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Gottfried Semper and the Profound Surface of Architecture

by

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Abstract

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Gottfried Semper argues for a return to the surface of architecture. In response to the aesthetic crisis brought on by the integration of industry and art, he sought a new source for principles with which to guide architectural invention. By looking to man’s own productions, Semper creates a kosmos for architecture, one that both describes the primal forms out of which all art and industry arise and that outlines the way in which those forms transform over time.

Semper believed that all cultural productions, both physical and conceptual, arose out of the Volk. Architecture’s role is to express the social structure monumentally, just as government expresses it in its political institutions. Architecture does that symbolically through its Bekleidung, the cladding. In the making and ordering of architecture, the culture itself is ordered.
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INTRODUCTION

Oh those Greeks! They knew how to live. What is required for that is to stop courageously at the surface, the fold, the skin, to adore appearance, to believe in forms, tones, words, the whole Olympus of appearance. Those Greeks were superficial—out of profundity.

Nietzsche (1844-1900)

Gottfried Semper shared with Friedrich Nietzsche a belief in the profound surface. In architecture, what appears on the surface is what man creates. And it was in the creations of social man that Semper believed architecture would find its salvation.

Semper’s theory of architecture arose from his early investigations into polychromy on Greek architecture. In the fierce debate surrounding polychromy, Semper took Quatremère de Quincy’s side and attacked Winckelmann’s “ideology of the white surface.” He constructed an entire theory of architecture out of the conflict between an idealized Greece and archeology’s discovery of color on ancient monuments.

His argues that polychromy must mean something because it grew out of the same culture which produced Greek art, architecture, and democracy. To Semper, all cultural
productions are expressions of society, arising out of the physical and spiritual needs specific to that society. Therefore, architecture should not only coincide with the political situation, it is, like government and religion, an expression of the people (Volk) themselves.

As the Volk transform over time, its expression through architectural forms must transform as well. But the disparity Semper found between the modern, democratic world of nineteenth-century Europe and its productions, which stagnated in historicist forms, led to his search for some principles which would guide the future of architectural design.

Semper sought the answer in the observation of the world around him. Using the new sciences of biology and linguistics as models, he formulated a theory based on the transformation of a few primal elements (Urtypen). Architecture becomes an activity (Energieia) rather than a product (Ergon); normative forms give way to the idea of "becoming" (Werden).

According to Goethe, "form is a flexible element, a becoming, a passing away. A theory of form is transformational theory; the theory of metamorphosis is the key to all the manifestations of nature." By examining architecture's past, one could discover the natural laws underlying design and set up guiding principles for future innovation. The observer "can set himself the following task: to explore the inherent
order \((\text{Gesetzlichkeit})\) that becomes apparent in phenomena of art during the process of becoming and to deduce universal principles from what is found, the essentials of an empirical theory of art.\(^2\)

Semper believed that transformations in architecture are driven primarily by changes in the social structure. Those transformations are best read in the surface of architecture, the cladding \((\text{Bekleidung})\) which wraps the building. Society \((\text{Gemeinschaft, community})\) replaces religion as the metaphysical guide for the modern age. In a world guided by community, architecture takes center stage as both an expression of that community and as a force in shaping it. It does so through the symbolic use of ornament on the surface of the building.
PART I: POLYCHROMY

THEIDEOLOGY OF THE WHITE SURFACE

A major debate at the end of the seventeenth century in architecture centered on the validity of Roman and Greek architecture as the source for normative forms. “The Renaissance view of antiquity as an arcane treasury hermetically cloistering the secrets of antiquity was rapidly giving way in the late seventeenth century to the notion of progressive knowledge open to the future, one capable of adding to and improving ancient forms and proportions.” With the broader perspective offered by hitherto unknown monuments of ancient cultures, the time-honored precepts of the Roman architect, engineer, and author, Vitruvius (1st cent. BC) began to give way to new ideas about architectural forms.

Extensive examination of ancient monuments questioned the Renaissance adherence to Roman architecture and led to the adoption of classical Greece as the standard for architecture by the late 1700s. Of all European nations, Germany was most ‘tyrannized’ by Greece, in part because of the rejection by the art theorist, Johann Joachim Winckelmann (1717-1768), of Romanticism’s search for aesthetic meaning in nature. He proposed instead that aesthetic norms could be found in a “golden age” which existed in the past, a real world which stood for something eternal, perfect, and beyond the ravages
of time.⁴ Aesthetic judgment, "the imitation of sensuous beauty in nature and of spiritual beauty in man; the combination of the beautiful and the sublime, of the human and the god-like by means of nobility, simplicity, serenity and greatness; all this could only be attained by studying and imitating the Greeks."⁵

Winckelmann determined that the fundamental principle guiding Greek art and architecture was harmony. "The universal, dominant characteristic of Greek masterpieces, finally, is noble simplicity and serene greatness in the pose as well as the expression."⁶ Unlike the contemporary Baroque fascination with passion, tragedy, and movement, its artists and poets had "banished passion and suffering from their works or softened them, conquering them by depicting them beautifully in the nobility and greatness of soul."⁷ The greatness of soul was best seen at rest, not in the passion of movement, and noble simplicity was best expressed through the serene white surface of Greek sculpture and architecture.⁸

But the classical world was under too much scrutiny to uphold Winckelmann's thesis. Measurement and the systematic presentation of monuments recorded by travelers and archeologists revealed a world far older and more complex than previously imagined, an antiquity more widespread and ancient than that suggested by Biblical sources. The revolution begun by the Enlightenment, which had opened up all of European history and offered it for regeneration,
brought the idealized view of Greece into question as well. By the late eighteenth century, the strict neoclassical viewpoint was thrown into question:

From the reports of the monuments brought back by the archeological traveler, it became evident that there were two disparate concepts of ancient Greece. One was its unique physical presence, now realized in visual presentations based on direct observation; the other, its idealization, realized through traditional interpretations of classical literature. The various attempts to resolve the contradictions between the traditional attitudes and the original material were to create major developments in architectural theory and taste during the last half of the eighteenth century.\(^9\)

The image of classical greatness collided with the actual archeology of the 1750s. One of the leading points in the clash between the real and the ideal was the argument over the existence of polychromy.

Antoine-Chrysostome Quatremère de Quincy (1755-1849), head of the Académie des Beaux-Arts from 1816-1839, gave the name "polychromy" to the large chryselephantine statues originally placed in the cellas of ancient Greek temples (Figure 1).\(^10\) Using classical sources as well as his own studies from a trip to Paestum,\(^11\) he published reconstructions (1814-15) of the colossal cult statues of Zeus and Athena at Olympia and Athens, showing them richly embellished with gold and ivory.\(^12\)

Neither the earliest nor only commentator on Greek polychromy, Quatremère was the first to construct a theory which would account for and reconstruct polychrome sculpture.
Previously, any trace of color found on Greek art and architecture or mentioned in texts was treated as accent. The painted sculpture and bas-relief found in other cultures, such as Egyptian or Etruscan, was merely proof of their barbarism or at least artistic under-achievement. Polychromy in the art of other cultures was an accepted fact; polychromy in the 'purity' of Greek sculpture was another matter.

But Quatremère argued that fifth-century texts praised these chryselephantine idols as the highest development of Greek art. Therefore, they should be judged by their own standards and not in comparison with the 'pure' marble sculptures admired by his contemporaries. These cult statues hearkened back to a more primal memory, a memory of the birth of art and of the earliest, primitive idols.\textsuperscript{13} Greek sculpture developed as torereotics, assemblages of metal, ivory, and wood on an armature. In this tradition, the earliest wooden idols were painted and dressed with actual materials. Therefore, argued Quatremère, color is innate, an organic element developed in the first Greek sculptures. Polychromy was part of an ongoing tradition so that "by the time of Pericles's reign color had become an indigenous part of the Greek artistic consciousness: symbolically consecrated by religious traditions as well as by the nature of this particular sculptural technique.\textsuperscript{14}

Quatremère's argument that the Greeks used polychromy because color was a fundamental element of the Greek artistic psyche
was at complete odds with the prevailing view of Greek art articulated by Winckelmann, who in Geschicte der Kunst [History of Art] (1763), wrote that "colour should have but little share in our consideration of beauty, because the essence of beauty consists not in colour but in shape."\textsuperscript{15} The beauty of the Greek sculptural form was found in its degree of whiteness, since white best reflects light and therefore best defines the contour and form of the sculpture. In turn, "this tenet was easily transposed upon the image of the Greek temple: a few bold, pristine masses, preferably of white marble, delicately proportioned and lightly accentuated with decorative reliefs."\textsuperscript{16}

But so many archeological discoveries endorsed Quatremère’s reading of polychromy that by the early nineteenth-century it had become an accepted phenomenon throughout Europe. (Figure 2)\textsuperscript{17} Painted architectural sculptures and moldings on the Temple of Jupiter at Aegina (excavated 1811-1812) provided significant proof of polychromy, and the publication of reports, travel descriptions, and plates of reconstructions of these temples fired the imagination.\textsuperscript{18} Color drawings of the ruins were displayed and exhibited throughout Europe. (Figure 3) The wall paintings and mosaics at Pompeii, traces of color on stones at other sites, and imaginative reconstructions of multi-colored Greek temples all supported a reading of ancient architecture and sculpture as polychrome.
In spite of the new knowledge, there was still a great deal of resistance. At stake was not simply the question of the fact of polychromy, but rather the implications. Neoclassicism relied on the ancient rules found in Greek art for the creation of all art. If polychromy was truly part of Greek art and architecture, then it became one of the rules for all architecture. Neoclassicists argued that polychromy was foreign to the Greek aesthetic because it mixed materials—Quatremère's gold and ivory—rather than using one material and because it hid the intrinsic value of the original material. Even more important, the use of these surface colors denied form as the fundamental tenet of sculpture and created an illusion with its imitation of cloth and skin.¹⁹

But after the excavations at Aegina, Bassae, and Selinus, the problem became not whether polychromy was used, but how it was used. "What was lacking was a theory by which one could appreciate aesthetically these indications of extensive color usage without destabilizing the Greek classical ideal. In effect, a new artistic ideal had to be postulated so that Greek art would not be brought down to the gaudy level of its barbaric counterparts."²⁰ How the Greeks used polychromy would also reveal why they used it.

There was no determining evidence, however, for the exact limits and practices of polychromy. Ancient authors, even when they had noted the use of color, offered no explanation
or motivation. There was no solid evidence of the degree to which temples were painted, how that paint was used, how intense the colors were, or whether all monuments were painted. Archeology used the process of analysis and induction from the natural sciences to expand on the scarce evidence. Traces of color were presumed to lead to more color. The very concept of polychromy "would seem to have been fostered by the evolution of archeological techniques and of extrapolative science. The meager evidence of architectural polychromy was sufficient that once the powers of abstract reason were applied to it some sort of painted decoration had to be admitted." 21

The various systems of polychromy revealed as much about the each commentator's preconceived idea of what Greek polychromy should look like as they did about the reality of ancient architecture. Even with new documentation, the archeological evidence was sketchy, contradictory, and ambiguous. Reconstruction drawings were not the efforts of impassive observers; they were themselves works of art and imagination, "more the product of contemporary taste and thought than of disinterested archeology." 22

Leo von Klenze (1784-1864) was one of the first architects to respond to the growing evidence for polychrome architecture in antiquity. 23 In 1816 he won the competition for the Munich Glyptothek, in which the marble fragments from Aegina were to be displayed. The stones had lost their original color after
brief exposure to air and were restored with full color and mounted on a temple facade painted in brilliant colors. Limestone covered with stucco, they were assumed to be painted all over, a vestige of an earlier need in wooden architecture to protect the rough (unrein) wood from decay. Greek temples were presumed to be originally wood, and this treatment was therefore continued in stone architecture. Color as a vestige of an older necessity implied that it was not integral to high Greek art.

The architect Jacques Ignace Hittorff (1792-1867) also contributed to the polychromy debate. In a presentation he gave to the Académie des Beaux-Arts in 1830 he showed color drawings with every surface and detail of the Greek temple rendered in brilliant colors and complicated patterns. In his reconstruction of the Temple of Empedocles at Selinus (Temple B), Hittorff covered the entire surface of the temple with a two-dimensional pattern. (Figure 4) The form does not dictate the pattern, rather it serves as a framework for the two-dimensional patterns, establishing areas to be colored--metopes, for example--but not how they should be colored. Small pieces add up to create an overall, unaccented quilt which Hittorff derived from mosaic-like wall paintings at Pompeii and fifth-century Etruscan tomb decoration at Tarquinia. The presentation caused an uproar at the Académie; his evidence was denounced as faulty since he had used colors, patterns, and motifs from various places and
ages--Tarquinia, Pompeii, Aegina, and Jerusalem--and had combined motifs as his imagination, not reality, dictated.26

Hittorff's importance derives more from his radical pronouncements on the role of color in Greek architecture than from his actual use of color. Not only did he insist on the universality of polychromy in antiquity, he proposed color, rather than the orders, as the principal variable of the classical decorative system. Von Klenze, on the other hand, argued that Greek marble had color only as a way to articulate its form and material, a treatment he called "lithocromie."

Franz Kugler (1808-58), a follower of Schinkel, supported von Klenze's "lithocromie" theory. In his reconstruction of the entablature of the Parthenon,27 a white marble structure is accented by color which sets off the materials because "all buildings in noble white marble from the Golden Age of Greece--that is, the majority of those in the Attic style--display their stone, in their principle parts, in its original colour, and ... only subsidiary details were painted."28 Kugler's drawing of the Parthenon showed an almost completely white temple. Only the lesser elements--the echinus, mutules, guttae, metopes, and cornice--were touched with color.29 According to this reading, form is a mass which paint should articulate, not obscure. In this way he was able to preserve the classical vision of Greek
architecture while still acknowledging polychromy’s existence.

Quatremère’s structural polychromy derived from the use of naturally-colored building material. In the toreutic tradition, form consists of particular materials with inherent colors. These materials could then be set off with gilding or touches of applied color. This reappears in Kugler’s use of color to articulate form and material. Hittorff, on the other hand, used painted polychromy, the “application of a non-structural coating of paint to architectural surfaces.” Polychromy’s role was divided between either articulating the forms which it covered or asserting it’s independence from these forms.
PRELIMINARY REMARKS ON POLYCHROMY

Semper was less concerned with proving the case for polychromy on historical grounds than with establishing a principle. Polychromy not only existed, it meant something, and it was his task, in the face of the misinformation, misinterpretation, and misappropriation of color in architecture, to uncover that meaning within the aesthetic system of the Greeks: “It has therefore been reserved for our time to collect the still existing traces of polychromy and to establish a system that will once again reconcile antiquity with its surroundings in space and time.”

Franz Christian Gau (1790-1854), a German-born architect practicing and teaching in Paris, first aroused Semper’s interest in polychromy. Semper worked and studied with Gau from 1826 to 1830 as Gau was publishing a study of polychromy and producing illustrations for Ruines de Pompeii (1829).

A further influence was the debate in the late 1820s between the French Académie de Beaux Arts and those opposed to its rigid interpretation of classicism, especially the emphasis on Roman imperial forms. Led by Henri Labrouste (1801-75), the debate used the evidence of polychromy on the Greek temples at Paestum and in Sicily, the recent discovery of Etruscan tomb cities, and the wall murals at Pompeii as evidence for an attack on the Académie’s classicist normative
aesthetics. In all likelihood Semper saw Labrouste's restoration of the Temple of Neptune at Paestum, exhibited in 1828, which featured partially painted architecture and the use of graffiti (light incisions in the finish coat).\textsuperscript{33}

Semper's interest in polychromy began in earnest with his own travels to the Mediterranean. He left Paris in 1830, traveling to Rome, Naples, the excavations at Pompeii, and ruins of Greek temples in Sicily before traveling by boat to Greece where he studied the ancient monuments, especially those on the Acropolis in Athens.\textsuperscript{34} He set out his views of polychromy upon his return from Greece in 1832 and began drawings in Rome in 1833. He wrote his Vorläufige Bemerkungen über bemalte Architektur und Plastik bei den Alten [Preliminary Remarks on Polychrome Architecture and Sculpture in Antiquity] in 1834 after his return to Berlin. The essay was intended to be the preface for a larger work of color plates of his reconstructions of Greek temples, Die Anwendung der Farben in der Architektur und Plastik [The Use of Color in Architecture and Sculpture]. This volume was never published.

For Semper, polychromy is not a rejection of classical heritage but rather a key to the greater appreciation and understanding of the artistic achievement of Greek art. By denying polychromy's existence or misrepresenting its extent
and character, we have lost the chance to truly understand what polychromy meant to the Greeks:

It is a curious fact that throughout the past century, a time that has distinguished itself for its efforts to base all education on the accurate study of the ancients, the important question concerning the use of polychromy on antique monuments was scarcely raised. And yet a thorough understanding of antiquity, to say nothing of penetrating the meaning of their artistic achievements, is not possible as long as this question remains unsolved.15

Polychromy, integral to Greek art, must be integral to our understanding of the Greeks. Greek culture is the guide for our own artistic endeavors and the standard by which we judge the worth of our own culture. How can we hold up a flawed classicism as that standard?

Semper’s own commitment to Greek political and aesthetic ideals derived from his background. He lived through the Napoleonic wars of 1805-1815, including the occupation and military rule of Hamburg and Altona, his birthplace. The lectures of the archeologist Karl Otfried Müller (1797-1840) at the University of Göttingen exposed him to a concept of history which taught that the people (Volk), rather than the elite, are the bearers of history.16 Later, his experience of the July Revolution of 1830 in Paris deepened his commitment to democratic, and hence Greek, ideals.17

The importance of Greek ideals to Semper must also be seen within the context of a nineteenth century aesthetic and
political theory in which the state (Staat, Volk)³⁸ is the union of physical and spiritual needs, a living organism, whose spiritual or conceptual expressions (Geistesäußerungen) -- its cultural productions -- are part of a continuity. Thus religion, political organization, and social norms as well as art, music, and architecture are all interrelated conceptual expressions of a common spirit."³³ The social and political development reached by the Greeks in democracy was therefore paralleled in their artistic achievements. Likewise, a true understanding of the needs of the present day would also lead to an organic architecture, an architecture arising out of the living organism that is the people.

Instead, writes Semper, German architecture is caught between systemization and imitation, neither of which are true expressions of the present culture. The aesthetic schematism of Jean Nicolas Louis Durand (1760-1834)⁴⁰ lacks any transcendental element in a system which "combines, lines up things superficially, and brings about a sort of unity of parts in a mechanical way, instead of showing their organic working together around the primary, animating idea."⁴¹

Neoclassicism, in its slavish adherence to ‘white’ classicism, also fails to penetrate to the essence of architecture. It replaces thoughtful response to real needs with slavish imitation of the past:
The young artist traverses the world, crams his notebooks full of pasted-on tracings of every kind, then returns home with the cheerful expectation (taking care to show his specimens to the right connoisseur) that soon he will receive the commission for a Walhalla 'a la Parthénon, a basilica 'a la Monréale, a boudoir 'a la Pompeii, a palace 'a la Pitti, a Byzantine church, or even a bazaar in the Turkish taste!  

The natural connection between the Volk and the productions of its culture has been severed by a misunderstanding of the very meaning of architecture.

Architecture must be in harmony with the conditions of human society.  

The Volk, as a living organism, evolves in response to the internal and external stimuli of changing physical and spiritual needs. Their institutions, cultural productions, and physical creations change and develop as well, making the arts, architecture, and other cultural productions reflections of sociopolitical conditions. Egyptian temples are axial, formal, and processional, reflecting a stratified society based on a rigid, priestly class. The non-axial, open configuration of Greek cities, on the other hand, reflects the democratically structured Greek society:

How organically everything in the city sprouted up, its markets, stoas, temple precincts, gymnasias, basilicas, theaters, and baths. Everything was situated to promote civic spirit and the public welfare. Nothing was arbitrarily laid out by the rule of symmetry; the monuments stood where importance and destination [Bestimmung] demanded, seemingly without rules, but determined by the higher conceptual laws of the political system.
With the overthrow of dogmatic religion and imperialism, neither blind devotion to faith nor authoritative hierarchical regimes now dictated architecture. The loss of religious faith has become sublimated, through a series of revolutions, into a concern for the welfare of others:

Because the warm heart of man cannot long do without higher feelings, there emerged an active interest in the state. With true religious zeal we seized the new teachings that destroyed all arbitrariness and restricted selfishness, while broadening interest in the welfare of the whole. Thus, our full religious enthusiasm became directed toward earthly conditions and was bound to improve them; in this way arose that rapprochement with antiquity that unmistakably characterizes our century.

The present situation calls for an architecture of liberation. Yet, Semper adds, we still falsely build cities like Karlsruhe and urban spaces like the Piazza del Popolo in Rome, "where buildings are placed in open plains and their colossal masses disappear in boundless space; they are not scaled to small human need." Despite the struggle to become democratic, we are still caught in the obsolete institutions and "expensive monuments to vanity and caprice ... raised in places that should be set aside for public use."

In ancient Greece, too, the democratic will of the people had found the old political forms too constraining. Social and political revolution were here also a necessary precursor to the flowering of artistic achievement. The achievement of Periclean Greece is that it surpassed its origins in Etruscan, Egyptian, and pre-historic Greek architecture whose
productions were of lesser aesthetic value because they were "patriarchal states in which material comfort was substituted for the exaltation of freedom." Artistic achievement requires and is concomitant with liberation. The organic development of the people (the Volk as a living organism) can only take place in a climate of freedom.

Polychromy became for Semper a synonym for the artistic expression of an emancipated Volk and harmonious, democratic government. As the complete unity of color and form, polychromy represents the harmonious cooperation of the three arts—painting, sculpture, and architecture. The rejection of polychromy is thus the rejection of the cooperative power and genesis of all arts. But it is also the rejection of cooperation, democracy, and liberation in political terms since "with the Greeks, ... this harmony could come about only through a free and circumscribed working together of elements of equal value, through a democracy of the arts." Political systems and architecture are both expressions of the national spirit, and therefore polychromy is as much an expression of the "higher conceptual laws" of the Greeks as is city planning or democracy. Therefore, "Greek polychromy is no longer seen as a mere isolated phenomenon, it is no figment of the imagination, but reflects the feelings of the masses."
Semper's reconstruction of the Parthenon illustrates this integration of paint and sculpture, color and form.\textsuperscript{52} (Figure 5) The colors soften and accentuate the form, creating a whole out of individual tones placed side by side:\textsuperscript{53}

In a bright, consuming southern light and strongly tinted environment, the effect of refraction on well-ordered tones of color placed next to one another is so mild that the colors do not offend the eye but soothe it. The secret lies in arranging colors in such a way as not to harm each other.... The ancients in their decoration knew no subdued half-tones of color. The blending and mixing took place not on the palette but on the wall, through the juxtaposition of variegated and graceful decorations that at a certain distance appear to the eye as intermixed, but that always retain a tender playfulness that has such a charming effect.\textsuperscript{54}

The temple becomes a "natural phenomenon of light and color."\textsuperscript{55} This is neither the two-dimensional pattern laid over the building by Hittorff, nor the touches of color of Kugler. Semper proposes something closer to a chromatic harmony so that "architectural form is not contradicted by the painting, but rather emerges as part of the complex system" unifying painting, sculpture, and architecture.\textsuperscript{56}

The colors do more than link the temple with its environment. They are a thin coating preserving both the structural and decorative motifs used on the earliest shelter. The two--structure and surface, form and color--arose and evolved together in the form of painting and sculpture, reaching the heights of artistic achievement in their harmonious balance in Doric architecture.
According to Semper, the decline of art runs parallel to the increasing separation of painting and sculpture on monuments. At their highest expression, in the Doric period, the arts were integrated into a lawful, disciplined system, "harmoniously and powerfully assisting one another, woven into a well-proportioned whole," with a proper balance struck between color, form, and the architectural frame. In the dialectical evolution of the arts, architecture is the cohering element. But in the late Hellenic period "the bond that unified the arts broke asunder." Painting would pursue illusion, sculpture would pursue form, and "architecture saw itself abandoned."58

The erosion of architectural polychromy continued with the Romans, who substituted colored materials for the original paint on architecture and sculpture. Now only material mattered:

Under the Romans the habit of substituting rich and colorful materials for the painting of architectural and sculptural forms seems to have become a common practice. With their love of ostentation they were not satisfied with the conviction that had such importance to the Greeks: that inner conviction should conform to outer beauty. As far as possible they banished the older use of paint and allowed costly material to speak for itself.59

Polychromy, which had persisted in Byzantine, Moorish, Venetian, Florentine, and Gothic architecture as well as other periods of "high artistic accomplishment," was
completely undone by the Renaissance discovery of ancient monuments so weathered that no color remained. Discounting any written reports, Brunellesci and Michelangelo used the monochromatic forms as the norms for their architecture, producing great but incomplete achievements.

But color and form belong together. Color is necessary to understand form, it brings coherence to the whole:

Modern writers on aesthetics ... are sure that color applied to sculpture must confuse the forms and pamper the eye. On the contrary, it clarifies the form, because color provides the artist with a new way to throw the surface into relief. It brings the eye back again to the natural way of seeing, which it lost under the sway of that mode of abstraction that knows precisely how to separate the visible and inseparable qualities of bodies, the color from the form -- knows it by those unfortunate principles of aesthetics that define exactly the sphere of the individual arts and do not allow any excursions into a neighboring field. 60

Semper’s work is not simply a description of polychromy in architecture. It is a socio-aesthetic ideology, 61 a personal and political plea for democracy, creativity, and freedom in both the political and artistic arenas. He wanted to produce a parallel between the democratic efforts of the French Revolution and the democracy of ancient Greece: “With the political storms that have arisen since the end of the past century a new upheaval in art has taken place at the same time. Politics and art have always gone hand in hand.” 62
His criticisms offer nothing new in terms of their basis in emancipation theory. However, "Semper is unique at that time in publicly uniting politics and architecture as a program. His sources had pointed out only that both art and the community (Gemeinwesen) of every nation belong together historically by virtue of their common roots in the national spirit (Volksgeist). It is Semper who takes this one step further and declares that they should belong together--both now and in the future."^3

Semper's writings on polychromy formed the basis of his later theory of architectural design and the meaning of architecture. His work always responded to the sociopolitical situation, what he called the "needs" of the age. He sought to develop a theory and a set of principles for architectural design which could serve as a guide for the challenges of the modern, industrial age. Architecture serves both a functional role and expresses a symbolic need. Architecture--at least monumental architecture--is inexorably linked to political and cultural tendencies. As European society struggled to devise new political and social structures, so architecture must respond to these tendencies and help to frame them.
PART II: THE NATURAL LAWS OF ARCHITECTURE

THE CRISIS OF STYLE

Semper's search for new design principles was driven by the chaos and confusion resulting from enormous changes in European culture. The discovery of lands and people beyond Europe began with sixteenth- and seventeenth-century gold-hunters and slave merchants who, driven by the hope of finding a classical past analogous to Europe's own, looked on exploration as conquest and exploitation. In the process, they unveiled an astonishing diversity of previously unknown natural and man-made phenomena.

Expansion and exploration created a larger intellectual world. The "Oriental Renaissance" arrived with the translation of ancient Sanskrit texts in Europe, which "produced an effect equal to that produced in the fifteenth century by the arrival of Greek manuscripts and Byzantine commentators after the fall of Constantinople." This marked the beginning of a world history in which "the partial humanism of the classics became the integral humanism that today seems natural to us." This and later texts offered proof of an other, non-European world, "an intelligence and a soul apart from Europe." For the first time, the globe became a single entity.
At the same time, the Enlightenment replaced dogma with reason and superstition with science and commonsense. The Protestant Reformation and other religious struggles unleashed a process of liberation and skepticism, initiating new speculations about history and spurring on new intellectual and artistic forces. Discoveries in the physical and natural sciences, anthropology, and systems of thought created an explosion of information in European intellectual life and introduced the pursuit of knowledge for its own sake and the idea that knowledge was fundamentally progressive. Cheaper printing and spreading literacy gave these ideas wider circulation.

The explorations and expansion of Orientalism multiplied the world, revealing a larger body of evidence from which to investigate it. Empiricism—observation, recording, questioning, interpreting, and understanding data—developed out of the comparison of this information. "The Oriental Renaissance was fundamentally a phenomenon of difference, generating comparative techniques, whereas the first Renaissance was essentially assimilative in that it flattered Europe without disturbing Europe's self-affirming cultural creativity." The data collected became the basis of the experimental method, in which the validity of general principles could be tested by observation of facts. Comparative techniques and the search for origins which epitomized Orientalism became the very definition of science.
The loss of dogmatic schema by which to understand the world, coupled with the expansion of knowledge of the physical universe, demanded some kind of arrangement of experience in order to make a sensible whole, or cosmos, out of the accumulation of data. After the great astronomers and cosmographers—Copernicus, Kepler, Galileo—initiated the concept of a universe designed and governed by natural laws rather than by divine will, these laws of nature displaced divine ordinance and the action of God's Providence as the source of order in the world. The mysteries of nature could, given time, be explained, because they must be manifestations not of incomprehensible, arbitrary will, but of ordered, regular principles.

Further, man was able, if not morally obligated, to use these laws for his own best purposes. Where Christian and medieval Europe had observed the natural world with awe as evidence of God's mysterious ways, science manifested a conscious and continuous search for ways to manipulate nature in the interest of mankind. Nature made up a complete, integrated, rational system and was therefore predictable and open to manipulation. The result was the belief that men can achieve anything if they approach their task methodically and put sufficient material and technical resources to work.

At the same time, reason was taking over from religious dogma and democracy was struggling with ancien regimes,
industrialism was profoundly transforming social relationships and the relationship of man to his environment. Industrialism and capitalism created a new world of growing urbanization, mass social integration, the separation of home and workplace, and changing social structures.

Capitalism and its pattern of production and consumption created a new relationship between design and the marketplace. Where religion, household, guild, or feudal relationships had once shaped and structured design, in the new economy the marketplace took over as the engine for innovation, creating needs and desires rather than responding to the needs of society.

The seminal event combining Orientalism, science, and industrialism was London’s Great Exhibition of 1851 in the Crystal Palace. The Exhibition, in which products from all over the world came together for the first time, showed the overwhelming diversity of the world’s cultures as displayed through their productions: machinery, raw and processed materials, rare woods, exotic foods, oriental carpets, contemporary art, and furniture. The great variety confirmed the diversity of the newly unified world, a diversity of aesthetic and practical suppositions, systems of thought, values, and social orders in addition to artisinal skills.

In the nineteenth century everything became grist for the mills of intellectual and productive activity. Science,
linguistics, economics, anthropology, archeology, systems, abstractions, origins—the scope of knowledge expanded exponentially. The axis of time extended when archeology brought ancient cultures to light and geology proved that the earth is millions, not thousands, of years old. The axis of space extended with explorations of far-flung and isolated peoples and places. The axis of perception extended from the telescopic view of the heavens to the microscopic view of the molecule. These axes spread out through all disciplines and created new intersections and juxtapositions. The Exhibition reified this multidimensional multiplication of the world.

The Exhibit was an achronological description of human production. One building mixed together products by peoples of various technological times making it possible to judge the primitive and the sophisticated side by side. (Figure 6) Semper and other commentators discovered that, in many cases, "the products of the most naive methods of material fabrication, as well as models for pattern and color, far surpassed the refined works of civilized nations in what one calls style." In European design, everything from furnishings to machinery was covered with a "monstrous hypertrophy of ornament that transforms the simplest objects into nightmarish creatures." (Figure 7) At the same time that the Great Exhibition revealed the diversity and variety of the newly expanded world, it also floundered in "an incredible eclecticism, [where] all the styles and all the
periods are invited to feast, in the extratemporal temple of
the commodity, on the spoils of the object."\textsuperscript{71}

In Semper's eyes, artistic production was under attack by the
forces of industrialization and capitalism, and the
historical basis of the traditional art of Europe's past was
being destroyed.\textsuperscript{72} Speculation, in which goods are produced
for the market rather than for any particular person or
place, suit no one by suiting everyone. Harmoniously agreeing
with every surrounding, they are like objects found in an
Oriental bazaar. Fashion and fad force the designer to
respond to the passing demands of an undifferentiated market
rather than the real needs of society because profit demands
the creation of needs. Fine art, too, does not belong in the
marketplace. It should exist for itself alone and is "always
distasteful when it betrays the purpose of pleasing or
seducing the buyer."\textsuperscript{73}

The development of new materials, especially iron, and new
technologies, with which traditional arts are not familiar,
also contributes to the breakdown in design. Traditionally,
new materials and products arose from addressing a problem;
currently, new methods, machines, and materials themselves
are creating change, reversing the normal process of artistic
creativity. The artist no longer has time to reflect and
master his methods and materials; the marketplace pushes him
along in its relentless competitive drive.\textsuperscript{74}
Industry has not learned how to deal with and use properly the means at hand, leaving the industrial arts "forsaken by the Graces and drowning, as it were, in its own excessive resources."\textsuperscript{75} We over-ornament not because we should, but because we can. "All technical, mechanical and economic means that we have invented and that give us an advantage over the past will lead to barbarity rather than indicate the progress of true industrial art or civilization, as long as we are generally unsuccessful in mastering these means artistically!"\textsuperscript{76}

The advances brought by the progressive forces of intellectual freedom, Orientalism, and industrial development are actually destroying the tradition of European art. The central question of Semper's theory--how to discover the principles with which to guide the future of European design--arose from his reaction to the degeneration of art and architecture he saw around him:

Where does the depreciation of materials brought about by the machine, by their surrogates, and by so many new inventions lead us? What effect will the depreciation of labor, a result of the same causes, have on the painted, sculptured, and other kinds of decorative work?... How will time or science bring law and order to these thoroughly confusing conditions? How do we prevent the general depreciation from also extending to all works executed in the old way by hand, how do we prevent them from being seen as antique, striking, or eccentric affectations?\textsuperscript{77}
RESPONSES TO MODERNITY

In addition to new industrial methods and technologies, new
democratic, middle-class values as well as changes in
political, economic, and cultural spheres created the need
for "stable and durable strategies for architectural
creation." These nineteenth-century strategies were almost
without exception historicist in tendency. Historicism
sought to rediscover an identity for the present within the
styles and cultural expressions of the past. Design became
a scientific process based on the comparison of historical
and temporal differences: "Persian, Indian, Gothic, Saxon,
German, Italian and French styles—architects ought to draw
from all these sources. Their first task is to know, their
second to compare and the third to select in order to
apply." The historical style would express not merely an aesthetic
preference but a cultural system. A lack of consensus on
which culture was the best led to factions which fought
against each other. Therefore, Greek architecture was not
only an aesthetic preference, it also expressed a superior
civilization and social structure. In Germany, romanticism
and nationalism suggested that the Gothic’s combination of
materiality and constructional honesty along with
antirationalist Christian spirituality created "formal
languages expressing the soul of the Germanic people and
land," thus turning style into "the physical form of a
spiritual zeitgeist." In his *In welchem Stil sollen wir Bauen* [In *What Style Should We Build*] (1828), the architect, Heinrich Hübsch (1795-1863), proposed the *Rundbogenstil* (round-arch style), based on the Romanesque, as the most characteristic architecture for Germany.

The industrial world created new social orders and threatened the stability of existing states. The search for new forms in architecture was an attempt to "adapt the premodern, aristocratic identity of architecture to a modern world increasingly dominated by the cultural values of the industrial middle class." The new social structure created tension between the expression of middle-class individuality and the greater aims of the state. Capitalism and entrepreneurship depended on individual risk and imagination, but the individual must still be confined to the service of the centralized state.

"The styles were the expression of one of modernity's most characteristic impulses: a desire to affiliate the modern conception of the individual with the greater meanings and unities of a cultural order. Each historical style was viewed as a mechanism to mediate modern uncertainty, feudal Christianity, court culture, and mercantile humanism."

At its extreme, historicism became a retreat from social reality.

[Its] refuge-character was occasioned by the denial of the given social reality in order to negate it through the preservation of a political order which no longer corresponded to the actual structure of society. Architecture therefore served to maintain
power. The connection to an a priori content of architectural aesthetics ... corresponded to the monarchical principle of the state and the view of the national government ... that it must then equate authoritarianism and monumental character. 85

While it may not appear that there was any consistent theory within historicism, there was a coherent attempt to respond to the conditions of the modern age. That response initially took the form of a reassessment of the historical forms and styles as they related to the present. Nineteenth century eclecticism and historicism, often criticized and ridiculed, was partly an attempt to open new avenues of artistic creativity.

While proponents may have advanced a particular style, the emphasis was on principle and the psychology of creation. 86 Originality and creativity depended not on some existing forms but rather by what could emerge from some system. Despite its ties to imitation, historicism created a conceptual rather than mimetic point of reference by opening up a debate about what constituted the new "natural laws" in architecture.

Greek architecture offered one source for these laws because its forms were believed to be the result of a priori principles like proportion, order, symmetry, and harmony which are found in nature and which can be deduced empirically through reason. According to Alois Hirt (1759-1837), "he who constructs logically, is building in the Greek style." 87 Schinkel agreed that, "for the artist there is only
one age of revelation— that of the Greeks. To build in the Greek style is to build correctly, and from this point of view the best products of the Middle Ages are to be called Greek.™

Even though these theories retain classical references, architecture, like intellectual thought, was shifting from ontology to empiricism:

No longer was classicism verified by the inert prototypes of antiquity; rather, it was understood much more as a dynamic building system, a technological and spiritual process much like other human activities. Architectural theorists wrote of building methods, not building styles. Yet, the sharp distinction between these empirical methods and earlier imitative analyses underscored that architecture need no longer be limited to its traditional immanence with antiquity. If the art of architecture was knowledge of making and not knowledge of form, the truth of historical architecture could be seen as an ongoing process. In other words, the meaning of architecture could be located in human technological and spiritual activity irrespective of classical form.™

The model used to construct this ongoing process came directly from language theory. Early linguistics had been a part of theology, because language was believed to be given by God and derived from a common origin. The comparative method of linguistic analysis developed by the German linguist, Franz Bopp (1791-1867), contradicted the universal nature of man, finding instead families of language, and showing that language had its own history and could be studied for its own sake. Language, no longer a part of religion, was a rational invention of man.
The search for origins in architecture imitated the search for early languages and root words. In the view of Quatremère de Quincy, "the invention of architecture must be seen as parallel to the invention of language. That is to say that neither one nor the other invention can be attributed to any man because both are attributes of men."\textsuperscript{90} Architecture and language are fundamental and coincident to civilization, the artificial productions of mankind. "Just as his ability to speak distinguished man from beast, so did his ability to construct his environment."\textsuperscript{91}

Since architecture is an artificial construction of culture, different types of social organizations create different architectural forms. In Quatremère's theory, each of three original models of society create forms specific to their culture. The Egyptians, as hunters, sought out the cave; the Chinese, as shepherds, used the tent; the Greeks, as farmers, built huts. Site, climate, and lifestyle determine the original type in a culture, and these forms remain with the culture as it develops and transforms. The primitive experience of the cave became an essential taste (goût) of the sophisticated Egyptian and molded the architectural form of buildings that had otherwise relegated the cave to ancient history.

Quatremère concluded that "everything in their architecture retraces this first origin."\textsuperscript{92} The massive architecture of
the Egyptians contains within it the original cave. The delicacy and impermanence of Chinese architecture retains the model of the tent. And the carpentry of the Greeks remains in their temples which, even when transformed into more monumental expression in stone, retain the sense of a joining of parts and the harmonious resolution of load and resistance. Typological origin is the key to identifying both the three 'mother languages' of architecture and the subsequent architectural variations or dialects.

The idea that architecture, like language, finds its inspiration neither in divine will nor in nature, but rather in the productions and history of mankind itself, developed in the Renaissance when "for the first time in modern history, a people chose its own past--that of ancient Rome--as a guide for the future as well as the present." The revolution begun by the Enlightenment offered all European history for regeneration; the Oriental Renaissance added the past and present of other cultures when the common elements found by ethnography in the comparison of their differences showed what was natural and what were mankind's own creations.

The integration of science into culture taking place in linguistics, biology, natural sciences, ethnography, engineering, physics, and other sciences depended on systems of rules and relationships which describe, analyze and manipulate raw data. Architecture also wished to become
Wissenschaft (knowledge). Archeology and anthropology supplied architecture with data collected from the ruins of past cultures and the productions of contemporary cultures. Architects could then classify this knowledge according to scientific schema or taxonomies.

To Semper, the 1851 Exhibition was a tower of Babel with its "confusion of tongues," but he also saw "the disorder it describes as the start of a more natural order." Semper found that order in the analysis of mankind’s productions. Semper reduced these to four primary elements—the hearth, terrace, wall, and roof. These became the taxonomic basis for architecture, and eventually for all fine and applied art. The hearth is the moral center of all architecture, its fire the locus around which the tribe gathers, giving order and shape to society. The hearth generates the other three elements, which protect and enclose it.

Together, these elements are found within the primitive hut. In contrast to the French scholar, Abbé Marc Antoine Laugier (1713-1769), whose hut was the result of a taste for the primitive, Semper’s hut is a real example of how architecture develops out of fundamental, radical elements. His hut, based on a contemporary building from Arima, near Port of Spain, Trinidad, which Semper had seen at the 1851 Exhibition, seemed to perfectly express the original forms (Urformen) as he had worked them out in the late 1840s, with all the elements separately and clearly expressing their
functions: "All the elements of ancient architecture (Baukunst) stood out as original and pure elements in it: the hearth as the center, the elevated platform encircled by a stockade as the terrace, the roof with its columns and the mat enclosure as the space-closer (Raumabschluss) of the wall." 99 (Figure 8)

Semper’s four Urtypen (primal types) are independent, non-derivative, radical elements from which all other forms evolve. The idea of Urtypen was not new with Semper. Goethe’s investigations into morphology in the 1790s and search for the Urpflanz (original plant) lead him to posit the possibility of a search back to a small number of Urformen (original forms). The German naturalist and explorer, Alexander von Humboldt (1769-1859), used this premise to describe change and mutability of species in his description of his travels through the Americas and Asia:

In the midst of this immense variety, and this periodic transformation of animal and vegetable productions, we see incessantly revealed the primordial mystery of all organic development, that same great problem of metamorphosis which Göthe has treated with more than common sagacity, and to the solution of which man is urged by his desire of reducing vital forms to the smallest number of fundamental types. 100

Like Quatremère, Semper created a taxonomy. But where Quatremère’s three types were architectural forms arising directly from culture, Semper’s types are elements of all architecture. Furthermore, his types are characterized by
their function within architecture and not by any particular form.

In this, Semper followed the work of the French zoologist, George Cuvier (1769-1832). Eighteenth century classification had been based on sorting out different species in some logical and useful way. Categories helped one remember and communicate, but there was no sense that nature's order could be represented within some system. Cuvier moved classification from a descriptive system to a functional one. He reformulated the earlier paradigm of a great chain of being, with each plant or animal in direct relationship to those above and below it, into a system of groups within groups. This model allowed a radical new outlook on the structure of the world. Cuvier showed that classification could be "coextensive with the shape of nature itself," and therefore that nature worked according to a plan and not by chance. The result was a sense that classification, far from being a simple tool of science, would reveal nature itself. The existence of a harmonious world is both proven and created by the use of classification, which ceases to have to do with the things themselves and becomes the structure of things, thereby shaping the creation of new things.

In Cuvier's taxonomy, animal systems were grouped by function, and the forms of the systems themselves were the
result of their function. "The great innovation which Cuvier had introduced was to shift the emphasis from description by the identifiable members of an organism, and classification by description, to classification by the function performed so that resemblance was no longer the principle criterion of classification, but the working of the member within the organism."\textsuperscript{103} Thus, breathing, digestion, circulation, locomotion, reproduction, and the nervous system were fields within the taxonomy. Cuvier's method, interpretive rather than historical, looked for "natural" relationships which "revealed the underlying order and lawfulness amid the diversity of things."\textsuperscript{104}

Semper's own groupings follow a similar vein: form and material are not what determine his taxonomy, but rather the functional role of each element in the cosmos of architecture.\textsuperscript{105} Semper's four elements are not methods of construction but rather fundamental functions. Each element can be interpreted in different materials and in different ways of building. Following Cuvier, Semper ascribes a particular function or essence to each element.\textsuperscript{106}

This shift from a chain of being to a system of groups within groups created a model of a harmonious system of functional interdependence. Humboldt's cosmos--a "harmoniously ordered whole"--is a "chain of connection, by which all natural forces are linked together, and made mutually dependent upon
each other." The search for a harmonious world in which interrelationships and connections could be perceived and revealed was at the heart of both Cuvier and von Humboldt's theories. Both sought harmony and coherence in the seemingly random creations of nature, a "synthetic unity" claimed by Goethe to exist in nature and found in the physical universe by von Humboldt. "Nature considered rationally, that is to say, submitted to the process of thought, is a unity in diversity of phenomena; a harmony, blending together all created things, however dissimilar in form and attributes; one great whole (kosmos) animated by the breath of life." 

The fundamental meaning of kosmos is "any arrangement or disposition of parts which is appropriate, well-disposed, and effective." It has the additional connotation of "good order." In this sense, it means things which are done properly--well-behaved as opposed to anarchy and disorder.

Semper's four Urtypen are his "good order" of architecture. As types, they are not only the result of reducing a complex of formal variants to a common root form, they are also the shape or kosmos of all that will subsequently evolve from them since the type "has to be understood as the interior structure of a form or as a principle which contains the possibility of infinite formal variation and further structural modification of the type itself." The Urformen propel the formative laws of creation. "From a limited
number of original motifs or Ur motive the whole family of motifs and forms can be seen to unfold. By referring to this history the architect or designer can introduce some order and direction in his or her work."

In conclusion, the Exhibition revealed a universe of confusion, a collision of forms and ideas whose study could reveal an underlying order. In the Exhibition Semper discovered mankind's own history, explained and disseminated through the production of objects, through the transformation of the idea into the visible. Semper's task was to organize it all into a cosmos, an order. His empiricism was ahistorical and achronological, using the past of all peoples, including non-European and pre-European peoples. Through empirical study, modern man could see himself connected to primitive man, and the primitive would reveal the origins of the natural laws guiding man's inventions:

He who can trace, through by-gone times, the stream of our knowledge to its primitive source, will learn from history how, for thousands of years, man has laboured, amid the ever-recurring changes of form, to recognize the invariability of natural laws, and has thus by the force of mind gradually subdued a great portion of the physical world to his dominion.

Where Humboldt speaks of the natural world, Semper speaks of the man-made world; where Humboldt finds the laws within the ever-recurring changes of form of the natural world, Semper turns to the ever-recurring changes of form in the man-made
world to seek out the invariable and inviolable laws for man's own productions. Why turn to nature or the absolute for guidance when science shows that we must refer to the very world we create for the forms of our own creation? "We must therefore study the most primitive works of their development with the same attentiveness that we study nature herself for her manifestations."\textsuperscript{116}
PART III. STYLE

THE STOFFWECHSELTHESIS

Architecture's future lies in understanding the history of past human productions and how those productions evolved over time. In Semper's Stoffwechsel thesis, architecture's elemental forms, like language's primitive words, develop meanings over time, changing perhaps their precise meaning, but retaining the original sense somewhere within the word. Two principle individuals support Semper's research, the architectural theorist, Quatremère, and the linguist Wilhelm von Humboldt (1767-1835). According to Sylvia Lavin, "for Quatremère, the problem of the relationship between primitive and modern architecture was none other than the process of transformation of type, a conceptual metamorphosis required each and every time a building was designed. As a result, architecture's past became the key to its future and most importantly to its public legibility."\textsuperscript{117}

Using the model of language as a process, Semper develops a principle of formal development based on Wilhelm von Humboldt's theory of language as constant change and transformation: "Language, regarded in its real nature, is an enduring thing, and at every moment a transitory one. ... In itself it is no product (Ergon), but an activity (Energeia)."\textsuperscript{118}
Using the idea of “becoming” as his central concept, Semper developed a theory of material transformation, whereby architectural forms “undergo changes of material but carry forward vestiges or residues of their earlier material styles in later forms symbolically alluding as it were to the materials used in the past.”

While Quatremère had shown how architecture’s fundamental forms develop over time depending on the climactic and cultural factors that condition their genesis and evolution, Semper’s evolutionary typology is driven by historical mechanisms. These mechanisms are evidenced according to changes in available materials and techniques. In essence, specific geographic, climatic, and cultural conditions have a direct impact on the artist’s treatment of forms. Semper was not interested in dictating specific forms, but rather in seeking “the constituent parts of the form that are not form itself, ... the idea, the force, the task, and the means, in other words, the basic preconditions of form.”

There are three preconditions of form: 1. the primordial motives (Urmotiven); 2. the intrinsic, technical influences—material and the tools or method by which something is made; and 3. the extrinsic influences—local, temporal, and ethnological aspects such as place, climate, customs, religion, politics, and geography coupled with personal aspects such as rank, position, artist, and client. These factors together determine “style:”
Style means giving emphasis and artistic significance to the basic idea and to all intrinsic and extrinsic coefficients that modify the embodiment of the theme in a work of art. According to this definition, absence of style signifies the shortcomings of a work caused by the artist’s disregard of the underlying theme, and his ineptitude in exploiting aesthetically the means available for perfecting the work.122

In a telling example, Semper outlines the development of a bead fillet on a Greek temple, promoting his thesis of the evolutionary development from the ‘real’ to the painted and into its final iteration, sculptural and painted expression:

1. hanging a braid made from the wool of a sacrificial animal
2. painting the braid on the wall as a symbol
3. carving this symbol as beads in light relief
4. painting the beads
5. rounding the beads and painting shadows
6. carving the beads into a molding and emphasizing with paint123

Each permutation undergone by an original type in an evolutionary change becomes part of its total new form, and new creation comes about through the adaptation of both the original types and their subsequent transformations. Here, the original motive is transformed through changes of material and technique from the physical braid into its representation in paint and carved form. In a process of ‘symbolic conservation,’ the original types and motifs transform from structural or actual elements into symbols articulated in other materials. The bead molding or
astragal, now abstracted, serves as a public symbol of the original, religious sacrifice. (Figure 9) Architectural form becomes a result, not an absolute, because "style is the accord of an art object with its genesis, and with all the preconditions and circumstances of its becoming (Werden)."124 Of the four elements, the wall, embodying the functional idea of 'enclosure,' embodies the essence of architecture. This is because the enclosure creates space, the basis for all architecture. According to the Stoffwechsel thesis, the idea of enclosure must remain within every wall built. Because the original form of the element, the woven fence, remains encoded within every permutation of that enclosure, the structural and material elements of the original enclosure remain symbolically embedded as it transforms. Semper calls this enclosure the building's Bekleidung (cladding).

Bekleidung has several connotations within German, with its primary meaning being "clothing." Kleiden, from which its derives, also means to clothe and always has the basic meaning of "cover." Kleiden goes back to the middle-high German, Kleit, cloth, which comes from the word Klei, meaning clay or loam used in fulling cloth.125 Thus, Semper's cladding or "dressing" springs originally from words used to describe textiles.

Indeed, the substance of his thesis is that architecture derives directly from textiles, that "the beginning of
building coincides with the beginning of textiles." Textile appears first as the fence or pen, the spatial enclosure constructed from tree branches, reeds, and other natural materials. These first textiles are also the first architecture, because they shape space, make boundaries, and create order. Semper devotes much of Der Stil to a detailed examination of textiles.

Textile making is the first art, the Urkunst, because its forms and types arise from its very character. It's motifs and patterns derive from itself or from pure, unmediated nature. "All other arts, including ceramics, derive their types and symbols from the textile art, while it appears completely independent in this relationship and its types form out of it itself or borrow directly from nature." In the knot, the wreath, braiding, and weaving, the patterns created and the construction used are one and the same; there is "no break between man the tool-maker and man the image-maker." Textiles are the origins of man's representational and artistic facilities because the making of textiles is the making of patterns.

The connection to the earliest weaving, the assumed origin of the enclosure, remains in all subsequent manifestations. Using grass, plant fibers, and animal skins, primitive man developed weaving patterns and then augmented these with variations in the natural colors of materials. With dyeing and knitting came the artificial textile and pattern making
of carpets. Carpets became the most common form of woven fabric and, in their capacity as a vertical means of protection, became the most common form of the enclosure. At Pasargadæ and Persepolis, the Assyrians used stone panels set into frames similar in intent to a carpet hung between supports.(Figure 10) The sculptural decoration remains two-dimensional even when greater modeling of the stone was possible and figures remain stiff with "sharp, thread-like contours" and inexpressive faces.\textsuperscript{131} In Egypt, too, "nowhere does the stone wall appear as such, but is covered both outside and inside as if with a painted carpet."\textsuperscript{132}

Even when the creation of a textile moves from weaving into another of the elemental processes, the existing forms transfer from one material into another, unconsciously imitating embroideries and carpet weaving. "Wickerwork, the original space divider, retained the full importance of its earlier meaning, actually or ideally, when later the light mat walls were transformed into clay tile, brick, or stone walls. Wickerwork has the essence of wall.\textsuperscript{133}

These examples still contain the wall's essence as protection, division, and enclosure. Material changes have nothing to do with the basic function of the wall--shaping space--but rather with the "secondary functions" of durability, preservation of the interior wall, economy, and the display of greater magnificence.
Hanging carpets remained the true walls, the visible boundaries of space. The often solid walls behind them were necessary for reasons that had nothing to do with the creation of space; they were needed for security, for supporting a load, for their permanence, and so on. Wherever the need for these secondary functions did not arise, the carpets remained the original means of separating space. Even where building solid walls became necessary, the latter were only the inner, invisible structure hidden behind the true and legitimate representative of the wall, the colorful woven carpets.134

Again, Semper’s theory stems directly from the etymological analysis of language. Semper is making a distinction between two words for “wall:” die Mauer and der Wand. Mauer is the support wall which holds up the partition wall, Wand. And Wand also connects directly to his thesis on the textile origins of language, since Wand shares the same root and meaning with das Gewand, “garment.” The root comes from wenden, to turn, and winden, to wind or twist. Both recall an origin in the original woven or “twisted” enclosure. Through the process of Stoffwechsel, Semper suggests that the original woven wall transforms in the Wand now supported by the Mauer.
THE PROFOUND SURFACE OF ARCHITECTURE

Semper's *Stoffwechselprinzip* does not deny that architecture's style depends on material, structural, technical, and spatial aspects. "To these, however, must be added as the most powerful factor of style in architecture the social structure of society and the conditions of the times, which to express artistically and in a monumental way has always been the most eminent task of architecture."\(^{135}\)

The problem with contemporary architecture, as he pointed out in his polychromy essay, was a disjunction between the present democratic needs of Europe and an architecture of earlier forms derived from authoritarianism. New forms were needed, but not because new construction techniques or new materials such as iron were available.

A vast field of inventiveness will be revealed to us once we try to make artistic use of our social needs as factors of the style of our architecture in the same way as had been done in the past; whereas it would hardly ever be possible only through new materials and their use in new methods of construction to bring about a decisive and lasting change in architecture and even less so through the simple power of a genius who has dreamed up his so-called style.\(^{136}\)

The beauty of Greek architecture and culture, including polychromy, arose from the perfect correlation of their needs as expressed in the monumental form of architecture, their political system and their religious structure. Semper found that to understand the monuments of ancient Greece, the architect "had to strive that nature, the environment, and
man did not remain strange to him. He had to think and learn to feel as a native and take careful notice of the relationship that there binds nature and art, the old and the new, so that one grows organically from the other and everything appears as a necessity of nature.\textsuperscript{137}

Semper outlined society’s present-day needs in his essay on polychromy. In \textit{Der Stil}, he showed that these needs are expressed in the ornamental \textit{Bekleidung} of the building.

Semper’s \textit{Bekleidung} always had a double meaning. Ornament related directly to construction when it was engaged with a structural part of the building. Ornament in infill areas, however, it was treated as a second kind of ornament, \textit{incrustation}.

This first type of ornament, which Semper called “structural-symbolic,” derived from Karl Bötticher (1806-1889), whose \textit{Tektonik der Hellenen} (1844) Semper first read in 1852.\textsuperscript{138} Bötticher developed the dichotomy of \textit{Werkform} and \textit{Kunstform} from the Greek’s mastery of the principles of construction. The \textit{Werkform} (structural framework) and the \textit{Kunstform} (artistic form; the artistic character of individual members) occurred together in Greek architecture. “He saw it as the function of the \textit{Kunstform} to serve as an ‘explanatory shell’ (erklärende Hülle), which presented the \textit{Werkform} by making the features of construction visible from without. Form
should thus reveal function without becoming identical to it."139

Bötticher wanted to visually express the structure and the materials with set artistic forms developed to explicitly represent them.140 Werkform and Kunstform remained for him essentially separate elements. Semper claimed that structure and decoration in Greek architecture are organically combined and thus are not able to be pulled apart. Semper subordinated the structural framework to the cladding, but the cladding remained a symbolic expression of that structure.

The original types and motifs transform from structural or actual elements into symbols articulated in other materials, just as in his earlier example the hanging braid transformed into a decorative band. Over the course of time, the joints and bindings which started out as actual constructive elements became purely decorative. These decorative motifs retain their original patterns when translated into other materials.

Incrustation, on the other hand, derived directly from the image of the carpet as the original wall. This type of ornament was concerned more with communicating social symbols and iconography. In its decorative aspects, it could reference the figurative nature of the carpet. Incrustation was not appropriate for the structural parts of the building,
but should only be used as infill or in what Semper called areas of "rest."

Thus, the fluting of the column refers artistically or ornamentally to its structural role, but the sculpture on the pediment, like the dado reliefs of Assyrian architecture, preserve the tapestry patterns of the original construction, the carpet. Another clear example is the different treatment accorded the triglyphs and the metopes. Because the triglyphs are symbolic representations, in Semper’s mind, of an earlier structural connection in wooden temples, they are given a "structural-symbolic" treatment. The metopes, on the other hand, are areas of "rest," and are thus open to incrustation. In their treatment, the two forms illustrate Semper’s tenet that enclosure and structure are separate.

Style thus becomes located in the skin of the building, and changes in style come about from transformations in methods of cladding. Semper proposed an entire comparative history of architecture based upon this point. Although he never wrote it, the third volume of Der Stil was slated to be an examination of how different epochs had expressed the transformation of structure into symbol on the enclosing surface of the building and how that had continued into the nineteenth century.

As the essence of architecture, the enclosure is the principle upon which architecture organizes itself. Karl
Bötticher had argued that "architecture could only express its essential form and significance through the dramatic interaction of support and load (Stütze und Last). The order of architecture would come through its construction." But in Semper’s taxonomy of elements, the construction is not part of the enclosure but belongs instead to the roof. "The structure that served to support, to secure, to carry this spatial enclosure was a requirement that had nothing to do with space and the division of space."  

In Semper’s theory, the order of architecture comes from the enclosure, the surface of the building. Semper had argued that polychromy must have had a meaning within the aesthetic program of the Greeks, and in the development of his Stoffwechselthesis, he had explained polychromy as a highly abstracted step in the transformation of social symbols on the surface of the building.

Semper develops this aspect of his theory from his understanding of the double meaning the ancient Greeks gave to the word kosmos. Kosmos is both cosmos (order, arrangement) and cosmetic (adornment, ornament). Therefore, the Greeks would have looked upon decoration as a process of applying a decorative order to form: "When one decorates, one more or less consciously imposes a natural order on the object that is adorned." Therefore, ornament is the ordering principle, an adornment which takes place on the
surface. The paint of polychromy is 'order' applied to the forms of the temple.

Polychromy is the last abstraction in the process of freezing in time earlier architecture into its monumental expression in the Greek temple. Semper had used the image of the temple as a scaffold upon which the ornaments of the culture are hung in his polychromy essay. Monumental architecture, that is, architecture in its public role, begins with the festival scaffolding:

The festival apparatus, the improvised scaffolding with all the special splendor and frills that indicate more precisely the occasion for the festivity and enhance the glorification of the day-covered with decorations, draped with carpets, dressed with boughs and flowers, adorned with festoons and garlands, fluttering banners and trophies--this is the motive of the permanent monument, which is intended to recount for coming generations the festive act and the event celebrated.\textsuperscript{144}

The monuments replace the mobile scaffolding of the primitive festival as the focal point around which the larger ritual of social and community interaction takes place. It makes the community, shapes it, creates a stage upon which the social group acts. The festivals that once defined social life became the monumental architecture which now has that role.

As the material existence of the festival undergoes its transformation into stone, the forms and architecture undergo the \textit{Stoffwechsel}. 
Plain constructions were consecrated for an ennobling purpose, for worship, for example. Decorations of a more definite religious meaning (not always designated) were appropriately attached to the outside walls and interiors of the sanctuaries: suspended flowers, festoons, branches, sacrificial implements, weapons, the remains of sacrificial victims, and other mystical symbols. With the further development of worship and concomitant with increasing artistic sensitivity they became fixed as typical symbols. No longer were they simply fastened to the walls in their natural state, according to local conditions and their destination; they were represented artistically and thereby incorporated into the monuments themselves as a characteristic part.\textsuperscript{145}

Architecture creates a common language accessible to the community, and people themselves join the scaffolding and symbolic decoration as participants at the core of this festival. "From the beginning the monuments were designed ... even for the surroundings--the crowds of people, priests, and the processions. The monuments were the scaffolding intended to bring together these elements on a common stage."\textsuperscript{146}

The decorative surface produces the social subject and cultural identity. This is the meaning behind Greek polychromy. Color and form belong together. In Semper, this means that "the denial of reality, of the material, is necessary if form is to emerge as a meaningful symbol, as an autonomous creation of man."\textsuperscript{147}

Finally we can understand the meaning of Greek polychromy. The thin skin of the paint, the skin of culture, was inseparable from form. It was the memory of the original
toreutic sculptures, those sculptures which had used an assemblage of different materials and thus had multiple colors; it was the memory of the original woven pen, in which different colored branches or bark had created colored patterns. Paint was the means to retain the original textile tradition in the age of solid construction. "This simulated textile, the painted text, becomes at once the new social language, the contemporary system of communication, and the new means by which space is constructed. Architecture is literally in the layer of paint which sustains the masquerade."^148

As Semper had outlined it in his original essay, each culture must express itself in its own productions, both physical and conceptual.

Whenever a new cultural idea took root and as such became assimilated into the general consciousness, there it found architecture at its service to define the monumental expression of the idea. Architecture's powerful civilizing influence has always been recognized and its works were consciously marked with that stamp that raised them to symbols of the prevailing religious, social, and political systems.^149

Semper believed completely in "architecture's powerful civilizing influence," and hoped to construct a theory which would bring that influence to bear on society as a whole through development of the Bekleidung.

In many ways, his theory is flawed, based on incomplete archeological evidence and subject to his own romantic
tendencies. His early preoccupation with polychromy never left him, and in many of its aspects, his theory is an apologia for polychromy and a continuing struggle to understand the meaning of ancient Greek architecture. In the end, he was much less concerned with the fact of polychromy as with the principles which could be derived from it.

Semper has been credited with the conceptual beginnings of the curtain wall as well as the modernist emphasis on space. But his theory of ornament has more often been overlooked, due in large part to the prejudices of early modernism and its rejection of ornament. The problem lies in the moral weight given to the concept of shell and core. "The metaphor of Stilhülse (stylistic "hull," or shell) und Kern (kernal or core) sets up an opposition which was given moral overtones by modernism. The interior kernal is better than the exterior covering, which conceals and deceives."\(^{150}\)

Semper suggests something diametrically opposed to this position. Rather than being the covering which conceals and deceives, the Bekleidung becomes the very aspect of architecture which reveals its true meaning.

Weaving, in Greek, is hyphainein, which has a dual meaning of weaving or plying the loom and bringing to the light, making visible (phaingo, come to the light).\(^{151}\) Epiphaneia, derived from phaingo, means appearance as well as surface. In Greek thought, the chros (skin, color) is the living body,
"understood as a surface and the bearer of visibility, visibility being the guarantor of existence or being."¹⁵² So bringing to the surface (through weaving) means causing to both appear and to exist. Existence is the appearance of the skin, of the surface; and wrapping the skin of the chros in a second skin (Bekleidung) makes the living surface appear.

In the myth of the wedding of Zas and Chthonie, Zas gives Chthonie a beautiful cloth on which he has woven the pattern of the earth. Once wrapped in the robe, Chthonie becomes Ge, the earth itself. "It is the woven cloth, or perhaps its very weaving, that makes Earth, with all its variegated, scintillating patterns, appear."¹⁵³ More importantly, the manuscript describes this veiling of Chthonie as the first instance of anakalyptergia, or unveiling, which was (and still remains) part of the traditional Greek wedding ceremony. The anakalyptergia comes at the end of the marriage banquet when gifts, including this robe, would be presented. "The wearing of the cloth is an unveiling insofar as the person veiled (Earth, or the bride) only appears, properly speaking, after she has been clothed."¹⁵⁴

It is exactly in this sense that Semper uses polychromy and incrustation. The symbolic treatment of the Bekleidung reveals the "truth" of architecture, which lies not in materials or construction, but in symbolic representation of ancient themes still embedded in the social structure.
The untainted feeling led primitive man to the denial of reality in all early artistic endeavors; the great, true masters of art in every field returned to it --only these men in times of high artistic development also masked the material of the mask. This led Phidias to his conception of the two tympana on the Parthenon. Evidently he considered his task, the representation of the double myth and its actors, the deities, as the subject matter to be treated (as was the stone in which he formed them), which he veiled as much as possible -- thus freeing them of any material and outwardly demonstrative expression of their non-pictorial and religious-symbolic nature. Therefore his gods confront us, inspire us, individually and collectively, first and above all as expressions of true human beauty and grandeur.155

The masking of material allows the subject matter to transcend the particular time and place and become a universal expression.

The modern movement became fascinated with the white surface. The ideology begun with Winckelmann developed into a whole movement, an approach to art so that “the fascination with the sublime progressively ate away at the figure and hypostatized the activated ground. In the twentieth century it devolved finally on the monochrome surface, the pure ground into which all futures have dissolved, as its central icon, representing the blank of the erased cultural world.”156

Semper’s insistence on polychromy, his rejection of Winckelmann’s ideological position, and his location of architecture’s cultural role in the surface of the building resonate still. He offers us a position from which to re-examine the role of the building envelope in architecture.
With Semper, we can extract the Kern from the Hülle and understand the German proverb, "die Tiefe der Dinge ist ihre Oberfläche," the depth (profundity) of the thing is its surface.
ENDNOTES


4 Eliza Marian Butler, The Tyranny of Greece Over Germany: A Study of the Influence Exercised by Greek Art and Poetry Over the Great German Writers of the 18th, 19th, and 20th Centuries (Boston: Beacon Press, 1958) 97. Winckelmann’s classicism was based only on his readings of texts. He himself had never visited Greece nor any other ancient site.

5 Butler, 47.


7 Butler, 97. As Butler points out, passion and suffering are the very qualities the Lacoön sculpture, on which Winckelmann bases his entire theory, possesses.

8 This “ideology” persists in early modernism. The following is Le Corbusier’s description of his first sight of the Erectheum. “A hundred paces away, welcomed by this unconquerable titan, smiles the lively temple with four faces.... They say it was once inlaid with gold, precious stones, ivory, and ebony.... But thank God, time got the better of it, and from the hill I salute the reconquered monochrome.” He later wrote, “I write with eyes that have seen the Acropolis, and I will leave with joy. Oh! Light! Marble! Monochromy!” Le Corbusier, Journey to the East, trans. Ivan Zaknic (Cambridge, MA: MIT Press, 1987) 228, 236.


10 Published in his Jupiter olympien (1814-15). Chryselephantine means overlaid with gold and ivory and specifically refers to ancient Greek objects.

11 He traveled in 1779 with the French painter, Jacques Louis David (1748-1825)

12 The existence of these figures was already a well-accepted fact. Bernhard Fischer von Erlach (1656-1723) featured a plate of the Olympic Jupiter in his Entwurf einer historischen Architetur (1725).

14 Harry Francis Mallgrave, *Gottfried Semper: Architect of the Nineteenth Century*, (New Haven: Yale University Press, 1996) 33. Quatremère's proposal ran counter to the accepted theories of neoclassicism both because it mingled form and color and because he shifted the emphasis from a divine ideal to a primal source.


17 Color had always been a part of European architecture. The late Romanesque and the Gothic used color extensively; even the Renaissance used glazed terra cotta tiles and graffito.

18 The most important archeological publication on Athenian monuments was James Stuart and Nicholas Revett's *Antiquities* (1762). The measured drawings in these volumes were the most widely disseminated and influential of all descriptions of ancient monuments. See Wiebenson, *Sources*, and Mallgrave, *Gottfried Semper*, for lists of other influential publications.


20 Mallgrave *Gottfried Semper*, 31.

21 Van Zanten, 7.

22 Van Zanten, 74. Van Zanten suggests that Quatremère's polychromy had more to do with contemporary Second Empire styles than with the actual (and very scanty) evidence from philological and physical sources.

23 Architektonische Erwiderungen und Erörterungen über Griechisches und Nichtgriechisches (unpublished) and Versuch einer Wiederherstellung des Toskanischen Tempels nach seinem historischen und technischen Analogien (1821). His actual trips to the Mediterranean took place after the publication of these works however, as he did not visit Sicily until 1823-24 and Greece until 1834.

24 This explanation was suggested by Johann Martin von Wagner, a German art historian, who based his interpretation of polychromy on Quatremère's. Van Zanten, 25.

25 Hittorff's proposal came closest to painting. In general, the eighteenth century believed that painting had developed from a simple outline to monochrome shading to a range of colors. In painting, art reached its highest perfection with the application of color. Hittorff seems to have aimed to bring architecture to the same height of perfection with the addition of color. Middleton, 79.

26 Mallgrave *Gottfried Semper*, 38. Hittorff's work was too unscientific for the Académie. The work of imagination did not belong in the realm of archeology; the drawings were losing their touch with the real and becoming expressions for and of themselves. Unlike Quatremère,
whose polychromy was based on an aesthetic--richness of material and realism in appearance--Hittorff had no general aesthetic to guide him.

27 Published in his Über die Polychromie der griechischen Architektur und Sculptur und ihre Grenzen (1835).


29 Mallgrave, Gottfried Semper, 62.

30 Kruft, 311.


32 Antiquités de la Nubia (1822-27), covering the area of what is today southern Egypt and northern Sudan.

33 Mallgrave. Gottfried Semper, 28. Although familiar with some of the debate surrounding polychromy, he was apparently unaware of Hittorff's work.

34 Upon his arrival, Semper became involved with the Greek civil wars which had been troubling that country since the early 1820s. He served as secretary to the German diplomat, Friedrich Theodor Thiersch (1784-1860), who was there as part of a peace-making effort organized by European countries. See Mallgrave, Gottfried Semper, 43-45.


37 "I am so excited that it is difficult to do the slightest thing!" Gottfried to Father, 28 July 1830, Semper Archive. Cited in Mallgrave, Gottfried Semper, 24.

38 The state (Staat) and people (Volk) are considered the same. Zeitler, 17.

39 Zeitler, 18.

40 Set out in his Précis des leçons d'architecture données à l'Ecole royale polytechnique (1802-1805).


43 Kruft, 311.


49 The discourse on democracy and architecture in the United States begun by Jefferson reappeared at the end of the nineteenth century, especially in the writings of the Chicago School. It is interesting to note Semper’s aesthetic influence on this school and worth wondering if, perhaps, some of his political views transferred to the United States as well.
50 Semper, Poly, 1989, . Italics added by ERS.
51 Semper, Poly, .
52 In the unpublished Die Anwendung der Farben.
53 The colors derive from the atmosphere of the Acropolis: "The prevailing colour of the temple burned with all the glowing beauty of the setting sun. The colour may be defined as of a yellow red, very vapoury resembling that of finest terra cotta. In fact, the general appearance of the temple would precisely resemble the appearance of a fine day in an eastern climate." Semper, "Preliminary Remarks," 245.
55 Van Zanten, 67. Semper’s color theory implies a dematerializing of the surface it covers.
56 Van Zanten, 10.
61 Kruft, History, 312.
63 Zeitler, 19-20. My translation. "Semper ist der Einzige, der damals Politik und Architektur öffentlich zu einem Programm zusammenfasste Seine Quelle hatten nur gesagt, dass bislang in der Geschichte die Kunst und das Gemeinwesen jedes Volkes kraft des ihnen beiden zugrunde liegenden Volksgeistes zusammengehörten Die praktische Forderung, dass sie zusammengehören sollten heute und künftig, hat es Semper ausgesprochen." Zeitler goes on to suggest that Vorläufige Bemerkungen was an excuse (Vorwand!) to condemn authoritarianism in architecture, society, and politics. Because he was writing in Prussia, he could not openly criticize the state. Without question this is an essential element in the essay, but Semper is clearly also articulating a theory of architecture.
1759-61 (published in 1771) was the first Asian text in Europe outside the biblical and classical traditions.

65 Schwab, 4.
66 Schwab, 5.
67 Schwab, 5.

68 Semper, who was waiting for his application to teach at the School of Applied Design, was able to obtain a few commissions for some minor work at the Exhibition. He designed the Canada exhibit as well as the Mixed Fabric Court. But most of the time, unemployed, he wandered through the Crystal Palace, formulating his later ideas on style.

69 Semper, MS.97, fol.27, Semper Archiv, in Mallgrave, Gottfried Semper, 198. Semper "never viewed these non-industrialized paradigms as something that could be grafted onto a conventionalized European system. The contemporary artistic crisis was on the contrary a style problem. ...style was the process of defining the proper normative values for artistic production, which had to rise within the European cultural system." Mallgrave, Gottfried Semper, 206.


71 Agamben, 39. Agamben suggests that the Great Exhibition was the possible source of Marx’s theory of the "fetischization" of the commodity.

72 The aesthetic response to the decay of the arts in European countries, especially in England where industrialism was further advanced than in other European countries, divided into two camps. In one stood Ruskin and his colleagues, who were opposed to the co-opting of craftsmanship by manufacturing. In the other stood Thomas Cole and the Institute for Applied Art as well as Owen Jones, Matthew Digby Watt, and Richard Redgrave, who accepted the replacement of craft with manufacturing and sought design principles to help guide it. Semper’s association was with these latter reformers. The goal of the Institute was to educate students in how to design for manufacturing. They were not opposed to industrialism, but rather opposed to naturalistic designs used on mass produced goods, preferring that industrial design abstract from natural design rather than imitate it. (Iverson, RvsS, Daidalos, 49)

74 Mallgrave, Gottfried Semper, 205.
75 Semper, Style in the Technical and Tectonic Arts or Practical Aesthetics," Four Elements, 226.

Historicism may have been especially prevalent in Germany because of the decentralized and regional character of the German nations, especially in contrast to French architecture which bowed to the dictates of the centralized authority of the Academy. See James Duncan Berry, *The History of Gottfried Semper: Studies in Späthistorismus*. diss., Brown U., 1989, 18.


Schwarzer, 54.

Schwarzer, 8.

Schwarzer, 100.

Schwarzer, 37.


Berry, 20.


Schinkel, *Das Architektonische Lehrbuch*, ed. Peschken, 1979. 148. Cited in Kruft, 99. Schinkel was writing in the 1820s and 1830s. The textbook was never published.

Schwarzer, 47.


Lavin, 77.

Lavin, 22.


Other societies have consciously adopted the rituals, beliefs, and productions of another culture, but none matched the scientific quality of the Oriental Renaissance—the careful accumulation of information,
its classification, analysis, and synthesis. As with all true
syntheses, foreign ideas were not simply combined with existing ideas,
but rather gave impulse to entirely new ideas—to invention.

This trend continues today. "The repeated attempts to make
architecture a scientific discipline suggests that what is actually
being attempted is an adjustment of architecture to the predominant
conception of science in a particular historical period." Leandro
Madarazo, "Durand and the Science of Architecture," Journal of

Semper, "Science," 130.

Semper's primitive hut is not Vitruvius or Laugier's "first hut in
time." His hut is "primitive" not in the ancient sense but in the sense
of being from a simpler culture.

Laugier's hut was a norm to be emulated; Semper's was an ethnological
fact. Berry, 215. As Semper later wrote, the hut was "the mythic-
poetic as well as artistic motive [for architecture], not the material
model." Gottfried Semper, Der Stil in den technischen und tektonischen
Künsten; oder, Praktische Aesthetik. Ein Handbuch für Techniker,
Künstler und Kunsträume, 2 vols. 2nd edition, (Munich: Friedrich
Bruckmann, 1878) 2:262. My translation. "das mythisch-poetische,
zugleich künstlerische Motiv, nicht das materielle Vorbild."

Semper, MS 129, fol.1. Semper Archive. Cited in Mallgrave, Gottfried
Semper, 198. This is, however, still Baukunst, because "every element of
the construction is speaking for itself alone and has no connection with
the others." This primitive building does not become Architektur until
it transforms these "original and pure" elements into an integrated
whole.

Alexander von Humboldt, Cosmos: A Sketch of a Physical Description of
1:21.

Mary P. Winsor, Starfish, Jellyfish, and the Order of Life: Issues in

Winsor, 2-3.

Joseph Rykwert, "Semper and the Conception of Style," in Gottfried
Semper und die Mitte des 19. Jahrhunderts, 74. It is interesting to note
that Le Corbusier also saw architecture as divided into functions or
"modes." Thus, the functional aspects of the facade could be pulled
apart and analyzed. See Schumacher.

Winsor, 1976, 4-5.

Semper's connection to Cuvier is as much a fact of his nineteenth-
century mind as a result of any powerfully felt attachment to Cuvier's
ideas. Mallgrave, Gottfried Semper, 26.

The essence of a thing, what Hegel calls its subjective being, and
the appearance of a thing, its objective being, are irrevocably
connected. The objective is not an expression of the subjective, nor is
the subjective the genesis of the objective. Rather, they are two manifestations of one and the same thing.

107 Alexander von Humboldt, 1.


109 Alexander von Humboldt, 2-3.


111 *Kosmos* can also mean one particular arrangement as opposed to some other, and therefore not just order opposed to disorder.


114 This "primitive" was not the primitive of ancient cultures but of contemporary cultures known from museums, descriptions and exhibitions. By extension and analogy, this primitive art came to be associated with the work of ancient cultures as well. Thus, when Semper speaks of the origins of art and architecture, he is basing his information on contemporary examples like the Caribbean hut from Trinidad, the reconstruction of a Maori village from New Zealand, the lattice work of South Sea tribes, and the grass skirts from Africa, all of which he saw at the Exhibition.

115 Alexander von Humboldt, 1-2.


117 Lavin, 98.


119 Mallgrave, *Gottfried Semper*, 284. *Stoffwechsel* itself translates literally as "material transformation," although it carries the biological meaning of "metabolism" as well.

120 Semper, "Science," 137.
The various components are:

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>ROLE</th>
<th>AREA</th>
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<tr>
<td>idea, motive</td>
<td>intention</td>
<td>meaning</td>
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<td></td>
<td>theme</td>
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<td>internal factors</td>
<td>material means</td>
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<td></td>
<td>technical means</td>
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<td>external factors</td>
<td>local, temporal and cultural conditions</td>
<td>expression</td>
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<td></td>
<td>personal aspects</td>
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Semper, "Preliminary Remarks," 63-64.

Semper, "On Architectural Styles," The Four Elements, 269. Semper uses the image of stylus to explain the meaning of style. The stylus relates a thing to its own origins by referring to the tool and the hand that guides it. Thus, it incorporates both the technical and personal factors included in his definition of style.

Harather, 10.


Semper's Ur-wall derives from examples of 'primitive' tribes of his day as described by ethnologists and as he had seen in the Great Exhibition of 1851 in London. Extrapolating from these tribes back to the primitive tribes of original man, Semper determined that the earliest built forms were fences woven from branches, reeds, and other natural materials.

Semper analyzes and categorizes various forms of textile-making. Spun yarn, twisted yarn, the knot and the related loop stitch, plaiting, felting, weaving, embroidery, and dying and printing, are the elements of the textile-worker's art and craft. Much of Der Stil is given over to very precise discussions of these various textile forms.

Semper, Der Stil, I, 13.


Semper, "Elements," 104

Semper, "Four Elements," 104

Semper, "Prospectus: Style in the Technical and Tectonic Arts or Practical Aesthetics," The Four Elements, 179. Note that this is monumental, i.e. public, architecture.


Kruft, 293-294.


Kenneth Frampton, *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture*, ed. John Cava, (Cambridge, MA: MIT Press, 1995) 82. Frampton writes that, "Semper asserts the primacy of the frame." While Semper does use the Caribbean hut as his example of the basic elements, this is not the source of his enclosure wall. This hut wall is described as textile (bamboo mats) hung between the framework (which is part of the roof). The key is to understand the relationship between the mats and the frames. Part of the problem in divining the meaning behind Semper's *Bekleidung* comes from his own paradoxical descriptions of the original enclosure. On the one hand, we can think of it as a band or continuous fabric which wraps around the building. On the other hand, we are asked to think of it as a fabric hung between vertical supports.


Indra Kagis McKewan, *Socrates Ancestor: An Essay on Architectural Beginning*, (Cambridge, MA: MIT Press, 1993) 70-71. *Histos*, the upright loom, is also the word for anything set upright, including the mast of a ship. *Histos*, *histon*, the web woven on a loom, is related to *histia,*
sails. They, in turn, are all related to hestia, the hearth, and all derive originally from histemi, I set up, make fixed. McKewan sees the Greek temple itself as a giant loom. "In the great contrapuntal theme of the Odyssey, Odysseus plies the seas [histos] to make a hitherto unknown world appear, while Penelope plies her loom [histia] in Ithica."

152 McKewan, "Socrates," 43.
155 Semper, "Style," 257.
157 Oechslin, 378.
Figure 1. Quatremère de Quincy’s reconstruction of the Athena statue for the Parthenon. 1815. From Mallgrave, Gottfried Semper, 64.
Figure 2. Terracotta decoration. Treasury of Gela at Olympia. Mid 6th century. From Lawrence, 85.
Figure 3. Mid-nineteenth century French reconstruction of the Parthenon. From Taplin, 234.
Figure 4. Hittorff's reconstruction of the Temple of Empedocles at Selinunte. 1830. From Mallgrave, 37.
Figure 5. Gottfried Semper’s view of the Parthenon entablature. 1833. From Mallgrave 49.
Figure 6. Gottfried Semper's Canada Exhibit for the Great Exhibition. 1851. From Brino, 87.
Figure 7. Examples of design from the Great Exhibition of 1851. From The Great Exhibition, 113
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