally produced drawings are critiqued for using the computer as a means of architectural representation, at the expense of the art of drawing by hand, these critiques are often rooted in understanding the computer as a technique of representation and not of production of architectural thinking, both for the creator and the observer of the drawings. To claim that computer software allows us to think differently might seem an abomination to some, but if it enabled new representational techniques, then new ways of seeing and thinking are enabled too.

One question that arises, is whether the use of the computer in the production and reproduction of architecture, has an effect on it being considered more allographic. Does the allographic or autographic aspect of a drawing change with the use of the computer? Does digital (re)production make everything more allographic? There have been interesting recent debates on this issue: one argument alleges that digital images explode the autographic- allographic distinction, while its rebuttal aims to prove that digital images actually are allographic. Delving into this debate would exceed the goals of this paper, but it illustrates the resonance that Goodman's work has had and its continued relevance even with more contemporary problems.

3.3 Objections to claim and response

The main claim I am making in this paper is that unbuilt architecture is still architecture, because drawings can have an agency of their own and still have the capacity to affect reality through its representations. There could certainly be an objection to this claim that points to how architectural representations cannot be experienced the way built architecture can. While certainly no drawing can transpose all the possible material and light and 3d effects that built architecture has on the user, its effect on reality is no less possible. My contention is that architectural representation has the same capacity to transform reality that autographic arts have, such as painting and photography. Why? Because they make us see new things- Yes, art forms have an effect on our perception, because they force us to put our attention on things in reality that we otherwise would not. Artforms produce knowledge in this way. The contention is that unbuilt architecture is no less capable of producing knowledge than a painting or a photograph are. Furthermore, it is indispensable for the advancement of the discipline. Built architecture is too, but it is a lengthier and more complex process that slows down the advancement that can happen more rapidly in drawing.

Another objection could be to the implication that musical scores are less *autonomous* to their performance than architectural drawings are to their built counterpart. There are many interesting cases of experimental composers such as John Cage, braking away from the traditional five-line musical staff to experiment with new modes of representation that in turn would have new unpredictable musical outcomes during the performance. He experimented with the graphics of scores using ambiguous numbers, shapes, and symbols that were intended to be interpreted by the performer. As a result, the interpretation of the score would be unique to that performer at to that particular instantiation of the musical score. This would allow for infinite readings of the notes, and for unpredictability in the musical outcome.[56] These experiments in musical scores have aimed to transform the allographic quality of music, and pushed it closer to what may be considered as autographic. Music resulting from the reading of these scores do not comply with Goodman's rules: it is not unambiguous; there is plenty of ambiguity given that it is not a conventional system; it is not disjointed syntactically and semantically, the notes to not appear to be mutually exclusive; it is not syntactically and semantically finite, there seem to be many different sizes and shapes that the marks could take. These kinds of experiments have certainly made us question the authority of the musical score and introduced new ways of visualization of music that are not tied to a traditional convention. While these are interesting exceptions, Goodman's rules can only really be applied to traditional notions of a score.



A third objection could be to the adoption of Goodman's theories, which have been significantly criticized. One such critic points to how Goodman's classification of autographic or allographic seem to be mutually exclusive and cause serious problems when considering artworks, such as architecture, that have a mixed status:

> *to the extent that a form of art consists of some grouping of works, it is hard to see how there could be one that could not be classed as either autographic or allographic, since the inapplicability of the distinction implies an absence of works and so an absence of art form.*[57]

This is a valid objection, but the aim in the paper was to use Goodman's work in order to put into question the relationship between drawing and building in architecture, and explore affinities or differences with other artistic practices such as music, painting and photography. Goodman's work has provided a sturdy framework for this goal.

[56] On one of Cage's most famous scores of this kind, paradoxically known as 4'33, there written statement on the score clearly illustrates this, by claiming that the piece: "may be performed by any instrumentalist or combination of instrumentalists and last any length of time."
[57] Kirk Pillow, *Did Goodman's Distinction Survive LeWitt?* p. 366

CONCLUDING REMARKS

This paper aimed to explore the relationship between the *drawing* of architecture and the *building* of architecture, in the light of the work on representation in artistic practices. In the context of Nelson Goodman's seminal work *Languages of Art* the distinction between autographic and allographic arts allows for a rigorous discussion on notation and the shifting conception of authenticity in certain artistic practices.

For the purposes of this paper, in part one (I) the distinction made by Goodman between allographic and autographic, digital and analog, allowed us to explore the paradoxical and difficult-to-classify condition of architecture. In part two (II) I concluded that the relationship between architectural notation and the built is not the same as a musical score to its performance because a score is more instrumental than architectural representation, and cannot on its own qualify as *music*. Architectural representation, in the form of a drawings or models, does indeed, on its own, independently of it being built or not, qualify as *architecture*. In addition, holding architectural modes of representation in opposition to the concrete physicality of building, is to miss what is specific about architectural representation and its capacity to have an effect on the world. The considerations of architecture's multiple modes of representation brought us, in part three (III) to the discussion of photography and the role of the computer. In this final section, I aimed to link the discussion on the mechanical reproduction in art, with that of digital production in architecture.

To summarize the main points made in this paper, I used Goodman's framework of artistic practices to parse the particular case of architecture and its relationship between representation and the built manifestation of it. Goodman's distinction between the three modes of representing, *sketch*, *score*, *script*, have been pivotal in framing and parsing architecture's particularly *mixed* status.
The *score:* part of architectural representation (floor plans, diagrams and models) that aims to be more abstract in order to intervene in reality, to produce something new- new realities.
The *sketch:* part of architectural representation (renderings) that aims to look like photographs, not by virtue of resemblance to reality, but because of what we know of photographs- that they will always depict something that at some point existed in the world.
The *script*: is the discursive dimension of architecture which Goodman points to as specifications, but I would extend it to architectural *theory*. Writing, as another mode of thinking about architecture; it acts as a mediator between architecture and other discursive practices such as philosophy - of which this paper is hopefully part of.

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