

In Search of a Cultural Background: The Recommended Reading Lists of Alfred Lawrence Kocher and the Beauty of Utility in 1920s America

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Abstract

The modernist architect and critic, Alfred Lawrence Kocher, proposed and commented on many bibliographical references in the *Architectural Record* in the years 1924-25. Recent studies on American architecture of the 1920s and 1930s have recognized the peculiar character of modernism in the United States and have gone in search of its cultural and social roots. However, Kocher's extensive lists have so far been completely overlooked. They were based for the most part on the correspondence he exchanged with a number of American and British architects and George Bernard Shaw: he had sent to them a circular letter, asking for recommendations on texts on background literature that a young architect should know. The unpublished correspondence that Kocher had with Louis Sullivan and the 19 texts on "Aesthetics and Theory of Architecture" are analyzed in particular by the author.

Although from 1927 onwards Kocher became a passionate supporter of European rationalist architecture, his bibliographies cannot be considered a conscious foundational literature on modernism and modernity. They rather give an idea of the 'cultural trunk' on which the discussion on modern European architecture was going to be grafted; they help to illuminate the scene on which American architects moved in the mid-1920s. In some of the texts, the pragmatic notion of utility shines through, as – sometimes connectedly – does the concept of a creative act as a free, 'natural' act, which derived from American transcendentalism. Independent from Kocher's will, a line of thought is even identifiable, through which one can explain the apparently contradictory combination of 'maximum of utility' and 'maximum of free creativity', openly advocated by the skyscraper architect Raymond Hood at the end of the 1920s. Such way of thinking was based on the recognition of the beauty of utility.

Keywords: Alfred Lawrence Kocher, Louis Sullivan, Raymond Hood, pragmatism, skyscrapers

Introduction

"The 1920s were far more interesting than we have been led to believe" wrote Gwendolyn Wright a few years ago, referring to the trite tendency to evaluate the architecture of those years with regard only to the

formal criteria indicated by the 1932 MOMA exhibition in New York. In general, stylistic interpretations cannot do much to explain the innovative, non-imitative character of many American buildings of this period; an approach based on the economic, social and intellectual milieu is more useful. Without putting

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emphasis on the 1960's category 'Art-Deco' and the coeval labels 'moderne', 'modernist' or 'modernistic', Wright (2008: 80-111) hinted at the experimental, individualistic character of many architectures of the 1920s and at the psychological, as well as real, impulse of the technological and economic conquests of the period. Richard Guy Wilson (1986) tried to relate the architectural features of those years to an 'aesthetic of the machine age'. While Terry Smith (1993), considering especially the forces at play in Albert Kahn's factories, demonstrated the genuineness and particularity of American modernism, which was irreconcilable with a single style.

In facing the interlocked co-presence of fantasy and economic efficiency in 1920s American skyscrapers, Manfredo Tafuri (1979) stressed their commercial and highly capitalistic nature, and their intrinsic usefulness for advertising reasons, to provoke astonishment and wonder. Concentrating on Manhattan, Rem Koolhaas (1994 [1978]) recognized its "delirious" character and connected it with the psyche of the architects, who had been 'disturbed' by capitalist hysteria and enamored with congestion.

However, many 1920s architectures can be better interpreted considering the idealistic American traditions of thought of transcendentalism and pragmatism, important in conveying the natural character of the creative act and freedom from aesthetic rules. Precisely those traditions will be traced here through the book lists recommended by A. Lawrence Kocher in *The Architectural Record*.

A. Lawrence Kocher, a bridge between cultures

Kocher's annotated lists appeared from August 1924 to April 1925 with the title "The Library of the Architect." They were preceded by a short contribution on the necessity of an international exchange of ideas, especially on training (1923). There are no known publications by him before this point, besides a series of articles for the same magazine on Pennsylvanian architecture in the eighteenth century (1920-1922). Professional activity cannot be found either. It is only in the following years that his relatively unknown career assumed a clear and positive direction.

In 1927, college teacher Kocher became associate editor and then, from January 1928, managing editor of *The Architectural Record*, which changed quickly after his arrival, not only from a design point of view. Already considered the magazine on the American scene which most greatly emphasized technical and scientific innovations, it became more oriented to face questions linked to the use of new construction techniques and materials and closely followed European debate on the same themes, also concerning formal aspects.¹

Thanks to his position, starting from the end of the 1920s Kocher promoted the new forms of expression coming from Europe. He worked from 1928 to 1930 with the German, Gerhard Ziegler, and from 1930 to 1935 with the Swiss, Albert Frey. With Frey, who in the previous two years had worked in Le Corbusier's atelier in Paris, he designed a number of houses which stand out for their use of prefabrication and experimentation with new materials. Their most famous work is the *Alluminaire house* (1931), which was also displayed at the MOMA exhibition.

In the coming years, Kocher developed a friendship with Walter Gropius, with whom he maintained a correspondence starting from 1934 (Kentgens-Craig 1999: 200). Taking up again a professorship in 1938, Kocher also had the opportunity to work with Gropius on a project for Black Mountain College in North Carolina. In the post-war period he accepted a role at the Colonial Williamsburg (VA), attending to historical studies, as at the beginning of his academic career.²

His private papers, stored at the Colonial Williamsburg Foundation, have recently been the subject of historical investigations, which have led to the re-evaluation of his part in the diffusion of the ideas of European rationalism in the United States. However, his approach was always inclusive and not exclusive (Stephens 2016): his interest in European avant-garde movements was a way to enrich and not to erase or subvert American ideas on architecture. His open-minded, multi-cultural and multi-disciplinary approach and the substantial American roots of his critical discourse can be appreciated through the correspondence that supplied the material for his seven articles on the "Library of the Architect" and the articles

1 On the history of the magazine, see Lichtenstein 1990.

2 For more on Kocher's life and work, see Goodman 2017.

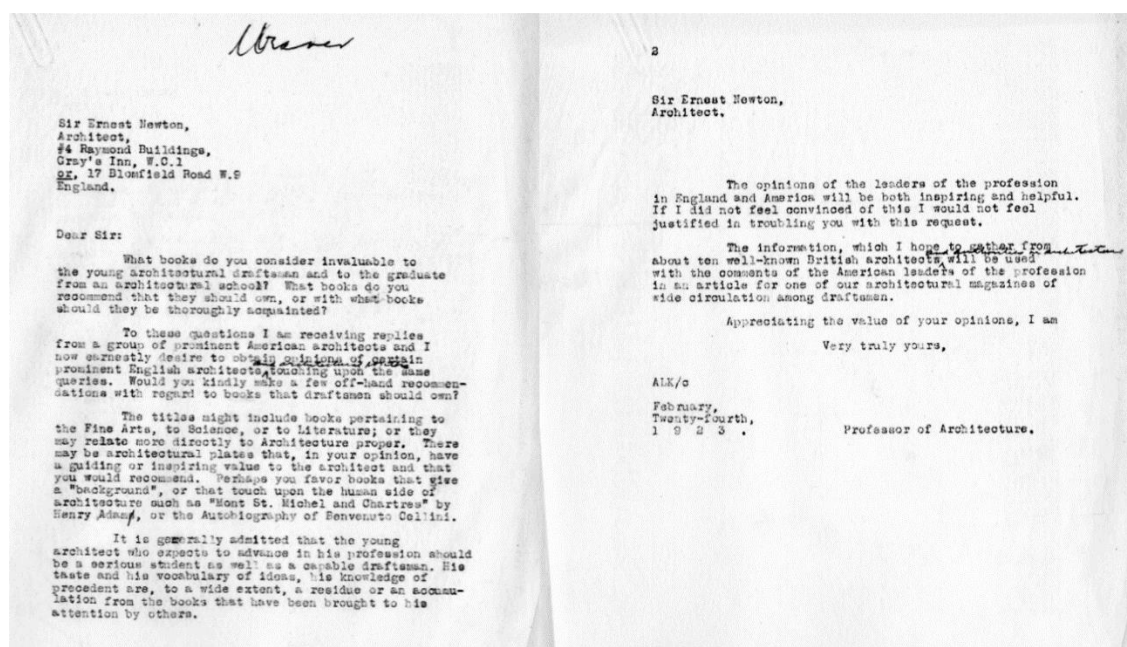


Figure 1. The version of the circular letter sent by Kocher to the British architects. Courtesy of the Rockefeller Jr. Library, Colonial Williamsburg Foundation, Williamsburg, VA.

themselves, which remain to be examined specifically.

Orientation for Reading Kocher's Correspondence and Bibliographies

The first outgoing letters are from the end of December 1921, when Kocher was teaching at Penn State, the last received is written to him by Louis Sullivan, on 24 December 1923. Introducing himself as a professor of architecture, he sent a sort of circular letter to well-known American and British architects and, as added by hand in the versions sent to those from Britain, also to "writers" and "authorities in architecture."

Kocher asked for "off-hand recommendations" on the books that a young graduate should own or know extensively. He wanted to receive suggestions on books touching upon "the human side of life," which give what he calls "a [cultural] background." From the American architects he received 29 answers in all, of which 27 were used for his articles. In the list of those who are consulted, we can find almost all the most

renowned architects of the first two decades of the century. From the British architects and critics, almost all belonging to the *Arts and Crafts movement* or neo-gothic tradition, he received 5 answers, to which George Bernard Shaw's must be added.³

The correspondence and the articles will be examined from three different perspectives. The first specifically considers the letters sent by Louis Sullivan. Even though the leader of the 'Chicago School' was at that time marginalized from a professional point of view, the books that he proposed and his ideas are greatly helpful in understanding a vast sector of the American architectural culture of the period. Through them, it is not only possible to carry out further reflection on his thoughts, but also to begin a more general discussion. This is on how the necessity for a revitalization of the discipline – which was much felt in the mid-1920s – was still affected by the transcendentalists' ideas on nature and art and by the influence of pragmatism. The Pragmatist philosophical movement – generally considered the most original expression of late nineteenth and early twentieth century American

3 The letters are at CWF RL (Colonial Williamsburg Foundation, Williamsburg, VA, John D. Rockefeller Jr.

Library, A. Lawrence Kocher Collection, MS 1986.12, box 2, II, Subseries A, folder: Books for Architect).

AMERICAN		BRITISH
<i>December 1921 – January 1922</i>		<i>February – March 1923</i>
Ralph Adams Cram (1863-1942) / 28 December 1921	Henry Bacon (1866-1924) / 5 March 1923	Charles FA. Voysey (1857-1941) / 13 Mar. 1923
Harold Van Buren Magonigle (1867-1935) / 5 Jan. 1922	Louis C. Mullgardt (1866-1940) / 19 June 1923	Gilbert Scott (1880-1960) / 23 March 1923
Irvin Kane Pond (1857-1939) / 3 January 1922	Walter Mellor (1880-1940) / 28 February 1923	Charles H. Moore (1840-1930) / 8 Dec. 1923
Cass Gilbert (1857-1939) / 30 December 1921	Elmer Grey (1872-1963) / 19 March 1923	George Bernard Shaw (1856-1950) / 27 Mar. 1923
Walter Harrington Kilham (1868-1943) / 30 Dec. 1921	Louis Sullivan (1856-1924) / 30 March 1923	Stanley Churchill Ramsey (1882-1968)
Clipston Sturgis (1860-1951) / 6 January 1922		Lawrence Weaver (1876-1930)
John Walter Cross (1878-1951) / 27 December 1921	<i>October 1923</i>	Ernest Newton (1856-1922)*
Egerton Swartwout (1870-1943) / 6 January 1922	Charles Z. Klauder (1872-1938) / 16 Oct. 1923	
Ernest Flagg (1857-1947) / 4 January 1922	Robert Kohn (1870-1953) / 15 October 1923	
Thomas Hastings (1860-1929) / 3 February 1922	Robert D. Farquhar (1872-1967) / 20 Oct. 1923	
Howard Van Doren Shaw (1869-1926) / 5 Jan. 1922	Reginald D. Johnson (1882-1952) / 14 Oct. 1923	
John Vredenburg Van Pelt (1874-1962) / 6 Jan. 1922	Hubert G. Ripley (1869-) / 22 October 1923	
Bertram Goodhue (1869-1924) / 10 January 1922	Harvey Wiley Corbett (1873-1954) / 26 Oct. 1923	
Charles Adams Platt (1861-1933) / 31 January 1922		
Paul Philippe Cret (1876-1945) / 30 January 1922		
Alexander Buell Trowbridge (1868-1950)		
Claude Bragdon (1866-1946)		
Aymar Embury II (1880-1966)		

*The letter remained unsent due to Newton's sudden death

Figure 2. List of American and British architects and writers to whom Kocher sent the request for bibliographical suggestions. These are shown with their years of birth and death and the dates of the answers, when known. The American architects are divided into three groups, according to the periods when the letters were sent. Author's elaboration.

culture, but so far minimally investigated for its influence on the field of architecture – seems to be well known by Sullivan and other American architects (Sherman 1962: 98-102; Duncan 1989 [1965]: 302-309; Weingarden 1987: 15-16; Watson 2015).

The second perspective concerns Kocher himself, who through filtering, integrating and arranging the received material, allows us to glimpse what his idea on architecture was at the time. If, on the one hand in this bibliographical activity, there are no direct signs of what his later convictions will be, there are, on the other hand, traces of the foundations for the critical stance that Kocher would clearly show starting from 1927. One even gathers the impression that the survey itself was somehow helpful to build up such stance.

The third perspective looks at the intellectual context in which American architects were working in the mid-1920s. The particular focus for this article is on the list of 19 texts on "Aesthetics and Theory of Architecture," published in January 1925. With the word 'aesthetics', architects of that time generally referred to the sensorial perception of the beholder and to the 'artistic' notion of beauty. However, as we shall see, they were influenced by critical assessments on the recognition of utility and sociality of art. In the

analysis of some of those texts, the pragmatic notion of utility shows through in particular as does the concept of a creative act as a free, unrestricted act. Through the combination of 'maximum of utility' and 'maximum of free creativity', in the end I will try to interpret the innovative skyscrapers designed over the late 1920s and early 1930s by Raymond Hood, an architect who was perfectly acquainted, directly or indirectly as will be shown, with the ideas expressed in some of the books included in the aforementioned list.

Sullivan's Reading List

Sullivan sent Kocher three letters, as yet unpublished. The first is dated 30 March 1923. Although he believed that "really thoughtful" books on architecture were "few and far between," he did agree to recommend some. Referring to Kocher's wish to receive recommendations on books which give "a background," he stated with conviction in the end that such books should surely be included in order to take architecture "out of its present isolation." He wrote again on December 16th, 1923 and this time he clearly stated that he was unwilling to provide a list of books dealing exclusively with architecture. These types of text, he claimed, are in general "unbalanced," because their

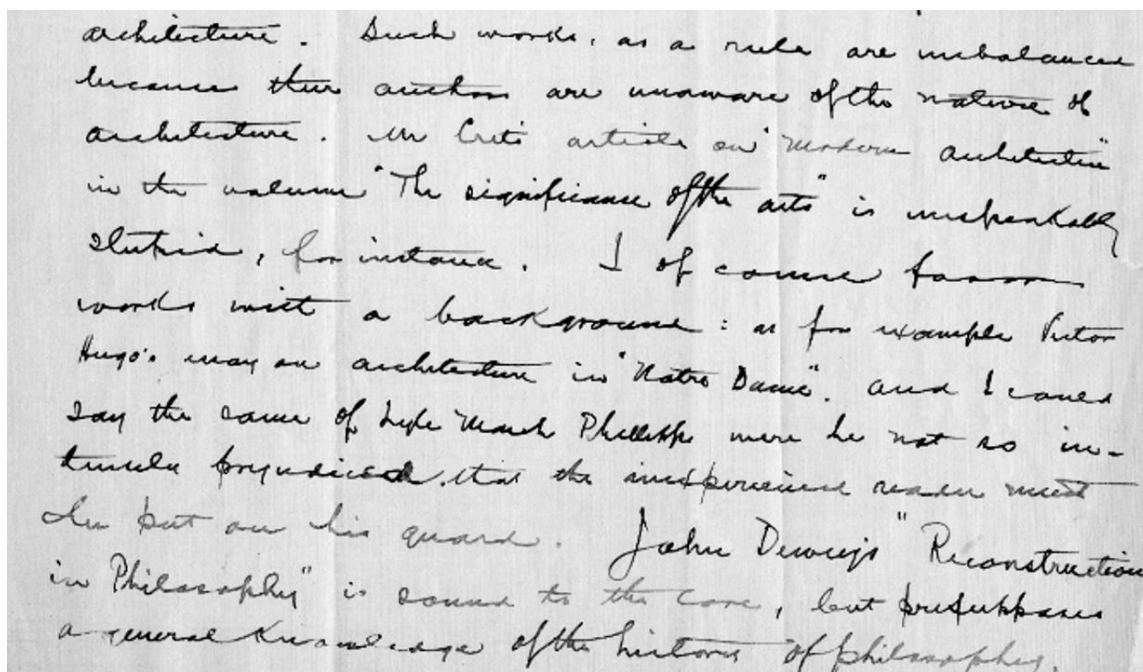


Figure 3. Letter of Louis Sullivan to Lawrence Kocher, December 16th 1923, detail. Courtesy of the Rockefeller Jr. Library, Colonial Williamsburg Foundation, Williamsburg, VA.

authors are “unaware” of the nature of architecture. He also called into question Paul Cret, an architect of strict *Beaux Arts* education, who, in the collective work *The Significance of the Fine Arts*, wrote a long essay on modern architecture. Cret’s contribution, a sort of detailed excuse-making history of American architecture from the beginning of the nineteenth century onwards, is defined by Sullivan as “unspeakably stupid.” “I of course form words with a background,” he adds immediately thereafter, “as for example Victor Hugo’s array on architecture in ‘Notre Dame’” (Fig. 3).

In that famous passage from *Notre-Dame de Paris* Hugo, starting from Frolo’s sentence “ceci tuera cela” (“this [the book] will kill that [the cathedral and, by extension, the building]”), makes a long, eloquent digression comparing architecture and books (1904: 140-153). He claims that after the gothic cathedrals, which embodied all the knowledge available at the time, architecture proved to be unable to convey the culture and sentiments of people through images, gradually being replaced in this role by the cheaper and more enduring books. The possibility could not be excluded that architectural masterpieces might be built in the future (1904: 151). At any rate, Hugo

writes that both in building architecture and in writing books, it is humanity as a whole which contributes little by little, either individually or collectively (1904: 153).

Now, Sullivan, in an essay written about twenty years before and then collected in *Kindergarten chats*, had referred to Hugo’s metaphor, even if he did not mention the French writer directly, when he observed that “the Architectural Art” was by that time “a closed book” for the dominant culture, on which “the word FINIS was written centuries ago.” What was left for “modern architects” was to “select, copy and adapt” (1979: 233). Nevertheless, for him it was possible to oppose this false destiny: “ALL buildings have arisen, have stood and stand as physical symbols of the psychic state of the people” (1979: 233). Architecture should have been capable of responding to the prompts of “modern science,” which “has placed freely at our service the most comprehensive, accurate and high-powered systems of organic reasoning that the world has known.” Someone who were able to generate a corresponding “modern thought,” expected to be “a poet, a teacher and a prophet,” was not at the sight. However he had emphatically imagined that “a normal student of Nature and of Man” –

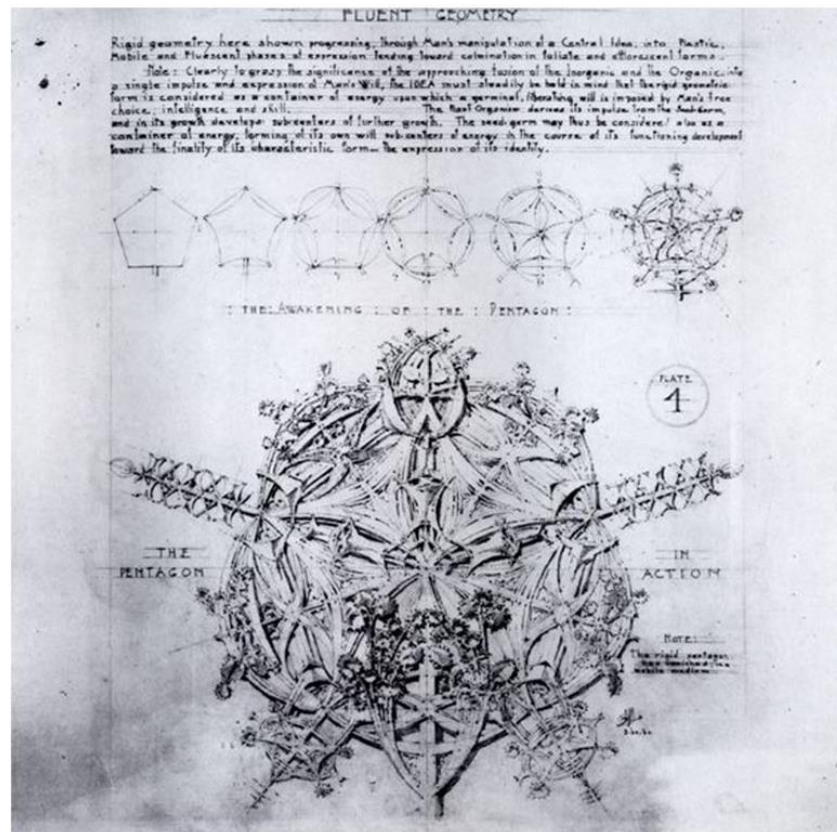


Figure 4. "Fluent Geometry – The Pentagon in Action," from Louis Sullivan's *A System of Architectural Ornament* (1924), plate 4.

an alter ego of himself, one may suppose – weighing up the architecture of his own time and the people, would have said to the people: "As you are, so are your buildings; and, as are your buildings, so are you" (1979: 234). In order to express architecture capable of responding to the challenges of the time and representing the people, the solution for Sullivan was in Nature (1979: 239).

He was influenced by the transcendentalists, who invited direct contact with nature, the source of inspiration and creative energy (Menocal 1981; Madden 1995; Uechi 2013). This did not imply that artists had to copy nature. They had to work as naturally as nature. An artist should be like the One who created nature. In a letter to his follower Claude Bragdon of 1904, Sullivan would explain clearly that his purpose in *Kindergarten Chats* was to show how the creative power was "divinely-human and humanly-divine" (Bragdon 1938: 158-159). In *A System of Architectural Ornament* (1924), he would stress that the natural forms he used in his ornaments were never directly

imitated, but rather were used by him to show how an idea was transformed into matter (Menocal 1981: 64-65).

For Sullivan, *Notre-Dame de Paris* was a literary background. Hugo had offered him a way of conceiving the relationship between architecture and the people, to which he had juxtaposed his own vision: we are architecture and, in order to express ourselves, we should look to nature, to which we belong. He did not share the French writer's ideas on the slow, historical evolution of a society (Menocal 1986). This is probably the reason why we do not find him expressly cited in *Kindergarten Chats*, or in *The Autobiography of an Idea*, which, issued as a series of articles in *The Journal of the American Institute of Architecture* (1921-1922), would be published as a book a few months later, in April 1924.

Sullivan indicated two other authors in his answer to Kocher which architectural historians usually do not consider when evaluating his cultural references. One

of them is the English writer Lisle March Phillipps, who is however judged by Sullivan to be “intensely prejudicial” for a naive reader. Phillipps had written two books dealing with themes related to art and architecture: *The Works of Man*, published in 1911 and *Form and Colour*, of 1915. In the first text, he had analyzed, in a rather simplistic way, the relationship between the culture of a people and its artistic expressions, starting from Egyptian architecture and ending with French furniture of the fifteenth century. A materialistic and non-intellectual people like the Egyptians could build only great pyramids of monolithic appearance and static figures. A rich and corrupt society such as that of the French court could produce only art permeated by luxury. In the second book, the thesis is that, in excessively cultivating their rational, intellectual capabilities, men had progressively lost their capability to excite and inspire, to make poetry; a bit like how the intrusion of rigidly defined forms had expelled the emotional effects of color, relegating it to a merely decorative function. Consequently and – again – simplistically, Phillipps had assigned a lower value to Western artistic culture, which for him represented form, than to that of Oriental artistic culture, which for him was analogous to color. The two volumes – little known nowadays – are also mentioned by many other American architects consulted by Kocher (Claude Bragdon, Irving Pond, Howard Shaw, Robert Kohn, Walter Mellor, Ralph Cram), who included them in the list of books of “general interest.” The positive message, which Sullivan and the others had probably drawn from them, overall, was that the American people could find their own original form of expression in an emotional and instinctive way.

The other author, suggested in the letter of 16 December 1923, is John Dewey, who had taught in his hometown Chicago, from 1894 to 1904. Sullivan refers to *Reconstruction in Philosophy*, published in 1920, which he praises for being “sound to the core,” although, he warns, it would require “a general knowledge of the history of philosophy.” In that book Dewey had presented his ideas on the need to re-found philosophy, which, born from the attempt to reconcile scientific truth and tradition, should no longer propose absolute, self-supporting solutions, but should offer only hypotheses connected to the real daily life of men. Dewey had also sometimes referred to the relationship between science and art in a way that certainly interested Sullivan. In a passage he had stated that the most significant question

humanity had to face was the “reconciliation of the attitudes of practical science and contemplative aesthetic appreciation” (1920: 127). In another, he had observed that on one hand economic ends are not merely instrumental but are capable of “idealization” and must acquire “ideal and intrinsic value.” On the other, “aesthetic, religious, and other ‘ideal’ ends are now thin and meagre or else idle and luxurious because of the separation from ‘instrumental’ or economic ends.” Only in connection with the latter could they be “woven in the texture of daily life and made substantial and pervasive” (1920: 171-172). For Dewey, when man is aware that science (intended as practical science) is impregnated with human values, the dualism between the material, scientific world and the moral and ideal will disappear: the reconciliation of art and science would therefore happen through the recognition of the human value of principles linked to the search for utility (1920: 173).

The appreciation for Dewey’s book is followed by the invitation to read *The Autobiography of an Idea*, soon to be published, and *Kindergarten Chats*, which Sullivan deemed still relevant – “It is as timely now as then,” he wrote –, but was only issued in book-form in 1934. The advice to read *The Autobiography* was repeated in his third letter to Kocher, of 24 December 1924, immediately after having harshly criticized the bibliographical suggestions of his colleagues, which he had been sent by Kocher.

In that autobiography, written in the third person, Sullivan mentioned quite a number of thinkers and scientists. He lingered on the book of the scientist and historian John William Draper (1811–1882), *The Intellectual Development of Europe* (1875), in which he had found “the war between science and religion” described (1956: 253). The effort of the former – science – to free itself from the latter – religion – was for him analogous to his wish to get rid of traditional concepts in architecture and was connected to his colleague John Edelmänn’s theory on “suppressed functions,” with which he would interpret the world through the connection between form and function. He never spoke of Dewey, whose books he probably read only in a later phase of his life: the philosopher from Chicago, like Phillipps, would appear out of place in a book where his ideas on architecture are presented as the result of his own education and early life experiences. This is evidently the reason why they both went unmentioned, but when he recollected the moment when, at 25 years old he started his partnership

with Dankmar Adler, what he wrote reflected the thoughts of a pragmatist:

[Louis] could now, undisturbed, start on the course of practical experimentation he long had in mind, which was to make an architecture that fitted its functions – a realistic architecture based on well defined utilitarian needs – that all practical demands of utility should be paramount as basis of planning and design; that no architectural dictum, or tradition, or superstition, or habit, should stand in the way. (1956: 257)

The concept of utility used here is different from the concept of function, as developed by Sullivan himself twenty years before. When Sullivan, and Horatio Greenough before him, spoke of adaptation of forms to function they were not referring to social or 'external' function, but to the biological internal, or organic function; function was for Sullivan the thrust of an internal force and form was the effect of such thrust (1979: 48). The very principle "form follows function," which he recalls immediately after, is explained differently to elsewhere: it was the necessity to find a solution for the problem of commercial structures, to obtain "the maximum amount of daylight," which led, through the use of iron, to more slender pillars, and, consequently, to achieving verticality (1956: 258). The concept of function as 'external function', and therefore as utility, prevails here over the concept of 'internal function'. However, no contradiction seems to be perceived by Sullivan, who did not feel the need to clarify. I shall come back to this point.

Kocher's Standpoint in the Mid-1920s

When presenting the suggestions he received from the American architects, Kocher put Sullivan in first place. The order in which he presented the various opinions is connected to their relevance to the base idea that stimuli for the renovation of architecture should be found elsewhere, in non-architectural fields. Architecture is living "a retrospective age," he noted at the beginning of his first article, where he explains the rationale for his investigation. The same remark was proposed again at the end, where he observed that the majority of the architects had not proposed "background literature" but "office literature," where Letarouilly, Pugin and Viollet-le-Duc, the same authors who were read at the end of the previous century, habitually find their place. In that first article

– as in the letters he sent – he suggested two books "allied to the profession," "with the atmosphere of the craftsman and the builder": *The Autobiography of Benvenuto Cellini* and *Mont Saint Michel and Chartres* by Henry Adams. The point of departure for his research were thus the genuineness and immediacy in the relationship between the artist/creator and building, which easily refer to the pre-industrial era.

When, in the November 1924 issue, Kocher went on to consider the opinions of the English architects, first he presented George Bernard Shaw's. The already well-known Irish playwright had drawn interest in those years for some peremptory statements on the necessity to draw a line under existing architecture and rebuild everything from scratch. In a remark given from the audience at the *Royal Society of Arts* in London and reported in the *Journal of the American Institute of Architects* of May 1920, he had declared that every building in England should be destroyed over the next twenty years and replaced by a new one. "If we were a genuinely active people, producing decent habitations and decent art, it would be very hard for an old building to keep alive," even including the much-loved ancient cottages (1920:179). In another commentary, published in the early months of 1923 both in the *Journal* and in *The American Architect*, he suggested that "a competent young man" should be appointed to renovate the public buildings of London, indicating the ones which had to be demolished. In his letter to Shaw of 12 March 1923, Kocher reminded him of these statements and, referring to the circular letter sent to the English architects, which he attached, he added: "It may be that you believe that a training should be free from the influence of books" (CWF RL). The answer is probably as he expected.

I should say that architects are made by building, not by books. An architect may read Vitruvius, Piranesi, Adam, Ruskin and Morris to add culture to his professionalism; but a comparison of 12th century architecture with 16th century, or Greek with Latin, will suggest strongly that the more an architect knows academically the worse he builds. Reading, picture gazing, and globe trotting all tend to shift an architect's eye to the back of his head. In England we have so many eminent 14th century faker-experts that the 19th century never had a dog's chance architecturally. (27 March 1923, CWF RL)

For Shaw therefore, excessive love for the past has inhibited architects and in order to build something new it is necessary to start afresh. If books had killed architecture – and Shaw, like Sullivan had to bear in mind Victor Hugo’s metaphor in *Notre-Dame de Paris* – then by killing both the books, which tell us what to do, and the architectures of the past, which were once the equivalent of books, we might possibly revive architecture. The act of building belongs to our essence and we should find the direction to take in ourselves. Shaw did not provide theories but he acted: building a revolving hut by himself, where he could work undisturbed (McEwan 2015).

It is precisely the importance of ‘doing’ which Kocher must have appreciated in Shaw’s words and behavior. Starting from the years 1927–1928, Kocher became progressively interested in prefabrication and in partnerships with companies. In facing these themes, he encountered Gropius, but his attitude was never programmatic, but rather ‘practical’, so to speak. During the period when he went back to teaching, between the 1930s and 1940s, he linked prefabrication to the tradition of American colonists, who built by themselves their little houses, easily taken down and reassembled at will, and had his students construct very simple residential structures (Goodman 2017: 26).

While from an expressive solutions point of view Kocher was surely influenced by Le Corbusier and Gropius, with regards to the necessity for a radical renovation of architecture he had already been fascinated by the extreme position of a much older thinker like Shaw. Moreover, he could already count on the American tradition of thought which based the necessity for regeneration on the instinctive urges of man to build, to improve his status. Through the texts on aesthetics and theory of architecture that he publishes in January 1925, it is possible to see a reflection of such tradition.

Kocher’s list on “Aesthetics and Theory of Architecture”

The entire group of suggested texts – around 450 in total – cannot but reflect the heritage of ideas and knowledge from which the American architectural culture could draw in those years. The absence of Le Corbusier’s books, which started to circulate in their original version only around the middle of the decade and were only translated from 1927, should not surprise. Nor should the absence of the articles on the

European architectural avant-gardes appearing in some American magazines in the early 1920s, which had received only little attention by that time. Kocher, as he himself announced in the foreword to the article of January 1925, followed the suggestions he received from those he called the “prominent architects” of the United States and England. But he inserted also different texts, perhaps suggested by others or perhaps deriving from independent reading. He drew up seventeen lists. Going through all of them we can have an idea of the magnitude of his interests and gather the impression of an encyclopedic, rather than selective approach. There are many books on British architecture, especially domestic, many French texts, either translated or in their original version, a few German. Although the presence of German books can be taken as a clue of an early interest for the German culture (Kentgens-Craig 1999: 83), the texts presented have nothing to do with the *avant-garde* experiments occurring in central and northern Europe in those years.

The large group of “general interest” (44 texts) includes the desired books touching upon “the human side of life”: we find books on social science, social critique (English and French), psychology, philosophy, philosophy of science, texts on the relation between art and religion, as well as allegorical and/or dystopian novels.

On the one hand, unlike Sullivan, Kocher’s intention at that time was not that of conveying a precise idea of architecture. On the other hand, his extensive and various bibliographies were influential, in different ways, for the development of the architectural discourse in America. In spite of all the differences, we may detect in particular some common reasoning echoing the pragmatic concept of utility and independent of Kocher’s will even identify a line of thought related to the ideas of the transcendentalists and pragmatists. This is particularly evident in the list on “Aesthetics and Theory of Architecture.”

This group clearly includes some texts which at the time could already have been called ‘classics’: Guadet’s *Elements* (suggested by Egerton Swartwout, Harvey Corbett, Robert Kohn, Robert Farquhar, Benjamin Wistar Morris) and the best-known texts by Viollet Le Duc (suggested by Claude Bragdon, Charles Klauder, Bertrand Goodhue, Howard Shaw, Walter Kilham). It is through Guadet and Viollet Le Duc that nineteenth-century ideas on structural rationalism arrived in America and Kocher himself presumably

AESTHETICS AND THEORY OF ARCHITECTURE	
Adams, Henry, <i>Theory and Practice in Designing</i> , London 1911.	Haneman, J. T., <i>A Manual of Architectural Compositions</i> , New York 1923.
Belcher, John, <i>Essentials in Architecture: An Analysis of the Principles and Qualities to be Looked for in Buildings</i> , London 1907. <i>Intended for a popular audience.</i> [Weaver]	Lethaby, W. R., <i>Architecture, Mysticism and Myth</i> , London, 1892. [Goodhue]
Croce, Benedetto, <i>Aesthetics as Science of Expression</i> , translated by Douglas Ainslie, London, 2nd ed., 1922.	Parker, De Witt H., <i>The Principles of Aesthetics</i> , Boston and New York, 1920.
Id., <i>The Nature of Architecture</i> , Society of Architects Journal, London 1923, v. 16, p. 273-278.	Pond, Irving K., <i>The Meaning of Architecture</i> , Boston, 1918. <i>A modern conception of architecture.</i> [Bragdon, Cram, Pond]
Fry, Roger E., <i>Vision and Design</i> , London 1920.	Robinson, J. B., <i>Principles of Architectural Composition</i> , (The Architectural Record series), New York 1899.
Guadet, J., <i>Elements et theorie de l'architecture</i> , Paris 1909. 4 vv. <i>The standard work for the theory of architecture.</i> [Corbett, Farquhar, Kohn, Morris, Swartwout]	Santayana, George. <i>The Sense of Beauty</i> , New York 1896.
Havard, Henry, <i>Histoire et philosophie des styles (architecture, ameublement, decoration)</i> , Paris 1899-1900, 2 vv. [Morris]	Viollet-Le-Duc, E. E., <i>Discourses on Architecture</i> , translated, with introduction by H. Van Brunt, Boston 1875. [Bragdon, Goodhue, Kohn, Moore]
Jackson, Thomas G., <i>Reason in Architecture</i> , London 1906.	Id., <i>Rational Building</i> , a translation of the article 'Construction', in the <i>Dictionnaire raisonné de l'architecture française</i> , by G. M. Huss, New York 1896. [Goodhue, Kilham, Kohn, Moore, Howard Shaw]
Hambidge, Jay, <i>Dynamic Symmetry</i> , Cambridge 1923. [Bragdon]	Wagner, H., <i>Architektonische Komposition</i> , Darmstadt 1904.
Hamlin, Talbot F., <i>The Enjoyment of Architecture</i> , New York 1921. <i>A popular account intended for general readers.</i>	

Figure 5. Transcript of the list of 19 texts on aesthetics and theory of architecture published in *The Architectural Record*, January 1925. Kocher's comments are marked in blue, while the architects who suggested each text are marked in red, into brackets. Author's elaboration.

studied their texts when becoming an architect. The presence of another famous book from the previous century, *Architecture, Mysticism and Myth* (1892) by William Lethaby, proposed by Goodhue, is also understandable. Many American architects felt the need to insert symbolical representations in their buildings, which were fitting with the present time, and they often recruited philosophers or poets to this end, especially for their public commissions.

Belonging to a category of its own is *Vision and Design* by Roger Fry, a selection of articles which were very influential in the acceptance of the artistic avant-garde in Anglo Saxon culture of the beginning of the century. In light of Kocher's passion for the theme of self-construction, we may think that his interest for that seminal collection is not only due to the formalist analysis of painting developed by Fry in the majority of those essays, but rather also to the examination that the English critic makes in one of them of the construction of his own house. In *A Possible Domestic Architecture*, the design process is described through the equation between "needs and habits" and economic limitations; and the outcome is presented as the example of a possible truly "genuine" domestic architecture, to which the artist-architect, free from historicistic influences, simply contributes his "nice

sense of proportion" and "feeling for values of plastic relief" (1920: 179–183).

One then finds in the list, texts that have the characteristics of handbooks: the engineering-detailed *Theory and Practice in Designing* (1911) by the English engineer Henry Adams (homonymous of the author of *Mont Saint Michel and Chartres*), which is a book purely of technical information. *Histoire et philosophie des styles* (1899–1900) by Henry Havard, where every style is presented as the visual materialization of the spiritual life of a civilization; *A Manual of Architectural Compositions* (1923) by John Haneman, a non-historical catalogue of the compositional possibilities for each element of a construction; *Architektonische Komposition* (1904) by Heinrich Wagner, organized according to an anthological criterion. They are not indicated by anyone and they are probably due in this case to Kocher's college teaching work.

Among the works with a philosophical character, the least obvious presence is that of two texts by the Italian philosopher Benedetto Croce; the volume *Aesthetics as Science of Expression*, and the article *The Nature of Architecture*, recently translated into English – the second in a British magazine widely distributed in the USA. Essentially, the concept that Croce expresses in both is that it is not true that architecture is not free because it obeys practical matters: utility is

not in contrast with the aesthetics of architecture; on the contrary, it is helpful to qualify architecture as an autonomous artistic discipline. Although Croce does not appear among the authors suggested by the architects consulted by Kocher, he can be considered as a reference point for the American culture of those years, also in the sphere of architecture. Commenting upon the essay *Aesthetics*, which appeared in *The Architectural Record* in 1928, when Kocher was managing editor, the literary critic Arthur W. Colton defined Croce as “the most lucidly interesting writer on aesthetics since John Ruskin” and he also referred to an American “Croce cult.” The success of the Italian philosopher was probably due to the pragmatist interpretation that his thought could lend itself to. Colton quoted a passage of that text: “Art is not a work of reflection and logic, nor a product of skill, but pure spontaneous imaginative form.” However, he noted that this vision does not prevent architecture being considered an art and indeed the practical end can be the object of “aesthetic externalization”:

Here however is one passage:

“Nothing can be more erroneous than the thesis that architecture is by its nature un-free and imperfect since it must also fulfill other practical objects,” that is, objects other than beauty. The two objects are not necessarily in opposition and the artist can prevent the contradiction by taking the practical end as itself “the material of his intention and aesthetic externalization.” He need not add anything. If perfectly adapted to its purpose it will be beautiful. (1928: 490).

The connection between beauty and utility is discussed in a number of other books of a conceptual nature, also chosen independently of the correspondence held during the two previous years. In two strictly philosophical texts, we may discern a very similar reasoning to the one used by Colton in his interpretation of Croce. In *The Principles of Aesthetics*, the professor of philosophy Dewitt Parker, referring to his contemporaries Croce and Theodore Lipps and starting from the definition of art as expression, maintains that “works of architecture and the other industrial arts are embodiments of purpose and the well-being that comes from the purpose fulfilled” (1920: 16). In *The Sense of Beauty* George Santayana, a pupil of the father of American pragmatism William James, after criticizing eclectic architecture for its seduction of his contemporaries compared to their historical

predecessors, speaks of utility as natural selection, as the organizing principle present in nature on which the forms realized by man also depend. He makes the example of the Egyptian pyramids, whose form depends on gravity and states that “architecture has all its forms suggested by practical demands” (1955 [1896]: 96). Three other ‘lighter’ books, intended for the general public, not just architects, also emphasize the relationship between the fulfillment of practical needs and the goodness of formal results. In *Reason in Architecture*, the Englishman Thomas Graham Jackson, exponent of the Arts and Crafts movement, maintains that, just as in the past innovations in art depended on external conditions, linked to convenience and necessity, “so at the present day our Architecture will depend for its vitality upon accommodation to the circumstances of the day” (1906: viii). In *Essentials in Architecture*, the architect and musician John Belcher, prized with the gold medal of the Royal Institute of British Architects, defines architecture as “a science interpenetrated in all its methods and applications by the true spirit of art.” He sustains that “nearly all, if not all, beautiful features in architecture have originally been designed to serve a very practical and necessary purpose” (1907: 5–7). In *The Enjoyment of Architecture*, the young American critic Talbot Faulkner Hamlin writes that architecture combines in itself factors apparently contradictory, “the practical” and “the beautiful,” “the scientific” and the “artistic.” Hamlin, who later became an esteemed professor at Columbia University, saw in the architecture of *Lower Manhattan*, formed by the needs of commercial architecture, the instinctive expression of an aesthetic idealism, the embodiment of the national spirit (1916: 12–13).

Among the texts that propose specific formal solutions – the last of the groups into which I have divided Kocher’s list – the most renowned is certainly *Dynamic Symmetry* (1923) by the artist of Canadian origin Jay Hambidge. Claude Bragdon, who suggested it, affirmed in his letter to Kocher its superiority over all other texts dealing with systems of formal analysis (CWF RL). In the pervasive proportional system proposed by Hambidge, based on the golden ratio, Bragdon had confirmed his own thesis of art as expression of cosmic life, which had been stated in *The Beautiful Necessity*. The same geometric and mathematical organization of space, known by the Greeks and found in nature, is referred to by Le Corbusier, who arrives at it at the end of the 1930s through the Romanian Matila Ghyka. However, Bragdon’s design

process was much more 'psychic' and based on intuition than that of Le Corbusier, who always tends to allude to immutable geometrical laws. In *The Beautiful Necessity* Bragdon had looked for regulating lines through the application in space of the musical laws of harmony. However, in the same book he stated that proportional studies were secondary to creativity: "The mathematical analysis of spatial beauty is an interesting study, and a useful one for the artist; but it can never take the place of creative faculty" (1910: 9).

The reference to musical laws and the caution with regards to formal rules are also in the book *Principles of Architectural Composition* by the American John Beverly Robinson, an architect of anarchist ideas. In that text, chosen autonomously by Kocher, Robinson states that the knowledge of general compositional rules might be useful for an architect just as the knowledge of counterpoint is for a musician. Designing remains however, a question of "talent and temperament." The generic rules proposed by Robinson are subject to individual judgment and "taste," which can be educated through training, but is fundamentally something innate (1899: 3, 68). Dealing with the concept of proportion, Robinson observes that the best compositions are those based on the use of geometrically similar rectangles, but he meaningfully adds that the desired absence of "exact coincidence" between similar rectangles, which would lead to boring uniformity, can be found in the geometrization applied by the Greeks of mathematical ratios existing in musical intervals. Only in this way can the similarity between rectangles combine with continuous variation. Robinson came up with a geometric interpretation of musical intervals akin to that which Bragdon would propose in *The Beautiful Necessity* (Fig. 6).

The analogy between architecture and music had been summarized by Schelling at the beginning of the nineteenth century through the famous saying "architecture is frozen music." It is often recalled in the course of the century and one may find it quoted also by Emerson, who placed it alongside those between architecture and the human body, between a Gothic cathedral and religion, between a river and the air that flows over it. These analogies were not based on likeness, but related to the general movement of the whole universe (1988 [1836]: 61–62). Bragdon's and Robinson's effort to find a relationship between musical intervals and architectural spaces should be seen from the same perspective: their attempt reflects the appreciation of music as a non-figurative art which is able to represent the variety, rhythm and movement which are present in nature. For them, architecture should possess such qualities. Another analogy that evokes the inherent forces that architecture should have, comparable to those present in natural elements, is the one between architecture and fountains. Bragdon would summarize it with the expression "frozen fountains" (1932). It was not only Sullivan therefore in those years who provided 'vitalistic' interpretations of architecture. Sullivan himself acknowledged Eliel Saarinen's project for the Chicago Tribune as the thing he had been searching for decades: a building springing from the ground, alive like a piece of nature (1923).

A book that was certainly circulating among architects in that period, which reflects an interpretation of the world as the outcome of internal forces or aspirations, regarding both animate and inanimate objects, is *The Ascending Effort* (1910) by George Bourne, whose title is taken from a phrase used by Emerson in one of his writings. Suggested by Pond, it was included by Kocher in the list of books of "general interest."

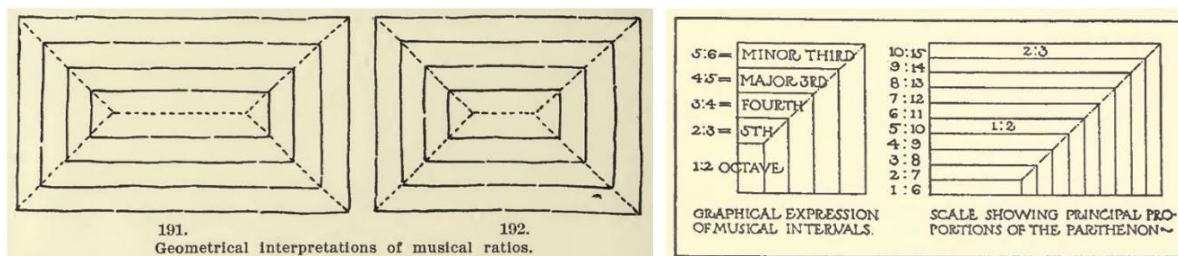


Figure 6. The geometric interpretation of musical intervals in *Principles of Architectural Composition* by Robinson (1899:82), on the left, and in *The Beautiful Necessity* by Bragdon (1910:89)

But it is in the book *The Meaning of Architecture* (1918), by Irving Pond suggested by Bragdon and by Pond himself, where we find an explicit elaboration of the concept of architecture as an embodiment of the movement and forces of nature. The volume is little-known nowadays, probably due to the poor attractiveness of the expressive solutions proposed, but it is certainly influential in the American debate on architecture throughout the Twenties. Bragdon defined it an “amplification” of the concept of a building as a fountain (1932:11) and in the letter to Kocher of ten years before, stated to “value [it] very highly”: it contains for him, “a great idea [although] presented with a halting art” (CWF RL). Kocher named it as “a modern conception of architecture,” in spite of the fact that the ideas exposed belong to the previous century.

Pond, a leading exponent of the *Arts and Crafts Movement* in Chicago, explains in the introduction of having developed the idea of architecture as “expression of life” and “pursuit of the ideal” in this book. The architecture of different periods, from Egyptian temples to contemporary American skyscrapers, is analyzed on the basis of the internal ‘natural’ forces at play within the buildings. For example, the columns of Doric temples are for him a “living force,” which upon meeting an obstacle develop a curve, the entasis, and encountering the entablature expand into the echinus (1918: 51-52). For Pond, every civilization (every “race”) and every individual expressed in different ways the “animating spirit” of the universe. At the end he proposes his own “development.” In a curious system of ornamentation, he represents American democratic society, based on “individualism,” “altruism” and “commercial enterprise”: the different elements express, in an abstract way, individuals who struggle for survival and at the same time help the weaker elements of the community. He also offers a suggestion for a steel-framed office building: a pyramidal motif based on the principle of set-backs (1918: 197-216).

The proposals are presented as something impromptu. To Pond, who directly draws on Emerson’s poems, emotionalism is reached through the instinctive rhythm that can be found in dance, which reflects in turn cosmic rhythm. No proportional or geometrical analyses are offered. But not even plant-related analogies are proposed. An architect belongs to nature, and he should never copy, not even nature. He should always create. He complains that “a certain American school of design based on horizontal lines and born in the great Middle West” was imitating and

reiterating itself, “little realizing [...] that the prairies are but one feature of the great physical face of this country.” Evidently, he was implicitly denigrating Wright; but similar accusations were also directed towards Sullivan for his “obsessive repetition of vertical lines” (1918: 138, 168, 175).

Pond’s call for ‘ideal’, ‘natural’ change was followed for certain by Raymond Hood.

The Ideas on Aesthetics of Raymond Hood

Hood read and appreciated Pond’s book. He quoted him in 1931 regarding the need for continuous change in architecture – as in life:

Habit is life in the brute creation; but habit in man has been aptly denominated ‘the soul’s tomb’. In reviewing the struggles and achievements of man it will become apparent that habit builds the tomb of art; that when the spirit no longer inspires, but forms are repeated from mere habit and for form’s sake, art has ceased to live and architecture reared in her name is her tomb. (North 1931: 15)

Hood took this hint of Pond’s, the only architectural theoretician to whom he ever referred, as a starting point to affirm that “the evolution of an American ‘style’ is precluded. A style is developed by copying and repetition, both destructive to creation and maximum usefulness, which is essential to building” (North 1931: 16). These words have been defined by Manfredo Tafuri “an absurd paradox” and read as an attempt to justify the commercial necessity for change, for advertising reasons, in a highly capitalist society (1979: 457). But if it is true that Hood’s skyscrapers responded to prosaic capitalistic reasoning, that they were “disenchanted mountains” – Tafuri’s words –, his ideas are in continuity with a certain sort of idealist thinking, whose tracks I have retraced through Kocher’s bibliographies.

On the one hand Hood was certainly influenced by the ideas of the transcendentalists – if not directly then through Pond’s book –, on the other hand what he wrote about creation and maximum usefulness reflects the ideas of the pragmatists. In an article from 1929, he speaks specifically of the relationship between utility and beauty, using terms almost identical to those used by Colton in his commentary to Croce in 1928: “Utility produces beauty – Hood writes – or

in some unknown way it weaves itself without the least conscious effect into the formation of most things that are beautiful.” He then goes on to add: “A beautiful woman!! I contend that even her beauty is in proportion to her utility!” And therefore, for him, “rules of art,” “systems of composition,” “philosophical analyses” are useless. “Immaterial” is the term he used to define the whole question. In line with pragmatist philosophy, which valued every theory only within the specific ambit of a certain action and in relation to the satisfaction it could produce, he states then, at the end of the article, that the idea itself that “beauty is utility” satisfies him “at least for the moment” (1929: 16). It is difficult to establish with certainty whether Hood did read the transcendentalists and the pragmatists – all his library and personal papers have been lost – but it is highly probable that he was at least acquainted with Santayana’s *The Life of Reason*, one of Kocher’s books “of general interest,” where it is stated that “utility and logic are themselves beautiful” (1905-6: 186). His first employer, Bertrand Grosvenor Goodhue, certainly educated in transcendentalist principles (Whitaker 1925:43), may have oriented him in his readings.

Hood arrived at formal results which are very different from each other. Yet, he never acknowledged any contradiction in his approach to design. On the contrary, consistency for him relied precisely on the use of different forms.

He had already affirmed that he designed his first skyscrapers in “what is called Gothic [style] simply because [he] happened to make them so,” adding that he could see “no reason in the world why there should not be as many horizontal or vertical lines in a building as man wants, providing the horizontal lines do not waste floor height unnecessarily, or the vertical lines sacrifice the window spacing unreasonably” (1924). The contrast between the Daily News Building (vertical stripes) and the McGraw-Hill Building (horizontal stripes), which would always puzzle critics, is perfectly consistent with his point of view, as he tried to make clear. Each of the two responded to a precise request: a regular subdivision of small office spaces in the first, the maximum amount of uninterrupted light to the lower floors in the second (1930). Similarly, he explained the choices related to the set-back of the *RCA Building* by their dependence on the organization of the elevator system and on the minimum amount of natural light to be obtained at each floor (1932a). The assertion of a total freedom of expression is flanked therefore by the will to satisfy a practical necessity, obviously linked to the financial and market requirements that he knew perfectly well (Willis 1995: 79–88). In some cases, he approached the formal results of European rationalism, but invited with the Mc Graw-Hill building to the MOMA exhibit he maintained a critical attitude toward the search for new aesthetic rules. Such a search was, for him, the negative aspect of the ‘movement’ coming from Europe (1932b). Leaving aside ‘stylistic’ analyses, the



Chicago Tribune 1922



Daily News 1929



Mc Graw-Hill 1930-31



RCA Building 1930-33

Figure 7. The main skyscrapers designed by Raymond Hood. (<https://www.flickr.com/photos/scottnorsworthy/9234268957/> (accessed 14 December, 2020), <https://commercialobserver.com/2019/07/tribune-medias-wpix-renews-110k-sf-in-the-daily-news-building/> (accessed 14 December, 2020), <https://www.pinterest.it/pin/607493437215245278/> (accessed 14 December, 2020), <http://www.nyc-architecture.com/MID/MID060.htm> (accessed 14 December, 2020))

forms of his late skyscrapers betray, if anything, a certain 'vitalism', both 'naturalistic' and 'mechanic', independent of the internal structure. In describing the Mc Graw-Hill building he said: "economy, efficiency and good working conditions were the three factors uppermost in mind." Then he provided a rather poetic explanation for the appearance of the building: "Dutch blue at the base, with sea green window bands, the blue gradually shading off to a lighter tone the higher the building goes, till it finally blends off into the azure blue of the sky. The final effect is a shimmery, satin finish, somewhat on the order of the body of an automobile" (1931). On the one hand, Hood wants the building to respond to practical needs; on the other hand, he feels the necessity to express its vitalism as an effect on the external surface.⁴

Epilogue

Hood is an example of how the intellectual development of an architect in the United States during the first decades of the twentieth century was affected by a tradition of thinking rooted in the nineteenth century, the same which Sullivan had drawn upon. The analysis of the material taken into consideration, through the three perspectives defined above, helps to delineate its characteristics. While based on French romantic rationalism – of which Hugo, precisely for that passage in *Notre Dame*, is considered to be the initiator –, or on the British Arts and Crafts movement, American architectural culture was also influenced by transcendentalism and pragmatism, and maintained, at least for a period and for a number of significant cases, its independence from contemporary European research, in spite of the similarity of some formal results. It has already been noticed by some critics that Sullivan's attempts to create tall buildings which displayed movement, action and power; and which were not in imitation of anything but only the embodiment of a divine-like idea, were 'continued' by the skyscraper architects of the 1920s (Van Leeuwen 1988: 118–149). We have observed that in Sullivan's thought the free and natural character of a creative act is also associated with the pragmatic necessity for doing, independent of any absolute, or revealed truth. We have also seen that the same attitude can be found in an architect like Hood. The focus for the latter, however, is decisively shifted

towards the utility of a building; its external function, which is able by itself to guarantee beauty. Here internal function is only reflected, so to speak, through effects on the surfaces.

In Sullivan, or Pond then, who both used nature as an example rather than a model to imitate, there was still the search for expressive solutions based on the 'organic' qualities of an architectural object. The outcome in Hood is that of a total indifference to any formal system, which, coupled with the search for the 'maximum of utility', produced apparently incomprehensible, paradoxical effects. A few decades ago, Rem Koolhaas, in his attempt to delineate a theory which could explain the combination of "fantasy" and "practicality" of many projects in Manhattan in the first half of the century, wrote evocatively that the "state of mind" of Hood was dominated by "schizophrenia." In this way, connecting it to a "schism" – typical of an illness or a loss of consciousness – it would be possible, for him, to interpret the mental process that caused the total uncertainty in the relationship between a form and its use. He observed in fact that in order to respond to the wishes of a client, the ever-changing forms of a skyscraper could host a church with commercial services and garages, or an entire city (1994 [1978]: 172–174). More precisely, without using the metaphor of mental illness or a 'delirious dream', we should probably speak of an attitude which leads transcendentalist and pragmatist ideas on art to having extreme consequences in the architectural field. We have noted before that Sullivan already, in a passage from his *Autobiography*, appears not to perceive any contradiction between internal and external function; as if one should not necessarily distinguish form as a result of internal, 'organic' forces, from form as a result of forces deriving from its use, its utility. In Hood, a further step is taken. The 'dissolving' of the internal function in the external function has almost – if not entirely – reached completion and has, as a consequence, total unpredictability of a form in relation to its use. In Hood, it seems that the quality of the results is exclusively granted by the naturalness of the creative process: there is a sort of utopian illusion that by freeing up creativity and responding only to practical needs it would be possible to build objects which, as in nature, are both beautiful and useful.

⁴ On these themes, see Canato 1992.

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