

**Materials through Symbolic Lens:  
The Meaning of Glass in Western Architecture.  
Subjects: LCSH: Architecture-Human Factors / Building Materials.**

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### ABSTRACT

Buildings, techniques and materials with which spaces and volumes have been created and defined are part of the architectural heritage, considered as material heritage. However, a more careful analysis allows us to grasp that it is much more than material heritage since it is actually the petrification of a cultural moment. One of the keys to fundamental understanding is the meaning of material heritage as a result of a social structure that organizes and guides the modes of production, daily practices, lifestyles, and their meanings.

But the existing separation between different types of heritage resulting from the Western mental structures marked by a strong dichotomy that governs the analysis of any matter can force a classification that avoids polyhedral analysis that the material heritage could offer. The dualism of "object" and "subject" requires re-consideration, in order to visualize the deep interrelationship between these two concepts. The material heritage is inscribed in a specific space-time framework materialized in a certain place and situation. That is, the subset of differences was selected that more strongly reflect the borders of the difference of one culture over another in its multiple dimensions. Therefore, in the analysis of material heritage, socially structured and specific historical contexts and processes must be taken into account as they affect the production and transmission of symbolic forms.

The aim of this paper is to concentrate particularly on attributing meanings to materials. It is crucial to realize that several aspects (function, use, context, user, etc.) can be effective in attributing meanings to materials and they should be taken into consideration for understanding the selection process since it is paramount to focus towards the intangible aspects in materials selection activity as well. So, materials' uses demand a holistic analyze from multiple dimensions to be understood in deep. One of them is symbolic analyze.

This article aims to address the study of the symbolic meaning of glass throughout time in architectures through the revision of literature. Delving beyond the visual level, we are able to discern the "embedding" of constructive action in networks of interpersonal connections and particularly, cultural conditions.

Through the analysis of a material, it is possible to analyze society itself with changing roles in its reciprocal relationship with the environment in a face-to-face community and with a complex social organization, a long past, an uncertain future and a cultural heritage that unfolds (Alcindor, Lima & Alcindor-Huelva). The symbolic perspective in analysis offers a way of understanding materials and their life stories; economies and their networks of trust and obligation; the co-production of people with their environments.

The intention of opening the lens through which all these material issues are seeking to incorporate a holistic point of view, namely, the way of thinking that reconstructs a totality of relationships between people and their products since any designer creates and constructs his objects imbued by the forms of social actions existing in daily practices that are always located in a space and time and therefore within a framework of political, social and economic conditions. Therefore, they do not act “freely” since the structures of action enter within the individual through rules and principles that guide us in our practices in an unconscious way.

**Key Words:** Ontology; Glass; Intangible Characteristics; Symbolic Meaning; Architectural Meaning;



## **Los Materiales a Través de La Lente Simbólica: El Significado del Vidrio en La Arquitectura Occidental.**

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### **RESUMEN**

Los edificios, técnicas y materiales con los que se han creado y definido espacios y volúmenes forman parte del patrimonio arquitectónico, considerándose patrimonio material. Sin embargo, un análisis más detenido permite captar que se trata de mucho más que patrimonio material ya que en realidad es la petrificación de un momento cultural. Una de las claves de comprensión es el significado del patrimonio material como resultado de una estructura social que organiza y orienta los modos de producción, las prácticas cotidianas, los estilos de vida y sus significados.

Pero la separación existente entre diferentes tipos de patrimonio resultante de las estructuras mentales occidentales está marcada por una fuerte dicotomía que rige el análisis de cualquier materia. Ello fuerza una clasificación que evita el análisis poliédrico que el patrimonio material podría ofrecer. El dualismo de "objeto" y "sujeto" requiere una reconsideración, a fin de visualizar la profunda interrelación entre estos dos conceptos. El patrimonio material está inscrito en un marco espacio-temporal específico materializado en un lugar y situación determinados. Es decir, se produjo una selección del subconjunto de diferencias reflejando con fuerza los límites de la diferencia de una cultura sobre otra en sus múltiples dimensiones. Por lo tanto, en el análisis del patrimonio material deben tenerse en cuenta los contextos y procesos históricos socialmente estructurados y específicos que afectan a la producción y transmisión de formas simbólicas.

En este artículo, pretende concentrarse en la atribución de significados a los materiales. Es crucial darse cuenta de que varios aspectos (función, uso, contexto, usuario, etc.) pueden ser efectivos para atribuir significados a los materiales y deben ser tomados en consideración durante el proceso de selección, por lo que es primordial enfocarse en los aspectos intangibles que gobiernan la selección de materiales también. Por lo tanto, los usos de los materiales exigen un análisis holístico desde múltiples dimensiones para ser comprendidos en profundidad. Uno de ellos es el análisis simbólico.

Este artículo tiene como objetivo abordar el estudio del significado simbólico del vidrio a lo largo del tiempo en arquitectura a través de una revisión de la literatura. Profundizando más allá del nivel visual, somos capaces de discernir la "incrustación" de la acción constructiva en redes de conexiones interpersonales y concretamente, de condiciones culturales. A través del análisis de un material, es posible analizar la propia sociedad con roles cambiantes en su relación recíproca con el medio ambiente en una comunidad cara a cara y con una organización social compleja, un pasado lejano, un futuro incierto y un patrimonio cultural que se despliega (Alcindor, Lima & Alcindor-Huelva). La perspectiva simbólica en el análisis ofrece una forma de entender los materiales y sus historias de vida; economías y sus redes de confianza y obligación; la coproducción de las personas con sus entornos.

La intención es abrir la lente a través de la cual todas estas cuestiones materiales buscan incorporar un punto de vista holístico, es decir, una forma de analizar que permita reconstruir la totalidad de relaciones entre las personas y sus productos ya que cualquier diseñador crea y construye sus objetos imbuidos de la formas de acciones sociales existentes en las prácticas cotidianas que se ubican siempre en un espacio y tiempo y por tanto en un marco de condiciones políticas, sociales y económicas. Por tanto, no actúan "libremente" ya que las estructuras de acción se introducen dentro del individuo a través de reglas y principios que nos guían en nuestras prácticas de manera inconsciente.

**Palabras Clave:** Ontología; Vidrio; Características Intangibles; Significado Simbólico; Significado Arquitectónico;





## **Matériaux à travers une Lentille Symbolique La Signification du Verre dans L'Architecture Occidentale.**

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### **RÉSUMÉ**

Les bâtiments, les techniques et les matériaux avec lesquels les espaces et les volumes ont été créés et définis font partie du patrimoine architectural, considéré comme patrimoine matériel. Cependant, une analyse plus approfondie nous permet de saisir qu'il s'agit de bien plus que du patrimoine matériel puisqu'il s'agit en fait de la pétrification d'un moment culturel. Une des clés de la compréhension fondamentale est la signification du patrimoine matériel en tant que résultat d'une structure sociale qui organise et guide les modes de production, les pratiques quotidiennes, les modes de vie et leurs significations.

Mais la séparation existante entre les différents types de patrimoine résultant des structures mentales occidentales marquées par une forte dichotomie qui régit l'analyse de toute matière peut forcer une classification qui évite l'analyse polyédrique que le patrimoine matériel pourrait offrir. Le dualisme entre "objet" et "sujet" doit être reconsidéré, afin de visualiser la profonde interrelation entre ces deux concepts. Le patrimoine matériel est inscrit dans un cadre spatio-temporel spécifique matérialisé dans un certain lieu et une certaine situation. Autrement dit, on a choisi le sous-ensemble de différences qui reflète plus fortement les frontières de la différence d'une culture par rapport à une autre dans ses multiples dimensions. Par conséquent, dans l'analyse du patrimoine matériel, les contextes et processus historiques spécifiques et socialement structurés doivent être pris en compte car ils affectent la production et la transmission de formes symboliques.

L'objectif de ce document est de se concentrer particulièrement sur l'attribution de significations aux matériaux. Il est essentiel de réaliser que plusieurs aspects (fonction, utilisation, contexte, utilisateur, etc.) peuvent être efficaces pour attribuer des significations aux matériaux et qu'ils doivent être pris en considération pour comprendre le processus de sélection, car il est primordial de se concentrer également sur les aspects immatériels dans l'activité de sélection des matériaux.

Ainsi, les utilisations des matériaux exigent une analyse holistique à partir de multiples dimensions à comprendre en profondeur. L'une d'elles est l'analyse symbolique.

Cet article vise à aborder l'étude de la signification symbolique du verre à travers le temps dans les architectures par la révision de la littérature. En allant au-delà du niveau visuel, nous sommes en mesure de discerner "l'enchâssement" de l'action constructive dans les réseaux de relations interpersonnelles et, en particulier, les conditions culturelles. Par l'analyse d'un matériau, il est possible d'analyser la société elle-même avec des rôles changeants dans sa relation réciproque avec l'environnement dans une communauté face à face et avec une organisation sociale complexe, un long passé, un avenir incertain et un héritage culturel qui se déploie (Alcindor, Lima & Alcindor-Huelva). La perspective symbolique dans l'analyse offre une façon de comprendre les matériaux et leurs histoires de vie ; les économies et leurs réseaux de confiance et d'obligation ; la co-production des personnes avec leurs environnements.

L'intention d'ouvrir la lentille à travers laquelle toutes ces questions matérielles cherchent à incorporer un point de vue holistique, à savoir, la façon de penser qui reconstruit une totalité de relations entre les personnes et leurs produits puisque tout designer crée et construit ses objets imprégnés des formes d'actions sociales existant dans les pratiques quotidiennes qui sont toujours situées dans un espace et un temps et donc dans un cadre de conditions politiques, sociales et économiques. Par conséquent, ils n'agissent pas "librement" puisque les structures d'action entrent dans l'individu par le biais de règles et de principes qui nous guident inconsciemment dans nos pratiques.

**Mots Clés:** Ontologie; Verre; Caractéristiques Intangibles; Signification Symbolique; Signification Architecturale;



## **Materialien durch Symbolische Linse: Die Bedeutung von Glas in der Westlichen Architektur.**

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### **ZUSAMMENFASSUNG**

Gebäude, Techniken und Materialien, mit denen Räume und Volumen geschaffen und definiert wurden, sind Teil des architektonischen Erbes, das als materielles Erbe betrachtet wird. Eine genauere Analyse erlaubt uns jedoch zu begreifen, dass es viel mehr als materielles Erbe ist, da es eigentlich die Versteinerung eines kulturellen Moments ist. Einer der Schlüssel zum grundlegenden Verständnis ist die Bedeutung des materiellen Erbes als Ergebnis einer sozialen Struktur, die die Produktionsweisen, die täglichen Praktiken, die Lebensstile und ihre Bedeutungen organisiert und leitet.

Aber die bestehende Trennung zwischen verschiedenen Arten von Erbe, die aus den westlichen mentalen Strukturen resultiert, die durch eine starke Dichotomie gekennzeichnet sind, die die Analyse jeder Materie bestimmt, kann eine Klassifizierung erzwingen, die eine vielseitige Analyse, die das materielle Erbe bieten könnte, vermeidet. Der Dualismus von "Objekt" und "Subjekt" erfordert eine Neubetrachtung, um die tiefe Wechselbeziehung zwischen diesen beiden Konzepten sichtbar zu machen. Das materielle Erbe ist in einen spezifischen Raum-Zeit-Rahmen eingeschrieben, der sich an einem bestimmten Ort und in einer bestimmten Situation materialisiert. Das heißt, es wurde die Teilmenge von Unterschieden ausgewählt, die die Grenzen der Differenz einer Kultur gegenüber einer anderen in ihren vielfältigen Dimensionen stärker widerspiegeln. Daher müssen bei der Analyse des materiellen Erbes sozial strukturierte und spezifische historische Kontexte und Prozesse berücksichtigt werden, da sie die Produktion und Weitergabe von symbolischen Formen beeinflussen.

Das Ziel dieser Arbeit ist es, sich besonders auf die Zuschreibung von Bedeutungen an Materialien zu konzentrieren. Es ist von entscheidender Bedeutung zu erkennen, dass mehrere Aspekte (Funktion, Verwendung, Kontext, Benutzer usw.) bei der Zuschreibung von Bedeutungen zu Materialien wirksam sein können und dass sie für das Verständnis des Auswahlprozesses berücksichtigt werden sollten, da es von größter Bedeutung ist, sich bei der Materialauswahl auch auf die immateriellen Aspekte zu konzentrieren. Die Verwendung von Materialien erfordert also eine

ganzheitliche Analyse aus mehreren Dimensionen, um sie in der Tiefe zu verstehen. Eine dieser Dimensionen ist die symbolische Analyse.

Dieser Artikel zielt auf die Untersuchung der symbolischen Bedeutung von Glas im Laufe der Zeit in der Architektur durch die Überarbeitung der Literatur ab. Indem wir über die visuelle Ebene hinausgehen, sind wir in der Lage, die "Einbettung" des konstruktiven Handelns in Netzwerke von zwischenmenschlichen Verbindungen und insbesondere von kulturellen Bedingungen zu erkennen. Durch die Analyse eines Materials ist es möglich, die Gesellschaft selbst mit wechselnden Rollen in ihrer wechselseitigen Beziehung zur Umwelt in einer Gemeinschaft von Angesicht zu Angesicht und mit einer komplexen sozialen Organisation, einer langen Vergangenheit, einer ungewissen Zukunft und einem kulturellen Erbe, das sich entfaltet, zu analysieren (Alcindor, Lima & Alcindor-Huelva). Die symbolische Perspektive in der Analyse bietet eine Möglichkeit, Materialien und ihre Lebensgeschichten zu verstehen; Ökonomien und ihre Netzwerke von Vertrauen und Verpflichtung; die Koproduktion von Menschen mit ihrer Umgebung.

Die Absicht, die Linse zu öffnen, durch die all diese materiellen Fragen versuchen, eine ganzheitliche Sichtweise einzubeziehen, nämlich die Denkweise, die eine Gesamtheit von Beziehungen zwischen Menschen und ihren Produkten rekonstruiert, da jeder Designer seine Objekte schafft und konstruiert, die von den Formen sozialer Handlungen durchdrungen sind, die in den täglichen Praktiken existieren, die immer in einem Raum und einer Zeit und somit innerhalb eines Rahmens politischer, sozialer und wirtschaftlicher Bedingungen angesiedelt sind. Sie handeln also nicht "frei", da die Strukturen des Handelns durch Regeln und Prinzipien in das Individuum eindringen, die uns in unseren Praktiken auf unbewusste Weise leiten.

**Schlüsselwörter:** Ontologie; Glas; Immaterielle Eigenschaften; Symbolische Bedeutung; Architektonische Bedeutung;



## **Materiali attraverso Lenti Simboliche: Il significato del Vetro nell'Architettura Occidentale.**

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### **ASTRATTO**

Gli edifici, le tecniche e i materiali con cui sono stati creati e definiti spazi e volumi fanno parte del patrimonio architettonico, considerato come patrimonio materiale. Tuttavia, un'analisi più attenta ci permette di cogliere che si tratta di molto più di un patrimonio materiale, poiché è in realtà la pietrificazione di un momento culturale. Una delle chiavi di lettura fondamentali è il significato del patrimonio materiale come risultato di una struttura sociale che organizza e guida i modi di produzione, le pratiche quotidiane, gli stili di vita e i loro significati.

Ma la separazione esistente tra diversi tipi di patrimonio derivante dalle strutture mentali occidentali segnate da una forte dicotomia che governa l'analisi di qualsiasi materia può forzare una classificazione che evita l'analisi poliedrica che il patrimonio materiale potrebbe offrire. Il dualismo di "oggetto" e "soggetto" richiede una riconsiderazione, al fine di visualizzare la profonda interrelazione tra questi due concetti. Il patrimonio materiale è iscritto in una specifica cornice spazio-temporale materializzata in un determinato luogo e situazione. Cioè, è stato selezionato il sottoinsieme di differenze che riflettono più fortemente i confini della differenza di una cultura sull'altra nelle sue molteplici dimensioni. Perciò, nell'analisi del patrimonio materiale, si devono prendere in considerazione contesti e processi storici socialmente strutturati e specifici che influenzano la produzione e la trasmissione delle forme simboliche.

Lo scopo di questo articolo è di concentrarsi in particolare sull'attribuzione di significati ai materiali. È fondamentale rendersi conto che diversi aspetti (funzione, uso, contesto, utente, ecc.) possono essere efficaci nell'attribuire significati ai materiali e dovrebbero essere presi in considerazione per comprendere il processo di selezione, poiché è fondamentale concentrarsi sugli aspetti immateriali anche nell'attività di selezione dei materiali.

Così, gli usi dei materiali richiedono un'analisi olistica da molteplici dimensioni per essere compresi in profondità. Una di queste è l'analisi simbolica.

Questo articolo si propone di affrontare lo studio del significato simbolico del vetro nel tempo nelle architetture attraverso la revisione della letteratura.

Andando oltre il livello visivo, siamo in grado di discernere l'"incorporazione" dell'azione costruttiva nelle reti di connessioni interpersonali e, in particolare, nelle condizioni culturali. Attraverso l'analisi di un materiale, è possibile analizzare la società stessa con ruoli mutevoli nel suo rapporto reciproco con l'ambiente in una comunità faccia a faccia e con una complessa organizzazione sociale, un lungo passato, un futuro incerto e un patrimonio culturale che si svolge (Alcindor, Lima & Alcindor-Huelva). La prospettiva simbolica in analisi offre un modo di comprendere i materiali e le loro storie di vita; le economie e le loro reti di fiducia e obbligo; la co-produzione delle persone con i loro ambienti.

L'intenzione di aprire la lente attraverso la quale tutte queste questioni materiali stanno cercando di incorporare un punto di vista olistico, vale a dire, il modo di pensare che ricostruisce una totalità di relazioni tra le persone e i loro prodotti poiché qualsiasi designer crea e costruisce i suoi oggetti impregnati dalle forme di azioni sociali esistenti nelle pratiche quotidiane che sono sempre situate in uno spazio e un tempo e quindi in un quadro di condizioni politiche, sociali ed economiche. Pertanto, non agiscono "liberamente" poiché le strutture dell'azione entrano nell'individuo attraverso regole e principi che ci guidano nelle nostre pratiche in modo inconscio.

**Parole Chiave:** Ontologia; Vetro; Caratteristiche Immateriali; Significato Simbolico; Significato Architettonico;



## **Materiais através de Lentes Simbólicas: O significado do Vidro na Arquitetura Ocidental.**

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### **RESUMO**

As edificações, técnicas e materiais com os quais espaços e volumes foram criados e definidos fazem parte do património arquitetónico, sendo considerados património material. Porém, uma análise mais atenta permite apreender que se trata de muito mais do que património material, pois na realidade é a petrificação de um momento cultural. Uma das chaves para a compreensão é o significado do património material como resultado de uma estrutura social que organiza e orienta os modos de produção, as práticas cotidianas, os estilos de vida e os seus significados.

Mas a separação existente entre diferentes tipos de património decorrentes de estruturas mentais ocidentais está marcada por uma forte dicotomia que rege a análise de qualquer matéria. Isso força uma classificação que evita a análise poliédrica que o património material poderia oferecer. O dualismo de "objeto" e "sujeito" requer uma reconsideração, a fim de visualizar a profunda interrelação entre esses dois conceitos. O património material se inscreve num determinado espaço-tempo, materializado num determinado lugar e situação. Ou seja, foi produzida uma seleção do subconjunto de diferenças, refletindo fortemente os limites da diferença de uma cultura sobre outra em suas múltiplas dimensões. Portanto, a análise do património material deve levar em conta os contextos e processos históricos socialmente estruturados e específicos que afetam a produção e a transmissão das formas simbólicas.

Neste artigo, pretende-se concentrar na atribuição de significados aos materiais. É fundamental perceber que vários aspectos (função, uso, contexto, usuário, etc.) podem ser eficazes na atribuição de significados aos materiais e devem ser levados em consideração durante o processo de seleção, por isso é fundamental focar nos aspectos intangíveis que governam a seleção de materiais também. Portanto, os usos de materiais requerem uma análise holística de múltiplas dimensões para serem totalmente compreendidos. Um deles é a análise simbólica.

Este artigo tem como objetivo abordar o estudo do significado simbólico do vidro ao longo do tempo na arquitetura por meio de uma revisão da literatura.



Indo mais fundo além do nível visual, seremos capazes de discernir o "encaixe" da ação construtiva em redes de conexões interpessoais e, especificamente, de condições culturais. Por meio da análise de um material, é possível analisar a própria sociedade com papéis mutantes na sua relação recíproca com o meio ambiente numa comunidade face a face e com uma organização social complexa, um passado distante, um futuro incerto e um patrimônio cultural em desenvolvimento (Alcindor, Lima & Alcindor-Huelva). A perspectiva simbólica em análise oferece uma forma de compreender os materiais e suas histórias de vida; economias e suas redes de confiança e obrigação; a coprodução das pessoas com o seu entorno. A intenção é abrir as lentes pelas quais todas essas questões materiais buscam incorporar um ponto de vista holístico, ou seja, uma forma de analisar que permita reconstruir a totalidade das relações entre as pessoas e seus produtos, uma vez que qualquer designer cria e constrói os seus objetos imbuídos das formas de ação social existentes nas práticas cotidianas que estão sempre localizadas num espaço e tempo e, portanto, num quadro de condições políticas, sociais e económicas. Portanto, eles não agem "livremente", uma vez que as estruturas de ação são introduzidas no indivíduo por meio de regras e princípios que nos orientam nas nossas práticas inconscientemente.

**Palavras-Chave:** *Ontologia; Vidro; Características Intangível; Significado Simbólico; Significado Arquitetónico;*



## **Materials through Symbolic Lens: The Meaning of Glass in Western Architecture.\***

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### **Introduction**

Rationalist tradition is based on the separation of the tangible from the intangible. This "tradition" so deeply rooted in occidental worldview gives orientation to the ways of thinking, having losing many opportunities for reflection along the way they are still to be explored. The consequences are far from being insignificant since "we are rarely aware that our emotions are guiding our lives even when we pretend to be rational" (Escobar, 2013).

Architecture is an activity of the human being that does not escape the effects of this rationalist tradition since discourse positions people in communities of practice are affected for a broader social and cultural environment (Holland, Lachicotte, Skinner, and Caine, 2001). Architecture's activities are integrated into traditions of activities that create some commonalities of experience and resources among those who share elements of this heritage, one of these is a reductionist way to analyse materials and how goes unnoticed the influence of their symbolic value in building decision-making.

Such as Bourdieu "*... the majority of human actions are not the result of a conscious selection of possible alternatives, but rather the effect of mental habits*" (Lewellen, 2009, p. 253). These are not social rules, but are instead ways in which we have been encultured to act. It is about *HABITUS* (Bourdieu's term) a collection of unconsciously enacted practices which define everyday life (Lucas, 2020).



So, materials' uses demand a holistic analyze from multiple dimensions to be understood in deep. One of them is symbolic analyze.

The objectives of this paper is to give further elaboration to symbolic knowledge associated to materials within architecture, to make explicit the embedded knowledge passed down through cultures, but rarely analyzed. It is about to offer new approach on the ways we interpret materials in architecture.

An attempt to establish an interdisciplinary dialogue between material and imaterial subjects, always intertwined, but not always explored in deep.

As Gaston Bachelard stated the substance of specific materials is as much a matter of matter as of individual and cultural memory. Accordingly, inventive engagements with material emerge out of a circular process in which specific individual and group associations with them are shaped by experience, memory and cultural imaginaries through time and use (cited in Coleman, 2020)

The symbolic perspective in analysis offers a way of understanding materials and their life stories; economies and their networks of trust and obligation; the co-production of people with their environments. This approach allows for an understanding of the many ways it is possible to dwell within the world.

The aim is to apprehend the practical relationships that are established in the material choice through a literature revision of socio-technical agencements, and thanks to the strange solidarity of the levels of practice, to capture the shifting meaning given to a specific material: the glass.

Taking glass' stories as the unit of analysis, studying the agency of designers, clients or users and their buildings, it is aiming to understand the complex network of social interactions which contributes towards the construction of our built environment. That is to say, to discern the true motivations and meanings at the heart of election of materials since material represents no fixed positive value.

In this paper, it will trace glass look at how it operates in a social context at different periods of time. This paper conceptualizes how the material can be able to be laden with symbolic meaning or association. Following the path of glass through building history around the Occidental world thanks to the revision of literature, looking in to how it is sourced, assessed, sold, bought and consumed, gives a picture that moves towards a full understanding of the economics, cultural and social significance.

An analysis based on a praxiological or pragmatic perspective, that is, one that defends that it is through the act that "the truth" is manifested. It follows the line of thought opened by Foucault of what he called allethurgy analysis. It is intended to unravel the defining axes of a constructive experience, a "system of thought". Through the work of historical research, it is about extracting the triple matrix structure (knowledge, power, subjectivity) that places a subject in front of an object (Foucault, 2017).

## Theoretical Framework

Adopting activity theory as a key theoretical approach, that is to say, a theory allows a deeper understanding focusing on the human relationship with technology. Although without taking for granted a monolithic and coherent culture, this leads to a consideration of culture as a system of shared meanings intersubjectively through which cultural models are created to interpret and guide actions in a wide variety of domains (D'Andrade, 1990). Therefore, in material selection, it is important to bear in mind that technique is a social-historical scheme that projects its dominant interests (Habermas, 2013). With any material, any statement about it is inevitably situational (Coleman, 2020) since material has no necessary intrinsic value, labour adds symbolic value to material, what matters is what is done with it.

Essentially, rather than focusing on individual psychology or on social structures, activity theory takes the activity that occurs between people in social situations as its phenomena of interest and unit of analysis. The comprehensive understanding of human work is a central aim of activity theory. In our case, building systems involve the use of materials which meaning changes alongside time. Looking closely at the way selection materials are mediated by society and the ways in which individual agencies can be affected and therefore, broader the social and cultural change in the material use field, as a consequence. Activity theory directs attention to the selection of material for building, not as individual selection, and so activity systems should be the unit of analysis. Material choice, in relation to execution is central to build architectural significance.

The practical and concrete units of using material in a design project change, since activity systems evolve over time. According to Ruskin, it must embody the reality of its time making and communicate this effectively (cited in Coleman, 2020). Activity theory explains that in material field, human action tends to form an object-oriented approach, focusing on objects for activities and on object motives.

This theory allows to undertake a piece of work that is methodologically sophisticated, grounded in real-world activities and address issues of complexity, which are commonly put to one side, therefore it allows access to the complexity and dynamism of real-life scenarios (Johnston & Dornan, 2015). Activity theory's capacity to work with the complexities of material field in architecture is one of the main reasons invoked for using it, as it brings light to gaps and contradictions between different materials.

The main system of activity discussed here is the use of glass in buildings in different contexts through time. Such a system entails the enactment of reflective discourse through the use of glass. So, it is paramount to turn to the notion of context, understood as constituted through the enactment of an activity involving people and artefacts, since it involves specific objects and goals and, at the same time, specific settings. Therefore, this conception of context is a transformative relation between people, tools and artefacts (Nardi, 1996).

Intangible characteristics of materials containing the characteristics which are subjective cannot be perceived through senses and cannot be identified easily by people (Karana, 2004). Higher psychological functions are involved in this issue. They are constructed from and reflect social activities and the corresponding cultural concepts regarding these activities (Ratner, 2000). The non-verbal expression signs that have been used start to lose their perceivable forms for outsiders, and a level of mental imagery emerges. This imaginative behaviour is self-oriented and can potentially function without any external signs, because this level operates with mental signs instead. A dissociation is produced between expression and feeling in intrapersonal regulation. This suggests that the intimate world of private feelings is a product of the internalization of previously externally perceivable expression signs (Holodynski, 2013).

Furthermore, discussion regarding the symbolic meaning process is thus needed. Any material and the processes that accompany it are the result of a complex history in which materials, tools, trades and other details that made it possible are involved. Agency is a key concept for analyzing and describing how "*communities of practice*" are mutually involved with and connected to the artifacts they produce, and how these activities are developed (Kawatoko, 2017) since one of the ways in which architecture produces knowledge is through building systems.

Indeed, material choice has a similar status in architectural discourse to the discussion of writing in anthropology. By cognition, it is talking about thinking: so, stated simply, material choices are a form of thinking (c.f. Lucas, 2020).

## **Historical and Social use of Glass in Architecture**

It is aimed to concentrate particularly on attributing meanings to glass. It is crucial to realize that several aspects (function, use, context, user, etc.) can be effective in attributing meanings to materials and they should be taken into consideration during the selection process. The significance of this material is going to be looked at in a wider historical context with their relationship with these components. It is meant to be suggestive, not exhaustive.

Before giving pass to the goal of this paper it is important to define the glass as a material and its main characteristics. A glass is a molten inorganic material that has cooled to a rigid state without undergoing crystallization, that is to say, its atoms have not been arranged in space, that is why it is called an amorphous solid (Navarro, 2003).

It consists of a mixture of different components, the most important being vitrifiers (the essence of the material, usually silica sand), fluxes (which allow the melting point to be lowered) and stabilizers (which are intended to compensate for the introduction of fluxes).

## **Glass in the Ancient Age**

Within a wide margin of imprecision, it can be assured that the glass was born in the region known as the Fertile Crescent (Figura 1), which covered the entire territory between the Tigris and Euphrates rivers and extended from the Mediterranean coast of Syria to the Persian Gulf. This event coincided with the beginning of metallurgy, between the end of the Neolithic period and the beginning of the Bronze Age (Navarro, 2003).

In a way, this was conditioned by the quality of the raw material since context is a transformative relation between people, tools and artefacts. The purity of the sands in this area was famous in ancient times. The Mediterranean coast of the Middle East was the area of Ancient Age in which true historical significance was achieved in the art of working with glass.



Due to the fact that meanings are formed as the product of a continuous cycle between the human and the environment, therefore, meaning is not a merely mental phenomenon, but instead it is objective in the sense that it involves activity. In the case of glass in ancient times, due to the insufficient temperature of the rudimentary technology to melt the mixture, the glass used to be obtained in the form of an opaque paste that was molded into a highly viscous plastic state.

For this reason, glass in its origins had a fundamentally ornamental character and often tended to imitate precious stones, which it came to surpass in value.



Source: <https://images.app.goo.gl/fwtism9TnmS5DKXVm6>

Figure 1  
Fertile Crescent



Colorless glass was a rare exception at first, and the greatest efforts were concentrated on the development of color.

Egyptian glass crafts appeared after the conquest of Syria by Tuthmes III (1501-1447 BC). These introduced technical innovations that allowed new functions to this material. They were the first to make hollow glass trying to imitate clay pots using the sand core technique, a pressing technique.

This technique resulted in a mass production that allowed it to radiate through the Eastern Mediterranean to Mycenae, Crete and Cyprus. The innovation achieved greater accessibility to this material and to a certain extent a devaluation compared to the preceding period.

A sample of the enactment of an activity involving people and artefacts that leads to new goals in specific settings.

Egyptian glassmakers maintained their undisputed primacy until the middle of the last millennium BC, in which Syrian glassmaking was reborn, which would be characterized by the manufacture of practically colorless glass, unlike the previous period, the new value of glass shifted to the production of this kind of glass. The relationship between agency and the collective interactions over time has shaped once more this “community of practice”.

The knowledge associated with glass was protected information. They were reserved for an elite capable of deciphering the cryptic language of the documents that contained it (Navarro, 2003). It is a reflection of the symbolic value of the material from that period and how projects its dominant interests.

Later in the middle of the second century BC (781) the Phoenicians began to work on this material. They incorporated a transcendental technological innovation: the reed to blow the glass (Figura 2).

This technique offered great advantages since it was possible to manufacture pieces with thinner walls. The first glass for windows were produced, that is, it was the first time when this material began to be used in architectural construction, although it continued to be a luxury item that only the buildings of greater architectural value had.

In summary, in this period glass was characterized by being a luxurious material produced with rudimentary technology with a mainly ornamental character. The production material activity as a socio-technical agencement of the creation processes allows to draw out cultural patterns, that have been worked through generations pointing out the way that have evolved in this period in reasoning processes ending up to an ornamental character.



Source : <https://images.app.goo.gl/rqYTKXkkWJAoPurK6>

Figure 2  
The reed to blow the glass

## Glass in Ancient Rome

When the great political unity of the Roman Empire was created with the domination of Egypt and Syria in the middle of the first century BC, oriental glass craftsmen began to arrive in the metropolis from the centres of Alexandria and Sidon, who established the first workshops of manufacture of glass (Navarro, 2003).

Glass crafts reached another level of expansion in the Roman period, reaching such a point that the mass production of glass containers lost their sumptuary character, taking on a more utilitarian role. Glass became a consumer product within the reach of a wide social spectrum, becoming a sign of poverty, another case about the situational character of any statement of glass. It is an ethnographic vignette that let show the legitimized discourse as a system of shared meanings intersubjectively through which cultural models provide the new use of a material by cultural and social values through ways of production.

In Rome, glass became an extensive part of architectural construction as a type of pavement and in the form of plates for wall cladding thanks to the technological innovation of cast glass, but due to its accessibility its use was associated with low-income communities. Unlike the flat glass that required more complicated production that continue to be a luxury that never came to displace the use of mica or alabaster for windows.

But with the collapse of the Western Empire the use of this material in the building systems that had begun to cover ended since technology associated required higher levels of structured society.

During the Roman Empire the Christian community also made its symbolic associations with glass. The source for the earliest known versions of the glass metaphor is in the Old Testament, specifically in the person of that great mainstay of arcane wisdom, King Solomon. The Old Testament story does not actually include a building of glass, but the materials that are mentioned, gold and water, will be found in close association with the later glass symbolism, forming a kind of iconographic constellation.

Possibly the reflective qualities of gold and water led in the later apocrypha to their being misinterpreted as, or intentionally magnified into, translucent buildings of glass (Bletter, 1981).

## Glass in Europe in Medieval Period

The great political and social upheaval that happened in Europe as a result of its invasion by the barbarian peoples of the North brought with it a crisis in all artistic and industrial activities that obviously affected glass production.

After the fall of the Roman Empire, a period of social disaggregation followed, making it difficult to maintain sophisticated techniques such as glass furnaces. The manufacture of glass decreased considerably, although it did not become extinct, but remained in small isolated groups, but without any notable innovation. These glass spotlights would be the forerunner of the most important European glass manufactures of our time, "*flat glass*" producers aimed especially at architecture.

Glass production followed an independent development in three main geographical areas: France, Venice and Germany. This was possible thanks to the abundance of forests to obtain resources such as fuels.

Venice was a great center of reference in the history of glass production, appearing from the 11th century on and remaining as a reference center for six centuries. Knowledge was guarded with the utmost suspicion under the threat of severe punishment. They enjoyed state protection and a link with the nobility as a signal of positive value attributed to this material.

They were the creators of the first mirrors (early 14th century) by coating a thin layer of an alloy of molten lead and antimony.

Once glass became more widely available; first the powerful, then the wealthy, appropriated it is transcendent associations, mainly entranced by the reflectivity of good quality mirrors. Paralleling secularization and technological progress, the primary function of glass shifted from figurative vision to literal viewing.

Along with the Gallic and Venetian enclaves that survived the collapse of the Roman Empire, there was a third nucleus that lasted, which was the German one that had a differentiated development due to its isolation in the Central European forests as a sign of the influence of the context. Their remoteness from the coasts made it difficult for them to regularly have the soda (flux) obtained from marine plants, and this forced them to resort to the use of ashes from the wood of their forests.

This made them different from the Mediterranean ones that were mainly soda-lime silicate glass, that is, those in which the component that lowers the melting point is sodium, unlike the Germans who used potassium from the ashes of the forest wood.

The development of this variety brought with it the famous glasses of Bohemia (Figura 3), which in the 14th century began to be a competitor of the glasses of Venice.



Source: <https://i.pinimg.com/564x/a0/eb/4b/a0eb4beb5445537ba6a595a44d641ca7c.jpg>

Figure 3  
Glasses of Bohemia.





Source: [https://todoelordelmundo.files.wordpress.com/2014/10/dsc07343\\_dxo.jpg?w=500&h=746](https://todoelordelmundo.files.wordpress.com/2014/10/dsc07343_dxo.jpg?w=500&h=746)

Figure 4

The Theological identity between God, Christ and Light Itself.

It is a clear example of how meanings are formed as the product of a continuous cycle between the human and the environment (Määttänen, 2015). The carved pieces of Bohemia ended up being the representation of Baroque art on glass.

Although the remarkable thing about this period was the monumentality of religious art and its abundant artistic manifestations that determined the consumption of quantities of glass and at the same time represented a considerable boost to the future manufacture of flat glass.

Gothic architecture found a magnificent aesthetic complement in multi-colored glass.

On the other hand, in Christianity, the crystalline qualities of glass were emblems of “*purity, spiritual perfection and knowledge*” analogizing the “light (wisdom) of God, subsequently transposed as its most practical attributes: the gaze drifts freely inward and outward; daylight illuminates interiors; and sunlight warms (Coleman, 2020).

A structure of thought known as “*the aesthetics of light*” is imposed, which is specially forged from the Latin reception of the *Corpus Areopagiticum*, a series of writings that began to circulate during the second half of the 6th century, in which Beauty is identified with the Good. The first great tropological articulation is produced from which Christian thought starts around light, in the theological identity between God, Christ and light itself (Figura 4). With the birth of the Gothic, a specific treatment of spaces is produced, in the service of a fundamental desire to “*look up*”, to gain “*supernatural vision*”, to find, in short, the most efficient modes of communication with God and it is done through the use of glass (Pradier Sebastián, A., 2015).

Gothic cathedrals gave pre-modern glass symbolism its greatest architectural expression. Dematerialization of wall mass opened cathedrals to divine light, rather than views; made possible by transferring downward thrusting loads away from enclosing walls to exterior. Therefore, largely freed of load-bearing necessity, walls could tolerate large voids filled with expanses of precious coloured glass resulting in luminous interiors articulated by lucid structure (Coleman, 2020). The goal was a jewel-like interior, not transparency, illumination or radiant heat. The meaning of the later glass-crystal symbolism comes from the New Testament: the Revelation of St. John that contains a number of vestiges of Solomonic legends needs to be pointed out. John's vision of the New Jerusalem, too, points up the interchangeability of light, glass, crystal, precious stones, and gold as metaphors of a transcendent life and from Revelation the notion of edifices of precious materials as architecture of spiritual salvation and transcendence (Bletter, 1981).

The first reference to the use of stained glass (Figura 5) dates from the first cathedral in Reims. The evolution of the pointed arch allowed the use of glass as a lightweight material enclosure, maximizing the entry of light. The stained glass illustrated stories from the Bible, about the cathedral's location, and its construction. These were small pieces that were embedded in strips of lead, which is a very malleable and soft metal and admits deformations, which did not limit the small movements of the glass pieces and in this way its duration was guaranteed.





Source: <https://historiasdelarteunred.files.wordpress.com/2015/03/bordeled.jpg>

Figure 5  
Stained glass in Gothic Cathedral.

Through an analogical procedure, the physical light elevated the spectator toward the divine luminosity and thus established a visual continuity between the world and the outer world (Alloa, 2008).

The dynamic relationship of structure, world and revelation made Gothic cathedrals into eloquent promises of a better world to come; as the symbolic interconnection between cosmos, Celestial City, and sanctuary since to the medieval thinker beauty was not a value independent of others, but rather the radiance of truth, the splendor of ontological perfection, and that quality of things which reflects their origin in God (Simpson, 1952).

For Suger, church decoration was immanence, the properties of glass were reflections of hope as a new level of mental imagery that had emerged. By guiding worshippers' spiritual attentions away from the mundane towards the sacred (Coleman, 2020).

## Europe: Modern Era

The seventeenth and eighteenth centuries represented a time of consolidation of the glass industry in the world motivated by a change in mentality resulting from the beginning of scientific thought, understood as a changing socio-technical *agencements*. Among all the ideas of the century of Enlightenment on which ideas of modernity rest, transparency is assuredly the oldest and most powerful value (Alloa, 2008). In spite of the many centuries it spans, the advances in glass-making techniques, and the resulting growth and diversification of glass industries, may be concentrate to this epoch.

Knowledge about glass previously guarded was disclosed. Technological improvements were produced that allowed to reach higher temperatures and the use of new components that increased the qualities of the glass produced thanks to the development of the studies in chemistry.

Although associations with glass as historically "*a precious substance limited in quantity and size*" linger, as it has become cheaper to make, and "*perfect clarity*" more easily achievable, its desirability has increased exponentially, such "*that our modern world*" has drifted towards "*structures of glass and steel*" (Coleman, 2020).

The industrial revolution brought radical changes to construction in its processes and materials. Iron was one of the main innovations that allowed new ways of conceiving structures. It is about a reconfiguration of the socio-technical agencement, since this moment glass is going to be mostly identified with transparency, encompassing publicity, consumption, office buildings, modern bureaucracies and views (Coleman, 2020).

This situation opened up an exploration field for the enclosures where flat glass found a unique space thanks to the development of new technologies for its production and application (Navarro, 2003).

Among the constructions that accounted for this phenomenon during the 19th century were the glass palaces, the covered urban galleries, the large commercial areas and the train stations, new architectural and urban programs typical of the technological advances brought by machines and their consequent transformations of society. They were buildings that serve transitory purposes.

The reference par excellence is the greenhouses that emerged at the beginning of the 19th century thanks to the interest shown by the great patrons in both horticulture and science as a result of the period of scientific travel. The interest in conserving exotic species that needed milder climates promoted the creation of greenhouses in English houses and became a symbol of social distinction.

The building that marked a milestone in the use of glass in architecture was the “Crystal Palace”, site of the Great Exhibition of London (1851), designed by Joseph Paxton, a gardener accustomed to building English “*conservatories*”.

In fact, Queen Vitoria had been impressed by the new glasshouse type this gardener had developed a few years earlier (Alloa, 2008). This building captured the attention of the general public. And it was even more radical for having been designed in contrast to the conventional neoclassical grammar of the day in record time. This building is considered to be the first prefab in history.

It was a modular building built with standardized components and covered by glass sheets. Its plant was 564 meters long by 139 meters wide, generating a space of 80,000 m<sup>2</sup> where light dramatically illuminated the interior spaces. It can be considered that this building was the key starting point of the modern infatuation with “*lightness in construction*”, also combining prefabrication and speed of execution.

The Cristal Palace (Figura 6) transformed glass into a myth while aligning it with technological society, and the display of products. If Gothic cathedrals were metonyms of the New Jerusalem, the Crystal Palace was an emblem of worldly attainment associated with solitude and the illusory promises of European capitalism (Coleman, 2020).





Source :[https://images.adsttc.com/media/images/51d5/7946/b3fc/4b58/3400/0231/large\\_image.jpg/72726307.jpg?1372944709](https://images.adsttc.com/media/images/51d5/7946/b3fc/4b58/3400/0231/large_image.jpg/72726307.jpg?1372944709)

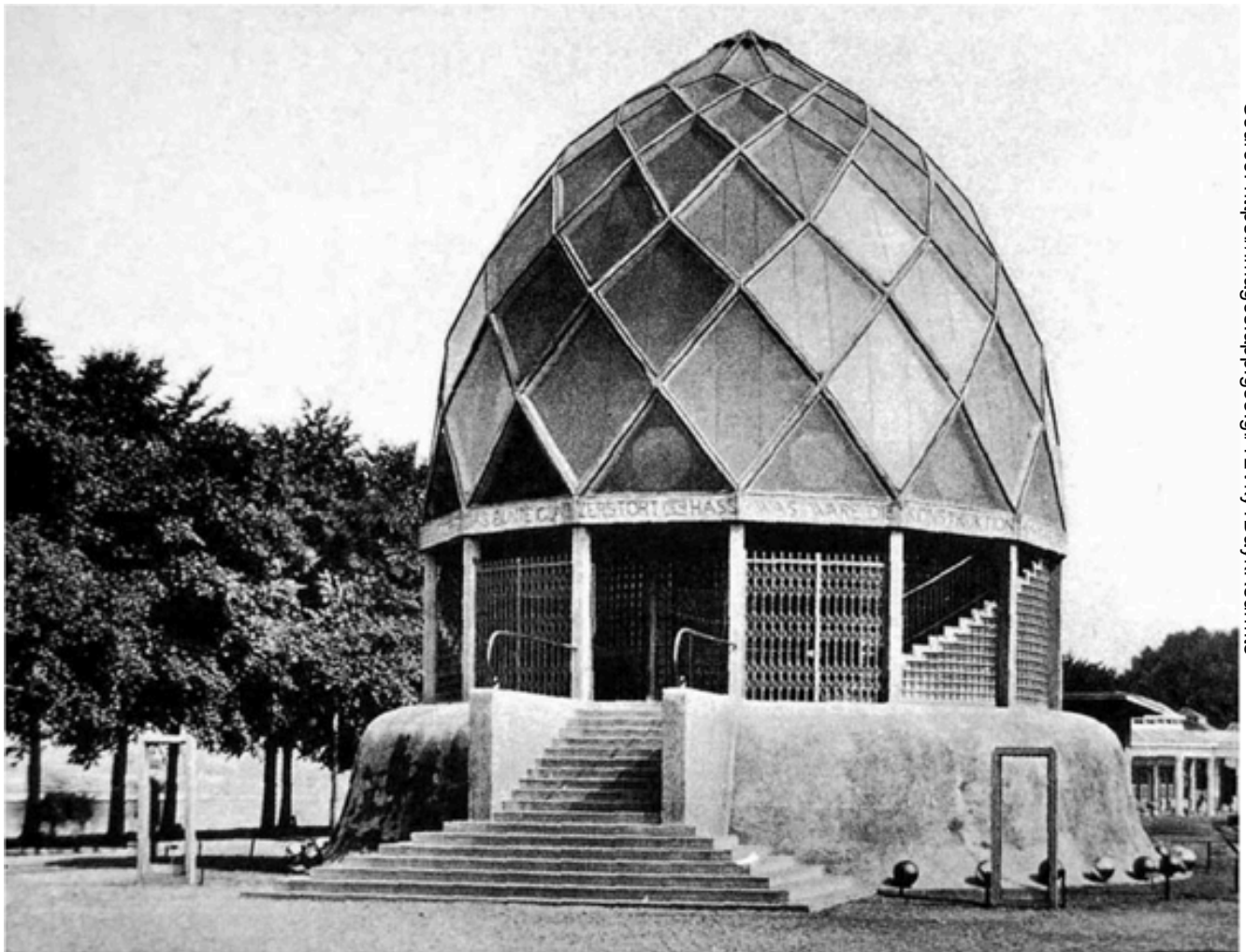
Figure 6  
Interior of the Crystal Palace.

## Glass Architecture of late Modernity

Glass, which in Paxton's Palace still inaugurated a zone of exception, became the material for everyday architectures. The fact that glass is a viscous material that can be moulded into any desired shape may lead us to assume that it might have been chosen as the perfect embodiment of Expressionism's idiosyncratic forms. Hence, transparency is another property of glass to be used frequently (Bletter, 1981).

This is the case of the glass pavilion by Bruno Taut (Figura 7) the designs by Mies Van der Rohe as well as the Maison de Verre de Paris by Pierre Chareau (Figura 8) where a new language was used until now unknown.

In the absence of ornament, the significance of material increase in importance developing new forms of symbolic expression; responsive to new materials and industrialized modes of production, in tandem with the rise of mass society (Coleman, 2020).



Source: <https://images.app.goo.gl/YzVky1DaykR6dm15>

Figure 7  
Bruno Taut's Glass Pavilion, 1914.

As activity theory explains human action tends to form an object-oriented approach since any artifact, such as constructive details, through its creation and use, are both ideal (conceptual) and material. It offers the ideal starting point for studying the work of such culture organization (Nardi, 2005; Foot, 2002).





Source: <https://i.pinimg.com/originals/8c/ed/2f/8ced2f6bd7702436ce452c28bf7ab0f8.jpg>

Figure 8:  
Maison de verre, Pierre Chareau 1928-31.

During the pre-First World War period, Scheerbart and Taut, sought to recuperate the crystalline qualities of glass with their attempts to secularize its spiritual associations as utopian instruments of social enlightenment (Coleman, 2020).

Although within the overall context of the modern movement's elevation of the glass house to the status of a redemptive myth was used for opposite ideologies. For instance, the first work is Terragni's Casa del Fascio in Como, the architect sought to translate Mussolini's pronouncement that *"fascism is a glass house that everyone should and can look into"*.

In short, the Casa del Fascio (Figura 9) is built upon a myriad of variations on the theme of tempered glass as the material of a secularized sacrality combining power, technics, and a higher morality. (Schnapp, 2013).



Source : <https://pbs.twimg.com/media/EhQFoVgXcAAZ1X3.jpg>

Figure 9  
Casa del Fascio, Terragni 1932.

Also hygiene was a new challenge that society in the late XIX century and the beginning of XX century had to face. Glass characterized by a high degree of innovation as regards installation design, and would eventually be accepted as a new architectonic language for population in order to avoid contagious problems, mainly tuberculosis, associated with dark spaces and dusty corners (Colomina, 2015).



Architects from the XX century as Le Corbusier, Gropius, Mies van de Rohe, Alvar Aalto wanted to create healthy environment in a physical and symbolic sense and for this glass took an important place.

In late modernity glass ideology was shifting to portray itself as confirming institutional transparency at a functional level. In most instances, glass is represented as a natural symbol, as if its own self-display is all that required to confirm transparency myths hiding this politic domain since in advanced industrial capitalist societies, domination tends to lose its exploitative and oppressive character, without the political dominance disappearing (Habermas, 2013).

It is about capillary power of Foucault represented by Panoptic's image which forces people to self-regulate since they do not control who is watching them. Glass building embodies this kind of power.

This exponential growth of glass was possible thanks to the technological innovation that led to the "*float glass*" patented by Pilkington in 1952. It was a real revolution in the manufacturing process of high-quality flat glass with high production speed.

In 1958, Mies built the Seagram Building (Figura 10) in New York. Since this moment the architecture made of glass emerged as well as a new non-linguistic corporate landmark. Companies that opt for the principle of transparency rely on the metonymic power of the transparent surface. Nothing is hidden for the customer.

As Graham (1999) states the appearance of the building, its immaculate cleanness, and its structural transparency combine the myth of technological advance to that of efficiency.

## Conclusion:

Through glass as a unit of analysis you can see the history of this material as the history of our civilization (Schnapp, 2013): From the medieval idea of something to look at, to the modern one of something to look through (Hall, 2014). Glass significance is more a matter of situation determined by what is done with it.



Source : <https://i.pinimg.com/originals/4d/34/e7/4d34e756af71b819334a9b75984f3b46.jpg>

Figure 10  
Seagram Building, Mies van der Rohe, New York 1958.

It is possible to analyze society itself since they are made explicit through cultural artifacts since "culture is alive and well in concrete practices." (Díaz, 2010, p.104)

The productive forces, understood as context, become the bases for the legitimation of the use of certain materials. In the case of glass, the reconstruction of the history of the material and its production systems has allowed shifting emphasis from spiritual significance towards performance criteria during nearly 300 years of developments. An objectification of rational action with respect to ends that has been oriented according to intersubjectively current norms, diminished privacy, mirroring individuality flattened by bureaucratic rationality, and mass consumption are just some modern conditions affiliated with overuse of glass.

Within the glass tradition then, the imagery of transcendence and metamorphosis has itself undergone a transformation, beginning with the Solomonic legends, continuing in the Revelation of John, the Gothic cathedral, Expressionism language, and culminating in bureaucratic symbol.

Nowadays, glass left behind a noble historical material with greatest limitation through a triumph in modern manufacturing techniques. A new *cultural logic* that dictated that the skin of a new humanity be made of industrial-era glass meaning a network of larger connections: between the self and the built environment, between the body and body politic, between ideals of health, openness, and moral transparency (Schnapp, 2013).

The glass metaphor has generally been expressed through more or less architectonic concepts, but always linked with a materialization of power issue.



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