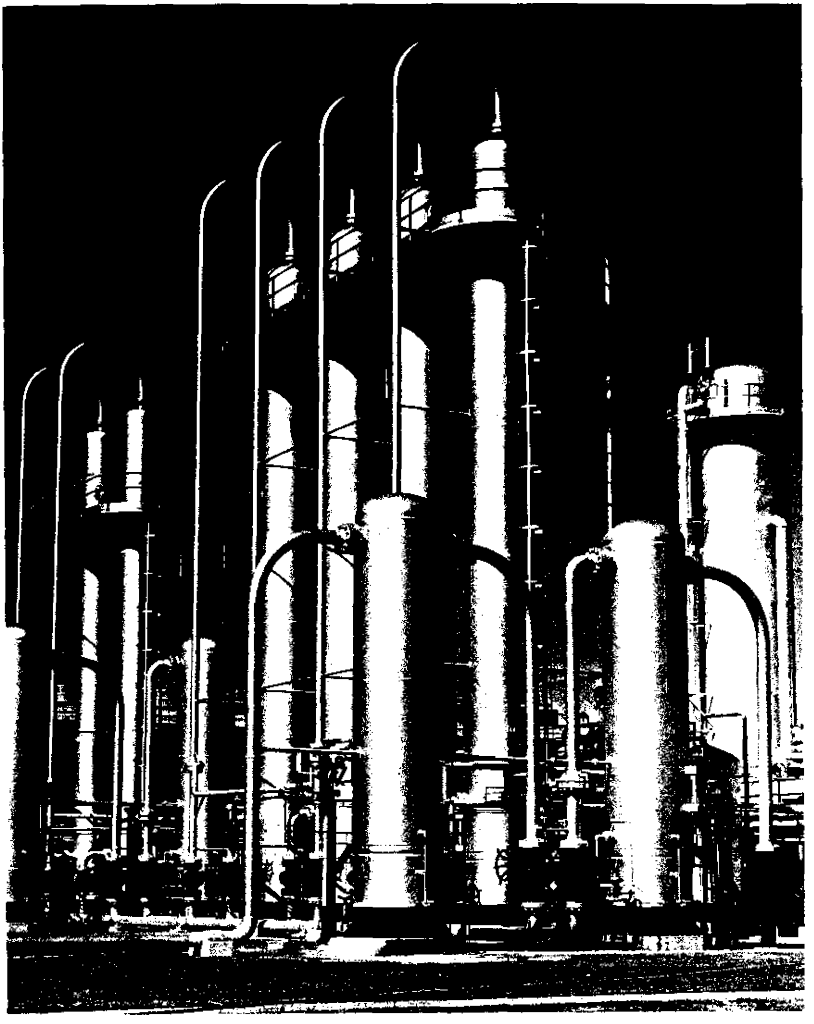

THE ARDENT FUNCTIONALIST MAINTAINS THAT BEAUTY, OR AT LEAST A KIND OF FORMAL PERFECTION, RESULTS AUTOMATICALLY FROM THE MOST PERFECT MECHANICAL EFFICIENCY; PERFECTLY ENGINEERED CREATIONS ACHIEVE BEAUTY WITHOUT A CONSCIOUS SEARCH FOR IT ON THE PART OF THE DESIGNER. GAS REFINING EQUIPMENT AT THE KATY GAS CYCLING PLANT, TEXAS, OPERATED BY THE HUMBLE OIL AND REFINING COMPANY, IS A CONVINCING DEMONSTRATION OF THIS POINT OF VIEW.

ORIGINS OF FUNCTIONALIST THEORY

EDWARD ROBERT DE ZURKO

COLUMBIA UNIVERSITY PRESS · NEW YORK 1957

PUBLISHED IN GREAT BRITAIN, CANADA, INDIA, AND PAKISTAN
BY THE OXFORD UNIVERSITY PRESS
LONDON, TORONTO, BOMBAY, AND KARACHI

MANUFACTURED IN THE UNITED STATES OF AMERICA

to HATTIE LEHMAN DE ZURKO

ACKNOWLEDGMENTS

IT HAS BEEN an inspiration to observe how scholars everywhere have been willing to offer helpful advice when requested to do so. The list below does not by any means include all the men to whom I am indebted either for general suggestions or details of treatment, but with warm thanks I wish to acknowledge the encouragement and advice of the following: Dr. Walter W. S. Cook, former Director of the Institute of Fine Arts of New York University, where an earlier version of this manuscript was submitted as a doctoral dissertation, and Dr. Cook's successor, Professor Craig Hugh Smyth; Dr. Richard Krautheimer and Dr. Guido Schoenberger of the Institute of Fine Arts; the late Talbot Faulkner Hamlin and Professor Emerson Howland Swift of Columbia University; Professor James Grote Van Derpool and Mr. Adolph Placzek of Avery Library, Columbia University; the late Dr. E. Baldwin Smith, formerly Chairman of the Department of Art and Archaeology, Princeton University; Dr. William S. Dix, Firestone Library, Princeton University; Dr. Robert Goldwater, Queens College, New York; Dr. Dmitri Tselos, University of Minnesota; Mr. Lewis Mumford; and Professor Henry-Russell Hitchcock, Smith College.

Houston, Texas
December 1, 1956

E. R. DE ZURKO

INTRODUCTION

THE main purpose of this book is to study the idea of functionalism from a historical point of view. The research media are the literary sources of functionalism. Early functionalist trends in writings on architecture shall be analyzed and compared with each other and with modern interpretations of the concept. By means of this essentially semantic study I hope to demonstrate (1) the antiquity of functionalist ideas, especially the tendency to connect ideas of use with ideas of beauty; (2) the variety of guises assumed by this type of theory; and (3) the recurrent ideas which have generally characterized functionalist theory.

The literature of functionalism consists largely of the writings of recognized functionalists (such as Horatio Greenough, Louis Sullivan, and Bruno Taut), the studies and reviews of their works, and the brief evaluations of the modern concept of functionalism which have appeared quite frequently in architectural periodicals; one of the best of the latter is Lewis Mumford's article on "Function and Expression in Architecture," in the *Architectural Record*. At one time Horace M. Kallen pursued research with the intent of writing a historical account of the relation of beauty to use, but he changed

his emphasis to the problem of art as the expression of the individual's struggle to live and find freedom for personal expression. Kallen describes this in his book entitled *Art and Freedom*. I have consulted this interesting work and have been influenced by certain details of its scholarly treatment. In France in 1952, after my manuscript had taken its approximately final form, there appeared *Le Fonctionnalisme dans l'architecture contemporaine*, by Charalambos A. Sfaellos. This is primarily an interpretation of functionalism in modern architecture, that is, it is based on a penetrating study of examples of contemporary building. This subjective approach is supported by numerous quotations from aesthetic treatises, poetry, and philosophical works, but the book is not primarily a study of contemporary and historical writings. Sfaellos's thesis is that modern functional architecture, like all great architecture, represents the resolution of the apparent contradiction between contemporary function and the expression of rational and spiritual values; in great architecture function is rationalized and spiritualized. My book is intended to fill a need hitherto unsatisfied. It is, to my knowledge, the only historical analysis of functionalist writings and functionalist trends in writings pertaining to architecture.

It is not my purpose to attempt a definitive bibliography of functionalism in writing since 1850. References will be made only to the principal treatises. Much has been written on the subject of functionalism from Horatio Greenough and Viollet-le-Duc to Le Corbusier, hence in the following pages the period prior to 1850 will be given concentrated analysis, whereas introductory and supplementary references will be made to writings of the modern period. The functionalist theories of modern architects are comparatively well known. In fact, functionalism is regarded as an essentially modern phenomenon extending back in time to the period of Horatio Greenough (1805–52).[1] This study will terminate with the period of Greenough. In the

[1] See, for example, the introduction by Erle Loran in *Form and Function, Remarks on Art by Horatio Greenough*, ed. by Harold A. Small, p. xiii;

eighteenth century and in the first half of the nineteenth century, many authors on architectural subjects stressed ideas of convenience, fitness, or utility. Some of them went so far as to make utility the primary value in architecture. By a study of those authors and of still earlier functionalist trends in writings pertaining to architecture, the deep roots of an important element in modern architectural theory should be exposed to view, and it should become clear to what extent Greenough was an original thinker and to what extent he stated ideas previously or coevally set down by other men.

The scope of this study shall comprise an analysis of a large number of Western European and American writings on architecture, art, and philosophical works. The analysis of literary sources shall be comparative in the sense that each book or unpublished manuscript considered will be investigated, in so far as possible, according to the same pattern. This pattern will be made clear as our study progresses. The scope of this study shall include writings by architects but shall not be confined to architects. The written works of artists, philosophers, and churchmen have also been investigated. I have been primarily concerned with functionalist trends and contributions to functionalism in written works; the degree to which specific buildings illustrate the principles of functionalism is not the direct concern of this study.

It is not my intention to add to the hostility between advocates of functionalism and those persons who may be described as anti-functionalists. It is not my purpose to attempt to prove or deny the validity of the idea of functionalism or its application; others have written with this end in view.[2] It seems evident that any ob-

Behrendt, *Modern Building, Its Nature, Problems and Forms*, pp. 114–17; Lewis Mumford, "Function and Expression in Architecture," *Architectural Record*, CX, No. 5 (November, 1951), 108; and Paul Zucker, "The Paradox of Architectural Theories at the Beginning of the 'Modern Movement,'" *Journal of the Society of Architectural Historians*, X, No. 3 (October, 1951), 8.

[2] Critical evaluations of functionalism are to be found in the following: Robert Woods Kennedy, "Form Function and Expression," *Journal of the American Institute of Architects*, XIV, No. 5 (November, 1950), 198–204;

jective attempt to shed light on a subject of controversy will inevitably contribute to men's understanding of it and improve the quality of their evaluations. Some aspects of my personal philosophy will appear in the concluding chapter, but they are introduced in a subordinate, correlative position with respect to my summary. This study was begun and concluded in a spirit of humility; it was inspired by a disinterested passion for understanding and an enthusiasm for the creative works of mankind.

Lethaby, *Architecture, an Introduction to the History and Theory of the Art of Building,* pp. 237–51; Lethaby, *Form in Civilization,* pp. 1–6; Mumford, "Function and Expression in Architecture"; Parker, *The Analysis of Art,* pp. 128–90; Scott, *The Architecture of Humanism, passim.*; Cynthia Ulrich, "Form versus Function," *Vassar Journal of Undergraduate Studies,* XI (May, 1938), 50–61.

CONTENTS

ORIGINS OF FUNCTIONALIST THEORY

SUMMARY OF A CENTURY OF FUNCTIONALISM

1

FUNCTIONALISM is a term which signifies a point of view toward architecture. There is no simple definition of the word upon which all agree. The basic premise that form should follow function becomes a guiding principle for the designer, but it is also a standard by which to measure architecture. Functionalism is therefore a value. The study of the backgrounds of functionalism in architecture involves the larger problem of the value of use and specifically, the place of fitness in beauty. The meanings of the terms used—function, fitness, utility, and purpose—will vary somewhat with each writer.

The concept of function applies to planning in general, but there is also a functional approach to structure.[1] Functionalism is identified with *Neue Sachlichkeit* in recent German usage.[2] *Sachlichkeit* implies

[1] This distinction is stressed by Cynthia Ulrich in "Form versus Function," *Vassar Journal of Undergraduate Studies*, XI (May, 1938), 50–61.

[2] See Paul Zucker, "The Paradox of Architectural Theories," 8–13, and Nikolaus Pevsner, *Pioneers of the Modern Movement*, pp. 35 ff., 146, 180. For a definition of functional architecture, see Zucker, "Functional Architecture," *Encyclopedia of the Arts*, ed. by Dagobert D. Runes and Harry G. Schrickel, pp. 375–76. This article also includes a bibliography.

perfect and pure utility. Ideas of fitness or utility have rarely been disparaged, but functionalist trends are those which stress the importance of fitness and utility. Functionalism may or may not involve a theory of beauty. Utility and fitness may be regarded as the measure of excellence or perfection of a building, but not necessarily as the measure of its beauty. This is true of those theorists who deny the validity, for architecture, of a conscious search for beauty. For those functionalists who take up this search, the principle, form follows function, becomes the fundamental condition of beauty. Functionalist theories of architecture are those which make strict adaptation of form to purpose the basic guiding principle of design and the principal yardstick by which to measure the excellence or the beauty of architecture.

Ornament is not necessarily incompatible with the functionalist approach to architecture. Louis Henry Sullivan, who is generally acknowledged to be one of the outstanding American functionalists, was a brilliant ornamenter and regarded ornament as essential to architecture.[3] The main condition which the functionalist imposes is that ornament must justify its existence by means of some tangible or practical function. It is not enough that it try merely to delight the eye. It must articulate the structure, symbolize or describe the function of a building, or serve some useful purpose.

The term "organic" is related to "functionalism." The idea of functional adaptation is a basic premise in modern biological science as well as in modern architecture. Good architecture follows the law of natural organisms. The terms organic architecture and functional architecture have become synonymous in some recent aesthetic

[3] Sullivan's ideas regarding the proper function of ornament are scattered throughout his writings. The reader's attention is directed especially to the following: *The Autobiography of an Idea, Kindergarten Chats,* and *A System of Architectural Ornament According with a Philosophy of Man's Powers.*

treatises;[4] however, it must be acknowledged that not all advocates of organic architecture are also advocates of pure functional architecture. Ralph Adams Cram, while asserting that all great architecture is organic, with all parts perfectly adapted to their function, "admirably co-ordinated, determined by exact considerations of the adaptation of means to end," nevertheless believed that these functions were expressed in forms and lines that are in themselves beautiful, and he stressed the spiritual element in architecture as opposed to the corporeal; spiritual ends were not merely a part of function but possessed intrinsic worth.[5] Claude Bragdon contrasted Gothic (organic) architecture with Renaissance (arranged) architecture and maintained that in organic architecture "form is everywhere determined by the function, changing as that changes," whereas Renaissance architecture, "represents an ideal in conformity with which the function is made to accommodate itself, to a certain extent, to forms and arrangements chosen less with a view to their exact suitability and expressiveness than to their innate beauty." The basic difference between organic and arranged architecture is, according to Bragdon, "that organic architecture, both in its forms and in the disposition of its forms, follows everywhere the line of the least resistance, achieving an effect of beauty mainly by reason of the fact that utility is the parent of beauty and that any increase in fitness is an increase in beauty," whereas arranged architecture is based on "a metaphysical idea of pure or abstract beauty." [6] The

[4] See, for example, Vivian C. Hopkins, *Spires of Form*, wherein Frank Lloyd Wright is identified with organic architecture and functionalism. A clear distinction between organic architecture and functional architecture has not been made even by writers such as Frank Lloyd Wright and Lewis Mumford, who use the terms organic and functional so as to imply a difference.

[5] Ralph Adams Cram, "The Beginnings of Gothic Art," in *Six Lectures on Architecture*, p. 3.

[6] Claude Fayette Bragdon, "Organic Architecture," in *Six Lectures on Architecture*, pp. 127–29.

terms "organic" architecture and "functional" architecture may be taken as synonymous if one accepts Bragdon's viewpoint, because the basic premises of the two are identical. The term "organic" is a kind of poetic metaphor or analogy. Functional architecture is identified with plant or animal life. The obvious truth of the matter is that buildings are not plants or animals, though they may be created by the application of the principle of adaptation of forms to functions, a principle which, it is believed, has governed the development of biological types. Architecture is not an organism; it is a product of the human will, the creative spirit of mankind.

Functionalism today is not merely a negative or an exclusive point of view, that is to say, it is not merely the traditional approach to architecture stripped of all considerations save the utilitarian. Functionalism represents not only a new emphasis upon function; certain positive principles are also involved.[7] One of these is that architects should seize eagerly the idea of the newness of our contemporary problems and invent wholly new forms to solve these new problems most efficiently. The second is that modern architects should exploit fully the potentialities of our new materials and techniques of construction in the solution of new architectural problems. Almost all architecture, from the most primitive hut, has been erected for some purpose, and it has always been the primary duty of a building to fulfill its intended purpose. At different times and places throughout the history of architecture, architects either followed this idea of the close relation of form to function unconsciously, or the function of the building was used as a kind of framework on which to construct a design which may not have had much relationship to the function of the edifice. For example, in Baroque design, methods of construction and provisions for practical func-

[7] See Hamlin, *Architecture Through the Ages*, chapter 33, especially pp. 629–32.

tion are often kept behind the scenes so as not to impede the designer's fanciful idea.[8]

The idea of function is not a simple one. Function may be objective or subjective. There are various interrelated types of functions, such as the practical or material needs of the occupants of a building; the functional expression of structure; the psychological needs of the occupants; the social function of architecture; and the symbolic-monumental function of architecture. Functionalism is generally associated with the first two: the practical, material needs of the occupants of a building and the expression of structure. However, even some of the most radical functionalists take a broader view of function. André Lurçat, for example, frequently stressed the social function of architecture.[9] Bruno Taut also stressed the social function of architecture,[10] and Le Corbusier's statement that "the business of Architecture is to establish emotional relationships by means of raw materials," implies a psychological interpretation of function not revealed by his mechanistic dictum, "the house is a machine for living in." [11]

The importance of the problem of functionalism warrants its analysis. The concept of functionalism has had a great influence on modern architectural thought, and it is a fundamental concept in modern architecture. One may appropriately call it the characterizing tendency of modern architecture. It is popularly associated with the modern style and some scholarly architectural historians have called the modern style the "functional style." [12] Adherence to the

[8] For a clear exposition of the variety of approaches to architectural design, see Fletcher, *Introduction to Architectural Design.*

[9] Lurçat, *Projets et réalisations,* pp. 5, 7; Lurçat, *Architecture,* pp. 80, 155–56, 186.

[10] See Taut, *Modern Architecture,* p. 9.

[11] Le Corbusier [pseud. of Charles Édouard Jeanneret-Gris], *Towards a New Architecture,* trans. by Frederick Etchells, p. 4.

[12] See Kimball and Edgell, *A History of Architecture,* pp. 499 ff.; Rexford

principle that architectural form must be intensely functional is now general, at least in so far as lip-service is rendered to it, and a large number of buildings are actually being created in the spirit of functionalism. The slogan "form follows function" no longer serves as a battle cry against eclecticism. The modern functional style now finds itself well established, therefore the time has come to analyze the idea of functionalism more fully. There is need to demonstrate the scope and backgrounds of the idea, for there is a tendency on the part of students and young architects to accept it as something new, not realizing that some of the most thorough statements of functionalism were formulated prior to the mid-nineteenth century. Moreover, the implications of functionalism are being called into question, and the frequency of statements by modern architects regarding functionalism indicates that functionalism is neither a clear and unchallenged law of architecture nor a spent force, but a vital concept requiring clarification.

The validity of functionalism has not been demonstrated scientifically according to laboratory procedure. Modern discussions of functionalism show a dual approach: the rational and the poetic. In addition to presenting reasons why functional architecture is superior to formal architecture or at least more appropriate for our day, writers draw analogies or use metaphors to reinforce their arguments. In fact, many writers often depend upon analogy or metaphor alone and neglect a firm rational foundation. These analogies may be grouped into three categories which serve as a point of departure in an investigation of the arguments in support of the functional position.

Newcomb, *Outlines of the History of Architecture*, Part IV, *passim*. Newcomb uses the term "functionalism" as a style designation to denote a large section of modern architecture, but not to denote the whole modern movement. In Alberto Sartoris, *Gli Elementi dell' Architettura Funzionale*, a large collection of photographs of modern architecture, the term "functional" is applied to the whole body of the modern style. See also Zevi, *Towards an Organic Architecture*, p. 33.

They are the *mechanic* analogy, the *organic* analogy, and the *moral* or *ethical* analogy.[13]

The mechanic analogy is based on the conviction that beauty, or at least a kind of formal perfection, results automatically from the most perfect mechanical efficiency, or that perfectly engineered creations achieve beauty without a conscious search for it. Perfected machines are therefore a great source of inspiration for architects. Architects should design their buildings in the spirit of the engineers as industrial productions. Le Corbusier's popular metaphor, "the house is a machine for living in," is an example. Le Corbusier asserted the superiority of "the engineer's aesthetic" over the eclectic approach to architecture. He compared modern airplanes and automobiles with the Parthenon at Athens. The products of modern technology are held up as examples of good design which should inspire modern architects.[14] Bruno Taut stated what he regarded as the simple thesis of the new aesthetic as follows: "*The aim of Architecture is the creation of the perfect, and therefore also beautiful, efficiency.*" [15] Taut, like Le Corbusier, professed admiration for the productions of engineering, machines, and all technical apparatus and appliances. These things are beautiful, and if architects approached building by making function the chief determinant of form their works would be equally beautiful. Henri Van De Velde also found inspiration in the machine.[16] The critic Walter Curt Behrendt

[13] See Scott, *The Architecture of Humanism*, *passim*. Scott epitomizes the fallacies of criticism as the romantic, the mechanical, the ethical, and the biological. In discussing naturalism in architecture, he writes: "It may have entered modern architecture by a kind of *false analogy*, and may still derive from poetry a half-unreal support" (p. 81; italics added). While I do not agree with all of Scott's conclusions, his use of the words "fallacy" and "analogy" suggested to me a method of approach to the problem of functionalism. However, it is not my intention to attempt to demonstrate that the analogies applicable to functionalism are fallacious.

[14] Le Corbusier, *Towards a New Architecture*, pp. 1–8.

[15] Taut, *Modern Architecture*, p. 9.

[16] Henri Van De Velde, *Der Neue Stil in Frankreich*, pp. 3–9.

has stressed the importance of the rôle played by engineering and technical form in inspiring and educating the early modern architects.[17] Doubtless the mechanic analogy is related to the Industrial Revolution and its aftermath, the development of highly perfected machines.

The organic analogy is based on a belief in the beauty and perfection of nature. Nature is therefore a great source of inspiration for architects. On the assumption that in the organic forms of nature each part as well as the whole conforms to its function, proponents of organic architecture assert that architecture, too, should be organic. Organic architecture has somewhat different interpretations and adaptation to function is not all there is to say about it.[18] My purpose here is not to define organic architecture but to consider the application of the organic analogy to the theory of functional architecture. This analogy received strong impetus as a result of the biological theories of Lamarck, Erasmus Darwin, Charles Darwin, and others in the eighteenth and nineteenth centuries. It is strongly related to evolutionary thought.[19] The organic analogy is associated with William Morris and Louis Henry Sullivan, as well as with Frank Lloyd Wright, in whose writings it is expanded into a broad personal interpretation. Gottfried Semper, who wrote in the 1870s

[17] Behrendt, *Modern Building*, pp. 71–75.

[18] Contrast, for example, Claude Fayette Bragdon's interpretation ("Organic Architecture") and the interpretation of Louis Henry Sullivan (*Kindergarten Chats*) with that of Frank Lloyd Wright as presented in his lectures at the Royal Institute of British Architects. This interpretation by Wright is summarized by Zevi (*Towards an Organic Architecture;* pp. 88–112). The latter takes up some of the conflicting interpretations of the meaning of organic architecture (pp. 66–76), and concludes by declaring organic architecture to be functional, that is, dedicated to human welfare, as opposed to abstractly utilitarian, that is, dedicated to structural and technical perfection. However, the word organic is frequently used to denote structure and organization.

[19] The impact of evolutionary thought on the idea of organic architecture, especially in America, is described in Donald D. Egbert, "The Idea of Organic Expression," in *Evolutionary Thought in America*, ed. by Stow Persons, pp. 336–97.

on style in the technic and tectonic arts, such as textiles, from the point of view of a practical aesthetic, is acknowledged to have made an important early contribution to modern art and architecture. Semper makes many comparisons between the work of art and the work of Nature, and finds Nature a source of inspiration not merely for her outward forms but for her principles.[20]

The organic analogy also appears in the writings of André Lurçat. "On peut regarder une architecture comme on regarde un organisme vivant, dont toutes les parties, son aspect comme sa structure et sa fonction, doivent suivre un même rhythme; sans cela elle court de grands risques de ne pas être réussie," [21] wrote Lurçat in discussing the organization of the modern house with its spaces and forms, "plus justement proportionnés aux besoins qui les ont déterminés." [22] The organic analogy is, despite the objections of William Lescaze,[23] in common use today, and Bruno Zevi finds "that the best architects of today are tending towards a kind of architecture which has been called organic." [24]

The moral analogy has several aspects. Architecture should reflect and contribute to the moral or ethical ideals of men. A building should be true, not dishonest. Forms must be what they seem to be. A building should be a true expression of its purpose and of its age. Materials and structural systems should be used with integrity and be honestly expressed. The society of forms should achieve its goals through harmonious cooperation. The moral analogy also implies

[20] See Gottfried Semper, *Der Stil in den Technischen und Tektonischen Künsten oder Praktische Ästhetik, passim.*

[21] Lurçat, *Architecture*, p. 158. "One may regard a work of architecture as a living organism in which all parts of its aspect, as its structure and function, must follow the same rhythm, for lacking this it runs a great risk of not being able to thrive." (Unless otherwise noted, the translations given are my own.)

[22] *Ibid.* "Most exactly proportioned to the needs which have determined them."

[23] *On Being an Architect*, pp. 67–80. Lescaze dismisses as "meaningless," all "labels" such as International Style, organic, and functionalism.

[24] Zevi, *Towards an Organic Architecture*, p. 10.

that practicality is a virtue in architecture as it is among men. Useless forms of ornament are rejected especially when they produce a sham effect. An interesting extension of this idea was set forth by Adolf Loos. He regarded ornament on modern architecture as a crime against society because society urgently needs large quantities of good, cheap architecture to solve the basic social problem of decent housing.[25] From the point of view of social service, ornament appears to be a species of conspicuous consumption.[26] The moral analogy recurs frequently in the statements of modern architects such as Berlage, Van De Velde, Wright, and Le Corbusier. In the nineties, H. P. Berlage denounced the prevailing architecture as "Scheinarchitektur, d.h. Imitation, d.h. Lüge" [27] ("Sham architecture; i.e., imitation; i.e., lying") and sought to create an architecture that was true. True architecture, for Berlage, was one which was above all a true expression of the age in which he lived. Henri Van De Velde described the revolt against the "mensonges des formes" of the 1890s as a moral revolt. He maintained that he was pushed into architecture by the necessity of warding off ugliness and protecting himself and his wife from the infected atmosphere of the immoral surroundings.[28] Sigfried Giedion states that the movement in the 1890s which abandoned the criterion of historical style in favor of fitness for purpose, "took its strength from the moral demands which were its real source." [29] Earlier, William Morris also

[25] Adolf Loos, "Ornament und Verbrechen," (1908), in *Die Schriften von Adolf Loos—Trotzdem 1900–1930*, pp. 79–92.

[26] Veblen, *Theory of the Leisure Class*, pp. 68–101, 115–66. Veblen maintained that historic ornament owed its value to several, primarily economic, factors, among them the fact that the leisure class possessed the power to exact tiresome and unnecessary labor from the working class. The problem of ornament and modern architecture is analyzed by Sir Kenneth Clark in "Ornament in Modern Architecture," *The Architectural Review*, XCIV (December, 1943), 147–50.

[27] Giedion, *Space, Time and Architecture*, p. 214.

[28] *Ibid.*, pp. 215–16.

[29] *Loc. cit.*

was motivated by a desire to substitute a moral art for the prevalent falsification of forms. He was primarily interested in the decorative arts, but the implications for architecture of his theories are obvious. He identified the arts of his day with slavery and falsehood. He advocated a new, moral art which would "give people pleasure in the things they must perforce *use*," and would also "give people pleasure in the things they must perforce *make*." [30] William Morris was attracted by the fitness, morality, and beauty he saw in Gothic architecture and hoped to discover in it a historic precedent for an appropriate new style. "We should take Gothic architecture by the hand and know it for what it was and what it is: a magnificent manifestation of organic order. Proceeding from such a tradition, one avows a principle of structure that evolves its forms in the spirit of truthfulness, following the conditions of use, material and construction." [31] Here we find the moral and the organic analogy coming to the support of the functional approach.

Viollet-le-Duc criticized the new eclectic buildings which were filling the cities of France because, although they were built at great cost, they were "without the harmony of truth." [32] He called for a new architecture whose first condition would be to make outward form accord with structure, which would be suited to its purpose and be based upon reason and common sense. Viollet cautioned against "neglect of those invariable principles which are, as it were, the moral sentiment of art." He adds, in a summary remark, "I have, I believe, sufficiently insisted on the value and the extent of these principles in preceding Discourses; indeed, they may be summed up in one word,—absolute respect for *truth*." [33]

[30] Morris, *The Decorative Arts*, p. 7. This strongly moral treatise was first delivered as an address before the Trades' Guild of Learning of London.

[31] Quoted by Bruno Zevi, in *Towards an Organic Architecture*, p. 164.

[32] Viollet-le-Duc, *Discourses on Architecture*, trans. by Henry Van Brunt, I, 334.

[33] *Ibid.*, p. 346.

The moral element is strong in the writings of Frank Lloyd Wright, who is to a large extent an inheritor of the romantic tradition. In addition to his prophetic warning, "avoid all things which have no real use or meaning," Wright, from the start, used such expressions as "integrity," "honesty," and "truth to itself," in describing good architecture.[34] The architect, according to Wright, "must build into his structure the good life as a new kind of beauty." [35]

Le Corbusier, too, possesses a strong moral sense which has influenced his aesthetic utterances. "If we eliminate from our hearts and minds all dead concepts in regard to the house, and look at the question from a critical and objective point of view, we shall arrive at the 'House-Machine,' the mass-production house, healthy (and morally so too) and beautiful in the same way that the working tools and instruments which accompany our existence are beautiful." [36] In the foregoing passage, as throughout the writings of modern architects, we find the implication that there is something essentially moral about simple, efficient, functional forms.[37]

[34] *Frank Lloyd Wright on Architecture, Selected Writings 1894–1940*, ed. by Frederick Gutheim, p. 3 and *passim*.

[35] Wright and Brownell, *Architecture and Modern Life*, p. 2.

[36] Le Corbusier, *Towards a New Architecture*, pp. 6, 7.

[37] I have dwelt at length on illustrations of the way in which ideas of morality and ideas of nature have been used in support of functional architecture. An interesting contrast is provided in the teachings of the Chinese philosopher Lao Tze, who frequently used ideas of function and ideas of nature to illustrate his moral teachings. Lao Tze taught that the usefulness of form is generally in the "empty innermost," or space created by the form, as for example, the hub of a wheel, the empty space within a bowl, or the empty space that is left in a wall for doors or windows. His lesson is that our bodies are our form and within us there is space; the greatest function of the space within us is to provide for the indwelling of the *Tao*. Again: the sage sitting looking at the waters of a running brook sees it as always seeking for itself a more lowly place until it finally rests in the great meeting-place of waters, the ocean. Lao Tze, *Tao Teh King*, trans. by Isabella Mears, pp. 13–15.

CLASSICAL ORIGINS OF FUNCTIONALISM

2

As far as we know, the ancient Greeks were the first people to take up the problems of beauty in the spirit of contemplative rationalism. They saw relationships between beauty, the good, the true, and the beautiful, and saw all as regulated by rational principles. The rationalism of the Greeks, their social, practical view toward art, and their sense of the importance of morality and the fitness of things, had a great influence upon all later philosophy of art, especially during the Classic Revival.

Socrates, if we may judge from Xenophon's *Memorabilia*, took a strict functionalist position with respect to architecture.[1] He introduced the moral aspect of functionalist art by pointing out connections between the good, the beautiful, and the useful. Xenophon records Socrates' ideas in a disputation with Aristippus.[2] The latter asked Socrates if he knew of anything good in order that if Socrates

[1] The edition consulted was Xenophon, *Memorabilia and Oeconomicus*, trans. by E. C. Marchant.

[2] See *ibid.*, III. viii.

mentioned some good he might show it sometimes bad. Socrates answered in effect, that there could be nothing good in itself but only in relation to something. A thing must be good for something in order to be good. Then Aristippus asked Socrates whether he knew of anything beautiful and Socrates answered in a similar manner, explaining, "a beautiful wrestler is unlike a beautiful runner, a shield beautiful for defense is utterly unlike a javelin beautiful for swift and powerful hurling." [3] When Aristippus protested that this was the same answer as Socrates gave to his question whether he knew of anything good, Socrates replied:

"You think, do you, that good is one thing and beautiful another? Don't you know that all things are both beautiful and good in relation to the same things? In the first place, Virtue is not a good thing in relation to some things and a beautiful thing in relation to others. Men, again, are called 'beautiful and good' in the same respect and in relation to the same things: it is in relation to the same things that men's bodies look beautiful and good, namely in relation to those things for which they are useful."

"Is a dung basket beautiful then?"

"Of course, and a golden shield is ugly, if the one is well made for its special work and the other badly." [4]

Praising the good proportions of a breastplate, Socrates explained to Pistias the armorer that good proportion is entirely a relative matter and depends on the individual to be served. He dismissed as trash the richly ornamented, gold-plated breastplates which do not fit their wearers.[5]

Socrates identified the beautiful and the useful with regard to architecture as well as in the industrial arts, and he concludes: "To put it shortly, the house in which the owner can find a pleasant re-

[3] *Ibid.*, III. viii.
[4] *Ibid.*, III. viii. 5, 6.
[5] Cf. *ibid.*, III. x. 9–14.

treat at all seasons and can store his belongings safely is presumably at once the pleasantest and most beautiful. As for paintings and decorations, they rob one of more delights than they give." [6]

Socrates considered painting and sculpture apart from architecture because their functions are different. For example, the business of the figure painter is to express beautiful, that is good, and lovable character. The business of the sculptor is to represent in his figures the "activities of the soul." [7]

The developed Platonic conception of beauty is far from the simple, functional, and relative concept which is attributed to Socrates in Xenophon's *Memorabilia,* but in the Platonic dialogues the analogy between beauty and morality is further pursued and the organic analogy is introduced.[8]

Plato distinguished between absolute and relative beauty. Absolute beauty is divine beauty or the idea of beauty. Relative beauty is the beauty of particular objects and is an inferior order of beauty. Absolute beauty is prototypal; the art of man is an imperfect ectype. Pure, divine beauty is "clear and unalloyed, not clogged with the pol-

[6] *Ibid.*, III. viii. 10.

[7] Socrates' ideas concerning painting and sculpture can be found *ibid.*, II. vi. 6; III. x. 1–8; and III. xi. 2.

[8] Plato's references to art and architecture are scattered throughout the dialogues. The edition used was *The Dialogues of Plato,* trans. by Benjamin Jowett. Plato's early writings reflect the functionalism of Socrates. In the *Hippias Major,* Plato equated beautiful things with their serviceability and fitness; in the *Gorgias,* he designated those things as beautiful which serve pleasure and utility. As Horace Kallen has shown: "It is in the works that Plato produced after he returned from Sicily and slavery, produced when he had begun to teach, that the views regarded as *par excellence* Plato's received their full and rich expression, and the functional and structural conceptions of the craftsman who understands Beauty through his labors were replaced by the mystic and emotional conceptions of the dialectician who understands Beauty by his feelings, his mathematics and his logic. It is from the *Symposium* and *Phaedrus* and the *Republic,* and still later dialogues, from the *Theaetetus,* the *Timaeus* and the *Laws* that the Platonism of Plato is drawn. These hypostatize craftsmanship and turn beauty from a function into an idol." Kallen, *Art and Freedom,* I, p. 45.

lutions of mortality and all the colours and vanities of human life." [9] To see and hold converse with true beauty one must behold it with the eye of the mind. It takes wisdom "to distinguish the idea of absolute beauty from the objects which participate in the idea, neither putting the objects in the place of the idea nor the idea in the place of the objects." [10] Ideas of beauty are formed by generalization from observation of a great number of a class of objects. The relative beauty of particular objects is never perfect. Beautiful objects will be found to possess some defect or ugliness. The artist reflects in an imperfect mirror the image of the divine idea of the object.[11]

Plato not only regarded art as dependent upon reason and a knowledge of good and evil; he believed that there is a mystical connection between beauty, virtue, geometry, and the cosmos. For the Greeks, the word *cosmos* was synonymous with order and harmony. In the *Timaeus*, Plato described a vast and elaborate cosmological geometry by means of which divine intelligence regulates all things in the universe in accordance with a system of circles, spheres, squares, cubes, and geometrical progressions of a less perfect kind. Definite proportion is the supreme evidence of rational design. In the divine system of craftsmanship, reason harmonizes or perfects by means of geometry what is brought into being by necessity.

Plato believed that the arts were necessary for the development of the soul. The citizens of his *Republic* were to be surrounded by

[9] *Symposium*, 209–211, p. 231.

[10] *Republic*, v. 476. Rhys Carpenter maintains that the Greek predilection for an architecture of fixed and conventionally established forms was based on their theory of "Ideas" or "Canonic Forms," especially the Platonic theory. The Greek philosophy, according to Carpenter, implies "a trick of visualizing, of apprehending the characteristic shape and line" by which specific objects of a species look sufficiently alike to be recognizable instances of their species. Hence the Greeks standardized the orders and repeated the basic temple form. Carpenter points out that although Aristotle criticized the Platonic theory he set up a very similar doctrine of forms himself. *The Esthetic Basis of Greek Art*, pp. 165 ff.

[11] The analogy of the mirror can be found in Plato's *Republic*, x. 596–598.

beautiful art, but beauty of a truthful, chaste, and geometrical nature: "then will our youth dwell in a land of health, amid fair sights and sounds, and receive the good in everything; and beauty, the effluence of fair works, shall flow into the eye and ear, like a health-giving breeze from a purer region, and insensibly draw the soul from earliest years into likeness and sympathy with the beauty of reason." The pleasant is to be pursued for the sake of the good. "And that is pleasant at the presence of which we are pleased, and that is good at the presence of which we are good." [12]

In the *Symposium*, the beautiful is described as the good.[13] Beauty is a manifestation of the good in the moral and physical realms. The beauty of all things in these realms, including the beauty of laws, institutions, and the sciences as well as the arts, are described as "all of one family." [14] Moral beauty is the highest order of beauty. In the *Laws*, the divine goods such as wisdom and temperance are placed in a category above the merely human goods such as physical beauty, health, and strength.[15]

Plato regarded art as inferior to nature. Art is the imitation or reflection of nature which in its turn is an imitation or reflection of a divine idea. But nature, for Plato, was a source of artistic inspiration. "The greatest and fairest things are done by nature, and the lesser by art, which receives from nature all the greater and primeval creations and fashions them in detail." [16] In the *Phaedrus*, the organic analogy is made in discussing the problem of artistic unity. The point is made that every artistic composition, whether in prose or verse, should have an organic unity: "You will allow that every discourse ought to be constructed like a living organism, having its

[12] *Republic*, III. 401.
[13] *Symposium*, 201, p. 221.
[14] *Ibid.*, 209–211, p. 231.
[15] *Laws*, I. 631.
[16] *Ibid.*, X. 889A. as quoted by Butcher in *Aristotle's Theory of Poetry and Fine Art*, p. 150.

own body and head and feet; it must have a middle and extremities, which are framed in a manner agreeable to one another and to the whole." [17]

Aristotle, who regarded architecture as, above all, a practical art, developed further the idea of the organic analogy and presented contradictory statements as to the function of moral values in evaluating art.[18] He regarded architecture in the same light as weaving, metalwork, the art of teaching, or the practice of medicine. This was the prevailing point of view of the ancient Greeks who linked architecture to the practical world. They saw clearly that architecture sprang out of the needs of the people: personal, civic, and religious; it reached its greatest heights as an expression of public faith and worship.

Aristotle observed that all forms of art have a common denominator in nature.[19] In a special sense, art imitates nature. The distinction between different forms of art lies first in what is selected for imitation; second, in the method of imitation; and third, in the end or purpose of the art form. Aristotle frequently used the term "nature" to denote the laws, the creative forces, the productive principles of the universe, and not the outward appearances of things. He used the term "imitation" with various shades of meaning to denote the processes of completing nature's purposes, aiding it to do its work or

[17] *Phaedrus*, 264 c, as quoted by Butcher, p. 177.

[18] The persistence of the organic analogy in antiquity is noteworthy. Oskar Walzel has traced the idea of the application of organic concepts and terminology to art primarily to the German Romantic movement. Donald Drew Egbert accepts Walzel's thesis and finds German Romanticism the primary source of the organic architecture of Sullivan, Wright, and Gropius. Doubtless the German romanticists were the first to give abundant poetic expression to the idea, but the idea had its origin in classical antiquity or earlier. See Walzel, *German Romanticism*, trans. by A. E. Lussky, and Donald Drew Egbert, "The Idea of Organic Expression and American Architecture," in *Evolutionary Thought in America*, ed. by Stow Persons, pp. 336–97.

[19] My interpretation of Aristotle's theory of art is based upon the work of Samuel Henry Butcher.

realize its goals, or imitating nature's methods. When Aristotle said art imitates nature, he meant that art has, like nature, certain ends in view, and in the adaptation of means to ends, catches hints from nature.

The classical philosopher derived his organic theory at least in part from a desire to approximate, in art as in all the institutions of mankind, the principles of order, harmony, efficiency, variation, and justice which bind the universe into a functioning entirety.

The relation of art to nature is discussed by Aristotle in *De Partibus Animalium*, the *Physics*, and the *Meteorologica*. Herein art is regarded primarily as the assistance which nature requires in carrying out her designs. Aristotle observed that the higher we ascend the scale of life from insect and animal to human existence, the more does nature require assistance in fulfilling her intent. Man, nature's highest creation, is brought into the world more helpless than any other animal. Samuel Henry Butcher paraphrased Aristotle's reasoning as follows:

> But . . . in his seeming imperfection lies man's superiority, for the fewer the finished appliances with which he is provided, the greater is the demand for intellectual effort. By means of the rational faculty of art, with which nature has endowed him richly, man is able to come to her aid, and in ministering to his own needs to fulfill her uncompleted purposes. Where from any cause nature fails, art steps in. Nature aims at producing health; in her restoration processes we observe the instinctive capacity for self-curing. But she does not always succeed, and the art of the physician makes good the defect. He discovers one of the links of the chain which terminates in health, and uses nature's own machinery to start a series of movements which lead to the desired result.[20]

In the *Politics*, Aristotle maintained that nature had formed man

[20] Butcher, *Aristotle's Theory of Poetry and Fine Arts*, pp. 112, 113. Butcher's presentation of Aristotle's idea of the relation of art to nature is derived from *De Partibus Animalium*, IV. 10. 687a 24; *Physics*, II. 8. 199b 30; and *Meteorologica*, VI. 7. 1032b 6.

to be a "political animal." [21] Family and tribal organization are stages on the way to a more complete existence, and man has now reached an order of community living called the state. The state, Aristotle asserted, is a natural institution which requires the political art to organize it and to realize nature's full idea. Thus in all the useful arts, according to Aristotle, the basic function is "to supply the deficiencies of nature." [22] He who would be a master in any art, Aristotle maintained, "must first discern the true end by a study of nature's principles, and then employ the method which she suggests for the attainment of that end. . . . Useful art supplants nature, and at the same time follows her guidance." [23]

Aristotle did not distinguish between fine and useful art. In painting and sculpture the idea of imitation is more obvious, but in these arts, as well as in architecture and medicine, the principle of the art is to complete in some sense the work of nature. Medicine imitates the *methods* of nature in achieving its goals, but in the arts of sculpture or painting it is not the *method* of nature but the *goal* which is imitated. Imitation, as Aristotle used the term in this connection, is not merely a mechanical reproduction; it is a creative act. Butcher paraphrased Aristotle's theory of creative imitation as follows:

> It is the expression of the concrete thing under an image which answers to its true idea. To seize the universal, and to reproduce it in simple and sensuous form is not to reflect a reality already familiar through sense perception; rather it is a rivalry of nature, a completion of her unfulfilled purposes, a correction of her failures.[24]

Aristotle found in nature a great source of inspiration for the artist. Nature is an artist, capable of making mistakes, but who by slow

[21] *Politics*, I. 2. 1253a 2, as paraphrased and quoted by Butcher, p. 113.
[22] *Politics*, IV. (VII.) 17. 1337a 1–2, as quoted by Butcher, p. 113.
[23] *Ibid.*, p. 114.
[24] *Ibid.*, p. 144.

advances and through many failures, realizes her own idea.[25] In *De Partibus Animalium,* Aristotle expressed his admiration for the functional beauty which he found in even the humblest creatures. His enjoyment of these humble creatures was essentially a rational thing. He pointed out that the humbler members of nature's kingdom may appear contemptible if judged superficially. However, their true beauty and significance are visible to the eye of reason, which looks not to the superficial effect but penetrates into the functional and structural basis of the forms.[26] In her structural faculty lies nature's perfection. With her, the attainment of the end "holds the place of the beautiful." [27]

Other instances of the analogy between the organic and the beautiful can be found in the *Metaphysics* and the *Poetics,* wherein Aristotle defined artistic "wholeness" in organic terms. He contrasted "wholeness" with mere "oneness." A unity is composed of a plurality of parts which cohere and fall under a common idea, but are not necessarily combined in a definite order. The notion of the whole implies something more. "The parts which constitute it must be inwardly connected, arranged in a certain order, structurally related and combined into a system. A whole is not a mere mass or sum of

[25] *Physics,* II. 8. 199a 17 sqq. as paraphrased by Butcher, p. 145. The idea that nature is a kind of artist with creative, plastic powers is a persistent one in Greek philosophy. It occurs in Plato, the Stoics, Plotinus, Dion Chrysostom, and Philostratus.

[26] *De Partibus Animalium,* I. 5. 645a 4 sqq.; "Having already treated of the celestial world, as far as our conjectures could reach, we proceed to that of animals, without omitting, to the best of our ability, any member of the kingdom, however ignoble. For if some have no graces to charm the sense, yet even these, by disclosing to the intellectual perception the artistic spirit that designed them, give immense pleasure to all who can trace the links of causation and are inclined to philosophy. Indeed it would be strange if mimic representations of them were attractive because they disclose the constructive skill of the painter or sculptor, and the original realities themselves were not more interesting, to all at any rate that have eyes to discern the reason that presided over their formation." Ogle's translation, in Butcher, p. 146n.

[27] *De Partibus Animalium,* I. 5. 645a 25, as quoted by Butcher, p. 146.

external parts which may be transposed at will, any one of which may be omitted without perceptibly affecting the rest." [28] According to Butcher, Aristotle conceived of artistic wholeness as "a unity which is unfolded and expanded according to the law of its own nature, an organism which develops from within." [29]

In the *Poetics*, Aristotle applied the theory of organic unity to the literary arts, and in one passage the idea of an organism is expressly mentioned as that from which the rule of epic unity is deduced. "The plot must as in a tragedy be dramatically constructed; it must have for its object a single action whole and complete, with a beginning, a middle, and an end, *that like a single living organism* it may produce its appropriate pleasure." [30]

The organic analogy also appears in the *Nichomachean Ethics*:

> Living organisms and works of art are definite after their kinds, which Nature and Man respectively form by qualifying matter. The quantity of matter used in any case is determined by the form subserved; the size of a particular organ, or part, is determined by its form, which again is determined by the form (limiting the size) of the whole organism or work. Thus animals and plants grow to sizes determined by their separate structures, habitats, and conditions of life, and each separate organ observes the proportion of the whole to which it belongs. The painter or the sculptor considers the symmetry of the whole composition in every detail of his work. The conductor of a choir is forced to exclude a voice which surpasses all the others conspicuously in beauty.[31]

The idea of an organism evidently underlies all of Aristotle's ideas about art. It remains to be seen to what extent Aristotle introduced the moral element into the evaluation of art.

In the *Politics* we learn that all art as well as science aims at some good. "All arts and sciences aim at some good, and the good or end

[28] *Metaphysics*, IV. 26. 1024a 1; *ibid.*, 1023b 26; cf. *Poetics*, VIII. 4, as summarized by Butcher, p. 175.

[29] *Ibid.*, p. 175.

[30] *Poetics*, XXIII. 1. as translated by Butcher, p. 176. Italics are Butcher's.

[31] *Ethica Nichomachia*, I. 194, as quoted by Butcher, p. 176n.

of the highest of all, the political, is justice, which is another name for the common interest." [32]

The question as to the proper end of art, that is, whether the proper office of the artist was that of a moral teacher or that of a pleasure-giver, was discussed in Greece in its special application to poetry. Strabo alludes to the issue in his criticism of Eratosthenes.[33] Aristophanes took up the issue in *Frogs*, wherein he censures Euripides for his failure to fulfill his office as a moral teacher.[34] He puts into the mouth of Aeschylus the saying that the poet is the instructor of grown men as the teacher is of youth.[35] Aristotle's treatment of poetry in the *Poetics* stands in contrast to this mode of criticism. He admits that in the period of childhood the proper function of poetry and music is to convey moral instruction, but in the period of maturity the proper function of poetry is emotional delight or a pure and elevated pleasure. Aristotle's analysis of the function of tragedy seems to contradict his view of poetry. Tragedy should be aimed at a serious well-being which is the true end of life.[36] It accomplishes this through the method of *catharsis*: the pleasurable relief of the kindred emotions of pity and fear.[37] The controlled indulgence of our emotions serves to maintain the balance of our nature.

Demetrius Phalereus, Athenian orator and governor, wrote an essay on style (*De elocutione*) which shows an indebtedness to Aristotle and has implications for functionalism. Demetrius, like Aristotle, emphasized clearness and fitness as the prime requisites of good style.[38] He recognized that the subject must create the style. A grand style is pompous and grandiose unless it is the expression of

[32] *Politics*, III. 13. c. 12, trans. by Benjamin Jowett, I, lxii.
[33] Strabo, I. 2. 3, and I. 2. 8; cf. Butcher, *Aristotle's Theory of Poetry and Fine Art*, pp. 200–202.
[34] *Frogs*, 389–390 and 1009–1010, as described by Butcher, pp. 203, 204.
[35] *Frogs*, 1055–1056, as paraphrased by Butcher, p. 205.
[36] *Poetics*, VI. 9, as paraphrased by Butcher, p. 224.
[37] *Ibid.*, pp. 224–229.
[38] Demetrius Phalereus, *On Style*, trans. by W. Rhys Roberts, pp. 257, 258.

a great theme. No ornamental flourish of phrase can ennoble that which is essentially mean.[39] Demetrius's ideas on style were not limited in application to the literary arts. He drew literary analogies from the great works of sculpture,[40] and the following quotation illustrates his effective use of architecture to support his plea for a coherent periodic style: "The members in a periodic style may, in fact, be compared to the stones which support and hold together a vaulted dome [*sic*]. The members of the disconnected style resemble stones which are simply thrown about near one another and not built into a structure." [41] Demetrius codified literary styles into four categories which recall the idea of codified orders of architecture: the elevated, elegant, plain, and forcible styles.[42] The selection of the proper style depends on the purpose of the work or speech. Milton may have studied the essay by Demetrius while at Christ's College, Cambridge. W. Rhys Roberts calls our attention to the fact that Milton mentions the book under the name of "Phalereus" in his *Tractate of Education,* and borrowing a striking comparison from the stoic philosopher Zeno, writes: "And now lastly will be the time to read with them those organic arts which enable men to discourse and write perspicuously, elegantly, and according to the fitted style of lofty, mean, or lowly." [43]

The Roman architect, Vitruvius, who regarded architecture from the points of view of "durability, convenience, and beauty," [44] and who was by no means a functionalist, impresses us in his writings by his extensive knowledge of and interest in the practical things of architecture. There is not one of his ten books which does not include

[39] *Ibid.*, p. 285.
[40] *Ibid.*
[41] *Ibid.*, I. 13.
[42] *Ibid.*, pp. 290–293.
[43] *Ibid.*, p. 281.
[44] Marcus Vitruvius Pollio, *The Ten Books on Architecture,* trans. by Morris Hicky Morgan, Book I, ch. III, 2.

a discussion of some very practical aspect of architecture, and these practical considerations determine to a large extent the forms of architecture.

A kind of organic analogy appears in the writings of Vitruvius. He compared the proportion and symmetry of the temple with that of the human body. Proportion, according to Morgan's translation of Vitruvius "is a correspondence among the measures of the members of an entire work, and of the whole to a certain part selected as standard." [45] After describing what he believed to be the basic arithmetical ratios of the different parts of the human body, Vitruvius concludes: "Similarly, in the members of a temple there ought to be the greatest harmony in the symmetrical relations of the different parts to the general magnitude of the whole. . . . Therefore, since nature has designed the human body so that its members are duly proportioned to the frame as a whole, it appears that the ancients had good reason for their rule, that in perfect buildings the different members must be in exact symmetrical relations to the whole general scheme." [46] Vitruvius then goes on to derive the fundamental ideas of measurement from the number and size of the members of the human body.

Noteworthy in the writings of Vitruvius is his inclusion of essays on engineering devices, machines, timepieces, and various implements (which we today would classify as objects of industrial engineering) in a work on architecture. In fact, in his discussion of the divisions of architecture, Vitruvius includes, in addition to the art of building, the making of timepieces and the construction of ma-

[45] *Ibid.*, Book III, ch. I, i. Dr. Erwin Panofsky, in his essay on, "The History of the Theory of Human Proportions as a Reflection of the History of Styles," in *Meaning in the Visual Arts*, pp. 55–107, clarifies the distinction between the terms *proportio* and *symmetria* as used by Vitruvius. See especially note 19, p. 68.

[46] Vitruvius, *Ten Books on Architecture*, Book III, ch. I, 3, 4.

chinery. Architecture proper includes military engineering, buildings for utilitarian purposes, and religious architecture.[47]

Thus we see that although Vitruvius did not develop a functionalist aesthetic he pointed the way for many who were to follow in his path. His insistence on a strong practical basis for architecture (economy, sanitation, convenience, and the like), his emphasis on the rôle of the architect-engineer and his use of the organic analogy (albeit a crude one) are to be taken up again and again in the future.

The *Historia Naturalis* of the Elder Pliny was intended to include all of the natural sciences and consider them in their application to the arts and crafts. The chapters on the history of art which are included in the *Historia Naturalis* take up art from a strongly practical point of view.[48] Throughout his work Pliny deplores the loss of craftsmanship in his day, and criticizes the artist of his day for being preoccupied with gaining money at the expense of the quality of his work.[49] He points out that in early times the thresholds and folding doors in temples were commonly made of bronze, whereas in his day the usage was apparently being discontinued.[50] To Pliny, integrity of design and execution were more important than the intrinsic value of material. The quality of simplicity was desirable in art.[51] He frequently criticized the practice of gilding statuary. The Elder Pliny's approach to art history is factual and narrative. He sets forth no theory of beauty, and criticism is generally reduced to a few remarks in which Pliny evaluates special services rendered to art by the artist in question. There is no discussion of architecture by itself, but architectural sculpture is included.

[47] *Ibid.*, Book I, ch. III, 1.
[48] See Plinius Secundus, *The Elder Pliny's Chapters on the History of Art*, trans. by K. Jex-Blake, *passim*.
[49] *Ibid.*, XXXIV. ii. 5.
[50] *Ibid.*, XXXIV. ii. 13.
[51] *Ibid.*, XXXV. ii. 158.

The Younger Pliny's letters in which he described his villas also reveal a strongly practical approach to architecture.[52] He showed special delight in the convenient arrangement of various rooms, the views and exposure to pleasant breezes of certain windows, the floods of sunlight which can warm certain rooms in winter, convenient furnishings, and gardens which afford opportunity for restful strolling. Nowhere does he boast of luxurious ornaments, expensive materials, or abstract beauty of proportion. Pliny regarded as the greatest attraction of his Tuscan villa "the solid comfort of the place." [53]

The Roman point of view toward architecture placed strong emphasis on the idea of practical utility but did not interpret architectural beauty or excellence in terms of utility. However, the Roman delight in the practical aspects of architecture, which is clearly evident in their treatises, is perpetuated and continued through the late Middle Ages into the Renaissance and Baroque periods. Before leaving the Romans, however, it would be well to take cognizance of the stress on utility to be found in their rhetorical treatises.

Quintilian, professor of oratory in the first century A.D., writing after twenty years of experience as a teacher of young aristocrats of the Roman Empire, set down the core of his teachings in the *Institutes of Oratory*. Evidently formal aristocratic address had become seriously loosened from the things and facts of real life. Quintilian argued against this trend. The basic education for the orator should be the learning of things. Beauty consists in patterns of usage; it is never separated from utility. Quintilian cited examples from nature.

> Shall not beauty, then, it may be asked, be regarded in the planting of fruit trees? Undoubtedly; I would arrange my trees in a certain order, and observe regular intervals between them. What is more beautiful than

[52] See Tanzer, *The Villas of Pliny the Younger*. This book contains the letter 17, Book II, on the Laurentian Villa, and letter 6, Book V, on the Tuscan Villa.

[53] *Ibid.*, p. 26.

the well-known quincunx, which, in whatever direction you view it, presents straight lines? But a regular arrangement of trees is an advantage to their growth, as each of them then attains an equal portion of the juices of the soil.

The tops of my olive, that rise too high, I shall lop off with my knife; it will spread itself more gracefully in a round form, and will at the same time produce fruit from more branches. The horse that has thin flanks is thought handsomer than one of a different shape, and is also more swift.

True beauty is never separated from utility. But to perceive this requires but a moderate portion of sagacity.[54]

This insistence on a kind of functionalistic theory of rhetoric survived as a tradition among the Roman wordmen. One sees it in the writings of Plutarch, Lucian, and Pseudo-Longinus.[55] The essay on the nature of a sublime style, attributed to Dionysius Cassius Longinus, Greek rhetorician and philosopher of the third century A.D., also contains the organic analogy. We find in this work the Aristotelian idea that art should always assist nature, and the cooperation of art and nature may thus result in perfection.[56] The organic analogy is drawn to clarify the idea of unity in the development of a sublime style.

Well, then let us see further whether we could [*sic*] find anything else that can make style sublime. Since there are in all things certain elements, essentially inherent, it follows that we shall find one factor of sublimity in a consistently happy choice of these constituent elements, and in the power of combining them together as it were into an organic whole. What attracts the reader is partly the selection of ideas, partly the soldering of these selected.[57]

In another passage, Longinus makes the specific comparison between the elements of a written or spoken composition and the

[54] Kallen, *Art and Freedom*, I, 72.
[55] *Ibid.*, pp. 72, 73.
[56] Longinus, *On the Sublime*, trans. by W. Hamilton Fyfe, xxxvi. 36.
[57] *Ibid.*, x. 1.

members of a human body: "Nothing is of greater service in giving grandeur to such passages than the composition of the various members. It is the same with the human body. None of the members has any value by itself apart from the others, yet one with another they all constitute a perfect organism." [58]

[58] *Ibid.*, XL. 1.

MEDIEVAL FOUNDATION AND SUBLIMATION

3

MEDIEVAL writings also contributed to laying the theoretical groundwork on which later functionalists built. The savants of the Middle Ages sometimes wrote on the nature and virtue of art, but they were primarily concerned with theological problems. The study of beauty, even among the Scholastic philosophers, was not a separate field of investigation.[1] Learned churchmen devoted themselves to comprehending the relationship between God and the world. The visible world was regarded as a symbol of God's will. Everything has an inner meaning intended by God for our instruction.[2]

One exception apparently might be found in *De Pulchro et Apto*, a treatise by Saint Augustine of Hippo devoted solely to the beautiful and the fit. This treatise was written when Augustine was a young

[1] See De Wulf, *History of Medieval Philosophy*, trans. by P. Coffey, 3d ed., p. 343.

[2] Compare the medieval view of the visible world as described in Mâle, *Religious Art in France, XIII Century*, trans. from the 3d ed. by Dora Nussey, pp. 29–31.

man and under the influence of the materialism of the Manichaeans.[3] It is unfortunate that this treatise is lost and is not available to clarify his early attitude toward the relation of beauty to fitness.

In his mature references to beauty and the aesthetic experience, Saint Augustine separates the enjoyment of an object from the use of that object. He maintains it to be "an indispensable requirement" that the object be enjoyed for itself. "Instruments cannot enter into the aesthetic experience because they are not delightful in themselves but are only a means to a further step in the process of utilization." [4] Saint Augustine found aesthetic pleasure to emerge when there is "agreement between the object and the whole of man's nature: mind and body. . . . The aesthetic object must be delightful not to the senses only but to the mind through the senses." [5] For him, therefore, the aesthetic experience was a kind of delightful contemplation; he is clearly within the classic, especially the Platonic, tradition.

The contemplation of the good and the true was, in the viewpoint of Augustine, an essential aspect of the aesthetic experience. In fact, he maintained that beauty is the product of the union of truth and goodness. This philosophy of beauty united ideas of beauty, reason, and morality.[6] Even the aesthetic experience (a form of love) itself is good, "because to love with a love that conforms to order is good, and by this very fact it is also beautiful, for whatever is in order is beautiful." [7]

Saint Augustine's philosophy of beauty seems to have obvious roots in Plato,[8] but we are reminded more of Aristotle by the follow-

[3] See Chapman, *Saint Augustine's Philosophy of Beauty*, p. ix.
[4] *Ibid.*, p. 2.
[5] *Ibid.*, p. 7.
[6] See *ibid.*, p. xii. Number, unity, and order are the aesthetic or formal constituents of Saint Augustine's philosophy of beauty but these are not simple concepts. He attached metaphysical (specifically ontological) meaning to these terms and even varied his interpretation of them in different writings.
[7] *Ibid.*, p. 12.
[8] See *ibid.*, p. xiii.

ing statement: "Any object contemplated with delight may enter into the aesthetic experience, whether it be a work of art, a worm, a cock fight, the universe as a whole, or God." [9] Thus even the humble creatures of God's kingdom may be seen as beautiful when contemplated from the point of view of exemplifying divine order, an order which is at once good, reasonable, and beautiful. All of God's creations are at once good, true, and beautiful. Obviously this is by no means a functionalist aesthetic, but this and related theological-aesthetic systems provide an almost forgotten foundation for eighteenth- and nineteenth-century references to the organic and moral analogies. Augustine's belief in the essential truth, goodness, and beauty of all of God's creations is related to the creed of Dionysius the Pseudo-Areopagite. According to the Pseudo-Areopagite (who was influenced by the concetps of "the One" and "Divine Emanation" of Plotinus), the universe was not only created but is perpetually animated and unified by the self-realization of what he calls "the superessential Light" or "the invisible sun." God is "the Father of the lights." All things reflect the divine radiance in a hierarchy, but even the lowest of created things partakes of the essence of God.[10]

The writings of Abbot Suger abound with references to neo-Platonic and Dionysian light metaphysics, of which he was intensely fond.[11] But it is not for his metaphysical prose and poetry that Suger is noted here. His writings reveal the great extent of the practical knowledge of a churchman in charge of building. The abbot of Saint-Denis appears to have had the technical and practical ability of an architect. In fact, Professor Panofsky describes the destruction of the ancient basilica and the erection of the new church of Saint-Denis as an audacious operation: "It was as if a President of the United States were to have had the White House rebuilt by Frank Lloyd

[9] *Ibid.*, p. 11.

[10] Suger, *On the Abbey Church of St.-Denis and Its Art Treasures*, ed., trans. and ann. by Erwin Panofsky, pp. 18, 19.

[11] See *ibid.*, *passim*.

Wright." [12] Abbot Suger would often lose sleep worrying about problems of construction. He led a group of carpenters into the woods in search of beams and personally picked the right trees. He checked the alignment of the new chevet with the old nave, using "geometrical and arithmetical instruments." [13] Thus it is obvious that Abbot Suger was not merely an employing patron or casual overseer, but more like a gentleman or amateur architect.

Suger's writings do not lay clearly before us his philosophy of beauty. Doubtless his aesthetic viewpoint was colored by the writings of the Pseudo-Areopagite and his commentator, John the Scot. One would assume then, that the Abbot would have accepted the doctrine of the essential unity of truth, goodness, and beauty, but such an assumption is shaken when one reads his description of the rich elaboration of the façade and its towers, wherein he writes of "the upper crenelations of the front" which he has added "both for the beauty of the church and, should circumstances require it, for practical purposes." [14] Here, obviously, Suger has permitted the introduction of a form primarily for its own sake and only incidentally for its possible utility. On the whole, however, he is concerned with the practical or theological utility of all parts of the church and its furnishings.

In 1127 the abbey of Saint-Denis was influenced by the reform movement which spread out from Clairvaux. Abbot Suger was himself, on more than one occasion, subject to the criticism of Saint Bernard of Clairvaux. It is a question to what extent, if any, the architecture of Saint-Denis was influenced by Bernard's writings, which condemned meaningless sculpture and other ornaments.[15] Nevertheless, Cistercian architectural purism was a vital force. It was a kind of proto-functionalist manifestation, which, though it

[12] *Ibid.*, p. 27
[13] *Ibid.*, p. 35.
[14] Suger, *De Administratione*, XXVII. 10, in Panofsky, pp. 46, 47.
[15] See *ibid.*, p. 13.

did not result in the triumph of a purely functional architecture, did, it appears, have the effect of curbing the use of forms which lacked symbolic value.

Bernard's criticism was directed against the superfluous decoration of the Cluniac churches. As he walked in an ornate cloister he looked upon the animal sculpture carved upon the capitals and asked himself why they were there.

> What are these fantastic monsters doing in the cloisters under the very eyes of the brothers as they read? . . . What is the meaning of these unclean monkeys, these savage lions, and monstrous centaurs? To what purpose are here placed these creatures, half-beast, half-man, or these spotted tigers? I see several bodies with one head and several heads with one body. Here is a quadruped's head, there again an animal half-horse, half-goat . . . Surely if we do not blush for such absurdities we should at least regret what we have spent on them.[16]

Bernard condemned these meaningless ornaments not only because they were unintelligible but because they were a form of obstacle to the good life, since they attract the soul to themselves and "hinder its meditation on the will of God." [17] In so far as church architecture was primarily didactic, the use of unintelligible sculpture represented a failure of form to follow function.[18]

Vincent of Beauvais, who held the post of "reader" in the monastery of Royaumont, on the Oise near Paris, which was founded by Louis IX, wrote a great work entitled *Speculum Universale*, which is an encyclopedia of thirteenth-century European knowledge, a

[16] Bernard of Clairvaux, *Apologia ad Guih. Sancti Theodorici abbat.*, ch. xi., as quoted in Mâle, *Religious Art in France*, pp. 48, 49.

[17] *Ibid.*, p. 49.

[18] Bernard's condemnation of the effect of rich but meaningless ornament finds a curious parallel in the will of Henry VI of England, which specified that the domestic portion of his college at Cambridge be built "without too great superfluity of detail or busie moulding." The architect, William of Wykeham, followed this prescription in the design of his building. See A. W. N. Pugin, *True Principles of Pointed or Christian Architecture*, pp. 52, 53.

mirror of the mind behind the building of the great cathedrals. Vincent's work was part of an intellectual edifice which was the counterpart of the cathedral edifice of stone. It was divided into three parts: (1) the *Speculum Naturale*, or mirror of nature and natural phenomena in the order in which they were created by God; (2) the *Speculum Doctrinale*, or mirror of instruction, a practical manual of all knowledge, and (3) the *Speculum Historiale*, or mirror of history. A fourth part, the *Speculum Morale*, was added by another hand.

The encyclopedia of Vincent has been used as a guide for the study of the art of the thirteenth century,[19] and great decorative schemes seem to have been directly inspired by it. The *Speculum Doctrinale*, which was intended to summarize all the different branches of practical knowledge such as medicine, alchemy, agriculture, navigation, and military engineering, contains a summary of architecture.[20] Vincent leans heavily upon Vitruvius, whose authority he acknowledges in determining the organization of architecture and for his aesthetic point of view. Firmness, utility, and beauty are the fundamental requisites of architecture. The aesthetic elements of architecture are position, eurhythmy, symmetry, distribution, and ornament.[21] In one sense, Vincent equates beauty with eurhythmy. Eurhythmy is the beauty of the various parts in terms of height and width. Symmetry Vincent defines as the interplay of correct measures, or a consensus of measures which are based on the parts of the human body such as the foot and hand. In modern parlance, Vincent's symmetry was a kind of modular design based on human measurements. Beauty for architecture as a whole consists in elegant and graceful ways of building based on correct measure, symmetry, and logic. Vincent turns to the authority of Isodorus, from whom he

[19] See Mâle, *Religious Art in France, passim.*
[20] See Vincentius Bellovacensis, *Speculum Doctrinale*, c. 160–173.
[21] *Ibid.*, c. 162, xiii, xiv.

derived the notion that ornamental beauty can be added to an edifice by friezes, incrustations of marble, and colorful decoration. This is an adjunct type of beauty. The practical nature of Vincent's treatise, his classification of architecture as a mechanical art, and his insistence on the regulating power of convenient or human measurement, are of real importance to an analysis of the historical origins of functionalism.

Other medieval writings which may be regarded as contributions to the theoretical groundwork upon which functionalism was built were the *Perspectiva* of Witelo and the *De Intelligentiis*, attributed to him.[22] According to Witelo, the action of light explains not only the spatial arrangement of bodies, but also the vital force of living organisms. With this premise in mind, later protagonists of the organic analogy could, in the absence of scientific verification, assume that the forces of living organisms could be comprehended and the forms of living organisms could therefore be judged as expressions of the vital force. Witelo further maintained that seeing is an active phenomenon of the soul, hence mankind has the power and capacity to comprehend God's perfect order.[23] This assumption is fundamental to the understanding of many later theories of beauty, especially to those of the eighteenth century wherein the divine beauty of nature is held up as a standard for art.

The scattered references to aesthetic matters in the writings of Saint Thomas and the Schoolmen reveal a complex notion of beauty and the aesthetic experience. It is not my present purpose to give an exposition of Scholastic aesthetics, but certain implications for functionalism are contained in these writings just as there were impli-

[22] Witelo, who was born about 1230 in Silesia, was educated in philosophy and in the sciences at the University of Padua. His *Perspectiva* was written about 1270. At the same time Bacon and Peckham also wrote treatises on perspective. *De Intelligentiis*, an unfinished work, is a more philosophical treatise, with elements derived from Plato and Aristotle, but especially from Plotinus.

[23] De Wulf, *History of Medieval Philosophy*, pp. 398–400.

cations for functionalism in the writings of Aristotle, on which much Scholastic thinking is based. Thomist or Scholastic theories of beauty shall here be considered briefly from only three points of view, as follows:

1. The extent to which purpose or utility controls form, or conversely, the extent to which form is governed by values independent of purpose and utility.

2. The relation between morality (virtue, goodness, truth) and beauty.

3. The relation of art to nature and natural beauty.

According to the Schoolmen, all art belongs to the practical order. Art is in the general category of activity called *making*. The Scholastics maintained that "whenever you find art you find some action or operation to be contrived, some work to be done." [24] Therefore the object of art must be ordered to a definite end. If a work is to be judged good, it must conform to the end peculiar to the work produced.[25] The perfection of the work depends upon this conformity. The work of art must be aimed at a maximum of practical perfection. The only rules for art are rules which grow out of the operation of the practical intellect in measuring and regulating the specific work to be done on the thing in question. The rules must grow out of the thing itself.[26] This applies not only to the work of the sculptor, but to the village carpenter and blacksmith. It applies to each and every work of the artisan or artist. Since the end or purpose of each work of art is something absolutely individual, utterly unique, it follows that "the artist has every time a fresh and utterly unique way of conforming to the end, and so regulating the matter." [27] The form of each work will therefore always be somewhat novel and unpredictable.

[24] Maritain, *Art and Scholasticism*, trans. by J. F. Scanlan, p. 4.
[25] *Ibid.*, p. 6.
[26] *Ibid.*, p. 12 and p. 151, note 14.
[27] *Ibid.*, p. 49.

Beauty is, according to Saint Thomas, a relative matter. It does not consist in conformity to an ideal or unchanging type. It is relative "to the peculiar nature and end of the thing and to the formal conditions in which it is involved." [28] The formal conditions or qualities of beauty are threefold and may be translated as: integrity, proportion or harmony, and splendor or clarity (*claritas pulchri*). Leonard Callahan paraphrases the Thomist condition of integrity as follows: "The condition of *integrity* requires that an object of beauty lack no essential parts, functions, or elements." [29] He contrasts integrity with imperfection and mutilation. Any foreign element which is introduced into a work of art prevents the rise of the true sentiment of beauty. The condition of integrity is relative and dependent upon the aims and object of the work.[30]

Whereas integrity depends on just the right kind and number of parts, the condition of *proportion* is concerned with their size and shape. According to Callahan, Thomas Aquinas stressed the rôle of proportion more than any other condition or quality of beauty, and this point of view has had common acceptance, in one form or another, from the time of Aristotle down to the present day.[31]

In some passages from Saint Thomas, "proportion alone is mentioned as a condition of objective beauty." [32] Doubtless the two other conditions are taken for granted when this is done. Proportion, in his aesthetic, "has no absolute significance, but must be understood in relation to the aim of the work." [33] The right proportion of a man is not the same as that of a child. Proportion, fitness, or

[28] *Ibid.*, p. 29.

[29] Callahan, *A Theory of Esthetic According to the Principles of St. Thomas Aquinas*, p. 58.

[30] *Ibid.*, pp. 58, 59.

[31] *Ibid.*, pp. 60, 61.

[32] *Ibid.*, p. 60. In note 1 at the bottom of this page Callahan calls attention to a passage beginning, "Unde pulchrum in debita proportione consistit . . ." (*Summa Theologica*, I, q. 5, art. 4, ad 1 m).

[33] *Ibid.*, p. 62.

harmony, vary according to their object or their aims and beauty which derives from them is relative to the particular nature and purpose of the work.[34]

Claritas pulchri is the most difficult to define of the three Thomist conditions of beauty. Maritain translates it as "clarity." [35] Callahan translates it as "splendor," "brilliance," or "the brilliance of the beautiful." [36] The words which Aquinas employed, *splendor, claritas, resplendentia formae,*[37] with reference to beauty are interpreted by Callahan as meaning "the shining forth of the *form* of a thing, either in a work of art or of nature, or whatever it may be, in such a manner that it is presented to the mind with all the fullness and richness of its perfection and order." [38] It is not enough that the form of a work of art have integrity and good proportion; this perfection must be obvious, must be clearly demonstrated to the observer: "the perfection of the form must shine out with all its splendor through its material envelope." [39] The Thomist doctrine of *claritas pulchri,* which was taken over from neo-Platonist metaphysics, has ontological and psychological implications which I am overlooking as irrelevant to this study of functionalism. One may, however, sum up in simple fashion the Thomist objective conditions of beauty as the right type, number, and arrangement of parts, their correct size and proportion, and lastly, their clear organization or expression.

Although art belongs to the practical order as opposed to the speculative order, art is nevertheless concerned with truth. Art is also, in the opinion of Aquinas, concerned with goodness, virtue, or morality.

[34] *Ibid.*
[35] Maritain, *Art and Scholasticism,* p. 25.
[36] Callahan, *Theory of Esthetic,* pp. 58 ff.
[37] *Summa Theologica,* II, q. 145, art. 2; I, q. 39, art. 8; as quoted in Callahan, p. 64.
[38] Callahan, *Theory of Esthetic,* p. 64.
[39] *Ibid.,* p. 65.

The idea of truth is inherent in the Thomist concepts of integrity, proportion, and *claritas pulchri.* To be beautiful a work must be true to its own unique end or purpose.[40] According to the Scholastics, art should be pure and truthful, but the truth of the work of art lies in its inherent logic.[41] The idea of goodness is inherent in the Thomist view of art, but art *as art* is concerned directly with only a limited type of goodness. Art "operates for the good of the work done, *ad bonum operantis* and everything which diverts it from that end adulterates it and diminishes it." [42] Art must not be regarded as the final end, Saint Thomas cautioned, lest we be guilty of idolatry. Art must not only be aimed at a maximum of practical perfection, but it must be the product of a virtuous workman.[43] Art is therefore subject to a control from without which is moral, lest the good of art be not for the good of man. Art is sovereign in its own realm which is its own end, but it is subordinate to the end of man: human virtue and the love of God.[44]

The relation of art to nature and natural beauty does not constitute as large a share of the aesthetic writings of Saint Thomas and the Schoolmen as the topics just discussed. Obviously the principles of beauty which they expounded were meant to apply to all of God's creatures as well as to man's works of art. God stands at the head of the Scholastic hierarchy of beauty. He alone is absolutely beautiful. He imparts beauty to all created things according to the peculiar nature of each. Therefore everything created by God is beautiful as everything is good, at least in a certain relation. Each kind of being is good in its own way and is beautiful in its own way.[45] The beauty

[40] Maritain, *Art and Scholasticism,* p. 6.
[41] John of St. Thomas, *Cursus Theologicus,* t. vi, q. 62, disp. 16, a. 4., as paraphrased by Maritain, p. 52, and p. 187, note 104.
[42] Maritain, *Art and Scholasticism,* p. 14.
[43] *Ibid.,* p. 11.
[44] *Ibid.,* p. 75.
[45] *Ibid.,* p. 30.

of one differs from the beauty of another in organic as well as inorganic objects.[46] Saint Thomas did not find it necessary to hold up nature as a guide and model for artists to follow, rather he set down principles for art which also applied to nature. He drew a parallel between the organic creation and the work of art. The aesthetics of Scholasticism, with its emphasis on the practical, functional nature of art, with its tendency to separate but sometimes unite art and morality, and with its parallel between the organic creation and the work of art, is obviously related to, and a continuation of, the aesthetics of Aristotle.

The notebook of Villard d'Honnecourt (Wilars De Honecort) is evidence of the medieval architect's love of nature. Although he was a busy architect who traveled in France and Switzerland he found ample time to draw from life not only human figures, but such things as lions, horses, a bear, a porcupine, a swan, ostriches, fishes, a grasshopper, a crawfish, and a snail.[47] His work reminds one of the bestiaries, or books of natural history, which were in circulation during the middle ages. On the second page in his sketchbook, Villard expresses the hope that his work will be of help to masons and carpenters.[48] The work was intended to be a practical treatise on architecture. He evidently felt that architects, masons and carpenters would derive direct benefit from a study of nature and drawings from nature. The book also has many drawings of machines. Most of these mechanical devices are directly applicable to architecture and of obvious practical value. Such, for example, are the saw mill,

[46] "In like manner beauty [of the body] consists in the proportion of its limbs and colours, and so the beauty of one differs from the beauty of another." Saint Thomas, *Commentarium in Psalma*, Ps. XLIV. 2, as quoted in Maritain, p. 62, note 171.

[47] *Facsimile of the Sketch-book of Wilars De Honecort*, trans. by Rev. Robert Willis. The animals noted can be seen in Plates 46, 51, 52, 47, 36, 5, 15, 45, 35, 6, 37, 13, and 3.

[48] *Ibid.*, p. 2.

the saw to cut off pile heads, or the screw to raise weights. Some, however, such as the perpetual motion machine and the crossbow with a sight, indicate that this thirteenth-century architect was fascinated by machines for their own sake or because of some subtle connection with architecture.[49] One must concede that Villard's sketchbook reveals a somewhat naïve, provincial mind. He was not a scholar nor a great architect. But his intensely practical viewpoint, his apparent love of nature even in its most humble forms, and his love for mechanical contrivances are symptomatic of a significant attitude toward architecture which is neither medieval nor modern, but universal. It is a point of view that from time to time has culminated in a functionalist attitude toward architecture.

The great minds of the Middle Ages established strong connections and fine distinctions between ideas of practical use, formal beauty, the good life, and divine purpose. From now on we discover that it is often churchmen or theologically minded philosophers of art who support the functional viewpoint. This tradition reaches its apex in the middle of the nineteenth century in the writings of such men as Pugin, Ruskin, and Greenough.

[49] Villard's sketches of the machines listed can be found in Plates 43, 44, and 8.

FORM AND FUNCTION FROM THE RENAISSANCE

4

Up to now two main cultural sources of functionalist ideas have been explored: classical philosophy and medieval theology. We turn next to Renaissance humanism, and Baroque science and skepticism.

Renaissance and Baroque architects often distinguished themselves by their socially and artistically progressive solutions to problems of planning; however, while large numbers of these men contributed, by the actual examples of their projects, toward the development of functional concepts of planning, only a few contributed to the literature of functionalism. With but few notable exceptions the men of the Renaissance and Baroque periods did not write theoretical treatises expounding ideas now generally grouped under the heading of functionalist.

There are many reasons for the essentially unfunctionalist orientation of Renaissance-Baroque architectural treatises. One reason is the devotion to the descriptive and codification aspects of Vitruvius and the undeserved authority attributed to the writings of that minor Roman architect. Another reason is the inability or unwillingness of

the Renaissance-Baroque mind to develop a functionalist aesthetic of structure despite an evident comprehension of the value of functional planning. In general, the men of the Renaissance interpreted beauty in terms of taste, beyond rational explanation, or as something absolute and based on proportions which were definite, fixed, and mathematically demonstrable. The literal representation of natural objects was their avowed aim in art. Architecture was dedicated to copying or skillfully adapting the antique. All forms of art were the proper sphere of the artist. Technical problems were to be overcome by mastery or circumvention, but the idea of technique did not become the basis for a system of aesthetics. To the modern critic, trained in the philosophy of functionalism, it appears strange when he reads that Vasari, for instance, praised Ghiberti's panels on the second of his baptistry doors, for representing naturalistic perspective in relief sculpture; or that the same author admired the tapestries Raphael executed for Leo X for resembling paintings; or that he believed Titian's mosaics in St. Mark's at Venice were the best possible "because they could not have been more excellently done in pencil and colors." Vasari reduced all design to drawing. The aesthetic of technique did not flourish until the eighteenth century.[1]

It is also noteworthy that the influence of Plato on the Renaissance mind, particularly during the fifteenth century under the aegis of the Florentine Academy and Marsilio Ficino, did not lead to the application of moral principles to art and architecture.[2] Such "truths" as did apply to art were truth to the facts of nature and true adherence to the antique tradition.

Some Renaissance and Baroque treatises have important impli-

[1] Chambers, *The History of Taste*, pp. 40, 41. These remarks should not be construed as implying that Vasari ignored the problems of technique. What is indicated is that the Renaissance writer on art did not develop an aesthetic based on technique. For Vasari's ideas on technique, see *Vasari on Technique*, trans. by Louisa S. Maclehose, ed. by G. Baldwin Brown.

[2] See De Wulf, *History of Medieval Philosophy*, pp. 467–69.

cations for functionalism. One among them was Leon Battista Alberti's *De Re Aedificatoria*.[3] Alberti maintained that architecture should be "of the greatest convenience to Mankind in all respects," and that a building, which has no other quality than that it be functional, will be a delight to look upon. "And if a Building be well laid out, and justly finished, who is he that does not view it with the utmost pleasure and delight?" [4]

According to Alberti, a different type of beauty is proper for each building, thus he evidently adhered to the principle of relative beauty.[5] Alberti repeatedly stressed the idea that architecture is largely an outgrowth of necessity and convenience; it is only lastly, and to a secondary degree, subservient to pleasure and recreation.[6] The proper way to study architecture is to study the uses of buildings and the nature of the men for whose uses the buildings were intended.[7]

Beauty is defined by Alberti in an Aristotelian manner as, "a harmony of all the parts . . . fitted together with such proportion and connection, that nothing could be added, diminished or altered, but for the worse." [8] The stress on *fitting together* and *proportion* remind one of the *integrity* and *proportion* of Thomas Aquinas. Alberti discusses compartition in this spirit.[9] Here, a sense of fitness is the postulate of consonant form.

To every Member therefore ought to be allotted its fit Place and proper Situation; not less than Dignity requires, nor greater than Convenience demands; not in an impertinent or indecent Place but in a Situation so

[3] Alberti's treatise was first published, posthumously, in 1485. The edition consulted was *The Architecture of Leon Battista Alberti*, trans. by James Leoni.
[4] *Ibid.*, I, Preface.
[5] *Ibid.*
[6] *Ibid.*, *passim*.
[7] *Ibid.*, I, 61.
[8] *Ibid.*, II, 3 (cf. Aristotle, *supra*, pp. 23, 24).
[9] See Alberti's discussion of compartition in Book I, chapter ix; Vol. I, pp. 12 ff., in Leoni's translation.

proper to itself, that it could be set no where else more fitly. . . . And these ought to agree one Member with another to perfect and compare the main Design and Beauty of the whole; that we may not so lay out our whole Study in adorning one Part, as to leave the rest neglected and homely in comparison to it; but let them bear that Proportion among themselves, that they may appear to be an entire and perfect Body.[10]

Alberti's logical approach to architecture began with a consideration of problems of region, then the building site, platforms and foundations of the building, compartition, walls, roofs, and so on down to the details of architecture. Alberti urged architects to consider the nature of the materials of construction with which they build.[11] His treatise contains many essays on the proper selection and uses of stone, timber, brick, and other materials of construction. Much of this practical information was taken from ancient authors such as Vitruvius, Pliny, Theostratus, and Varro, whose authority is acknowledged by Alberti. Alberti's main interest seems to be in the functional elements of architecture and their interrelationships.

Ornament (which is considered after Alberti's analysis of layout, construction, materials, and the practical accessories of architecture) should be adapted to the proportions of the basic geometric shapes and to their uses.[12] Reasoning in a manner similar to Vincent of Beauvais, who regarded the ornamental beauty of color, rich material and decoration as a second type of beauty adjunct to the primary beauty of form, Alberti observed that beauty is something "innate," and does not reside in ornament, which is "added" and an "auxiliary brightness and improvement to Beauty." [13] Ornament is required if architecture is to be wholly pleasurable. The source of our delight in beauty and ornament stems from the same basic thing, and that is

[10] *Ibid.*, I, 12.

[11] *Ibid.*, I, 22 ff.

[12] Alberti's discussion of ornament can be found in Book VI, chapters ii and iv; *ibid.*, II, 2 ff.

[13] *Ibid.*, II, 3. Cf. Vincent of Beauvais, *supra*, pp. 37, 38.

the manner in which the inventions of the mind, the skill of the hand, the qualities of materials and the forces or concepts of nature are adapted to the various functions of architecture.

That which delights us in things that are either beautiful or finely adorned, must proceed either from the contrivance and invention of the mind, or the hand of the Artificer, or from somewhat [*sic*] derived immediately from Nature herself. To the Mind belong the election, distribution, disposition, and other things of the like nature which give dignity to the Work: to the Hand, the amassing, adding, diminishing, chipping, polishing, and the like, which make the work delicate: the qualities derived from Nature are heaviness, lightness, thickness, clearness, durability, etc., which make the work wonderful. These three operations are to be adapted to the several parts according to their various uses and offices.[14]

Alberti's remarks on the relation of architecture to nature are noteworthy. Alberti urged architects to "imitate the Modesty" of nature. What he meant by "modesty" was probably a humble devotion to purpose wherein all the constituent parts of a building take their proper relative positions, and wherein all the constituent parts are no larger or more prominent than they need to be according to their proper offices. These ideas are implied by his statement, "Let the Members therefore be modestly proportioned and necessary for your Uses." [15] Alberti's suggestion that architects imitate the modesty or economy of nature sounds like the advice of a modern critic. The references I have cited are not exceptional. In his recapitulation of the principles of compartition, Alberti states:

The chief and first ornament of anything is to be free from all improprieties. It will therefore be a just and proper Compartition, if it is neither confused nor interrupted, neither too rambling nor composed of unsuitable parts, and if the Members be neither too many nor too few, as it were separate and divided from the rest of the Body: but every

[14] *Ibid.*, II, 6.
[15] *Ibid.*, I, 12.

thing so disposed according to Nature and convenience, and the uses for which the structure is intended, with such order, number, size, situation, and form, that we may be satisfied there is nothing throughout the whole Fabrick, but what was contrived for some use or convenience, and with the handsomest compactness of all the parts. . . . The whole composition of the Members therefore shou'd seem to be made and directed entirely by necessity and conveniency; so that you may not be so much pleased that there are such or such parts in the building, as that they are disposed and laid out in such a situation, order and connection.[16]

This is a strong testimony of Alberti's functionalist attitude toward architectural planning and of his use of the organic concept.

Alberti has recourse to the organic analogy in comparing the early architecture of the Italian peninsula with the architecture of the Roman Empire. "*Italy*, in her first beginnings, having regard wholly to parsimony, concluded that the members in buildings ought to be contrived in the same manner as in animals; as, for instance, in a Horse, whose limbs are generally most beautiful when they are most useful for service: from whence they inferred that beauty was never separate and distinct from conveniency." [17] The architects of the imperial age, in the opinion of Alberti, did not reject the old organic architecture but "thought it most laudable to join the magnificence of the most profuse Monarchs, to the ancient parsimony and frugal contrivance of their own Country." [18] Alberti does not make clear how many of the more ostentatious edifices of Rome could possibly represent anything less than a rejection of the principles of parsimony and organic architecture. In fact, in considering further the relationship between nature and architecture, Alberti sharply criticizes the harbor works of Claudius and Hadrian for the folly of trying to strive against nature rather than work with it. Alberti warns his reader not

[16] *Ibid.*, II, 8.
[17] *Ibid.*, II, 4, 5.
[18] *Ibid.*, II, 5.

to strive directly contrary to the nature of things. "For Nature, if you force or wrest her out of her way, whatever Strength you may do it with, will yet in the end overcome and break thro' all opposition and hindrance; and the most obstinate violence (to use such an Expression) will at last be forced to yield to her daily and continual Perseverance assisted by length of time. How many of the mighty Works of Men do we read of, and know ourselves to have been destroy'd by no other cause than that they contended against Nature?" [19]

In summing up his ideas on the organic analogy, Alberti states conclusively: "The most expert Artists among the Ancients . . . were of opinion that an Edifice was like a Animal, so that in the formation of it we ought to imitate Nature." [20] But Alberti is inconclusive when he goes beyond the mere analogy to the reasons why this is so. He feels that aesthetic judgment is not a matter of mere opinion, "but from a secret argument and discourse implanted in the mind itself. . . . Whence this sensation of the mind arises, and how it is formed, would be a question too subtle for this place, etc." [21] *Number, finishing, collocation,* and *congruity,* are the qualities common to beautiful objects as observed by Alberti.[22] This is true of the beauty of natural objects—in fact, these may be thought of as laws of nature which operate in architecture. The main points of this section of Alberti's treatise may be summarized as follows: (1) Architecture imitates the principles of art which are in nature's organic

[19] *Ibid.,* I, 21.
[20] *Ibid.,* II, 84.
[21] *Ibid.,* II, 85.
[22] Alberti's discussion of the principles of *number, collocation, finishing,* and *congruity* can be found *ibid.,* II, 85, 86. My interpretation of Alberti's principles is as follows: *number* is the correct number and type of parts; *collocation* is the proper disposition of the parts in space; *finishing* is synonymous with technical excellence; and *congruity* is the conformity of the parts with one another as well as the whole, and of the whole to purpose.

creations; and (2) just as one organic body differs from the other so too does one building differ from the other and for the same reason: "end" or "purpose," i.e., function.[23]

Alberti's theory of architecture was functionalistic to a degree not indicated by the actual buildings which he designed, and his frequent use of the organic analogy shows greater subtlety and sophistication than most Renaissance critics, who generally limited the organic analogy to a rather obvious comparison of the physical features of architecture and human anatomy.

Although they do not present a completely functional philosophy of architecture such as Alberti's, the writings and sketches of Leonardo da Vinci contain descriptions of the functions of buildings which, together with his designs, indicate the height to which the Renaissance power of functional analysis could on occasion arise.[24] Leonardo's devotion to engineering and his remarks on the relationship between art and nature are also of interest to the student of the historical backgrounds of functionalism.

Leonardo's writings on architecture are of an intensely practical sort. He stressed convenient planning, good ventilation, fire safety, and good construction.[25] His point of view seems to be that of an engineer who turns to buildings occasionally just as he also turns to the design of canals, fortifications, elevated roadways, or the flying machine.[26] Leonardo made studies for a church designed around the idea of preaching to a congregation. His reference to one drawing as

[23] See *ibid.*, II, 85.

[24] The manuscripts of Leonardo da Vinci afford the chief existing proof of his extraordinary versatility. Included are the records and results of his studies in the theory of art, mathematics, natural science, and fragments of philosophical and imaginative writings. Some personal material is also included. The published editions of Leonardo's writings which I have consulted are *Leonardo da Vinci's Note-books*, trans. and ed. by Edward McCurdy, and *The Literary Works of Leonardo da Vinci*, ed. by Jean P. Richter and Irma A. Richter.

[25] Richter and Richter, *Literary Works of Leonardo*, II, 20–82.

[26] *Ibid.*, II, *passim*.

"fondamento locho dove si predicha," [27] which may be translated "a plan of a place for preaching in," prefigures Le Corbusier's dictum, "the house is a machine for living in."

Leonardo attached a spiritual significance to an idea of force which he saw as the motivating power behind all movement.[28] He saw this force at work whether he looked at nature or the works of man. "Weight, pressure, and accidental movement together with resistance are the four accidental powers in which all the visible works of mortals have their existence and their end." [29] All of nature operates according to necessity, the prime mover. "Necessity is the mistress and guide of nature. Necessity is the theme and artificer of nature, the bridle and the eternal law." [30] This law of nature lives and works within it. Nature never breaks its own law.[31] All forms in nature are governed by necessity. "There is no result in nature without a cause." [32] Although Leonardo saw that all forms in nature conformed to function and at the same time was filled with admiration of the beauty of nature, there is no direct evidence that he attributed the beauty of nature to this principle. In fact it might be said that Leonardo's rules for proportion of the human figure are absolute, and hence can be construed as evidence to the contrary.[33] But his rules for anatomical proportion seem rather to be aimed at giving the student ratios to guide him in the construction of figures without

[27] Leonardo da Vinci MS, Bibliothèque Nationale, 2037 5a, as quoted *ibid.*, II, 42.

[28] Cf. Leonardo MS, Library of the Institut de France, B 63 r., as published in McCurdy, *Leonardo da Vinci's Note-books*, p. 114.

[29] Leonardo MS, South Kensington Museum, ii. 116 v, as quoted in McCurdy, p. 55.

[30] Leonardo MS, South Kensington Museum, iii. 43 v, as quoted *ibid.*

[31] Leonardo MSS, Library of the Institut de France, c 23 v, and E 43 v, as quoted *ibid.*

[32] *Codice Atlantico*, 147 v a, as quoted *ibid.*, p. 54.

[33] Leonardo's rules for the proportion of the human figure, together with the movements of the human figure, can be found in Richter and Richter, *Literary Works of Leonardo*, I, 243–70.

the use of models. They do not appear to be rules for drawing the most beautiful possible figures. Leonardo's notations indicate a relative view of proportion, for he indicates different proportions for a stout as opposed to a thin man or a young as opposed to an aged man.[34] On the whole, he seems more interested in the dynamics of figure drawing.

Leonardo has not left us a complete statement of his theory of beauty, nor has he left us a book on architecture.[35] It is therefore impossible to formulate his theory of architectural beauty. We can be certain that he saw in nature both beauty and the embodiment of mechanical principles. His remarks on architecture are practical to the extreme; he does not speculate on the cause of architectural beauty. As to the function of painting, we know that he regarded it to be the "imitator of all visible works of nature." [36] These visible works are the embodiment of nature's mechanical principles which govern all form. One may assume that beauty is related to or equated with the expression of nature's principles which govern form, but there is no evidence that Leonardo believed architecture should be the visible embodiment of nature's mechanical principles, or that the perfect embodiment of nature's mechanical principles is the cause of all beauty.

Andrea Palladio, who perpetuated the Vitruvian trichotomy of convenience, structural solidity, and beauty, was of the opinion that architecture was an expression of the principles of nature. He maintained, "that *Architecture* (as all the other Arts) being grounded upon Rules taken from the imitation of Nature, admits of nothing that is contrary, or foreign to that Order which Nature has prescrib'd

[34] See *ibid.*, I, 244, esp. note 1, for Richter's opinion of this issue.

[35] Henry de Geymüller believed that Leonardo considered writing a book on architecture, but, according to the Richters, the existing isolated notes and sketches do not constitute parts of a projected book. *Ibid.*, II, 19.

[36] Leonardo MS, Bibliothèque Nationale 2038 20 a, as quoted *ibid.*, I, 367.

to all things." [37] Palladio observed that the ancients provided a taper or entasis to column shafts by studying the form of trees. Architectural forms such as bases appear to Palladio to represent a swelling caused by placing a weight upon the object, thus describing the natural forces involved in the structure. Cornices, triglyphs, modillions, and dentils, according to Palladio, represent, or rather originally represented, the heads of joists which support the roof.[38] Architects should learn the lesson which nature can teach them. Architecture should have the simplicity of natural objects, and combine the good, the true, and the agreeable.[39] Palladio condemned useless architectural forms such as scrolls and cartouches. All architecture, "should be made to some end, and . . . shew what it would be." [40] Of all architectural abuses, according to Palladio, the most unreasonable and unnatural is the making of frontons (pediments) over doors, windows, or galleries, in such a manner that they are open in the center.[41] This practice destroys the functional nature of the form.[42] Palladio cautions that the search for varied and novel form must not lead architects to go against the precepts of art which can be found in nature.[43] It appears inconsistent that Palladio turned from such a point of view to rules for correct proportion based on arithmetical relationships, but it must be borne in mind that Palladio was trying, by means of published treatises, to curb mannerisms, stem the rising tide of the Baroque, and insure a minimum standard of what he considered to be good design.

[37] *The Architecture of A. Palladio in Four Books*, trans. and ed. by Giocomo Leoni, I, 24.

[38] *Ibid.*, I, 24, 25.

[39] *Ibid.*, I, 25.

[40] *Ibid.*

[41] The characteristic Baroque broken pediment is referred to here.

[42] *Ibid.*

[43] *Ibid.* Palladio's warning about the consequences of going against nature reminds one of Alberti.

Sebastiano Serlio was another sixteenth-century Italian architect noted for his books on architecture.[44] Serlio's controversial so-called "sixth" book, which exists in two manuscripts, one in the National Library in Munich and one in Columbia University, is in a sense a contribution to the literature of functionalism.[45] This statement must first be qualified by an acknowledgment of the fact that Serlio's style of architecture, at least as illustrated by his published plates, was playfully inventive and manneristic, a far cry from the simple, almost functional style of Palladio.[46] The "sixth" book was intended by Serlio to contain appropriate designs of houses "suitable for all grades of men, commencing with the poor peasant and the poor citizen artisan, and following from degree to degree up to the royal house, both for the country and for the city." [47] In addition, the book turned out to be a demonstration of the right method of adapting the Renaissance style of architecture to French conditions, with which Serlio was familiar. The designs are alternately Italian and French. In so far as the author was in the service of Francis I, it seems obvious that one of the principal functions of this book was to educate the French as to the proper mode of adapting the foreign style to their own peculiar conditions of climate and custom. Steep roofs are substituted for relatively low-pitched roofs, large windows are substituted for small ones, large and numerous chimneys are introduced, and other appropriate modifications are suggested by Serlio. The Italian original is not held up as superior. We have thus a tacit acceptance of the idea of relative beauty. Style in architecture must arise out of

[44] See Dinsmoor, *The Literary Remains of Sebastiano Serlio.*

[45] *Ibid.*, pp. 115 ff. I have had an opportunity to examine the Serlio MS while a student in Professor Talbot Hamlin's inspiring course in the literature of architectural theory. The Columbia MS of Serlio's sixth book was prepared *ca.* 1550, during his sojourn in France. It is to be hoped that this work will be published within a few years.

[46] See Serlio, *Il primo quinto libro d'architetture,* and *Extraordinario libro.*

[47] Serlio's statement in 1545 (Book I, fol. aa iii), as quoted by Dinsmoor, p. 116.

conditions of climate, the land, and the customs and conditions of the people who are to be served by it.

While on one hand the Renaissance preoccupation with the forms of antiquity, the idea of pure taste, and its devotion to the idea of correct proportion based on arithmetical ratios stood as stumbling-blocks before the development of a functional architecture, the tradition of the architect as engineer seems to have flourished rather than atrophied. Vincenzo Scamozzi's writings on architecture illustrate this paradox.[48] In addition to his books on the correct proportions and applications of the classic orders of architecture, Scamozzi is concerned in book one with practical geometry, especially ideas for measuring irregular surfaces, methods for finding the lengths and angles of hip members, rafters, etc.; he also treats of prevailing winds, and systems of fortifications.[49] Book three is devoted largely to planning various types of buildings, and contains in addition a study of stairways.[50] Book seven is devoted to practical facts about the construction of walls, and book eight is devoted to the construction of bridges.[51]

The practical manual of architecture showing both designs and construction became an increasingly popular form of architectural publication during the sixteenth century, not only in Italy but in other countries of Europe. Cardinal Borromeo's *Instructiones Fabricae,* was a compilation (*ca.* 1580) of practical instructions for building probably intended to serve churchmen and builders when no architect was available.[52] Fray Lorenzo de San Nicholas and Rodrigo Gil de Hontanon also recorded the traditional practical knowl-

[48] See *Oeuvres D'Architecture de Vincent Scamozzi, passim.*
[49] *Ibid.*, I, 1 ff.
[50] *Ibid.*, III, 18 ff.
[51] *Ibid.*, VII, 262, 263, and VIII, pp. 264 ff.
[52] See Kubler, *Mexican Architecture of the Sixteenth Century,* II, 249 and note 43. Borromeo's book was translated into English by G. W. Wrigley as *Instructions on Ecclesiastical Building* (London, 1857).

edge of building. These books gave recommendations for the computation of the thickness of bearing walls (taking into account the span of volume, height of wall, and nature of material used in the wall), correct location of rooms, windows, and doors in churches, and miscellaneous empirical recommendations. In general these recommendations were over-cautious and did not encourage structural daring.[53] They were not based on a scientific knowledge of engineering principles.

In so far as the size and shape of structural members were determined by arithmetical ratios and geometric configurations, these are the counterpart of the arithmetical and geometrical rules for the orders. The significance of empirical formulae for the development of a functionalist point of view is relatively unimportant, though not negligible. More important is the tradition of the architect-engineer. This tradition found expression in many of the great books on architecture during the Renaissance and Baroque periods from Alberti onward. Even the great *Cours d'architecture* of François Blondel, who is regarded as the exponent par excellence of academic authority and is thought of as contributing little to the development of functionalism, contains for example a rather lengthy treatise on bridge building.[54] Blondel also contributed a book on fortifications.[55] The grand academician's interest in definite, mathematical rules for achieving good proportion (which he equates with beauty), springs, by his own admission, from a desire to create beauty by following principles as "stable, constant et indubitable" as those which govern mathematics, mechanics, and "des instrumens et des machines dont l'usage est si nécessaire et si utile à la vie." [56] Hence, though he was not a designer of functional architecture, François Blondel was mo-

[53] *Ibid.*, I, 179 ff.
[54] Blondel, *Cours d'architecture*, II, 629–63.
[55] *Nouvelle manière de fortifier les places.*
[56] *Cours d'architecture*, II, 769.

tivated by a point of view which was at least partly responsible for the development of functionalism.

Returning to the theme of the organic analogy in Renaissance and Baroque theory, let us again contrast the two types, the naïve and the philosophical. The naïve type, characterized by direct comparison of anatomy or plant structure with building forms, is illustrated by Vasari's description of an ideal palace whose façade "should be divided as is the face of a man." Vasari continues: "The door must be low down and in the middle, as in the head the mouth of the man, through which passes every sort of food; the windows for the eyes, one on this side, one on that, observing always parity, that there be as much ornament, and as many arches, columns, pilasters, niches, jutting windows, or any sort of enrichment, on this side as on that; regard being had to the proportions and Orders already explained, whether Doric, Ionic, Corinthian, or Tuscan." [57] Vasari goes on to compare the courtyard of the palace with the trunk of a man, and the staircases with the arms and legs of his body. Good proportion is achieved when all members of a building are proportioned to the whole building as the members of a body are in proportion with the whole body.

The philosophical type of organic analogy is concerned with the philosophical or theological implications behind the comparison of works of art and nature. Richard Hooker and Francis Bacon illustrate the degree to which sixteenth- and seventeenth-century thought could rise in this direction.

Richard Hooker, in his lengthy treatise, *Of the Lawes of Ecclesiastical Politie* (*ca.* 1593), stresses the idea that fitness to right

[57] *Vasari on Technique*, pp. 96, 97. Vasari's remarks on architecture are contained in his introduction to the *Three Arts of Design, Architecture, Sculpture, and Painting*, prefixed to *The Lives of the Most Excellent Painters, Sculptors, and Architects*. The book *Vasari on Technique*, quoted here, is an English language edition of the *Three Arts of Design*.

ends should govern man's creations, including his institutions as well as his art. Hooker also drew an analogy between fitness, morality, and beauty. This analogy was destined to have great influence on later architectural thought.

Hooker saw that God had created all forms to perform some function. All things in nature work toward some end. The great law which God has set for himself is to make things "suitable, fit, and correspondent unto their end." [58] This is the great limitation which God has placed on all things, but this is also the means by which all things achieve their perfection.

> The world and all things in the world are stinted, all effects that proceed from them, all the powers and abilities whereby they work whatsoever they do, whatsoever they may, and whatsoever they are, is limited. Which limitation of each creature is both the perfection and also the preservation thereof. Measure [fitness or proportion for function] is that which perfecteth all things, because every thing is for some end, neither can that thing be available to any end which is not proportionable thereunto, and to proportion as well excesses as defects are opposite. Again, forasmuch as nothing doth perish but only through excess or defect of that, the due proportioned measure whereof doth give perfection, it followeth that measure is likewise the preservation of all things.[59]

Hooker thus regarded perfectibility to be relative according to the principle of fitness for function, and from this point he launches an attack on the concept of infinity or the unlimited as applied to organic life: "Out of which premises we may conclude not only that nothing created can possibly be unlimited, or can receive any such accident, quality, or property, as may really make it infinite (for then it should cease to be a creature,) but also that *every creature's limitation is according to his own kind.*" [60] Thus Hooker regards

[58] *"Of the Lawes of Ecclesiastical Politie," The Works of that Learned and Judicious Divine Mr. Richard Hooker,* ed. by the Rev. John Keble, I, 200.
[59] *Ibid.*, II, 238, 239.
[60] *Ibid.* (Italics added.)

organic limitation and perfection as relative and based on function.

According to Hooker, like his medieval forerunners, men could and should listen to the voice of nature and learn lessons for morality as well as for art. God speaks to men through nature; "her voice is his instrument." [61] Hooker draws the following analogy between fitness, morality, and beauty:

> Goodness in actions is like unto straightness; wherefore that which is done well we term *right*. For as the straight way is most acceptable to him that travelleth, because by it he cometh soonest to his journey's end; so in action, that which doth lie the evenest between us and the end we desire must needs be the fittest for our use. Besides which fitness for use, there is also in rectitude, beauty; as contrariwise in obliquity, deformity. And that which is good in the actions of men, does not only delight as profitable, but as amiable also. In which consideration the Grecians most divinely have given to the active perfection of men a name expressing both beauty and goodness, because goodness in ordinary speech is for the most part applied only to that which is beneficial. But we in the name of goodness do here imply both.[62]

Hooker then inquires into the problem of how we are to discern goodness. He reduces the inquiry into a search for causes and signs. One sign of goodness is universal consent. Hooker maintained that a test for the goodness of laws was in universal consent.[63] Thus Hooker set down a principle which was a contribution to the foundation of ideas upon which the social revolutions of the eighteenth century were built. Similarly, Hooker's analogy between fitness, morality, and beauty became a basic principle in the aesthetic revolution of the eighteenth century.

There are few direct references to art or architecture in Hooker's *Of the Lawes of Ecclesiastical Politie*. It is not strange nor surprising

[61] *Ibid.*, I, 227.

[62] *Ibid.*, I, 225, 226. The Greek word referred to here is *kalokagathia*, meaning nobleness. It is related to *kallos* (beauty), and *agathos* (good). See *ibid.*, I, 226, note 1.

[63] *Ibid.*, I, 227.

to read his condemnation of the art as well as the learning of his day; Francis Bacon had not yet written his great works. There was, Hooker felt, a great amount of improvement yet to be made in them.[64] Aside from his simple statement that art could be perfected by industry,[65] Hooker gives no simple formula for improvement. The artist is left with the task of formulating a specific aesthetic program on the basis of the general ideas outlined in his writings. Hooker did make one direct application of the idea of fitness to architectural criticism, when he defended the resemblance which some critics saw between the form of the Christian church and the form of the Jewish temple. "So far as our churches and their temple have one end, what should let but that they may lawfully have one form?" [66] Hooker calls attention to the differences as well as the similarities of the forms and functions of the temple and the church. "The temple was for sacrifice, and therefore had rooms to that purpose such as ours have none." [67] Hooker describes differences as well as the similarities in the division of the plans by partitions according to the class of worshipper. In short, Hooker's whole defense is to show how similar forms are an outgrowth of similar functions while conversely, dissimilar forms are an outgrowth of dissimilar functions.

Francis Bacon, writing in the first quarter of the seventeenth century, combined a scientific attitude with a utilitarian attitude toward knowledge. Although he rarely addressed his writings directly to artists or architects, he set down ideas rich in implications for the arts. Among these are ideas related to the functional and organic concepts of architecture; moreover, ideas of nature, truth, and fitness, are interrelated without destroying the special identity of each.

Bacon abhorred an elaborate edifice of intricate reasoning based

[64] *Ibid.*, I, 217–18.
[65] *Ibid.*
[66] *Ibid.*, II, 51.
[67] *Ibid.*

on a flimsy foundation or unfamiliarity with what is actually in nature, hence his ideas of organic form have an authority lacking in less scientific observers. Vivian Hopkins points out that Emerson wisely studied Bacon in developing his own organic theory, and a marked copy of Bacon's works was in Emerson's library.[68]

Bacon found that the greatest of all hindrances to the advancement of science was mankind's failure to make utility the proper goal of knowledge.[69] He found that much of the knowledge of his day, as well as of antiquity, was useless. This was the result of speculations divorced from natural phenomenon, hence he urged all men to abandon abstract principles and syllogistic reasoning for a closer acquaintance with the facts of nature.[70] Bacon placed no limits on the benefits to be derived from the discovery and application to all fields of the great laws of nature. His emphasis was, of course, on the application of these laws of nature for the good of society as a whole.[71] Bacon urged men to rely on their own strength and not call the ancients to their aid and support.[72] Truth, he maintained, was the daughter of time, but not of authority.[73] A reverence for antiquity was keeping men back, "as by a kind of enchantment," from progress in all fields of knowledge.[74] Men must begin anew. "No one has yet been found," he lamented, "so firm of mind and purpose as resolutely to compel himself to sweep away all theories and common notions, and to apply the understanding, thus made fair and even, to a fresh examination of particulars." [75]

Bacon rejected the idea of absolute beauty and the related idea

[68] Hopkins, *Spires of Form*, pp. 71, 72, 74.
[69] See Bacon, *Essays, Advancement of Learning, New Atlantis, and Other Pieces*, ed. by Richard Foster Jones, p. xix.
[70] *Ibid.*
[71] *Ibid.*
[72] *Magna Instauratio, ibid.*, p. 326.
[73] *Ibid.*, p. 307.
[74] *Ibid.*, p. 306.
[75] *Ibid.*, p. 313.

that a thing of beauty was made up of parts which are each perfectly proportioned according to some absolute ideal. "There is no excellent beauty that hath not some strangeness in the proportion." [76] In his essay *Of Beauty* he criticizes Apelles (Zeuxis?) and Dürer; "the one would make a personage by geometrical proportions, the other, by taking the best parts out of divers faces, to make one excellent." [77] Beauty cannot thus be created by rule.

Bacon evolved his concept of form and fitness from a study of nature. As he saw nature, it consisted of nothing but individual bodies performing individual acts according to fixed laws, the discovery and explanation of which are the foundations of science, pure and applied.[78] These laws he called "forms." Bacon is himself somewhat inconsistent in defining form, and uncertain in his own mind regarding simple natures, though they represent the objective of his method. At times he defines forms as the essence or definition of simple natures; at other times, as their laws or causes. But he seems rather to lean towards the latter idea.[79]

First, Bacon insists, we must understand "cause," for our understanding of form is through "knowledge by causes." Bacon finds that there are four kinds of cause: the material, the formal, the efficient, and the final. "The material cause has reference to the basic material element upon which qualities may be imposed; the formal cause is any quality given to this matter; the efficient cause is the instrumentality by which a quality or form is imposed upon matter; and the final cause is the purpose or end for which anything exists." [80] Here "form" has been used in the sense of the essence, or nature,

[76] "The Essays or Counsels," *ibid.*, p. 125.

[77] *Ibid.*

[78] *Ibid.*, p. xxiii.

[79] *Ibid.*, pp. xiii, xiv. Vivian Hopkins criticizes Emerson's lack of understanding for asking, "What were Bacon's forms?" She insists that Bacon presented a "very clear picture of what the romantics called 'organic form.'" *Spires of Form*, p. 71.

[80] *Magna Instauratio, ibid.*, p. 334, note 1.

of an object. More commonly Bacon uses the term "form" in the sense of the "laws and determinations" of form. For the modern reader, substitution in the first paragraph of the term "function" for "form," and "form" for "nature," clarifies the following explanation of organic form:

> For a true and perfect rule of operation then the direction will be *that it be certain, free,* and *disposing or leading to action.* And this is the same thing with the discovery of the true Form. For the Form of a nature is such that given the Form the nature infallibly follows. Therefore it is always present when the nature is present, and universally implies it, and is constantly inherent in it. Again, the Form is such that if it be taken away the nature infallibly vanishes. Therefore it is always absent when the nature is absent, and implies its absence, and inheres in nothing else. . . . Now these two directions, the one active the other contemplative, are one and the same thing; and what in operation is most useful, that in knowledge is most true. . . .
>
> For when I speak of Forms, I mean nothing more than those laws and determinations of absolute actuality, which govern and constitute any simple nature, as heat, light, weight, in every kind of matter and subject that is susceptible of them. . . .
>
> But if any one conceive that my Forms too are of somewhat abstract nature because they mix and combine things heterogeneous, . . . he may be assured that his mind is held in captivity by customs, by the gross appearance of things, and by men's opinions. For it is most certain that these things, however heterogeneous and alien from each other, agree in Form or Law which governs heat, redness, death, and that the power of man cannot possibly be emancipated and freed from the common course of nature, and expanded and exalted to new efficients and new modes of operation, except by the revelation and discovery of Forms of this kind.[81]

In the writings of Francis Bacon, ideas of nature, fitness, and morality are occasionally interrelated, or rather juxtaposed, so that their special identity is preserved. For example, in one of the few instances when Bacon paid tribute to the pursuit of truth without regard for

[81] *Ibid.*, pp. 335, 336, 338, 339.

immediate practical consequences, he did not turn his back on utility, but stated: "Truth, therefore, and utility are here the very same things, and works themselves are of greater value as pledges of truth than as contributing to the comforts of life." [82] Another illustration of this characteristic in Bacon appears in connection with a discussion of morality in book one of *The Advancement of Learning.* Here Bacon used the organic analogy as a metaphor to clarify the nature of moral progress in a man.

> For if these two things be supposed, that a man set before him honest and good ends, and again that he be resolute, constant, and true unto them; it will follow, that he shall mould himself into all virtue at once. And this is indeed like the work of nature, whereas the other course is like the work of the hand: for as when a carver makes an image, he shapes only that part whereupon he worketh [though the whole image exists in his mind], as if he be upon the face, that part which shall be the body is but a rude stone still, till such time as he comes to it: but, contrariwise, when nature makes a flower or living creature, she formeth rudiments of all the parts at one time.[83]

Occasionally Bacon applied his general philosophical ideas directly to the specific problems of art and architecture. Apparently he sensed the revolutionary implications of his ideas, for in *The Essays or Counsels,* though he encouraged innovation, he urged that men should follow the example of time [nature], and innovate "quietly and by degrees scarce to be perceived." [84] He also cautioned "not to try experiments in states, except where the necessity be urgent, or the utility evident." [85]

[82] *Ibid.*, p. 329 and note 2.

[83] *The Advancement of Learning,* in *Works,* I, 187. Vivian Hopkins presents this quotation as Bacon's definition of "organic virtue," *Spires of Form,* p. 71. Bacon's analogy is defective in that many sculptors do not finish one part at a time, but cut out the general masses of the whole composition before they introduce the details, yet, on the whole, it is a skillful use of metaphor and clarifies Bacon's meaning.

[84] *"The Essays or Counsels,"* Jones ed., p. 71.

[85] *Ibid.*

The Essays or Counsels contain a short essay on architecture. In this work Bacon states a very simple principle, that "houses are built to live in." We are treated to a description of a house which Bacon has conceived in accordance with his simple principle. "Houses are built to live in, and not to look on; therefore let use be preferred before uniformity, except where both may be had. Leave the goodly fabric of houses, for beauty only, to the enchanted palaces of the poets, who build them with small cost." [86] Bacon's description of his concept of a livable house reminds us of Alberti and Palladio, because it begins with the site, and throughout the description the conditions of the site and their relation to the form of the building are stressed. A building should first of all be located where the air is wholesome, with a mild, steady breeze to temper the climate. The selection of the proper location for a building should be based not only on terrain, but also on the kind of neighbors and market places in the neighborhood. An adequate supply of water is necessary, as is some woodland for shade and shelter. The grounds around the building should provide some soil that is productive for gardening. There should be a hill with a view as well as some level ground. Climate, particularly the change between summer and winter conditions, must be provided for. As for the size, shape, and arrangement of the rooms in the house, Bacon demands that they be regulated by such things as convenience, comfort, the avoidance of unpleasant noise or odors, and good ventilation.

At one point in his summary of the requirements of good domestic architecture, he paused to comment upon the prevailing mode of palace building: "For it is strange to see now in Europe such huge buildings as the Vatican and Escurial and some others be, and yet scarce a very fair room in them." [87]

At another point Bacon seems to be a precursor of modern design

[86] *Ibid.*, p. 127
[87] *Ibid.*, p. 128

when, in recommending a variety of types of rooms for summer or winter use, he calls for glazed rooms for warmth in winter and shaded rooms for protection from the summer sun.[88] Bacon required very little embellishment for his ideal house.

Great stress was placed on the garden. Bacon recommended ample terraces and gardens, designed as part of the house and convenient of access.[89] "God Almighty first planted a Garden. And indeed it is the purest of human pleasures. It is the greatest refreshment to the spirit of man, without which buildings and palaces are but gross handyworks." [90] It seems doubtful that Bacon's garden was the same as the Baroque garden of his day. Bacon, like Alberti a century and a half earlier, warned men not to bend nature out of shape, nor "trust his victory over nature too far, for nature will lay buried a great time and yet revive upon the occasion or temptation." [91]

Some remarks on style in *Magna Instauratio*, which Bacon directed to those about to undertake scientific or historical writing, have obvious implications for architecture and correspond to his recommendations for domestic architecture. There should be a practical reason for all things, "for the end rules the method. . . . But the more difficult and laborious the work is, the more ought it be discharged of matters superfluous." [92] He urged men to spare labor on that which would "immensely increase the mass of the work, and add little or nothing to its worth." [93] Bacon urged writers to learn by following the efficient example of the shipbuilder.[94]

The ideas of Francis Bacon stand out in striking contrast to the spirit of absolutism and authority which permeated all aspects of

[88] *Ibid.*, p. 130.
[89] *Ibid.*, p. 131.
[90] *Ibid.*
[91] *Ibid.*, p. 113 (cf. Alberti, *supra*, pp. 50, 51).
[92] *Ibid.*, p. 352.
[93] *Ibid.*, p. 353.
[94] *Ibid.*

thought in the seventeenth century. In France, where absolutism reached its zenith under Louis XIV, there was produced at Versailles the palace which soon became the envy of lesser monarchs, but to the functionalist critic it is the monument par excellence to waste and extravagance, devoid of what modern man has come to regard as convenience or true comfort. We have already remarked that François Blondel had been the great supporter of academic authority under Louis XIV, and in his *Cours d'architecture* had sought to establish architectural proportion, which he equated with beauty, on a basis as definitely arithmetical and invariable as that of harmony in music or the laws of mechanics. The Blondel *Cours* had, during the reign of Louis XIV, an authority almost equal to that of the ten books of Vitruvius. However, Claude Perrault, architect of the east front of the Louvre, dared to challenge the premises which were generally accepted.

Perrault showed, in his book on the orders of architecture, a skeptical and scientific attitude that doubtless stems from Bacon and Descartes. Perrault could not accept complete dependence upon those recognized as authorities, especially the authors of the revered works of antiquity.[95] He pointed out with apparent delight the extreme differences between the proportions set up by various so-called authorities, and how the buildings of antiquity failed to show the same proportions called for by the authorities. Perrault was reticent to develop and set forth a theory of beauty of his own, but he did set forth a consensus of generally acceptable ideas for the proportions of the orders.

Perrault's treatise on the orders, when regarded from the point of view of contributions to functionalism, is important, (1) because it

[95] See *A Treatise of the Five Orders of Columns in Architecture*, trans. by John James, pp. xiv, xv. Perrault's treatise, which appeared in Paris in 1683, shows considerable dependence upon Roland Fréard de Chambray's *Parallèle* of 1650.

helped to weaken the idea that beauty could be achieved by creating forms according to fixed mathematical or geometrical rules for proportion, and (2) because it opened men's minds to a variety of possible causes of beauty, including custom or usage, rich materials, precise construction, the imitation of nature, and resemblance to primitive architectural forms. Perrault did not attribute beauty solely to fitness for function, but function was an important ingredient of beauty in his opinion.

Perrault frequently made use of the organic analogy to illustrate his ideas. His organic analogy generally involves the proportions of the human face, and occasionally involves the human body or the form of a tree. Occasionally, as in the following example, Perrault compares the fitness of architectural proportion with the fitness of an organic form: "It was not without Reason the Ancients thought that the Rules of those Proportions, which make the Beauty of Buildings, were taken from the Proportions of human Bodies, and that as Nature has given a stronger Make to Bodies fit for Labour, and a slighter to those of Activity and Address; so there are different Rules in the Art of Building, according as a Fabrick may be design'd massy or more delicate." [96]

Perrault has recourse to the organic analogy in arriving at the validity of rules for proportion. The same human face, he argues, may appear beautiful when expressing one emotion and disagreeable when expressing another emotion, yet the proportions have not changed. Two faces, each with quite different proportions, may be equally beautiful. He concludes that standard proportions or rules for proportions owe their validity mainly to the fact that they establish the type. The proportions must be such that the form is recognized as a face. One must therefore not depart too drastically from standard proportions lest he destroy the basic idea of the type. The beauty of

[96] *Ibid.*, i.

an object depends not upon the strict observance of the standard of proportion but upon "its agreeable modification." The latitude thus allowed to the designer is the crux of the matter.[97]

Perrault maintained that rules for good proportion are derived from ancient buildings which are acknowledged to be beautiful, but this beauty which they possess is not necessarily a result of proportion. The beauty of such a building, whose proportions are held up as the fit rule and pattern for others to follow, may more likely be the result of richness of materials, grandeur of size, skill of construction and workmanship, or other nonproportional factors.[98]

Perrault criticized those who try to make a strict comparison between architectural proportion and musical harmony. What is significant, he argued, is not the ideas of musical consonance or architectural proportion, but the use to which these are put. This usage varies with different musicians and architects, and in different countries." [99]

Perrault concluded that there are two sorts of beauties, those founded on solid, convincing reason (which he called positive beauty), and those founded on prepossession and prejudice (which he called arbitrary beauty). Richness of material, grandeur and magnificence of structure, exactness and neatness of workmanship, symmetry, and general proportions contribute to the first class of beauty, whereas the second class depends entirely on ideas derived from custom, usage, and mode.[100] Perrault's recourse to a dichotomy of beauty is not new; we have observed it in Plato. Many eighteenth- and early nineteenth-century theorists also maintained allegiance to relative as well as absolute beauty. The great variety of possible sources of beauty which Perrault indicated prefigures later writers on

[97] *Ibid.*, ii.
[98] *Ibid.*, ix.
[99] *Ibid.*, iv.
[100] *Ibid.*, vi, vii.

aesthetics such as Archibald Alison and others of the associationist school.

Returning to Perrault's theories, we should observe in conclusion his ideas on the relative place of reason, common sense, and taste in architectural design.

Reason and common sense, Perrault maintained, should chiefly regulate architecture. In other words, he advocated a fundamentally rational architecture. The "reasons" which should chiefly regulate architecture may be based upon the "imitation of nature," i.e., natural phenomena; or upon ideas derived from primitive building; or, lastly, upon ideas derived from the nature of the craft involved, such as carpentry or stonemasonry.[101] But, Perrault insisted, an architect had to make many decisions for which reason and common sense could not supply the answer; for example: What proportion should a capital bear to the height of a column? What form of capital should be used? It is just such decisions as these which are most vital to architecture. "Neither the Imitation of Nature, nor Reason, nor good Sense, are then the Foundations of those beauties, which we fancy we see in the Proportion, Order, and Disposition of the Parts of a Column; and it is impossible to assign any other Cause of their agreeableness, than Custom." [102] Perrault furthermore insisted that the knowledge of arbitrary beauties is most proper to the formulation of right taste in judgment, "and 'tis that only which distinguishes true Architects from those that are not so; because common Sense alone is sufficient for knowing the greatest part of positive Beauties." [103]

Perrault's treatise on the orders was destined to be widely read in the eighteenth century, and be the subject of some controversy as well as favorable review.

[101] *Ibid.*, vii.
[102] *Ibid.*, vii.
[103] *Ibid.*, x.

Perrault's dichotomy of beauty is reflected in Sir Christopher Wren's statement:

> There are two causes of Beauty, natural and customary. Natural is from Geometry, consisting in Uniformity (that is Equality) and Proportion. Customary Beauty is begotten by the use of our senses to those objects which are usually pleasing to us from other causes, as Familiarity or particular Inclination breeds a Love to Things not in themselves lovely. Here lies the great Occasion of Errors; here is tried the architect's Judgement: but always the true test is natural or geometrical Beauty.[104]

Thus we observe that although Wren accepted the idea of customary (arbitrary) beauty, he cautioned against it and placed greatest emphasis upon beauty derived from nature or geometry. Consciously or otherwise, this was a criticism of Perrault. On the other hand, Wren echoes Perrault's ideas on the validity of rules for proportion and on the origin of such rules.[105]

For Wren, the primary quality of good design was structural equipoise: "the duly poising of all Parts to equiponderate; without which, a fine Design will fail and prove abortive. Hence I conclude," he said, "that all Designs must, in the first place be brought to this Test, or rejected." [106] With this in mind he criticized the excessive abutment of the Pantheon and the necessity of introducing iron rings to reinforce the cupola of St. Peter's. Wren admired the simple fitness of Greek architecture in this and other respects, but strangely enough, was unfavorably critical of Gothic architecture, because it lacked the geometric regularity of the Greek and because it deviated too much

[104] Wren was not a prolific writer. Most of his architectural writings are collected together in Parentalia, and consist of short discussions of ancient buildings such as the Mausoleum of Halicarnassus or the Temple of Diana at Ephesus, as these were known to him from the description of Pliny. There is also a tract on the geometry of vaults and domes, and a group of aphorisms. The quotation in my text is from Wren, Sir Christopher, "Of Architecture," Tract I, *Life and Works of Sir Christopher Wren*, pp. 236, 237.

[105] "Of Architecture," Tract II, *ibid.*, p. 239.

[106] *Ibid.*, p. 245.

from his principle: "There are only two beautiful Positions of straight Lines, perpendicular and horizontal: this is from Nature and consequently Necessity, no other than upright being firm." [107]

Wren made a strong appeal for consideration of the geometrical as opposed to the ornamental basis of architecture, and at one point calls into question the use of half columns stuck upon the walls of buildings "where they cannot be supposed of any Use, but merely for Ornament." [108]

Wren constantly appealed to nature for support of his ideas. Nature and Vitruvius were his greatest authorities. In reviewing the Vitruvian theory of the origin of porticoes in an avenue of trees, he remarked parenthetically: "A Walk of Trees is more beautiful than the most artificial Portico." [109]

Wren's writings on architecture, though fragmentary and known to us only from some imperfect rough drafts, show relationship to many of the progressive theories we have observed. He welded his interpretation of Vitruvius, a Cartesian enthusiasm for geometry, a pious devotion to the laws of nature, and a liberal theory of beauty. The implications of his writings for functionalism are not great, but they cannot be ignored.

[107] Tract I, *ibid.*, p. 237.
[108] Tract II, *ibid.*, p. 240.
[109] Tract I, *ibid.*, p. 239.

BRITISH MORALISM, RATIONALISM, AND NATURALISM

5

THE problem of beauty, the nature of taste, and similar aesthetic questions received the attention of large numbers of thoughtful men during the century and a half from 1700 to 1850. The eighteenth century was especially distinguished by lively and thoroughly reasoned treatises on the arts. This is a period rich in contributions to functionalism and criticisms of it. While diverse and conflicting theories were put forth, they are on the whole an outgrowth of the same simple and relatively limited psychological concepts, such as the faculty theory of human personality. John Locke's distinction between *inner* and *outer* sense was also generally accepted. As the eighteenth century progressed, more stress was given to the association of ideas, which had been suggested earlier by Locke, but the psychological foundation of aesthetics remained essentially unchanged. Another general characteristic of eighteenth-century thought which entered into theoretical writings on architecture was a faith in the perfection, order, and beauty of nature. With few exceptions this

attitude was shared by classicist and romanticist alike. The humanism of the Renaissance had been characterized by faith based upon reason, whereas the eighteenth century, as described by Alfred North Whitehead, was, "an age of reason based upon faith." [1] This faith had not yet been undermined by the impact of late eighteenth- and early nineteenth-century scientific biological treatises.

A study of British writers on art of this period might well begin with Locke's friend, the Earl of Shaftesbury. Although often the object of attack, his ideas stimulated discussion and influenced many subsequent writers, notably George Berkeley and Francis Hutcheson. His doctrine of ethical aestheticism, which he formulated at the turn of the century, is in the tradition of the moral analogy and has its roots in Platonism. The implication for functionalism of this theory is limited to this one point, but he presented his thesis with insistence and he was to a large extent responsible for the perpetuation of the idea that art should be judged by moral standards.

According to Shaftesbury, beauty and morality were intimately related; however, beauty of form or aesthetic beauty was but an inferior order of beauty compared to moral beauty. The laws of beauty find their fullest and most significant expression in the realms of ethics and morals rather than in the realm of material things, yet all of these are related. "Who can admire the outward beauties, and not recur instantly to the inward, which are the most real and essential, the most naturally affecting, and of the highest pleasure, as well as profit and advantage?" [2] asks Shaftesbury. So firm was Shaftesbury in his Platonic conviction that physical or material beauty was of the same order as moral beauty, that in his *Advice to an Author* (Part III, section 3), he states that the cultivation of a taste for the arts was a preparation for moral development.[3]

[1] *Science and the Modern World*, p. 83.

[2] Shaftesbury, *Miscellaneous Reflections*, Miscellany III, chapter II, note, as quoted in Allen, *Tides in English Taste*, I, 86.

[3] *Ibid.*

The satirical lines from the Fourth Epistle of Alexander Pope's *Moral Essays* (1731), addressed to Richard Boyle, the Earl of Burlington, are directed against the pompous, overdecorated Baroque ducal mansion; but in addition to witty ridicule of thoughtless imitation of the past, useless expense, and the blind following of formal rules of composition, the lines show the positive characteristics of thought which were behind the developing neoclassic style, viz., a confidence that the essentially moral principles of beauty and order in nature can be rationally understood and embodied in art, and that for architecture this embodiment of nature's principles means practical and useful form.

> You show us, Rome was glorious, not profuse,
> And pompous buildings once were things of use.
> Yet shall (my Lord) your just, your noble rules,
> Fill half the land with imitating fools
> Who random drawings from your sheets shall take,
> And of one beauty many blunders make;
> Load some vain church with old theatric state,
> Turn arks of triumph to a garden-gate;
> Reverse your ornaments, and hang them all
> On some patch'd dog-hole ek'd with ends of wall;
> Then clap four slices of plaster on't,
> That, lac'd with bits of rustic, makes a front:
> Shall call the winds thro' long arcades to roar,
> Proud to catch cold at a Venetian door:
> Conscious they act a true Palladian part,
> And if they starve, they starve by rules of Art.
>
> . . .
>
> Something there is more needful than expense,
> And something ev'n to Taste—'tis Sense.
> Good Sense, which only is the gift of Heav'n,
> And tho' no science, fairly worth the sev'n. . . .
> To build, to plant, whatever you intend,
> To rear the column, or the arch to bend,
> To swell the terrace, or to sink the grot,

> In all, let Nature never be forgot. . . .
> 'Tis use alone that sanctifies expense,
> And splendor borrows all her rays from sense.[4]

Pope's attack on Baroque eccentricities was one manifestation of a widespread preoccupation among British literary critics, from the Restoration to the middle of the eighteenth century, with simplicity of style and what Santayana has called "the idealization of the familiar"; these critics continued to apply the criteria of clarity, simplicity, and fitness which were stressed by such classical critics as Longinus, Demetrius, Cicero, and Quintilian.[5]

Francis Hutcheson condemned the current philosophical practice of dividing the pleasures which human nature is capable of receiving into two sharp divisions: sensible (trifling) and rational (significant). He developed Shaftesbury's doctrine into an expanded idea of the senses in his book, *An Inquiry into the Original of Our Ideas of Beauty and Virtue* (1725).[6] In this book Hutcheson restated Locke's distinction between *inner* and *outer* sense, and extended inner sense to include moral and aesthetic senses. The perception of beauty, Hutcheson maintained, was the manifestation of a special sense of beauty. Good taste is nothing more or less than a well-developed sense of beauty. There is also a rational pleasure, distinct from the sensible, which we derive from art. Extrarational factors such as association, prejudice, custom, education, and example also influence our enjoyment of a work of art. There are two types of beauty: absolute or original beauty, and relative or comparative beauty. The basic condition of absolute beauty was found by Hutcheson to be the principle of uniformity amidst variety whereas relative or com-

[4] *The Poetical Works of Alexander Pope*, ed. by the Rev. H. E. Cary, pp. 280–284.

[5] Bate, *From Classic to Romantic, Premises of Taste in Eighteenth-Century England*, p. 8.

[6] This book was first published in 1725. The edition consulted was a reprint of the fourth edition of 1738.

parative beauty arises largely from adaptation to necessities. Proportion gives us a form of relative beauty. Taste was associated by Hutcheson with absolute beauty, as, he argued, it was independent of any knowledge of principles, proportions, causes, or the influences of an object. These are the general ideas of Hutcheson's aesthetic.[7] Let us examine his protofunctionalist ideas.

While he did not make a direct comparison of the beauty of architecture with the beauty of machines, Hutcheson saw that the same artistic principles applied to machines as to architecture or any art form. Beauty arising directly from mechanism is a form of relative or comparative beauty.[8] This pleasure transcends selfish interest. It is a form of rational delight. "Every one has a certain pleasure in feeling any design well executed by curious mechanism, even when his own advantage is in no way concerned; and also in discovering the design to which any complex machine is adapted, when he has perhaps had a general knowledge of the machine before, without feeling its correspondence or aptness to execute any design." [9] Machines please us because they are evidence or proof of wisdom. "Wisdom," Hutcheson observed, "denotes the pursuing of the best ends by the best means."[10]

> When we see any machine with a great complication of parts actually obtaining an end, we justly conclude, that since this could not have been the effect of chance, it must have been intended for that end, which is obtained by it; and then the ends or intentions being in part known, the complications of organs, and their nice disposition adapted to this end, is evidence, of a comprehensive large understanding in the cause, according to the multiplicity of parts, and the appointments of their structure, even when we do not know the intentions of the whole." [11]

[7] Hutcheson, *Inquiry*, Preface and Treatise I.
[8] *Ibid.*, pp. 23, 24.
[9] *Ibid.*, p. 40.
[10] *Ibid.*, p. 59.
[11] *Ibid.*, pp. 59, 60.

"There is another kind of beauty from which we conclude wisdom in the cause as well as design." It is that beauty which we experience "when we see many useful or beautiful effects flowing from one general cause," i.e., economy of forces. According to Hutcheson, "there is a very good reason for this conclusion among men." Self-interest leads men, who are "beings of limited powers" and "incapable of a great diversity of operations and distracted by them," to prefer economy of forces, "and look upon such management as an evidence of wisdom in other beings like themselves." [12] Thus economy of forces pleases as a kind of beauty because it answers a basic human need for comprehensibility. Hutcheson then goes on to point out a connection between this pleasure which men feel in observing many effects flow from a single cause with the principle of absolute beauty.

> Nor is this speculative reason all which influences them; for even besides this consideration of interest, they are determined by a sense of beauty, where that reason does not hold; as when we are judging of the productions of other agents about whose economy we are not solicitous. Thus, who does not approve of it as a perfection in clockwork, that three or four motions of the hour, minute, and second hands, and monthly plate, should arise from one spring or weight, rather than from three or four springs or weights, in a very compound machine, which should perform the same effects, and answer all the same purposes with equal exactness? Now the foundation of this beauty plainly appears to be an uniformity, or unity of cause amidst diversity of effects." [13]

The interest in the beauty of mechanical efficiency shown by such early eighteenth-century British writers as Hutcheson, Berkeley, and Hume, appears at the beginning of the industrial revolution in England. Their interest is symptomatic of a spirit which is manifest at

[12] *Ibid.*, p. 60.

[13] *Ibid.*, pp. 60, 61. See Philip Johnson, *Machine Art* (New York, W. W. Norton and Co., 1934), for modern examples of the more purely formal (absolute) beauty contrasted with the functionally expressive (relative) beauty of various mechanical products.

the outset of the Industrial Revolution rather than something which resulted from it. Newcomen's steam engine did not revolutionize daily life in Hutcheson's day; it was solely at work, after 1705, pumping water from the English collieries. The manufacture of cloth was not revolutionized by the flying shuttle and roller spinning until the years after 1733, when Hutcheson's *Inquiry* was already in its third edition. Although daily life had not been revolutionized by applied mechanical inventions, there were many intricate and ingenious machines in service by 1725. Before he began his *Inquiry*, Hutcheson must have been familiar with some of the devices for controlling water power, mechanical dolls, and the Newcomen engine as well as mechanical clocks.

It is noteworthy that Hutcheson was among the first aestheticians to elevate the principle of mechanical efficiency to a principle of beauty, but we have observed that this was vaguely anticipated by François Blondel. Socrates and Aristotle admired objects produced by industry and found them beautiful as embodiments of the idea of fitness for purpose, but with the coming of the Industrial Revolution philosophers of art saw beauty in the machinery of industry and regarded the machine as the embodiment of mechanical efficiency, a principle of beauty. The question of beauty is now seen to involve what a thing does as well as what can be done with a thing, and the relationship of both of these factors to the appearance of the object.

Organic beauty of form arising from adaptation to necessities of environment was, like mechanical beauty, classified by Hutcheson in the category of relative or comparative beauty.

> This beauty arising from correspondence to intention, would open to curious observers a new sense of beauty in the works of nature, by considering how the mechanism of the various parts known to us, seems adapted to the perfection of that part and yet in subordination to the good of some system or whole. We generally suppose the good of the greatest whole, or of all beings, to have been the intention of the Author

of nature; and cannot avoid being pleased when we see any part of this design executed in the systems we are acquainted with.[14]

In nature, all is design. Irregularity does not prove want of design. "There is no form in nature concerning which we can pronounce, 'it has no beauty'; for it may still please some perceiving powers." [15] But God has implanted in us our sense of absolute beauty so that we see beauty in uniformity or regularity. It is part of the divine plan and it must serve God's purpose. Our internal sense of nature (our sense of order, harmony, beauty) is arbitrary, yet it is part of the system of general laws which govern the universe and which result in variety within the general uniformity of all things.[16] Thus natural as well as mechanical objects possess absolute, in addition to relative, beauty.

Hutcheson distinguished between our sense of beauty and moral sense.[17] We have a separate sense of morality just as we have a sense of beauty. The full nature of Hutcheson's "moral sense" need not be described here, but some aspects of it must be considered. Hutcheson insists that our perception of moral good and evil is different from "natural good or advantage." Further, our attitude toward a "commodious habitation" is not the same as toward a "generous friend or any noble character," although both may be advantageous to us.[18] Our moral sense is a sensitivity to the beauty of virtue. "We have a distinct perception of beauty or excellence in the kind affections of rational agents; whence we are determined to admire and love such

[14] Hutcheson, *Inquiry*, p. 40.

[15] *Ibid.*, p. 58.

[16] See *ibid.*, pp. 41 ff.

[17] See esp. Treatise II, pp. 95 ff. The term "moral sense" (the *sensus decori et honesti* of ancient moralists) came into use early in the eighteenth century as a substitute for conscience, to indicate perception of moral qualities in a way analogous to the perception of physical beauty. It is so employed by Shaftesbury, in his *Inquiry Concerning Virtue* (1699), and afterwards by Hutcheson.

[18] *Ibid.*, p. 100.

characters and persons." [19] The basis of virtue is benevolence or good will, not merely usefulness to others. "Nay . . . the actions which in fact are exceedingly useful, shall appear void of moral beauty, if we know they proceed from no kind intentions towards others." [20] Works of art may be an expression of benevolent intent and thus possess moral beauty. Hutcheson maintained that the moral sense is the greatest source of pleasure and pain, and the moral pleasures are "the most delightful ingredient in the ordinary pleasures of life," including the perception of beauty, order, and harmony.[21] He saw a great moral necessity behind our sense of beauty. God has joined a sense of pleasure to the contemplation of those objects which a finite mind can best comprehend, which are most efficacious and fruitful to mankind, and those ideas which most enlarge our minds.[22] Thus we see that for Hutcheson, as for Shaftesbury, the beauty of morality held a higher place than the beauty of form. But it is significant to observe that he did not propose to judge art by specifically moral standards, instead he sought to determine the place of formal beauty in the essentially moral and rational order of God's universe.[23]

While Hutcheson belongs to the large group of writers who thought in terms of a dichotomy of beauty—absolute and relative—he attempted a synthesis. He was a protofunctionalist in so far as he regarded the beauty of mechanism or adaptation to necessities as the principal form of relative beauty; moreover, he saw that the two types of beauty often appeared in integrated coexistence in mechanical and organic form.

Hutcheson's contemporary, George Berkeley, was a more thoroughgoing functionalist. Berkeley's theory of beauty can be found in his

[19] *Ibid.*, p. 101.
[20] *Ibid.*, p. 151.
[21] *Ibid.*, p. 223.
[22] See *ibid.*, p. 92.
[23] *Ibid.*, pp. 40–41 note.

Essay Towards a New Theory of Vision (1709), and *Alciphron* (1732).[24] Berkeley opposed the concept of moral sense which was put forth by Shaftesbury and Hutcheson. He also rejected the dichotomy of beauty, maintaining that all beauty can be apprehended only by relating the form of the object with its use. Hutcheson added a footnote to the fourth edition of his *Inquiry into the Original of Our Ideas of Beauty and Virtue* (1738), expressing his surprise at and objection to Berkeley's anti-moral-sense arguments and his extreme functionalism.

Berkeley also denied that men have a special sense or instinct for beauty. In his *Theory of Vision* he states that vision is a faculty of the soul. God has implanted in all men an arbitrary connection between nature and our soul which men can effect by experience and reflection. What is called seeing is really interpreting the prophetic language of nature that is continuously presented to our sight by God. The sensuous phenomena of experience are equivalent to words spoken by God.[25] We are reminded of Witelo's interpretation of vision as an active phenomenon of the soul which gives mankind the power and capacity to comprehend God's perfect order.[26] Berkeley's interpretation of vision is fundamentally medieval. Not only the work of art but the entire world of nature has an anagogical function.

Berkeley's functionalism can be found in *Alciphron or The Minute Philosopher*, the largest and one of the most popular of his works, written during the author's sojourn in Rhode Island. Berkeley used the classical dialogue form in which to put forth his ideas, which

[24] To these might be added *The Theory of Vision or Visual Language, Vindicated and Explained*, which Berkeley wrote in answer to an anonymous letter criticizing his original essay published in the *Dublin Daily Post-Boy* of September 9, 1732. The later work is a more complete restatement of the original essay on the theory of vision.

[25] See *The Works of George Berkeley*, ed. by Alexander Campbell Fraser, II, 399, 400.

[26] See p. 38 *supra*.

for the most part are intended to combat deism and moral-sense philosophy. The dialogist Euphranor, whose main function is to reveal the rational element in religion, expresses Berkeley's views on the nature of beauty. All beauty depends on subserviency to ends and uses. The perception of beauty depends on a knowledge of use hence we see beauty with the eye of reason.[27] An alternate to "use" is admitted; it is "appearance of use." In his explanation of the beauty of classical Greek entablatures, Euphranor maintains that "their beauty riseth from the appearance of use, or the imitation of natural things, whose beauty is originally founded on the same principle." [28] This is seen as the important difference between Greek and Gothic architecture, especially architectural sculpture. Gothic is regarded as "fantastical, and for the most part founded neither in nature nor in reason, in necessity nor use," whereas Greek architecture is regarded as deriving all its "beauty, grace, and ornament" from this basis.[29] Crito adds his opinion that Greek architecture is founded on truth, nature, and good sense; it is not tied down by arbitrary rules. "This latitude or license," Crito laments, "might not, perhaps, be safely trusted with most modern architects, who in their bold sallies seem to act without aim or design; and be governed by no idea, no reason, or principle of art, but pure caprice. . . ." [30]

Moral considerations are of the utmost importance to Berkeley, and the *Alciphron* dialogue is primarily concerned with them. Berkeley only hinted at the connection between his functional theory of beauty and his moral philosophy. We have already observed Crito's opinion that Greek architecture is founded on truth, nature, and good sense. In the same discourse he adds that personal notions of taste should not govern architecture, but rules, precepts, and

[27] Fraser, *Works of Berkeley*, II, pp. 133–36, 138.
[28] *Ibid.*, p. 136.
[29] *Ibid.*, pp. 136, 137.
[30] *Ibid.*, p. 137.

morals.[31] When he attacked the idea that virtue or moral sense is independent of religion, Berkeley, speaking through the mouth of Euphranor, used his functional theory of beauty to prove his religious and moral philosophy. "I would fain know what beauty can be found in a moral system, formed, connected, and governed by chance, fate, or any other blind, unthinking principle? Forasmuch as without thought there can be no end or design; and without an end there can be no use; and without use there is no aptitude or fitness of proportion, from whence beauty springs." [32] Then, through the mouth of Crito, Berkeley sketches his conception of the perfect economy of the universe, a City of God, a society of persons in intercommunication through data of senses, all ideally united in God, "concurring in one design to promote the common benefit of the whole, and conforming their actions to the established laws and order of the Divine parental wisdom." [33] Euphranor calls attention to the wisdom embodied in nature, especially in organisms, a wisdom far surpassing the wisdom shown by man-made machines; moreover, everything in nature conspires to one and the same end and fulfills the same design.[34] Unfortunately, Berkeley did not carry this line of reasoning to the point where he could clarify the precise relationship between his functional theory of beauty and his philosophy of nature and morality.

We have seen that for Berkeley, the significance of nature or in nature is ultimately based on faith in the power universally at work in nature. God animates the whole material world as a man animates his own body. Sensible things are the symbol and sacrament of Omnipresent Deity. Nature is essentially supranatural. Berkeley fails to articulate the connection between physical order, morality, and beauty. He also fails to clarify why forms perfect for their use are,

[31] *Ibid.*
[32] *Ibid.*, p. 138.
[33] *Ibid.*, pp. 138, 139.
[34] See *ibid.*, p. 160.

per se, beautiful. Although he maintained that everything in nature serves God's purpose, he did not specifically say that is why all of God's creations are beautiful.

Berkeley's emphatic, but incompletely reasoned, functionalism may be compared and contrasted with the point of view of David Hume. Hume was stimulated by John Locke and Francis Hutcheson. We learn from a letter which Hume addressed to his physician in 1734 that his philosophy originated in his preoccupation with moral questions.[35] His developed thinking is characterized by skepticism and empiricism. He developed a functional theory of beauty which, unlike Berkeley's essentially religious viewpoint, was part of a utilitarian social philosophy.

Hume's general view of beauty was founded on an exceedingly simple psychology. He used the term "feeling" as an omnibus term. It was his general title for all the various manifestations of our "sensitive nature." He did not analyze such terms as "feeling," "passion," and "sentiment." [36] Hume did not define beauty or attribute our perception of it to a special sense. Beauty, he maintained, can be discovered but not defined: it is a form which produces pleasure. Beauty exists in the contemplating mind, not in the object observed. What pleases is that which we find by experience to be pleasurable, therefore rules of art must be founded on general experience and on the common sentiments of human nature.

References to beauty are scattered throughout the philosophical writings of David Hume. They can be found in his youthful *Treatise of Human Nature* (1739–40), wherein Hume contrasted beauty and deformity. Here also we find a statement of his functionalist position. Beauty produces pleasure and deformity produces uneasiness or pain. This applies to animate or inanimate objects.[37] "A great part of the

[35] Smith, *The Philosophy of David Hume,* pp. vi, vii.
[36] *Ibid.,* pp. 547, 548.
[37] Hume, *Philosophical Works,* II, 31.

beauty which we admire in animals or in other objects is derived from the idea of convenience or utility. . . . That shape which produces strength is beautiful in one animal; and that which is the sign of agility in another." [38] In everything that is useful, the principle of its beauty is its usefulness. "Thus, the convenience of a house, the fertility of a field, the strength of a horse, the capacity, security, and swift-sailing of a vessel, form the principal beauty of these several objects. Here the object, which is denominated beautiful, pleases only by its tendency to produce a certain effect." [39] Most works of art and many works of nature are esteemed beautiful in proportion to their fitness for the use of man.[40]

The case for functionalism which Hume presented was closely interwoven with his moral and social philosophy. The relationship of morality and beauty is introduced in the *Treatise of Human Nature* and elaborated in *Essays, Moral, Political, and Literary* (1741–42), *An Inquiry Concerning Human Understanding* (1748), and *An Inquiry Concerning the Principles of Morals* (1751).

Taste is related to moral sense; in fact, it is conditioned by our moral sense. Because of our moral sense, that which is socially most desirable gives us the greatest pleasure. This applies to the appreciation of art or to moral judgment. Hume set out to find the common element in aesthetic and moral judgment and found it to be the sentiment of sympathy.

When we feel the pleasure of beauty on viewing a useful object whose usefulness is designed for the advantage of some other person, we are pleased because of our sympathy for that person. The sentiment of sympathy is behind our sense of the beauty of useful things.[41] The principle of sympathy is also a powerful principle of our moral sense. "The same principle produces, in many instances, our senti-

[38] *Ibid.*, II, 32.
[39] *Ibid.*, II, 363.
[40] See *ibid.*, II, 364.
[41] *Ibid.*, II, 363.

ment of morals, as well as those of beauty," he wrote. Justice, modesty, and good manners "are mere human contrivances for the interest of society. . . . Now, as the means to an end can only be agreeable where the end is agreeable, and as the good of society, where our own interest is not concerned, or that of our friends, pleases us only by sympathy, it follows, that sympathy is the source of the esteem which we pay to all the artificial virtues." [42] In general, "qualities acquire our approbation because of their tendency to the good of mankind." [43]

Thus we see that, for Hume, usefulness to society was the primary standard of judgment of works of art or problems of morality. Although he lived in an age which placed great faith in the power of reason, Hume did not emphasize the rôle of the rational faculty in artistic judgment. It is sentiment, or feeling, which governs our perception of beauty. Reason marshals the facts and points out the relations; final judgment depends upon sympathy.[44] At one point, Hume approached the idea of empathy in aesthetic experience when he stressed the delicacy of feeling involved. One actually suffers from jarring sounds. "In every judgment of beauty, the feelings of the person affected enter into consideration, and communicates to the spectator similar touches of pain or pleasure." [45]

The social and utilitarian point of view of David Hume is reflected in the work and writings of the English architect, William Halfpenny. In the preface of his *New and Compleat System of Architecture* (1749) he wrote:

As necessity was the parent of building, convenience should be the Architect's first view; this in the following designs I have made the principal and the foundation; as to beauty and magnificence, they are schemes inexhaustible, simplicity is the basis of beauty; as decoration is of magnifi-

[42] *Ibid.*, II, 364.
[43] *Ibid.*
[44] *Ibid.*, IV, 368–73.
[45] *Ibid.*, IV, 299.

cence; harmony is the result of the first, and proportion elegantly compos'd is the certain effect of the latter; and in these I have us'd all possible diligence to regulate the whole in the neatest and most exact manner, with regard as well to convenience, as to beauty and decoration.[46]

Three years later, publishing under the significant title, *Useful Architecture*, Halfpenny presented twenty-one designs of simple, inexpensive, unadorned structures such as farm houses, parsonages, and inns. He prefaced his designs with the statement: "But the Truth will ever stand uncontested, that more real Beauty and Elegance appears in the due Symmetry and Harmony of a well-constructed Cottage, than can be found in the most exalted Palace, where Variety of frippery Inventions can never make good the least Deficiency of Proportion. . . ." [47]

William Hogarth's *Analysis of Beauty* (1753) includes many references to the beauty of fitness. The "line of beauty" was only a small part of the artist's aesthetic. Hogarth was not as extreme in his emphasis on functionalism as Berkeley or Hume; he acknowledged that there were many principles involved in the production of beauty: fitness, variety, uniformity, simplicity, intricacy, and quantity, all of which "cooperate in the production of beauty, mutually correcting and restraining each other occasionally." Variety and intricacy suggest Rococo design, whereas simplicity and fitness portend the new emphasis. But Hogarth stressed the importance of fitness.[48]

According to Hogarth, fitness is of the greatest consequence in the production of beauty. "This is so evident, that even the sense of seeing, the great inlet of beauty, is itself so strongly biased by it,

[46] Halfpenny, *A New and Compleat System of Architecture Delineated*, p. 1.

[47] This book and Halfpenny's *New and Compleat System* show a change in the author's earlier attitude toward proportion. In *Practical Architecture*, which reached a fifth edition in 1730, tables were presented giving the exact proportions of the orders, doors, windows, and various other parts of buildings. The later books do not present mathematically predetermined proportions.

[48] *The Analysis of Beauty*, p. 48.

that if the mind, on account of this kind of value in a form, esteem it beautiful, though on all other considerations it be not so, the eye grows insensible of its want of beauty, and even begins to be pleased, especially after it has been a considerable time acquainted with it." [49] The beauty of bulks and proportions depends on fitness. Hogarth contended that good proportion arises, "chiefly from a fitness to some designed purpose or use." In addition, good proportion is an outgrowth of all the other secondary ideas of beauty which only comprehend "the surface of form, viewing it in no other light than merely as being ornamental or not." [50]

Hogarth admired the mechanical perfection of machines and regarded this as tantamount to beauty. He observed how "in shipbuilding the dimensions of every part are confined and regulated by fitness for sailing. When a vessel sails well, the sailors call her a *beauty*; the two ideas [fitness and beauty] have such a connection!" [51] On the other hand, Hogarth contrasted "the living machines of nature, in respect of fitness, and such poor ones, in comparison with them, as men are only capable of making." To illustrate this, he described a clock, made by a Mr. Harrison on the government's order, for keeping true time at sea. This clock evidently contained awkward and apparently superfluous parts whereas "in nature's machines," Hogarth exclaims, "how wonderfully do we see beauty and use go hand in hand!" [52]

A large share of Hogarth's analysis of beauty consists of an analysis of a variety of natural forms. He regarded the beauty of "nature's machines" as proof of his thesis that the utmost beauty of proportion comes from perfect fitness. However, Hogarth was not sure that all forms in nature have a practical purpose: some seem

[49] *Ibid.*, pp. 49, 50.
[50] *Ibid.*, pp. 123, 124.
[51] *Ibid.*, p. 51.
[52] *Ibid.*, pp. 128, 129.

ornamental, as the designs on butterfly wings or shell patterns.[53] The greatest of "nature's machines," and the most perfectly proportioned, is, according to Hogarth, the human body; but here he distinguishes different types of beauty because there are different types of fitness. To illustrate this, Hogarth compared the figures of Mercury and Hercules with the race horse and the war horse, and concluded that each part as well as the whole must be regarded from the point of view of fitness for its purpose, and to interchange parts "would disgust and deform, instead of adding beauty; because the judgment would condemn it as unfit." [54]

The emphasis upon the value of fitness continued in the writings of the architect Isaac Ware, whose book, *A Complete Body of Architecture* (1756), was intended to make up for the neglect of this value. In his preface, the author condemns earlier books on architectural subjects.

> Those who have studied these things have in general considered the magnificence of building rather than its use. Architecture has been celebrated as a noble science by many who have never regarded its benefits in common life: we have endeavoured to join these several parts of the subject, nor shall we fear to say that the art of building cannot be more grand than it is useful; nor its dignity a greater praise than its convenience. From the neglect of this consideration, those who have written to inform others of its excellence, have been too much captivated by its pomp, and have bestowed in a manner all their labour there, leaving the more serviceable part neglected.[55]

Ware's principal concern was for the necessary and useful. His extremely practical attitude is shown by his avoidance of rules of architecture and definitions of terms such as "beauty" or "good proportion." Instead, he approaches architecture from the point of view of optimum use of the site, and consideration for the nature of

[53] *Ibid.*, p. 53.
[54] *Ibid.*, p. 52.
[55] Ware, *A Complete Body of Architecture*, p. 1.

materials. Ware's over-cautious avoidance of aesthetic issues indicates lack of familiarity with the theoretical development of the idea of fitness which had been advanced by Berkeley, Hume, and Hogarth.

In his *Philosophical Inquiry into the Origin of Our Ideas of the Sublime and Beautiful* (1757), Edmund Burke inquired into the nature of taste and beauty and discussed the qualities in objects which he thought were the cause of their beauty or sublimity. According to Burke, beauty is neither a separate faculty of the mind nor an instinct: "Beauty is for the greater part, some quality in bodies acting mechanically on the human mind by the intervention of the senses." [56] He sought beauty in certain dispositions of sensible qualities rather than in rational or moral qualities. Burke found beautiful objects small. ("Sublime" is his word for the beauty of vastness.) Smoothness is another formal characteristic of beautiful objects. Gradual variation (the absence of monotonous, brutal, or awkward parts) is another. Delicacy of form (just the right amount of strength and mass, neither too much nor too little), is another. Clear, clean, and mild (harmonious) color is another quality. Burke thus excluded fitness as a quality of beautiful objects, but he did not say that fitness is of no value in a work of art. The idea of fitness is implied in his concepts of gradual variation and delicacy; moreover, he stressed the principle that good proportion is a result of fitness. In fact, he maintained that there is no other way of achieving good proportion save by forming objects so as to achieve fitness for function. But proportion and beauty are separate concepts in Burke's theory. Proportion elicits the cold approbation of reason. Beauty elicits a warmer response. In his chapter on "The Real Effect of Fitness," Burke wrote:

[56] Burke, *A Philosophical Inquiry into the Origin of Our Ideas of the Sublime and Beautiful with an Introductory Discourse Concerning Taste*, adapted by Abraham Mills, p. 141.

When I excluded proportion and fitness from any share in beauty, I did not, by any means, intend to say that they were of no value, or that they ought to be disregarded in works of art. Works of art are the proper sphere of their power; and here it is that they have their full effect. . . . The effect of proportion and fitness, at least so far as they proceed from a mere consideration of the work itself, produces approbation, or the acquiescence of the understanding, but not love, nor any passion of that species. . . . In beauty, as I said, the effect is previous to any knowledge of use; but to judge of proportion, we must know the end for which any work is designed. According to the end the proportion varies. . . . Good sense and experience, acting together, find out what is fit to be done in every work of art. We are rational creatures, and in all our works we ought to regard their end and purpose; the gratification of any passion, how innocent soever, ought to be of secondary consideration. Herein is placed the real power of fitness and proportion; they operate on the understanding considering them, which *approves* the work, and acquiesces in it.[57]

Two years after the publication of Burke's *Inquiry*, Adam Smith's *Theory of Moral Sentiments* was issued. Smith devoted a large part of this book to a discussion of the beauty which the appearance of utility bestows upon all the productions of art, the extensive influence of this species of beauty, and the beauty which the appearance of utility bestows upon the character and actions of men.[58] Adam Smith's concepts of moral sense and sense of beauty are related to those of Hutcheson and Hume. The latter was generous in his warm and friendly praise of Smith's work. In his letter to Smith written shortly after the publication of the economist's *Theory of Moral Sentiments*, Hume stated that he gave five copies of the book to that many men, including Horace Walpole and Edmund Burke, "an Irish gentleman, who wrote lately a very pretty treatise on the Sublime."[59] Smith's interest in utility derives primarily from its

[57] *Ibid.*, pp. 133–35.
[58] Smith, *The Theory of Moral Sentiments*, ed. by Dugald Stewart, pp. 255 ff.
[59] Letter dated April 12, 1759; *ibid.*, p. xxxviii.

effect upon the moral sentiments; however we can find in his treatise not only a tendency to identify beauty and utility, but also references to the mechanic and moral analogies.

According to Adam Smith, the fitness of a machine bestows a beauty on it. A building is like a machine in that respect. Utility is not the only source but it is one of the principal sources of beauty.[60] Utility pleases because "the spectator enters by sympathy into the sentiments of the master, and necessarily views the object under the same agreeable aspect" which the master experienced in the process of creation; we find added pleasure in discovering the intent or purpose of the creator.[61]

Adam Smith observed that sometimes the quality of fitness is valued more than the actual end which the object is designed to accomplish. We enjoy fitness for its own sake. He pointed out that this aspect of the problem of utility had hitherto been neglected, despite the fact that it applies to some of the most important as well as the most frivolous concerns of human life. Smith gave as one illustration the displeasure which a man feels on entering a room wherein the chairs are standing about in the middle of the room. He is willing to go to the trouble to replace the chairs with their backs to the walls rather than see them continue in that disorder.

> The whole propriety of this new situation arises from its superior conveniency in leaving the floor free and disengaged. To attain this conveniency he voluntarily puts himself to more trouble than all he could have suffered from the want of it; since nothing was more easy than to have set himself down upon one of them, which is probably what he does when his labour is over. What he wanted therefore, it seems, was not so much this conveniency, as that arrangement of things which promotes it. Yet it is this conveniency which ultimately recommends that arrangement the whole of its propriety and beauty.

[60] *Ibid.*, p. 257.

[61] *Ibid.*, p. 258. Here Adam Smith, like Hume, approaches the idea of empathy.

Smith gives as another illustration the man who sells his watch because it falls behind two minutes a day. This same man may not be scrupulously punctual in his habits nor need a perfectly accurate instrument for recording time. "What interests him is not so much the attainment of this piece of knowledge, as the perfection of the machine which serves to attain it." He observed that toys and trinkets of frivolous utility also please, but what pleases, "is not so much the utility as the aptness of the machines which are fitted to promote it." Smith also interprets in terms of utility the ambitious struggle of a poor man's son to become wealthy. The youth will subject himself to more inconvenience during the struggle than the convenience he may ultimately acquire through wealth if he should attain it. It is not the convenience, that goads him on.[62]

Thus we see that Adam Smith was one of the first to distinguish two types of pleasure which come from the contemplation of useful form; he saw that it was easy to confuse the pleasure which comes from the convenient arrangement and the pleasure which comes from the beauty of an arrangement fitted to produce convenience. Palace architecture and living standards are striking illustrations.

> We are then charmed by the beauty of that accommodation which reigns in the palaces and economy of the great; and admire how everything is adapted to promote their ease, to prevent their wants, to gratify their wishes, and to amuse and entertain their most frivolous desires. If we consider the real satisfaction which all these things are capable of affording, by itself and separated from the beauty of that arrangement which is fitted to promote it, it will always appear in the highest degree contemptible and trifling. But we rarely view it in this abstract and philosophical light. We naturally confound it in our imagination with the order, the regular and harmonious movement of the system, the machine or economy by means of which it is produced. The pleasures of wealth and greatness, when considered in this complex view, strike the imagination as something grand, and beautiful, and noble, of which the attain-

[62] *Ibid.*, pp. 258, 259.

ment is well worth all the toil and anxiety which we are so apt to bestow upon it.[63]

We are the victims of a kind of "natural deception" which "keeps in continued motion" the industry and institutions of mankind. Even when things tend to promote the public welfare, men tend to lose sight of the true ends and become engrossed in the means. "From a certain spirit of system, however, from a certain love of art and contrivance, we sometimes seem to value the means more than the end, and to be eager to promote the happiness of our fellow-creatures rather from a view to perfect and improve a certain beautiful and orderly system than from any immediate sense or feeling of what they either suffer or enjoy." [64] Aside from its implications for the aesthetic of utility, this statement by Smith is a direct criticism of the social motives of Baroque absolutistic government.

Adam Smith was in agreement with Hume on the point that ideas of virtue are derived from ideas of utility, and he too stressed the distinction between the merely useful and the socially desirable.[65] He gives the name "propriety" to the right relationship between a beneficial act and the good will of the doer. Accidental or incidental benefit is not the expression of propriety. Smith maintained that our sentiment of approbation always involves our sense of propriety as well as our sense of utility, hence it is involved in aesthetic experience as well as in the ordinary active affairs of life. When we discover the propriety of something as well as its utility, we enjoy a "new beauty" which still further recommends it to our approbation. "This beauty, however, is chiefly perceived by men of reflection and

[63] *Ibid.*, p. 263.

[64] *Ibid.*, pp. 265, 266.

[65] *Ibid.*, pp. 270 ff. Smith did not realize that Hume took the same point of view as he did, hence he criticized Hume for resolving "our approbation of virtue into a perception of this species of beauty which results from the appearance of utility," without realizing that "utility" for Hume, implied the socially desirable. Cf. pp. 88–89 *supra*.

speculation, and is by no means the quality which first recommends such actions to the natural sentiments of the bulk of mankind." [66] Propriety, in Smith's usage, is a quality of actions whereas utility is a quality of objects. A finished product may have utility, but the sentiment behind the creation of the product determines the propriety of the act of making which will be associated with the finished product.[67] Propriety is a matter of the motive behind the action, "the sentiment or affection of the heart from which any action proceeds, and upon which its whole virtue or vice must ultimately depend." [68]

Throughout his book, Adam Smith connected ideas of beauty with ideas of virtue. He frequently compared our sense of beauty and deformity with our sense of right and wrong. He believed in the perfect economy of nature, but from this he drew a lesson for morality rather than purely for art: Nature makes all men desire and strive after her own ends.[69] He did not use the organic analogy to illustrate or support his thesis that utility is the principal source of beauty. In another connection, however, Smith introduced the mechanic analogy to illustrate a moral point. In discussing the sentiment of approbation of virtuous action he observed, "when we consider such actions as making a part of a system of behavior which tends to promote the happiness either of the individual or of society, they appear to derive a beauty from this utility, not unlike that which we ascribe to any well-contrived machine." [70]

Another eighteenth-century English contributor to the theory of the fine arts whose ideas in many respects prefigure modern functionalism was Henry Home, Lord Kames. Kames's point of view toward architecture is presented along with his general theory of

[66] *Ibid.*, p. 276.
[67] *Ibid.*, pp. 1 ff.
[68] *Ibid.*, p. 17.
[69] *Ibid.*, p. 103.
[70] *Ibid.*, p. xxx.

art in his *Elements of Criticism*, dedicated to King George III in 1761.

According to Kames, the fine arts were a subject of reasoning as well as of taste, but the attributes, relations, and circumstances of the fine arts were chiefly employed to raise agreeable emotions.[71] This is the special province of the fine arts. Some things raise emotions directly by means of their properties and qualities: the size, force, and fluency of a river contribute to raising an emotion of beauty in the observer, and the regularity, propriety, and convenience contribute to the emotion evoked by a fine building.[72] Kames stressed the importance of the "train of perceptions and ideas," a kind of association process. This train, Kames insisted, should be allowed (1) to follow its "natural" course, assuming the "order of nature," proceeding from "causes to their effect," (2) to follow in a historical sequence, or (3) to follow in a scientific (i.e., synthetic or analytic) chain.[73] In support of his demand that the course of our ideas, which art sets in motion, be "natural," Kames used the organic analogy.

> Every work of art that is conformable to the natural course of our ideas, is so far agreeable; and every work of art that reverses that course, is so far disagreeable. Hence it is required in every such work, that, like an organic system, its parts be orderly arranged and mutually connected, bearing each of them a relation to the whole, some more intimate, some less, according to their destination: when due regard is had to these particulars, we have a sense of just composition, and so far are pleased with the performance.[74]

Beauty, as Kames defined it, sometimes comprehended many particulars, sometimes but a few. He gave the name beauty to a group of emotions with certain common characteristics. He subdivided beauty into two types or kinds: intrinsic and relative. Intrinsic

[71] Kames, *Elements of Criticism*, I, 195.
[72] *Ibid.*, I, 36, 37.
[73] *Ibid.*, I, 17 ff.
[74] *Ibid.*, I, 27.

beauty, he believed, is purely sensory; it exists without relation to any other object. Color, size, figure, and motion are aspects of intrinsic beauty.[75] The emotions of relative beauty accompany an act of understanding and reflection. They are founded on the relation of objects: "relative beauty is that of means relating to some good end or purpose." [76] Intrinsic and relative beauty are frequently intimately connected. Natural forms such as the human body and the body of a horse possess both types of beauty in a high degree. They please "partly from symmetry, and partly from utility." [77]

It is significant that Kames's classification of relative beauty depends entirely on the perception of utility, and that utility is not just *any* use, but some *good* use. Furthermore, utility has such a strong appeal that it can make objects appear beautiful despite the lack of intrinsic beauty of any kind.[78]

Kames saw beauty in all kinds of instruments and engines, and he admired them for possessing the intrinsic beauty of simplicity as well as the relative beauty of utility. "No single property recommends a machine more than its simplicity; not solely for better answering its purpose, but by appearing in itself more beautiful." [79] The quality of simplicity, when governing behavior and manners, has a similar enchanting effect.[80] The great quality of simplicity, which, Kames observed, distinguished not only behavior but all the works of nature, machines, and laws of motion, was highly desirable in art. He decried what he regarded as "the fate of all the fine arts" to

[75] For Kames "figure" was a generic concept including proportion, order, regularity, symmetry, and simplicity. Note that he, unlike Berkeley, Hume, Hogarth, and Adam Smith, did not equate the beauty of proportion with fitness or utility. According to Kames, the perception of utility directly inspires a pleasurable emotion of beauty independent of the beauty of proportion. *Ibid.*, I, 195–99, 202.

[76] *Ibid.*, I, 198. Kames's analysis of beauty appears pp. 195–209.

[77] *Ibid.*, I, 199.

[78] *Ibid.*, I, 198, 199.

[79] *Ibid.*, I, 205.

[80] *Ibid.*

degenerate "from original candor and simplicity" into "artificial refinements." Kames preferred the Doric to the more ornate orders, and challenged a person of genius and taste "to restore ancient simplicity." [81]

The ethical strain in Kames's aesthetic appears also in his insistence upon congruity and propriety in art. When these basically moral or ethical concepts are embodied in art we react emotionally to them. According to Kames, this is a source of great satisfaction. It is a sense of congruity which determines the appropriateness of ornaments. For example, a music room or a playhouse may appropriately be ornamented richly.[82]

Kames regarded architecture as originally a purely useful art, but one which in its developed state aspires to be a fine art; that is, it aspires to invoke a variety of the pleasant emotions of beauty. "Every building ought to have a certain character or expression suited to its destination." [83] Kames saw architecture as rather limited in its variety of expressive possibilities; he felt that gardening was superior to architecture in this respect. In architecture, regularity, order, symmetry, simplicity, and utility unite to raise the emotions of beauty, and size alone raises the emotion of grandeur.[84] According to Kames, architecture was not far advanced beyond its primitive state of purely utilitarian art; attempts to give it a wide range of emotional expression were largely abortive.[85] Looking about him at the architecture of his day, Kames observed that "two things mainly are wanted. First, a greater variety of parts and ornaments than at present it seems provided with. . . . The other thing wanted to bring the art to perfection, is, to ascertain the precise impression

[81] Kames's discussion of simplicity appears *ibid.*, I, 204–6.
[82] *Ibid.*, I, 333–51.
[83] *Ibid.*, II, 433; see also II, 467.
[84] Kames's comparison of the expressive possibilities of gardening and architecture appears *ibid.*, II, 430 ff.
[85] *Ibid.*, II, 433.

made by every single part and ornament, . . . for in vain will an artist attempt rules for employing these, either singly or in combination, until the different emotions they produce be distinctly explained." [86]

At times, Kames referred to relative beauty as "perfection" and intrinsic beauty as "beauty." He did this in his analysis of gardening and architecture, but here, it is important to note, he regarded relative beauty "as of greater importance." [87] Distinguishing between buildings intended solely for use, those intended for ornament (that is, not intended for habitation) such as commemorative monuments, and those buildings which are intended both for use and ornament, Kames wrote: "In general, it is the perfection of every work of art, that it fulfills the purpose for which it is intended; and every other beauty, in opposition, is improper. But in things intended for ornament . . . beauty ought alone to be regarded." Buildings intended to be both useful and ornamental are a specially difficult problem. "The only practical method in such buildings is, to favour ornament less or more according to the character of the building: in palaces, and other edifices sufficiently extensive to admit a variety of useful contrivance, regularity justly takes the lead; but in dwelling-houses that are too small for variety of contrivance, utility ought to prevail, neglecting regularity as far as it stands in opposition to convenience." [88]

Sir Joshua Reynolds's discourses, delivered to students of the Royal Academy between the years 1769 and 1786, do not reveal a clear, well-organized philosophy of architecture, much less a specifically functionalist philosophy, but Reynolds did express certain general ideas related to the organic analogy which should be considered in connection with functionalist trends in the eighteenth

[86] *Ibid.*, II, 434.
[87] *Ibid.*, II, 456.
[88] *Ibid.*, II, 455.

century. Reynolds developed classical ideas derived from Plato, Aristotle, and Longinus. His point of view was that of the painter and critic of painting. One of Reynolds's chief concerns was the discovery of the beauty of nature for the purpose of artistic inspiration and imitation. Reynolds stressed the effect of fitness upon the proportions of the human body but neglected this effect upon the proportions of architecture. On the whole, Reynolds was less interested in the purely formal aspects of art than in its effect on the rational and emotional nature of man: the qualities of a grand and noble style. Usefulness or convenience, while it must not be sacrificed, was not, according to Reynolds, the basis of the beauty of architecture.[89]

Reynolds found beauty to be an attribute of nature. Roger Fry has called attention to the three ways in which Reynolds used the word "nature." [90] He used it (1) in the ordinary sense in which artists used the word, as the sum of visible phenomena not made by artifice; (2) in the Aristotelian sense as an immanent force working in the refractory medium of matter toward the highest perfection of form; and (3) in the sense that nature is not only what nature produces, or what nature strives to produce, but whatever is agreeable to the affections and predispositions of the mind. "In short," Reynolds stated, "whatever pleases has in it what is analogous to the mind, and is, therefore, in the highest and best sense of the word, natural." In another context Reynolds stated: "The terms beauty, or nature, which are general ideas, are but different modes of expressing the same thing." [91]

Nature, then, was for Reynolds, as for a long line of writers on art and architecture who make the organic analogy, the great source of

[89] See Reynolds, *Discourses Delivered to the Students of the Royal Academy*, introductions and notes by Roger Fry, *passim*.
[90] *Ibid.*, pp. 39, 40.
[91] *Ibid.*

inspiration and guidance. For Reynolds, nature's archetypes (or the forms it strives to attain) are the perfect models of beauty. Reynolds conceded that nature sometimes produces a deformity and often falls short of perfection, but degrees of beauty, he maintained, are more common in nature than deformity. Beauty for each species invests the form most common to all. It is embodied in a perfect archetype existing in the mind of the Creator and toward which the species is striving. Obviously, Reynolds's perfect archetype functioned perfectly, but this was not singled out by Reynolds as the cause of beauty.

Although he took up the problem in his thirteenth discourse, December 11, 1786, Reynolds did not clarify in detail the extent to which he regarded architecture an art in imitation of nature.[92] One thing is certain: for Reynolds, the highest function of architecture was identical with the highest function of the obviously imitative arts of painting and sculpture. This function was to inspire "sentiment" and fill the mind with "great and sublime ideas." In addition to the appeal of symmetry and proportion, architecture may appeal to the imagination by means of the association of ideas. Thus, Reynolds illustrated, a castle delights by its association with ancient customs and ideas of chivalry. In later years, Quatremère de Quincy was more explicit than Sir Joshua in his analysis of architecture as "imitative" in the Aristotelian sense, and it remained for Archibald Alison to reconcile the cult of fitness with associationism.

Archibald Alison, a Scottish clergyman and aesthetician, is the exponent par excellence of late eighteenth-century associationism. His book, *Essays on the Nature and Principles of Taste*, dedicated to Dugald Stewart, was first published in 1790 and was republished in numerous editions up through the middle of the nineteenth century.

Distinguishing (as did Edmund Burke, Lord Kames, and other

[92] *Ibid.*, pp. 349 ff

eighteenth-century thinkers) between sublimity and beauty, Alison described the emotion of taste which we experience in the presence of works of great artists, as follows: "We feel the sublimity or beauty of their productions, when our imaginations are kindled by their power, when we lose ourselves amid the number of images that pass before our minds, and when we waken, at last, from this play of fancy, as from the charm of a romantic dream." [93] Alison's main purpose, according to Leslie Stephen, was "to prove that beauty is not a quality of things considered as existing apart from the mind, but a product of trains of agreeable ideas, set up in the imagination by objects associated with, or directly suggestive of, the simple emotions." [94] Use, skill, wisdom, moral qualities, and the like are, according to Alison, classes of association whose emotional overtones contribute to the emotion of beauty.

Alison frankly derived and interpreted ideas from other writers. He acknowledged his indebtedness to Pope and Whateley for their remarks on garden design. Hutcheson's emphasis upon a harmonious relationship between uniformity and variety influenced Alison. Edmund Burke appears largely but not entirely as the target of criticism. Diderot's attribution of our aesthetic emotions to the perception of relations, Saint Augustine's resolution of the aesthetic emotion into the pleasure which belongs to order and design, and the relationship between art and nature as interpreted by Winckelmann and Reynolds—all had their influence on Alison's eclectic aesthetic. Alison's stress on fitness is frankly derived from Hume and Hogarth, and his interpretation of utility as distinct from fitness is derived from Adam Smith. Alison made the acquaintance of the Scottish engineer Thomas Telford in 1784, but the extent, if any, to which the engineer influenced Alison is problematic.

[93] *Essays on the Nature and Principles of Taste*, ed. by Abraham Mills, p. 21.
[94] Leslie Stephen, "Archibald Alison," *Dictionary of National Biography* (London, 1885), I, 287.

Alison saw that it was a mistake to explain beauty by any one quality.[95] He selected all previous theories of beauty which he thought were valid and arranged them into groups. In Alison's system there were three classes of sublimity and beauty: natural, relative, and accidental or associated.[96] Alison's use of the word "associated" in this connection is unfortunate because the idea of association is involved in all three classes. Natural beauty or sublimity consists of those qualities of which forms and colors, in themselves, are expressive to us; for example, winding or serpentine forms are expressive of fineness, delicacy, and ease, whereas angular forms are expressive of strength, roughness, and the operation of force or constraint. But beauty, according to Alison, can never be ascribed to the mere circumstance of form itself; material is an important factor. A winding or curvilinear form is beautiful only in those subjects which are distinguished by softness or delicacy of texture, whereas in substances of hard and durable nature it ceases to be beautiful. Economy and skill in the use of material are also important factors. Relative beauty consists of such qualities as skill, wisdom, usefulness, and propriety, of which forms are but the signs. Relative beauty is the quality of those arts which are produced by wisdom or design for some end. The accidental beauty of forms comes from associations peculiar to individuals and are often the expression of the individual's education, profession, situation in life, and peculiar habits of thought. Passing fashion also belongs in this category of accidental beauty.[97]

Alison disparaged accidental beauty. The only types of beauty which were meaningful for him are natural and relative beauty. It is important to note that in Alison's philosophy, beauty of natural or relative type cannot be ascribed to form in itself; in addition to the relationship of form to material already mentioned, Alison stressed

[95] Alison, *Essays*, pp. x–xii, 188 ff.

[96] See *ibid.*, pp. 191–330.

[97] Alison's description of the categories of beauty appears *ibid.*, pp. 185–250, and 324–26.

the right correspondence between form and the character of the whole which the form is intended to express. For example, an element in a work of art may possess natural beauty as a separate entity, but it may be out of place with or contrary to the character of the whole which it is the artist's intention to express.[98] In representing the human figure, Alison observed, painters and sculptors did not always strive after beauty of physical form, because such form did not necessarily express what they wanted to express, but instead they endeavored "to unite the beauty of form with the beauty of expression; and would thus gradually ascend to the conception of ideal beauty, and to the production of form and of attitude more beautiful than any that were to be found in nature itself." [99]

The three great sources of relative beauty, according to Alison, are design, fitness, and utility. Design, as Alison used the word, was certain qualities in the mind of the artist: the thought, wisdom, propriety, or intent which produced the work.[100] Certain forms are expressive of these qualities of mind and they "derive their beauty from this expression." [101] Fitness and utility presuppose design, but certain qualities of forms, such as regularity or uniformity, are in themselves expressive of design.[102] Alison defined fitness as "the proper adaptation of means to end." [103] He observed that the greater part of the beauty of furniture, machines, and instruments "arises from this consideration." [104] Alison agreed with Hogarth's use of the word "beauty" to describe a sailing vessel, but criticized Burke's

[98] See *ibid.*, pp. 196–249.

[99] *Ibid.*, p. 268.

[100] The term "propriety" as used by Alison in this connection seems to be the same as Adam Smith's "propriety." The term denoted correspondence between the object and the sentiment or motive which produced it.

[101] *Ibid.*, pp. 251, 252.

[102] Alison quotes Thomas Reid in support of this. "In all cases . . . regularity expresses design and art: for nothing regular was ever the work of chance." *Ibid.*, p. 266.

[103] *Ibid.*, p. 283.

[104] *Ibid.*, p. 282.

hostility toward fitness as an ingredient in natural beauty. He countered Burke's illustration of the unbeautiful swine and the ridiculous monkey by asserting, in Aristotelian fashion, that in the light of fitness alone, these animals were beautiful.[105] According to Alison, fitness can be the only reason why we regard an object as beautiful, and fitness is the sole determinant of beautiful proportion. Proportion is, in fact, simply the "fitness of the parts for the end designed." [106] The beauty of fitness and the beauty of proportion were not regarded by Alison as the most generally appealing or the strongest forms of beauty. "To a common spectator, the great test of excellence in beautiful forms is character or expression, or, in other words, the appearance of some interesting or affecting quality in the form itself." [107] Utility, the third great source of relative beauty was not defined by Alison. He referred his readers to Adam Smith's *The Theory of Moral Sentiments*, which he advertised as "the most eloquent work on the subject of morals that modern Europe has produced." [108] The term "utility" as used by Smith and Alison refers to the way in which an object serves its owner and society, whereas fitness refers to the way in which the parts of an object are adapted to serve the end for which the object was designed. According to Alison, "the sublimest of all mechanical arts [that is, those arts the object of which is utility] is architecture." [109] In these arts, the production of useful form must never be sacrificed even when "ornamental" or purely formal beauty is sought along with them, because although the immediate appeal of ornamental beauty is stronger, the beauty of fitness and utility "is of a more constant and permanent

[105] See *ibid.*, pp. 285, 286. Burke had used these animals to show that adaptation of form to purpose does not produce beauty.
[106] *Ibid.*, p. 287; see also pp. 287 ff. and 323.
[107] *Ibid.*, p. 280.
[108] *Ibid.*, p. 324.
[109] *Ibid.*, p. 193.

kind, and more uniformly fitted to excite the admiration of mankind." [110]

Alison sums up, as follows, the relationship between the beauty of fitness, utility, and the other types of beauty:

> To unite these different kinds of beauty—to dignify ornamental forms also by use, and to raise more useful forms into beauty—is the great object of ambition among every class of artists. Wherever both of these objects can be attained, the greatest possible beauty that form can receive will be produced; but as this can very seldom be the case, the following rules seem immediately to present themselves for the direction of the artist:
>
> 1. That where the utility of forms is equal, that will be the most beautiful to which the most pleasing expression of form is given.
>
> 2. That when those expressions are at variance—when the utility of the form cannot be produced without sacrificing its natural beauty, or when this beauty of form cannot be preserved without sacrificing its utility—that form will be most universally and most permanently beautiful in which the expression of utility is most fully preserved.[111]

Richard Payne Knight, numismatist, connoisseur, author, and occasional architect, was a contemporary of Archibald Alison. Like Alison, he made a study of taste from an associationist point of view.[112] Building upon ideas derived from Hume, Burke, Reynolds, Boileau, and Uvedale Price, Knight came to the conclusion that beauty depended not solely upon the sensible qualities of things but upon moral and intellectual qualities as well. Proceeding from sensory experience, the imagination and the emotions carry on an association process which is a very important part of our experience of beauty. Knight disparaged the limited idea of "taste" as a pure

[110] *Ibid.*, p. 329.

[111] *Ibid.*

[112] See Knight, *An Analytical Inquiry into the Principles of Taste, passim.* This book was first published in 1805. It was noticed by Jeffrey in the *Edinburgh Review* (May, 1811), and censured by Wilson in his *Essays* (in *Works*, 1856, iv, 102).

feeling and called attention to a broader interpretation of "taste" which included the intellectual and emotional natures of man.[113]

Late in the eighteenth century writers on art became seriously concerned for the first time with a new idea: the picturesque. In 1792 William Gilpin's *Three Essays on Picturesque Beauty* appeared describing the new type of beauty, and two years later, Uvedale Price's *Essay on the Picturesque as Compared with the Sublime and the Beautiful* made "picturesque" an independent category of aesthetics along with Burke's categories of the beautiful and the sublime. In his book entitled *An Analytical Inquiry into the Principles of Taste*, Richard Payne Knight was somewhat adversely critical of Edmund Burke and Uvedale Price. He accepted their positive contributions but criticized their limited view of beauty and the picturesque.

In his insistence on the value of irregular, informal planning wherein form is adapted to convenience and to terrain, Knight seems to show the influence of the new cult of the picturesque.[114] In describing Greek, Roman, and Gothic military architecture he wrote: "The forms, proportions, and distribution of the towers, and their respective height, compared with that of the walls, as well as the general plans of the castles to which they belonged, depended entirely upon circumstances and situations; and were confined by no rules or systems of architecture." [115] Turning to the domestic architecture of the ancients, he continued: "In like manner, the villas or country houses of the Romans were quite irregular—adapted to the situations on which they were placed—and spread out in every direction, according to the wants or inclinations; the taste, wealth, or magnificence of the respective owners." [116] With reference to modern

[113] *Ibid.*, pp. 1–18.

[114] See *ibid.*, chap. v, especially pp. 76, 77.

[115] *Ibid.*, p. 164.

[116] *Ibid.*, pp. 164, 165. It is a question whether or not Roman villas were as "irregular" as Knight implied they were. The point to be noted here is that Knight considered irregularity desirable and sought illustration of this good quality in historic architecture.

domestic architecture he observed: "The system of regularity, of which the moderns have been so tenacious in the plans of their country houses, was taken from the sacred, and not from the domestic architecture of the ancients; from buildings, of which the forms were prescribed by the religion." [117]

Knight used the word "regularity" to denote bilateral symmetry or the repetition of parts on each side of a central axis. "Symmetry," for Knight, was practically synonymous with fitness. He described it thus:

> Nearly connected with propriety or congruity, is symmetry, or the fitness and proportion of parts to each other, and to the whole: a necessary ingredient to beauty in all composite forms; and one, which alone entitles them, in many instances, to be called beautiful. It depends entirely upon the association of ideas, and not at all upon either abstract reason or organic sensation; otherwise, like harmony in sound or colour, it would result equally from the same comparative relations in all objects; which is so far from being the case, that the same relative dimensions, which make one animal beautiful, make another absolutely ugly. That, which is the most exquisite symmetry in a horse, would be the most gross deformity in an elephant, and *vice versa:* but the same proportionate combinations of sound, which produce harmony in a fiddle, produce it also in a flute or harp.[118]

According to Knight, beauties of the highest class were the beauties of neatness, freshness, lightness, symmetry, regularity, uniformity, and propriety.[119]

The relationship between art, nature, and morality was a prominent concern of Richard Payne Knight. Our experience of art, nature, and morality is united by the process of association of ideas. The pleasures of association are not limited to objects of art, "but extend to every object in nature or circumstance in society that is at all connected with them: for, by such connection, it will be enabled to ex-

[117] *Ibid.*, p. 167.
[118] *Ibid.*, p. 172.
[119] *Ibid.*, p. 157.

cite similar or associated trains of ideas, in minds so enriched, and consequently to afford them similar pleasures." [120]

By comparing nature and art, "both the eye and the intellect acquire a higher relish for the productions of each; and the ideas, excited by both, are invigorated, as well as refined, being thus associated and contrasted. The pleasures of vision acquire a wider range and find endless gratifications, at once exquisite and innocent, in all the variety of productions, whether animal, vegetable, or mineral, which nature has scattered over the earth. All display beauty in some combinations or others." [121]

Knight challenged Burke's limitation of the word "beauty" to the sensible qualities of things; he found that the word "beauty" has always been applied to moral and intellectual things as well as objects of sense. Intellectual qualities such as composition, proportion, expression, and fitness, "perpetually distinguish the beautiful from the ugly in the same species. . . . When we speak of the *beauty of virtue*, we mean the pleasing result of well-balanced and duly-proportioned affections; and when we speak of the *beauty of the human form*, we mean the pleasing result of well-balanced and duly-proportioned limbs and features." [122]

According to Knight, the association of ideas renders pleasing those qualities in visible objects which are "peculiarly appropriate" to the type of art (painting, sculpture, or architecture); "so likewise does it render those qualities, which are peculiarly adapted to promote the comforts and enjoyments of social life, pleasing to the eye of civilized man; though there be nothing in the forms or colours of the objects themselves, in any degree pleasing to the sense; but, perhaps, the contrary." [123] Knight applied the term "propriety" to the

[120] *Ibid.*, p. 146.
[121] *Ibid.*, p. 153.
[123] *Ibid.*, pp. 9–12.
[122] *Ibid.*, p. 157.

correspondence of actual properties of objects with habitually associated properties. "Hence neatness and freshness will always delight, if not out of character with the objects, in which they appear; or with the scenery, with which they are connected: for the mind requires propriety in everything; that is, it requires that those properties, the ideas of which it has been invariably habituated to associate, should be associated in reality; otherwise the combinations will appear to be unnatural, incoherent, or absurd." [124]

If Richard Payne Knight may be linked with Alison and even earlier eighteenth-century authors, this connection doubtless also applies to the writings of two of England's most revolutionary Classical Revival architects, Sir John Soane and Joseph Gandy, even though, unlike Knight, their writings did not analyze the ideas of other men or acknowledge indebtedness to them.

Joseph Gandy was the favorite among the students and draftsmen who worked under Soane. His fine renderings of many of the buildings designed under Soane's direction are among the most valued possessions of the Soane Museum. Talbot Hamlin summarized his contribution in the following words:

> Gandy carried the Soane doctrines of simplicity even further than did his teacher. He published two books of designs for rural buildings—farmhouses, gate lodges, laborers' cottages—in which many of those tricks of composition which are at the basis of much contemporary architecture already prophetically appear. There are no orders in these buildings; instead, simple posts and beams. The wall surfaces are clean and smooth, and wherever possible the windows and other openings are combined into long, horizontal, rectangular panels; the roof eaves often project markedly, as simple shelves without moldings or other decoration; and everywhere there is an emphasis on horizontal dimensions and on the clear composition of geometrical volumes. These features all show how close Soane's revolutionary Classic Revival could come to many of the controlling ideas of the architecture of a century and more later.[125]

[124] *Ibid.*

[125] Hamlin, *Architecture Through the Ages*, p. 556.

Gandy's two books were published in 1805 and 1806.[126] The publication of 1805 contained an introductory essay which set forth some of the general theoretical ideas behind the designs. Gandy's theory, if we may judge by this essay, was relatively simple. Gandy wrote that it was his desire "to unite convenience and taste in a greater degree than has hitherto prevailed in this class of Buildings." [127] He did not define taste or the qualities in architecture which he regarded as expressive of good taste, but a fine regard for convenience is shown by his designs. Doubtless we may infer from his designs that, for Gandy, convenient, simple, well-constructed architecture was architecture in good taste. He stressed the social value of architecture as well as the cultivation of a taste for beauty. He challenged the need for ornaments, especially exterior architectural ornament. "Simplicity, and variety in the great outline of buildings, should be considered, both in the greatest and smallest works." [128] Gandy regarded the principle of "uniformity" in the manner of Richard Payne Knight and others, that is, as denoting axial balance or bilateral symmetry. Gandy believed that uniformity was only fitting for "the higher class of architecture" and not for cottages and rural architecture. His preference was for simple architecture with picturesque masses which grew out of ideas of convenience and nature. "Uniform buildings have but one point of view from whence their parts are corresponding; from every other point they fall into the picturesque by the change of perspective, which is an argument drawn from nature, that the picturesque is the most beautiful; but it is more difficult to manage, and requires the same sort of skill and genius as fine music. The flanks of our Churches and other public buildings, generally fall into the picturesque and are far preferable to the fronts." [129]

[126] The editions consulted were *Designs for Cottages, Cottage Farms, and Other Rural Buildings*, 1805, and *The Rural Architect*, 1806.

[127] *Designs for Cottages*, p. iv.

[128] *Ibid.*, p. vii.

[129] *Ibid.*, pp. vii, viii.

The architect John Soane, for whom Gandy worked and whose ideas and style of architecture doubtless influenced him, did not write his *Lectures on Architecture* until after the two aforementioned publications of Joseph Gandy. In 1802, Soane became a member of the Royal Academy, and in 1806 he succeeded George Dance as Professor of Architecture. Between 1806 and 1809 Soane managed to find time, in addition to his busy professional practice, to prepare the first course of six lectures. According to Bernstingl, "He appears to have reread all the standard works and filled several folio volumes with MS. extracts, which still exist, together with numberless sheets of draft Lectures. His chief guide in the maze of authorities and theories seems to have been the *Essai sur Architecture* of Marc Antoine Laugier (1713–1769) first published [in English] in 1755." [130] Unfortunately, it is nowhere stated when he first met with this work, but Arthur Bolton believes this occurred at least as early as the year 1800.[131] The writings of the French architect Claude Perrault also influenced Soane as we shall soon see.[132] In general, French architecture was too ornate to appeal to Soane, but he was interested in the severe work of the Empire period, and the bridges and canals of the French architect-engineers of the early nineteenth century appealed to his constructive sense.[133] Soane's theory as presented in his lectures was neither particularly new nor fully in accord with his own earlier architecture;[134] Soane's importance to the his-

[130] According to Bernstingl, "Soane was very much impressed by this treatise, which, it is assumed from the number of copies found in his library, he was in the habit of distributing among his pupils." *Sir John Soane*, p. 12.

[131] Soane, *Lectures on Architecture*, ed. by Arthur T. Bolton, p. 5. Mr. Bolton did not give the reasons for assuming 1800 to be the year Soane may first have become acquainted with Laugier's *Essai*.

[132] *Ibid.*, pp. 100, 101, and *infra*, p. 117.

[133] *Ibid.*, pp. 7, 8.

[134] According to Bolton, when Soane set about the preparation of his lectures "he undertook the most difficult of all tasks for a practicing architect, that of trying to reduce his own instinctive impulses to a consistent theory, capable of being taught to others." After developing what Bolton called a "restricted"

tory of architectural theory is, firstly, in his position of perpetuator of the radical ideas of the eighteenth century, and, secondly, in his attempt in his later work to apply these ideas in the creation of a new style of nineteenth-century architecture.

The "First Principles" of Soane were founded on "Nature, Truth, Reason and the fitness of things." [135] Following Vitruvius, Soane found that for all types of architecture "three things are indispensably necessary, viz., *Solidity in Construction, Convenience in Distribution, and Beauty in Characteristic Decoration.*" [136] Soane classified all buildings as either useful, ornamental, or a combination of these two.[137] He emphasized the logical use of the orders and of ornament. No ornament should be used for which one cannot give an account; ornaments are to be used conformably to the customs, laws, and ceremonies of the nation. Soane saw in ancient classical architecture, especially Greek architecture, the embodiment of his ideals, not only in the matter of the use of ornament, but in matters of character, harmony, proportion, and all the principles of architecture.[138] Soane took up the dichotomy of beauty as intrinsic and relative. Intrinsic beauty, he maintained, "determines certain Forms and Proportions to be beautiful, such as the Circle, the Polygon, the Square, the Parallelogram, the Cube, the double Cube, and others." [139] Thus, intrinsic beauty is inherent in certain geometrical forms. Relative beauty, Soane maintained, is dependent upon use and character. The greatest works combine intrinsic with relative beauty.[140]

Soane was not a functionalist in the sense that he made fitness the single standard of all architectural excellence. He looked back

theory, "Soane," he continued, "is actually found apologising for earlier work that could not be squared with his acquired doctrines." *Ibid.*, pp. 5, 6.

[136] *Ibid.*, p. 6; see also pp. 138–51.

[139] *Ibid.*, p. 113. (Italics are Soane's.)

[137] *Ibid.*, p. 14.

[138] *Ibid.*, pp. 114, 167, 169, and *passim*.

[139] *Ibid.*, pp. 113, 114.

[140] *Ibid.*, p. 114.

through history at Indian, Chinese, and Gothic structures, and believed they were to a large extent expressive of whim and caprice; but these styles were inferior to the Greek. For the architecture of his own day, whatever past style it may be based upon if any, "the most simple forms will always be best fitted and the most proper for the purposes required." [141] Furthermore, relative beauty, according to Soane, is not only the most important, but it alone may commend a work as great from an artistic and intellectual standpoint.

In no part of the practice of the Profession of Architecture will the Artist be more distinguished from the patronized pretender to Architectural knowledge than in the correct application of relative Proportion and fitness of parts. The Architect who is master of these powerful means may, without the aid of Sculpture, Columns, and costly materials, please the eye, and even satisfy the minds of those who possess elegant fancy, classical taste, and sound judgment.[142]

Soane, like Claude Perrault, argued that architecture must not be "confined to any shackled mechanical system" such as fixed systems of proportion. Like Perrault, Soane compared the beauty of architecture with the beauty of nature. The creation of an organic architecture was a matter not of rules, but of taste combined with reason.

It [architecture] has no fixed Proportion; Taste, good sense, and sound judgment, must direct the mind of the Architect to apply harmony and justice of relative Proportion, the correlation of parts with the whole, and of the whole with each part. Let the young Student study incessantly, and endeavor to infuse into his own Compositions, such harmony, fitness and mutual relation of parts as is found in the great productions of Nature, and experienced in the magical effect produced by the sublime Works of the Ancients.[143]

Soane's advice to the student to go to nature for ideas of harmony, fitness, and mutual relation of parts is in the tradition of the organic

[141] *Ibid.*

[142] *Ibid.*, p. 101.

[143] *Ibid.*, pp. 100, 101. For Perrault's use of the organic analogy, see p. 70 *supra.*

analogy which we have seen in classical times in the writings of Aristotle, in Renaissance Italy in the writings of Alberti, in Baroque England in the writings of Hooker and Bacon, and in the writings of Hume and others of the eighteenth-century British school. All of these writers admired organic form because of its organization, unity, harmony of parts, fitness, or utility. The English metaphysician and poet, Samuel Taylor Coleridge, who was by no means a functionalist, nevertheless added a new insight into the concept of organic form in what Matthiessen calls his "key-passage on the organic principle" which was developed in his critical analysis of Shakespeare.[144]

> No work of true genius dares want its appropriate form, neither indeed is there any danger of this. As it must not, so genius can not, be lawless; for it is even this that constitutes it genius—the power of acting creatively under laws of its own origination. . . . The form is mechanic, when on any given material we impress a predetermined form, not necessarily arising out of the properties of the material; as when to a mass of wet clay we give whatever shape we wish it to retain when hardened. The organic form, on the other hand, is innate; it shapes, as it develops, itself from within, and the fulness of its development is one and the same with the perfection of its outward form. Such as the life is, such is the form. Nature, the prime genial artist, inexhaustible in diverse powers, is equally inexhaustible in forms.[145]

The biologists and zoologists of the eighteenth and early nineteenth centuries gave mankind a better understanding of organic process and a finer appreciation of the subtleties of biological organization.[146] Coleridge reflects this development. In the passage quoted above we find the emphasis is upon the *process* of natural growth and development rather than upon certain *qualities* of organic form

[144] Matthiessen, *American Renaissance*, p. 113.

[145] *Coleridge's Essays and Lectures on Shakespeare*, ed. by Ernest Rhys, pp. 46, 47. For Coleridge's criticism of the idea that there is a connection between beauty and utility, see his *Biographia Literaria*, ed. by J. Shawcross, II, 244–46.

[146] See Charles Robin, "Recherches sur l'origine et le sens des termes organisme et organization," *Journal de l'anatomie* (1880), pp. 1–55.

such as unity or fitness, though doubtless the latter were not meant to be excluded. Here also we find a new but related type of organic analogy; the genius of nature (i.e., its capacity to create an inexhaustible variety of forms) becomes the model or standard for artistic genius. There is implied here a strong emphasis upon individuality, individual genius, and freedom for self-development: values which were among the most prized in the laissez faire industrial society of the nineteenth century.

The English architect Joseph Gwilt was perhaps the last prominent nineteenth-century theorist with a strong functionalist bias who regarded his ideas as an extension of an essentially eighteenth-century tradition. After Gwilt, the general tendency was to lose sight of the contributions of eighteenth-century writers and to overlook the fine qualities of eighteenth-century architecture. Pugin and Ruskin unfortunately contributed to this tendency. They were prophets of a new nineteenth-century architecture based upon principles exhibited by Gothic Architecture. Perfect fitness was, to them, an attribute of Gothic architecture. All intervening developments were of an inferior order in their eyes.

Gwilt was a student at the Royal Academy in 1801 and soon thereafter entered active practice as an architect. An antiquarian and theoretician by inclination, Gwilt became a rather voluminous writer.[147]

[147] Joseph Gwilt is rarely mentioned in American theoretical and historical treatises. His article on St. Paul's in Britton and (A. C.) Pugin's *Illustrations of the Public Buildings of London*, was originally a paper read March 4, 1823, before the Architects' and Antiquaries' Club of London. Gwilt's book, *Examination of the Elements of Beauty in Grecian Architecture*, was published *ca.* 1825. In the year 1826, he published his translation of Vitruvius and *Rudiments of Architecture, Practical and Theoretical*. His *Elements of Architectural Criticism* appeared in 1837, and the eight-volume *Encyclopedia of Architecture, Historical, Theoretical and Practical* was published in 1842. Most of Gwilt's writing was done prior to the early writings of A. W. N. Pugin and Ruskin. Pugin's *Contrasts* (mostly illustrations) first appeared in 1836, and his first full statement of theory, the *True Principles*, was not published until 1841. Ruskin's early articles in *Loudon's Magazine* appeared between 1837 and 1838, while his *Seven Lamps* was not published until 1849.

His literary career was climaxed by an eight-volume *Encyclopedia of Architecture, Historical, Theoretical, and Practical,* first published in 1842.

Hume's definition of taste, Hogarth's and Alison's attribution of beauty of proportion to fitness, Knight's interpretation of association, and Quatremère de Quincy's analysis of the origin of ornament were put forth and advocated by Gwilt in his *Encyclopedia* essay "On Beauty in Architecture." [148] Gwilt's discussion of the orders shows his familiarity with not only the writings of Vitruvius but many of the outstanding Renaissance treatises, including that of Alberti.[149]

Gwilt drew lessons for an understanding of architectural beauty from analogies with the beauty of machines and organic beauty. He did not put forth his arguments on behalf of use or fitness in terms of their moral value. In this neglect of moral values and in the fact that he found Greek rather than Gothic architecture to be the embodiment of his ideals, Gwilt stood in opposition to the great Romantic critics.

According to Gwilt, "beauty in its application to architecture, changes the meaning of the word with every change in its application." [150] The only permanent principle of beauty in architecture is fitness. Proportion entirely depends upon fitness and proportion is the basis of beauty.[151]

Gwilt's definition of genius as "the power or faculty of inventing" is in accord with his comparison of the beautiful proportions of architecture with the beautiful proportions of machines.[152] Gwilt admired the mechanical skill and ingenuity exhibited by Sir Christo-

[148] *Encyclopedia of Architecture, Historical, Theoretical, and Practical,* rev. by Wyatt Papworth, pp. 837 ff.
[149] *Ibid.,* pp. 845 ff.
[150] *Ibid.,* p. 841.
[151] *Ibid.,* pp. 838–41.
[152] *Ibid.,* p. 837.

pher Wren in the design of St. Paul's.[153] This ingenious work called to Gwilt's mind Hooker's observations on the relation of measure, fitness, and proportion to perfection set forth in the fifth book of his *Lawes of Ecclesiastical Politie*.[154] Taking up Hooker's thesis that the true measure of proportion consists in avoiding excess as well as deficiency, Gwilt concluded: "In estimating the merits of a building, and the constructive skill of its architect, that is superior in which the greatest effects are produced by the use of the slenderest means." [155]

Gwilt maintained that principles of architecture such as expression, unity, harmony, and symmetry should be interpreted in terms of fitness. Expression Gwilt defined as "the faculty of representing . . . the inventions which the architect conceives suitable to the end proposed. That end is twofold: to be useful, and to connect the use with a pleasurable sensation in the spectator of the invention." [156] Unity and harmony result from purity of style, and style is not arbitrary or capricious, but results from fitness for a certain set of conditions.[157] As to symmetry, it was tantamount to similarity of parts.

> Symmetry is that quality which, as its name imparts, from one part of an assemblage of parts enables us to arrive at a knowledge of the whole. It is a subordinate, but nevertheless a necessary, ingredient in beauty. It is necessary that parts performing the same office in a building should be strictly similar, or they would not *ex vi termini* be symmetrical; so when relations are strictly established between certain parts, making one the measure of the other, a disregard of the symmetry thus induced cannot fail of destroying beauty. But here again we have to say, that for want of attention to the similarity of parts, or neglect of the established relations on which the whole is founded, they have lost their symmetry, and have

[153] Gwilt, "St. Paul's Cathedral," in J. Britton and A. C. Pugin, *Illustrations of the Public Buildings of London*, I, 8, 19.
[154] See pp. 59–61 *supra*.
[155] "St. Paul's Cathedral," p. 20.
[156] *Encyclopedia*, p. 837.
[157] *Ibid.*, p. 841.

thus become *unfit* for their purpose; so that thus again we return to fitness as the main foundation of beauty.[158]

Again and again Gwilt pointed to nature as the standard for art. The fitness for function of organic form was, to this critic as for many others before him, a source of inspiration for the architect and artist. He saw that "all art in relation to nature is subject to those laws by which nature herself is governed." [159] And what is the basic law of nature from which beauty arises? "Throughout nature beauty seems to follow the adoption of forms suitable to the expression of the end." Gwilt continued:

> In the human form there is no part, considered in respect to the end for which it was formed by the great Creator, that in the eye of the artist, or rather, in this case the better judge, the anatomist, is not admirably calculated for the function it has to discharge; and without the accurate representation of those parts in discharge of their several functions, no artist by means of mere expression, in the ordinary meaning of that word, can hope for celebrity. This arises from an inadequate representation having the appearance of incompetency to discharge the given functions; or, in other words, they appear unfit to answer the end.[160]

Gwilt observed that the beauty of Greek sculpture "is founded on nature itself," hence "will throughout all time excite the admiration of the world." [161] But unable to interpret color in terms of fitness, Gwilt regarded "polychromatic architecture" as "a curious and interesting circumstance," and was unable to believe that "it could add a charm to the stupendous simplicity and beauty of such a building as the Parthenon." [162]

Gwilt was admired by Thomas Donaldson, professor of architec-

[158] *Ibid.*, pp. 841, 842.
[159] *Ibid.*, p. 838.
[160] *Ibid.*
[161] *Ibid.*, p. 841.
[162] *Ibid.*, p. 842.

ture in the University College of London. In his *Preliminary Discourse on Architecture* (1842), Donaldson paid respect to his "learned and scientific professional brother, Mr. Gwilt." In this discourse, Donaldson urged that the distinction between engineering and architecture be reduced if not altogether eliminated. He advocated that the same course of training be given to prospective architects and engineers.[163]

Warning that "a recurrence to first principles was never more essential than at this moment," Professor Donaldson went on to confine the significance of imagination in the creation of architecture and to commend the scientific study of natural form.

> But Architecture is not to be considered as a purely imaginative creation; for as its beauties derive their chief value from their reference to utility, so its productions, however otherwise attractive from the gracefulness of their proportions and the playfulness of their outlines and richness of detail, will not satisfy the mind, unless it be immediately evident that they are constructed upon sound principles, and have an evidence of a solid and substantial endurance. To realise this end the Architect must be acquainted with all the resources of the mineral and vegetable world; with the laws that govern matter, and with those principles of action and resistance, derived from the study of the exact sciences.[164]

From the moralistic treatises on art by Shaftesbury to the voluminous critical and theoretical works of Gwilt, we find a succession of writings rich in contributions to the development of functionalism. In the same period of time many French, Italian, German, and American writers were developing functionalist or proto-functionalist theories of architecture; however, before turning to the latter writers let us consider the succession of British writers up to *ca.* 1850, the approximate beginning of our modern century. By retaining our focus

[163] See Donaldson, *Preliminary Discourse on Architecture*, pp. 25, 28.
[164] *Ibid.*, pp. 29, 31.

of attention upon the British school we can see more clearly that Pugin and Ruskin were more a part of an old tradition of criticism than innovators of a new one. It also becomes more clearly apparent how they gave new direction to British functionalism.

THE FUNCTIONALISM OF RUSKIN AND HIS EARLY CONTEMPORARIES

6

An important phase of the history of functionalism is related to the Gothic Revival in Western architecture. This revival had many literary champions, but Pugin and Ruskin were outstanding in their influence (for good or ill) on contemporary and later architects. It is not my purpose to judge these men as historians or as creative architects, but to place their dominant ideas into the contexture of functionalist analogies.

Doubtless the most ardent and consistent among the early nineteenth-century protagonists of the revival of Gothic principles of design was Augustus Welby Northmore Pugin. A precocious delineator, he assisted and received his architectural education from his father, Augustus Charles, whose books, featuring careful drawings of medieval architecture and furniture, helped to make possible the systematic study of Gothic forms which was at the basis of the true Gothic Revival. Pugin the younger was one of the first to understand the structural basis of medieval architecture, and in his satirical

books, *Contrasts* and *On the State of Christian Architecture*, "took delight in poking as much fun at the earlier castellated Gothic of the mansions and the thin lath-and-plaster Gothic of the earlier Revival churches . . . as he did at what seemed to him the stupidities of the Classic." [1] Pugin desired to achieve more than a superficial revival, but not a reproduction of Gothic; he hoped to bring new life to the architecture of his day by a fresh application of what he regarded to be principles of Christian architecture.

> He came more and more to realize that no revival of medieval architecture, in the older sense, was possible, because conditions and structural methods had so deeply changed, and that the only thing which was possible was a new architecture beginning where the Gothic had left off. Using Gothic ornament and the pointed arch—for these seemed to him essentially Christian elements, and he was looking for a Christian architecture above all—but trying always to design honestly and creatively in accordance with the necessities of the individual problem, it was the tragedy of Pugin that his own work was seldom able to rise to this ideal.[2]

Pugin's theoretical principles were put forth most fully in his books *True Principles of Pointed or Christian Architecture* (1841) and *An Apology for the Revival of Christian Architecture in England* (1843). Basically, Pugin's theory was what we of today would call functionalist. He contributed to the development of the concept of organic architecture and placed strong emphasis upon ethical, religious, and moral standards in judging the value of architecture.

For Pugin, "the great test of architectural beauty" was the fitness of the design for the purpose intended.[3] By building "exactly what was wanted," observed Pugin with regard to railway stations, "in the simplest and most substantial manner,—mere construction, as the old men weathered the flanking walls of their defences,—tens of thousands of pounds could have been saved on every line, and grand and

[1] Hamlin, *Architecture Through the Ages*, p. 582.
[2] *Ibid.*
[3] Pugin, A. W. N., *Contrasts*, p. 1.

durable masses of building been produced." [4] One of the primary rules of architectural design, according to Pugin, was *"that there should be no features about a building which are not necessary for convenience, construction, or propriety."* [5] Even the smallest detail should have a meaning or serve a purpose. Pugin made a distinction between much use of mechanical contrivances in architecture and real fitness, but he urged architects to accept gratefully and apply all modern inventions with wisdom and integrity.[6] Pugin maintained that he was contending for a principle of Christian art and not a style of Christian art.[7] The only true basis for a style was fitness for purpose; "the style of a building should so correspond with use that the spectator may at once perceive the purpose for which it was erected. Acting on this principle," Pugin asserted, "different nations have given birth to so many various styles of Architecture, each suited to their climate, customs, and religion." [8] When the internal as well as the external aspect of an edifice "is illustrative of and in accordance with the purpose for which it was destined," then architectural propriety is achieved.[9] Character likewise is a matter of fitness for purpose: "A building should look like the type of building it is." [10] Pugin defined the true picturesque quality of architecture in similar terms; the picturesque *"results from the ingenious methods by which the old builders overcame local and constructive difficulties. . . .* I am quite assured," he wrote, "that all the irregularities that

[4] Pugin, A. W. N., *An Apology for the Revival of Christian Architecture in England*, p. 10.

[5] Pugin, A. W. N., *The True Principles of Pointed or Christian Architecture*, p. 1.

[6] We can observe a change in Pugin's attitude toward mechanical inventions by comparing statements in *Contrasts* (1836), p. 34, and the *Apology* (1843), pp. 38 ff. See also *Contrasts*, p. 31, for Pugin's condemnation of the substitution of contrivances for real fitness.

[7] See *Apology*, p. 44.

[8] *Contrasts*, p. 1.

[9] *True Principles*, pp. 35, 36.

[10] *Ibid.*, p. 36.

are so beautiful in ancient architecture are the result of certain necessary difficulties, and were never purposely designed; for to make a building inconvenient for the sake of obtaining irregularity would be scarcely less ridiculous than preparing working drawings for a new ruin." [11] Thus we see that, for Pugin, all architectural qualities such as style, character, propriety, and picturesqueness, have to be achieved through fitness of forms for function.

The place of ornament in Pugin's system was to decorate "essential form." He argued that it was wrong to "construct" ornament instead of confining its function to the enrichment of construction. He felt that the late Gothic style showed a departure from this principle of Christian architecture and if it had not been supplanted by the Renaissance would have destroyed itself in the pursuit of novelty. Pugin urged a return to the "pure and ancient models." [12]

The word "natural" is used in Pugin's writings with almost as much frequency as the word "Christian." To be "natural" is one of the highest merits of architecture. Pugin urged students of architecture to study nature. He condemned the current practice of sending youthful architects to Europe to study only the great monuments. He urged instead that students first be sent to their own countryside to study the old architecture of village, town, hamlet, and city. But the student should not limit his studies to architecture. "He should be a minute observer of the animal and vegetable creation, of the grand effects of nature. The rocky coast, the fertile valley, the extended plain, the wooded hills, the river's bank, are all grand points to work upon; and so well did the ancient builders adapt their edifices to localities, that they seemed as if they formed a portion of nature itself, grappling and growing from the sites in which they are placed." [13]

[11] *Ibid.*, p. 52. Knight and Gandy had similar points of view toward picturesque architecture. See *supra*, pp. 110, 114.

[12] *Ibid.*, p. 8.

[13] *Apology*, p. 21.

Architectural designs should "be adapted to the material in which they are executed." Modern architects should follow the lead of the architects of the Middle Ages, who, according to Pugin, "*turned the natural properties of the various materials to their full account,* and made *their mechanism a vehicle for their art.*" [14] To be consistent, a style should be generated instead of adopted.[15] Failure to do this had resulted in a mongrel architecture. Pugin insisted that the natural and honest way was the way to beauty. "*Every building that is treated naturally, without disguise or concealment, cannot fail to look well.*" [16]

Moral values are at the heart of much of Pugin's architectural criticism. Fitness of form for function is the point he makes most insistently, but he saw clearly that purpose has larger aspects than private utility. Of all buildings, those raised for religious purposes should be most vast and beautiful, because, "the greatest privilege possessed by man is to be allowed, while on earth, to contribute to the glory of God." [17] Pugin implored his fellow architects to apply the ancient and consistent principles. "Let then the Beautiful and the True be our watchword for future exertions in the overthrow of modern paltry taste and paganism, and the revival of Catholic art and dignity." [18] Pugin expressed admiration for the religious devotion which raised the great edifices of the Middle Ages. The result of applied devotion was an architecture characterized by unity and integrity and expressive of the true Christian spirit.[19] Pugin looked in vain for "an honourable specimen of the architectural talent" of his time.[20] He attacked the professor of architecture at the Royal Acad-

[14] *True Principles,* pp. 1, 2.
[15] *Apology,* p. 2.
[16] *Ibid.,* p. 39.
[17] *True Principles,* p. 36.
[18] *Ibid.,* p. 56.
[19] *Contrasts,* p. 1.
[20] *Ibid.,* p. 31.

emy, scoffed at "Soanian eccentricities," and condemned those who produced "mongrel compositions" and those who "tremble at the ascendancy of truth." [21] He asserted that the architecture of his day was "entirely ruled by whim and caprice." [22] At one point he stated that the vanity of architects was responsible for the unfortunate state of architecture.[23] "Private judgment runs riot," he warned, and referred to current eclecticism as "the *carnival* of architecture." [24] The core of Pugin's moralistic theory of architecture reflects the Oxford Movement: the architecture of the Middle Ages was great because it was expressive of the true Christian spirit; to achieve greatness, the architecture of today must do likewise.[25]

Pugin and Ruskin set the tone for much of the thinking about architecture in the nineteenth century and their influence can be discerned in present-day theory especially in the conspicuous part played by moral and social values. Their prophetic character, their tendency to denounce almost everything about them, and their hortatory style can also be seen in the writings of Greenough, Morris, Sullivan, and Wright. While, on the whole, this group of critics tended to interpret architecture in terms of a few theoretical principles which they elaborated and applied with emotional intensity, we find that Ruskin was not only the most productive from a literary standpoint, but (perhaps because of this fact) he is especially rewarding to the reader for the breadth and variety of his ideas. Ruskin's literary activities continued up to the decade before his death in 1900, but it is appropriate to turn to him at this time not only because his ideas

[21] *Apology*, pp. 3, 16.
[22] *Contrasts*, p. 30.
[23] *Apology*, p. 11.
[24] *Apology*, pp. 1, 2.
[25] Pugin believed that, at best, the various styles of non-Christian antiquity were "*perfect expressions of imperfect systems*," and he claimed for Christian art a "merit and perfection" which it was impossible for any other art to attain. *Apology*, p. 5.

have a relationship to those of Pugin, but because some of his most important writing was done prior to 1850.[26]

Ruskin envisaged and advocated a functional, organic architecture erected according to, and itself illustrating, moral principles. Ruskin denied that the beautiful *is* the useful.[27] On the other hand Ruskin, like Pugin, accepted the principle that form should follow function as vital to good architecture, but he was more insistent than Pugin in expanding the meaning of function to include religious, moral, and ethical elements. Ruskin's thoughts on architecture are difficult to sort out into clearly separate categories without altering his original meaning, but, following the procedure applied to other writers in this study, I shall endeavor to clarify Ruskin's point of view toward the following relationships: (1) the relation of architecture to use, (2) the relation of architecture to nature, and (3) the relation of architecture to moral principles.

According to Ruskin, in all things the end must be clearly perceived and must govern the means lest the "doubtfulness of the one . . . cause indistinctness of the other." [28] Art is no exception; it must

[26] Ruskin's architectural writings began in the late 1830s with *The Poetry of Architecture* and contributions to Loudon's *Architectural Magazine*. *Modern Painters* (1843–60) contains remarks on art, truth, and nature which were intended to apply to architecture as well as painting. *The Seven Lamps of Architecture* (1849) and *The Stones of Venice* (1851–53) are Ruskin's largest works devoted to the art of architecture. *Lectures on Architecture and Painting* appeared in 1854. Lectures delivered between 1857 and 1859, some pertaining to architecture, were published as one volume in 1859 under the title *The Two Paths*. *Ethics of the Dust* (1866), though not on art or architecture, contains lessons for them derived from the study of crystals. Lectures delivered between 1880 and 1885 were published under the title *The Bible of Amiens* in 1885. It was one of the most popular of Ruskin's later writings and was the first of a projected series of studies of medieval architecture.

[27] *Modern Painters*, II, 67. This and all subsequent page references to the writings of Ruskin refer to *The Works of John Ruskin*, ed. by E. T. Cook and Alexander Wedderburn.

[28] *Seven Lamps of Architecture*, p. 281.

be subordinate to use.[29] Material service is one of the essential functions of all art.[30] Use is the "universal inspiration" and "universal benediction" of art.[31] Ruskin asserted, "that the entire vitality of art depends on its being either full of truth, or full of use"; one or the other is the vitalizing principle.[32]

The highest functions of art, according to Ruskin, are threefold: (1) to enforce the religious sentiments of men, (2) to perfect the ethical state, and (3) to do material service.[33] But, Ruskin insisted, the beginning of all ideal art, "must be for us in the realistic art of bestowing health and happiness. The first schools of beauty must be the streets of your cities, and the chief of our fair designs must be to keep the living creatures round us clean, and in human comfort—primarily clean." [34]

Many British writers on art expressed admiration for the simple, functional beauty of sailing vessels, but Ruskin's admiration seems to have been particularly intense. "I say," he wrote in *The Stones of Venice* (1851–53), "without any manner of doubt, that a ship is one of the loveliest things man ever made, and one of the noblest; nor do I know any lines, out of divine work, so lovely as those of a head of a ship, or even as the sweep of the timbers of a small boat, not a race boat, a mere floating chisel, but a broad, strong, sea boat, able to breast a wave and break it: and yet, with all this beauty, ships cannot be made subjects of sculpture." [35]

[29] *Laws of Fésole*, pp. 351 n., 440.

[30] *Lectures on Art*, pp. 46, 73, 95.

[31] *Ibid.*, p. 115.

[32] *Ibid.*, pp. 95, 96. Although Ruskin was doubtless thinking about painting and sculpture when he wrote these words, it is safe to assume that he would have accepted their application to architecture. Ruskin's use of the word "art" generally refers to architecture, painting, drawing, and sculpture.

[33] See *ibid.*, p. 73. The subject of this lecture was "The Relation of Art to Morals."

[34] "On the Present State of Modern Art," in *Works*, XIX, 214, 215; see also *Lectures on Art*, p. 131.

[35] *Stones of Venice*, I, 258. Ruskin elaborated this theme later in the prefatory matter to *The Harbours of England*.

In his lecture on "The Relation of Art to Use," Ruskin expressed admiration for the functional forms of drinking cups and vases, especially the more simple types in which "are developed the most beautiful lines and most perfect types of severe composition which have yet been attained by art." [36]

Ruskin also admired simple architecture. At one point he grouped simplicity, usefulness, and truthfulness as the three qualities which make great art.[37] Ruskin's admiration for simple architecture is implicit in his description of architecture as a "glorified roof." [38] Ruskin called upon architects to "design all things at first in severe abstraction, and to be prepared, if need were, to carry them out in that form." [39] Better plain walls than meager ornaments.[40] Ruskin regarded proportion and abstraction as the two especial marks of architectural design.[41] Ornament should be regarded as "the extreme grace in language; . . . not to be obtained at the cost of purpose, meaning, force or conciseness . . . the least of all perfections, and yet the crowning one of all—one which by itself, and regarded in itself, is an architectural coxcombry." [42]

Ruskin required ornament to perform a special function. Basically this function is to make people happy; but there is a right and a

[36] *Lectures on Art*, pp. 108, 109.

[37] *Sesame and Lilies*, p. 131.

[38] "The Relation of Art to Use," *Lectures on Art*, p. 96. "And all the architectural arts begin in the shaping of the cup and the platter, and they end in a glorified roof." See also p. 111 of this lecture for another reference to architecture as a glorified roof.

[39] *Seven Lamps of Architecture*, p. 175.

[40] *Ibid.*, p. 105.

[41] *Ibid.*, p. 162.

[42] *Ibid.*, pp. 174, 175; see note on p. 175 regarding Ruskin's attitude toward ornament in 1880. There also appears to be contradictory opinion within the *Seven Lamps of Architecture*. In order to lead up to his thesis that in devotional and memorial architecture (if not all architecture) we should add unnecessary labor and precious material in the spirit of an offering which demands that we sacrifice something, Ruskin makes the existence of architecture, as opposed to building, dependent upon unnecessary features such as moldings. See chap. 1, "The Lamp of Sacrifice," esp. pp. 28–32.

wrong way to make people happy. People must be made *rightly* happy. To be made rightly happy by ornaments, the latter must be an expression of man's delight in God's work. "Not of delight in man's own laws, liberties, and inventions, but in divine laws, constant, daily, common laws;—not Composite laws, nor Doric laws, nor laws of the five orders, but of the Ten Commandments." [43] Ruskin then set down the proper means for expressing man's delight in God's work. "The proper material of ornament will be whatever God has created; and its proper treatment, that which seems in accordance with or symbolical of His laws. And, for material, we shall therefore have, first, the abstract lines which are most frequent in nature; and then, from lower to higher, the whole range of systematised inorganic and organic forms." [44] But ornament need not be an exact imitation of natural forms, nor does the mere following of natural form itself make ornament good.[45]

Ruskin placed many restrictions on the use of ornament. Under no circumstances should "beautiful form" of any sort be used "as a mask and covering of the proper conditions and uses of things." [46] Architects should avoid useless expense in unnoticed fineries or formalities, in interior cornices, in woodgraining, fringing of curtains, and the like.[47] Things belonging to purposes of active and occupied life should not be ornamented.

> Wherever you can rest, there decorate; where rest is forbidden, so is beauty. You do not mix ornament with business, any more than you may mix play. . . . Work first, and then gaze, but do not use golden ploughshares, nor bind ledgers in enamel. Do not thrash with sculptured flails: nor put bas-reliefs on millstones. . . . The most familiar position of Greek mouldings is in these days on shop fronts. There is not a trades-

[43] *Stones of Venice*, I, 265.
[44] *Ibid.*
[45] *Ibid.*
[46] *Seven Lamps of Architecture*, p. 161.
[47] *Ibid.*, p. 38.

man's sign nor shelf nor counter in all the streets of all our cities, which has not upon it ornaments which were invented to adorn temples and beautify king's palaces. There is not the smallest advantage in them where they are. Absolutely valueless—utterly without the power of giving pleasure, they only satiate the eye, and vulgarize their own forms.[48]

Ruskin condemned machine-made ornament for being deceitful, degrading to the worker, and bad in itself.[49] On the whole, Ruskin had little use for the machine, especially the machine in art. He respected mechanical ingenuity. He admitted that the Crystal Palace showed mechanical ingenuity which was worthy of our admiration, but this quality did not make it art.[50] Moreover, in living things, the appearance of mechanical contrivance such as bone and tendon destroyed their beauty. For Ruskin, the beauty of living things consisted in their being alive and in action.[51]

Ruskin's views on the relation of architecture to nature was strongly stated in the *Seven Lamps of Architecture* (1849), but the relationship between art and nature was Ruskin's constant concern, hence it is manifest throughout his works. Ruskin saw three aspects to the relationship between art and nature; these were relationships of law, ornament, and truth.

According to Ruskin, all beauty is founded on the laws of natural forms, and conversely, "forms which are *not* taken from natural objects *must* be ugly." [52] Related to this are Ruskin's ideas concerning the materials of architecture. Throughout his writings we find him in-

[48] *Ibid.*, p. 157. By 1880 Ruskin was doubtful of this principle which he had expressed in *The Poetry of Architecture* and *The Seven Lamps of Architecture*. Cf. *ibid.*, n., p. 157.

[49] *Seven Lamps of Architecture*, pp. 60, 81–86, 214, 218.

[50] "The Opening of the Crystal Palace," in *Works*, XII, 409, 410.

[51] *Modern Painters*, II, 154, 155.

[52] *Seven Lamps of Architecture*, p. 141. An illustration of this is Ruskin's advice that color in architecture should follow nature's laws of color. He observed that in nature color does not follow form but is arranged in an independent system (*ibid.*, p. 177).

sisting that architecture should use the most readily obtainable natural materials, and the manner in which these materials are used should respect their natural properties, laws, virtues, and limitations. All art, including architecture, is related to organic form in another sense: it depends "on the sculpture or painting of Organic Form." [53] That is to say, for example, architecture should be ornamented with *natural* forms applied according to laws derived from the study of nature. The third sense in which Ruskin related art and nature is contained in his dictum that the beautiful in art must conform to the true in nature. This was applied by Ruskin to the representational arts of painting and sculpture rather than to architecture.[54] But in a general sense, architecture copies or is at least inspired by nature, and is most beautiful when doing so. Architecture can imitate the sublime effects of nature. Architecture can show a sympathy with "the vast controlling powers of Nature herself." [55] Architecture can, to a limited extent, copy the forms of nature; architecture must be content with straight lines, but these should be grouped as naturally as possible. The crystals of nature were regarded by Ruskin as a source of inspiration for architects.[56] Animal forms were another source of inspiration. For example, Ruskin compared the expression of support in the Doric base with the foot of an elephant.[57]

I have illustrated ways in which Ruskin related architecture and nature. What was behind this love of natural beauty which Ruskin professed and found inspiring for architecture? How did he define natural beauty? The answers to these questions can be found in *Modern Painters*, especially in the second volume, issued in 1846. In this book Ruskin defined what he regarded as the two types of beauty: typical and vital. The latter is the more limited form of

[53] *The Two Paths*, p. 251.
[54] *Modern Painter*, II, 67.
[55] *Seven Lamps of Architecture*, p. 102; see also pp. 101, 103.
[56] *Seven Lamps of Architecture*, pp. 144, 145.
[57] *Stones of Venice*, I, 106.

beauty as it is restricted to organic things. Ruskin found vital beauty to be "the appearance of felicitous fulfilment of function in living things." [58] The first condition requisite to the appreciation of this kind of beauty is "the kindness and unselfish fulness of heart, which receives the utmost amount of pleasure from the happiness of all things." [59] In describing this attitude and in his use of the expression "felicitous fulfilment," Ruskin introduced moral considerations of vital beauty. This also appears in his statement, "there is no high beauty in any slothful animal." [60] Typical beauty is the most universal beauty and applies to natural and artificial objects. Ruskin described typical beauty almost entirely in terms of morality. He wrote, "whatever good there may be desirable by man, more especially good belonging to his moral nature, there will be a corresponding agreeableness in whatever external object reminds him of such good, whether it remind him by arbitrary association or typical resemblance." [61]

Ruskin had three ways of approaching the problem of the relationship between art and moral values. One was from the point of view of society, another was from the point of view of the artist, and the third was from the point of view of the art object. Ruskin believed that all great and noble art was the product of a great and noble people, the expression of national virtue.[62] He told one audience this was "the most important of all things, I can positively declare to you." [63] According to Ruskin, art was a necessary part of national life, and he cautioned against the evil effects of neglect of art.[64]

[58] *Modern Painters*, II, 146.
[59] *Ibid.*, I, 148.
[60] *Ibid.*, I, 157.
[61] *Ibid.*, I, 76.
[62] This idea was developed in Ruskin's lectures "On the Relation of National Ethics to National Arts" and "On the Present State of Modern Art" (both of which were published in volume XIX of *The Works of John Ruskin*), and in *Queen of the Air* and *Sesame and Lilies*.
[63] "Inaugural Lecture" (Oxford, 1870), in *Works*, XX, 39.
[64] *The Cestus of Aglaia*, p. 57, and *Modern Painters*, II, 211.

Ruskin reasoned that since art was the formative or directing action of a spirit, the character of the deed necessarily depends on that of the doer: noble art can only proceed from noble persons.[65] True art is the emanation of inner virtue.[66] A great artist must be a good man, that is, he must have elements of good that show in his work.[67] In *The Seven Lamps of Architecture* Ruskin declared the test of good ornament to be the happiness of the workman at his work, but this idea is more fully developed in *The Stones of Venice*, where the principle is applied to architecture as a whole. Here Saint Thomas of Aquin may have inspired Ruskin.[68] In Ruskin's own words, "*The Stones of Venice taught* . . . the dependence of all human work or edifice, for its beauty, on the happy life of the workman." [69] Looking at the relationship between art and morality from the point of view of works of art, Ruskin concluded that art represents the beautiful and the good.[70] "Little else beside art is moral," he wrote, "life without industry is guilt, and industry without art is brutality." [71]

Ruskin connected practical and moral principles. All practical laws, he maintained, are the exponents of moral ones. Practical laws are an expression of the mighty laws which govern the moral world.[72] "There is no action so slight, nor so mean, but it may be done to a great purpose, and ennobled therefore." [73] Things which seem "mechanical, indifferent, or contemptible, depend for their perfection upon the acknowledgement of the sacred principles of faith, truth,

[65] "On the Relation of National Ethics to National Arts," in *Works*, XIX, 165, and "Inaugural Lecture" in *Works*, XX, 39.

[66] "On the Relation of National Ethics," *ibid.*, p. 188.

[67] *The Cestus of Aglaia*, pp. 49, 59, and *The Two Paths*, p. 310.

[68] *Seven Lamps of Architecture*, p. 218, and *Stones of Venice*, II, chapter 6, "The Nature of Gothic," p. 180 ff. Cf. Saint Thomas, p. 42 *supra*.

[69] *Fors Clavigera*, VII, letter 78, p. 137.

[70] *Modern Painters*, III, 42, 44.

[71] *Lectures on Art*, p. 93.

[72] *Seven Lamps of Architecture*, p. 22.

[73] *Ibid.*, p. 23.

and obedience." [74] The practical art of architecture could achieve virtue, that is, moral value. The virtues of architecture as Ruskin conceived them, were, first, to act well, that is, to do a practical job well; second, to speak well, that is, to tell the truth; and third, to look well, that is, to do its job and tell its truths with grace and dignity.[75]

Truth, for Ruskin, was the end, foundation, and test of art.[76] But he saw beauty and truth as correlative, not equivalent. Truth is not beauty, but nothing untrue is beautiful. Truth is more important than beauty, hence we are at liberty to pursue only as much beauty as is consistent with truth.[77] The sacrifice of truth actually leads to a loss of beauty.[78] Ruskin preferred a religious basis to an aesthetic basis for art because the word aesthetic, for him, was devoid of moral meaning.[79]

Ruskin was by no means a functionalist in the modern sense of the word: he did not write of the beauty of machines, nor draw an analogy between mechanical and architectural beauty.[80] But Ruskin's demand for a new architecture which would itself be moral, especially truthful, and minister to the health, practical needs, and moral happiness of the great masses of people, was an inspiration for later functionalists.

[74] *Ibid.*, p. 25.

[75] *Stones of Venice*, I, 60–73.

[76] This is the main subject of *Modern Painters*, I. It is prominent in *Modern Painters*, Vol. V, *Lectures on Architecture and Painting*, and *The Laws of Fésole*.

[77] *Modern Painters*, V, 55–56n.

[78] See *ibid.*, p. 324 and *Lectures on Architecture and Painting*, pp. 145–48. Ruskin believed that the artist of the Renaissance, by denying truth and pursuing beauty for its own sake, ended by losing beauty.

[79] *Modern Painters*, II, 211.

[80] At times Ruskin found it expedient to use the words beauty and ornament interchangeably, an expedient incompatible with functionalism. See p. 134 *supra*; *Seven Lamps of Architecture*, pp. 28, 161; and *Stones of Venice*, I, appendix 17, p. 451. In the light of Ruskin's own writings it seems to have been an unfortunate expedient because it did not truly describe his viewpoint.

Ruskin's moralistic interpretation of architecture as presented in the *Seven Lamps of Architecture* had a strong influence on Edward Lacy Garbett. The latter, in his *Rudimentary Treatise on the Principles of Design in Architecture* (1850), also acknowledged his indebtedness to the writings of Ralph Waldo Emerson, James Fergusson, and Quatremère de Quincy.

Garbett contrasted two basically different approaches to architecture: (1) "the art of clothing or masking buildings," and (2) "the art of Building Well—well as regards every purpose intended in building, and not only the actual fitness of a building or its parts to their several purposes, but also the fitness of their *appearance* thereto, and the correct or tasteful choice and disposition of such decoration (if any) as may aid in this object." [81] Garbett's demand for apparent as well as actual fitness is significant. He held the concept of fitness in high regard, and this (together with his sense of morality) led him to reject superficial copyism. "The highest beauty is fitness. Therefore, when you see a thing highly beautiful, *beware of copying it* till after mature study; for the more beautiful (i.e., the fitter) it may be in its situation, the less likely to be fit (i.e., beautiful) in any other." [82]

Fitness is basic to good design, but mere personal utility does not automatically produce beauty. Garbett asked himself why utilitarian buildings (or any type of architecture) should be ugly. He found the answer to lie in their expression of immoral qualities. Like Emerson, Garbett saw that many utilitarian buildings were selfish looking.[83]

It is the mind that sees. The rude, selfish, and the crude must be softened by politeness, "and this politeness we term architecture." This is not all there is to architecture, Garbett continued, but "it is

[81] Garbett, *Rudimentary Treatise on the Principles of Design in Architecture*, p. iii.

[82] *Ibid.*, p. 214.

[83] *Ibid.*, pp. 5, 6. Emerson's remarks, on the selfish aspect of some architecture, which impressed Garbett, were in the former's, *Essay on Art*.

the most indispensable portion, without which all attempts at the higher aims of beauty, sublimity, or definite expression will be totally useless. The building that aims at being anything more than useful and strong, must first be polite. This is the lowest quality in architecture as distinguished from building." [84] The higher qualities of architecture are not necessarily to be obtained by ornament and not to be obtained at all by unnecessary features. No mask of decoration can cover a selfish-looking building.

It is a great mistake, though a common one even in architectural books, to suppose an edifice cannot be architectural unless it have decorative or unnecessary features. The first purpose of art—viz., politeness in building —may be attained perfectly without any unnecessary *features*, but not without unnecessary *design*.

It was Goethe, I believe, who called Gothic architecture "a petrified religion." I cannot but regard the perfection of domestic architecture as an embodied courtesy.

And will any one dare to say that this courtesy is useless? [85]

Deception, according to Garbett, is destructive to all the arts. Like Ruskin, he found it especially prevalent in the architecture of his day.[86] "The end of art is truth," he wrote. "The instant it proposes any other name . . . it ceases to be art; and what is not art is not architecture." [87] Integrity in construction and the structural basis of style were two of Garbett's main points. He regarded "constructive truth" and "constructive unity" to be "the two most important principles to be borne in mind, in tracing the history of architecture." [88] Only the Greek Doric and the thirteenth-century Gothic were pure styles, in the sense in which Garbett defined purity, that is, they possessed the combination of constructive and decorative truth and con-

[84] *Ibid.*, pp. 7, 8.

[85] *Ibid.*, p. 9. Ruskin's remarks in the *Seven Lamps of Architecture*, pp. 28, 29, were the object of Garbett's criticism in this case. See note 98 in this chapter.

[86] *Ibid.*, pp. 122, 125.

[87] *Ibid.*, p. 213.

[88] *Ibid.*, p. 130.

structive and decorative unity.[89] Garbett called upon the architects of his day to develop a new architecture based on a new system of constructive unity. Historic architecture demonstrated the possibilities of the arch and the beam. Architects must now be true to their own characteristic style of construction and approach "a consistent use of *tensile* covering, to the exclusion of every other." [90]

Garbett's emphasis upon truth and consistency reflects his intellectual orientation toward the art of architecture. He described four stages by which architecture is ennobled as it extends its appeal to the mind. Architecture begins "as a courtesy due, from every one who builds, to humanity, on whose ground and in whose sight he builds"; then, when attention is given to things which "please the higher faculties" of the mind, architecture is brought to a higher state; beyond that a higher state can be attained when architecture is capable of "conveying to the mind definite emotions, suited to, and even indicative of, the character and general destination of the work"; lastly, architecture is at its greatest when it not only delights but "exalts and improves" the mind of man. These are the fourfold uses of architecture: politeness, beauty, expression, and poetry.[91]

Garbett preferred to accept Fergusson's concept of "aesthetic" or "sensuous" beauty rather than reject, with Milizia, all forms of beauty apart from the beauty of mental inferences or associations. But Garbett differed from Fergusson by a strong inclination to restrict "aesthetic" or "sensuous" beauty to the beauty of color. Furthermore, Garbett, echoing Plato, insisted that the beauties of form are always addressed to the mind hence they are of a higher class of beauty than the merely sensuous beauty of color.[92] Color and abstract beauty played an insignificant part in Garbett's moralistic and functionalistic theory of architectural beauty.

[89] *Ibid.*, p. 217.
[90] *Ibid.*, pp. 217 ff.
[91] *Ibid.*, p. 32.
[92] See *ibid.*, chap. ii, pp. 33 ff.

Three types of analogy were used by Garbett to illustrate or clarify his arguments. One of these, the moral analogy, we have already observed: ugliness can be created by the expression of immoral qualities. The other two were the physical analogy and the organic analogy. Garbett compared ugliness to physical injury. Ugly objects should be removed from sight because they inflict mental injuries "just the same as a nuisance, a noise, or a stench, which is known to be injurious to the body, because unpleasant." [93] Garbett used the organic analogy in contrasting a certain type of chateau which was designed in consideration of the neighborhood with a selfish type of building. The chateau reminded Garbett of "an organism of nature, not its own, but belonging to the surrounding scene," whereas the rude structure, "oyster-like, concentrated all in self," and bore no apparent relation to any other thing without.[94] Observe that it was nature's morality or lack of it which impressed Garbett and formed the basis of the analogy.

The organic analogy and primitivism were combined with the moralistic interpretation of architecture by Garbett when he contrasted "artificial" with "natural" politeness and found the latter superior. He then praised the natural politeness of primitive architecture. The primitive structure shows that it "belongs not altogether to a man, but in some sort also to humanity." Primitive huts "conform to all the rules of a systematized etiquette," and deserve the name architecture.[95] Garbett regarded much of the architecture of his day as having, at best, artificial politeness.

Garbett, following Quatremère de Quincy, believed that architecture should imitate nature in the sense of doing as nature does, not copying specific forms. Architecture should generalize nature.[96] Ar-

[93] *Ibid.*, p. 11. Compare Plato: "then will our youth dwell in a land of health," etc.

[94] Garbett, *Rudimentary Treatise*, p. 9.

[95] *Ibid.*, pp. 8, 9.

[96] *Ibid.*, p. 110.

chitects should observe the basic truths of nature and try to apply them to architecture. Garbett used the Doric order of the Greeks to illustrate how nature could be generalized.[97]

Although he shared Ruskin's sense of the morality of nature, Garbett's view of the relationship between art and nature was less like Ruskin and more like the views of Sir Joshua Reynolds or Quatremère de Quincy. Ruskin was uncompromising in his rejection of the idea that nature was something the artist could criticize or correct, an idea which he associated with Garbett and which was implied, if not directly stated, in Garbett's book. The principal differences between Ruskin and Garbett concerned, as we have seen, (1) the significance of ornament, and (2) the relationship between the artist, his art, and nature.[98] On the whole, the similarities between Ruskin and Garbett obscure the minor differences. Garbett's importance in the historical development of functionalism lies in his compact restatement and clarification of the more functionalistic aspects of Ruskin's theory.

Ruskin's three virtues of architecture, viz., to act well, look well, and speak well, found their counterpart in James Fergusson's three categories of beauty: technic, aesthetic, and phonetic.

Technic or mechanical beauty is, in Fergusson's system, the same as perfection; whatever is perfect is beautiful in the eyes of those who understand it. "A sailor sees beauties in a class of ships, a jockey in a race of horses; while to the common observer these look only like the common, every-day forms of these objects. A mechanician is enchanted with the ingenuity of some new machine; an astronomer is enraptured by the beauty of some new instrument, in which most men would see only unintelligible complexity; an anatomist searches for and finds beauty amidst death and putrefaction, from which most men would shrink in horror and disgust." [99] The forms of useful art,

[97] *Ibid.*, pp. 116, 117.

[98] See *Stones of Venice*, I, 450–54, appendix 17, for Ruskin's answer to Garbett's criticism.

[99] Fergusson, *An Historical Inquiry*, pp. 138, 139.

such as tools, instruments, machines, and architecture, aspire to such perfection or beauty.

Fergusson's second class of beauty, aesthetic, was the beauty of direct sensuous appeal such as color or musical harmony, and beauty of proportion. He used the terms "euchromatics" and "eumorphics" to denote ideas of beauty of color and beauty of proportion. Despite his concept of technic beauty, Fergusson did not attribute the beauty of proportion to fitness for function. "While beauty of fitness may often reconcile us to the want of it [beauty of proportion] in an object, beauty of form or proportion is something separate from beauty of fitness." [100] Fergusson did not go beyond this statement to tell his readers in what the beauty of proportion consisted. He simply stated that it was an important problem and that "it ought to be more studied as a separate art than it has been." [101] Most of Fergusson's discussion of the aesthetic arts centers on music.

The fine arts are characterized by either aesthetic or phonetic beauty. These beauties may or may not be combined with mechanical perfection. Fergusson, as we have seen, classed architecture among the useful rather than among the fine arts, but architecture is capable of aesthetic beauty through color and of phonetic utterance through sculpture, painting, or inscription.[102] Architecture alone, considered apart from its mechanical appeal, cannot express much more than indistinct emotions "like unphonetic brutes," and the real voice of architecture, according to Fergusson, is in painting and sculpture.[103]

Fergusson described phonetic or intellectual beauty as the highest class of beauty. It is that beauty "which may be presented to the mind by mere words or conventional signs, without enlisting either the aesthetic or technic arts to assist it; but the most perfect work

[100] *Ibid.*, p. 109.
[101] *Ibid.*
[102] *Ibid.*, pp. 76, 78.
[103] *Ibid.*, p. 121.

of art will be one that combines all three classes, but it must rank higher as an utterance of fine or high art in the ratio in which the phonetic predominates over the aesthetic ingredient, or that over the technic one." [104] Fergusson relegated association to a minor rôle as a variation of phonetic beauty.[105] He criticized his contemporaries for placing too much emphasis upon association in architecture to the detriment of technic and aesthetic beauty.[106] His point of view, that association is the enemy of mechanical perfection, should be contrasted with Richard Payne Knight's point of view, that fitness depends upon association.[107]

The sense of beauty, according to Fergusson, is the sense of gratification we are able to extract out of every useful function we perform. The threat of pain, disease, and death, goads man on to perform the functions necessary to his existence. This is something man has in common with all animals.

> But, on the other hand, there is attached to the exercise of every function a certain gratification or inducement to its exercise, which, properly cultivated, converts that which was a task and burden into a source of pleasure and enjoyment; and with man, at least, the inducement that attracts him to the healthful exercise of his faculties may in most cases be greater than the force that goads him to it. With the lower animals this is scarcely the case, except in the sexual appetite, or such, perhaps, as eating, drinking, sleeping, and the lowest class of emotions; but in man it is attached to every thing, and is greatest in the highest intellectual exercises, where the goading stimulus that forces men and animals to corporeal exertion is almost entirely wanting, and the attraction of pleasure almost the only inducement to their exercise.[108]

The pleasure which we call beauty "is necessarily attached to the

[104] *Ibid.*, p. 139.
[105] *Ibid.*, p. 144.
[106] *Ibid.*, p. 145.
[107] Cf. pp. 111–13 *supra*.
[108] Fergusson, *An Historical Inquiry*, p. 95.

proper performance of all these functions." [109] The principal things which Fergusson desired to show, were, in his own words, "that all common and useful things may be refined into objects of beauty, and, though common, that all that is beautiful or high in art is merely an elaboration and refinement of what is fundamentally a useful and a necessary art." [110]

Like Ruskin and Garbett, Fergusson saw that architecture did not achieve its value by means of form alone but by the thought and high motive of the creator which is expressed in the form.[111] The expression of high motive can make up for any other deficiency. Sometimes, as in early Gothic art, works of little technic or aesthetic merit appeal to us strongly.

> And why is this?—simply that the men that did these things were earnest and religious men, and in spite of their untechnic art they expressed their conception of grandeur and of holiness in a manner that must speak to the heart of man in all ages; whereas, in spite of all the perfection to which the mechanical processes of art have been carried in our days, there is an absence of mind in its productions that renders them vapid and powerless.[112]

Fergusson saw three moral-intellectual problems which confronted the architects of his day who sought to achieve a new architecture. Firstly, imitation of past styles must be abandoned. Secondly, the profession of architecture should enlist the highest order of intellect into its ranks; and thirdly, the aim of architects should be to teach and elevate mankind rather than to please the dilettante.[113] On the whole, according to Fergusson, it has not been architecture, but civil engineering projects, such as the Eddystone, Bell-Rock, and Skerry-

[109] *Ibid.*
[110] *Ibid.*, p. 96.
[111] *Ibid.*, pp. 149, 152.
[112] *Ibid.*, p. 152.
[113] *Ibid.*, p. 155.

more lighthouses, certain canals, railroads, and bridges, which have illustrated progressive rather than imitative tendencies, and by cultivating common-sense principles, have only "narrowly escaped becoming a fine art." [114]

[114] *Ibid.*, p. 158.

RATIONALIST FUNCTIONALISM IN EIGHTEENTH-CENTURY FRANCE

7

THE controversial figure of Claude Perrault was the center of a lively discussion concerning architecture which continued through the middle of the eighteenth century in France.[1] The most extreme of the anti-Perrault views was expressed by C. E. Briseux, in his *Traité du beau*.[2] He worked out in meticulous fashion an intricate system of arithmetical relationships which, he maintained, must govern architectural form if it is to attain the same harmony as is found in music which likewise is based on an intricate system of arithmetical relations. The essence of this point of view is that taste received its sanction from mathematics. Obviously, we are more concerned with those French authors of the eighteenth century who took, or tended to take, an opposite point of view, especially those who were inclined to place commodity and functional structure as the imposts of their aesthetic arch.

[1] Hamlin, *Architecture Through the Ages*, pp. 467, 468.
[2] See Briseux, *Traité du beau essential dans les arts*.

Among the latter was the critic Cordemoy, Canon of Soissons. Cordemoy, in general, accepted the Perrault point of view, especially with regard to the proportions of the orders, but he criticized Perrault for being too diffuse and obscure in his principles.[3] For the sake of clarity, Cordemoy analyzed the component principles of architecture. These he found to be three in number: (1) *ordonnance* (i.e., order, ordering, arrangement, regulation), that which gives to all parts of a building a just size which is proper to them with respect to their use; (2) *disposition* or *distribution*, the convenient arrangement of all the parts; and (3) *bienséance* (propriety, fitness), which he defined as the principle of disposition in such manner that nothing will be contrary to the nature and use of the elements involved.[4] Nowhere did Cordemoy attempt to define terms like "beauty" or "taste." We gather that these intangibles are best left undefined.[5] He did not specifically state that beauty depends exclusively on fitness or use, but we do have his prefatory analysis of architecture which ties together the threefold basis of the excellence of architecture, order, convenience, and propriety, by the single but unbreakable bond of use.

Cordemoy introduced the modular system of proportion in his exposition of the idea of *ordonnance*. He referred to the module as the "measure which gives just proportion to all things."[6] This would seem to indicate that good proportion lies in the underlying mathematical relationships, but this idea is soon dispelled when Cordemoy points out that the authors who have set down rules for the modular design of the orders have done so, despite the rather

[3] Cordemoy, *Nouveau traité de toute l'architecture*, pp. iii, iv.

[4] *Ibid.*, p. v.

[5] At one point in his discussion of public squares, Cordemoy states that "one of the beauties" of squares, "according to his taste," was broad avenues of approach, etc., and "another beauty," is the "ornamentation" of squares by fountains and statues in honor of great men. *Ibid.*, p. 200. This inexact use of the word beauty is somewhat misleading.

[6] *Ibid.*, p. 2.

wide differences in the actual proportions of the orders of ancient buildings.[7] Cordemoy did not follow up this one statement as to the relationship between good proportion and a modular or mathematical basis. His treatise is therefore somewhat inconclusive from an aesthetic point of view, neither rejecting mathematical rule, embracing the rule of function, nor effecting a synthesis. He did not recommend a mathematical system for proportioning façades or rooms, but limited the mathematical system to the orders. He advocated a rational use of the orders and of all the other classic elements of architecture. For example, he condemned twisted columns and rusticated columns as being in bad taste.[8] Cordemoy, in the same spirit, insisted on the propriety of keeping the orders square and plumb; he condemned arbitrary breaks and other distortions of architectural members.[9] Even ornamentation must be subject to the general laws of architecture, notably, that of *bienséance*. A large class of building requires no ornament at all, but when ornament is introduced it must be determined by the type of occupancy or use to which the building is to be put.[10]

Cordemoy is important not only as one who followed and clarified Perrault, but also for his influence on Marc Antoine Laugier. Cordemoy comes closer to full acceptance of the idea of relative beauty based solely on fitness, whereas Laugier was inclined to place more stress on the idea of a mathematical basis of good proportion.

Sébastien Le Clerc, in his *Traité d'architecture* first published in 1714, carried on in the Perrault tradition. Maintaining that beauty of proportion cannot be achieved by arbitrary rules, he pointed out the differences in the proportions recommended by the principal

[7] *Ibid.*, pp. 2, 3.
[8] *Ibid.*, pp. 106, 107.
[9] *Ibid.*, p. 120.
[10] *Ibid.*, pp. 128 ff. Pierre Le Muet in his *Manière de bien bâtir pour toutes sortes de personnes* (1633), was one of the earliest French writers on architecture to take up this idea.

authors such as Palladio and Vignola.[11] Proportion, he defined as nothing more nor less than fitness of parts founded on the good taste of the architect. "Par proportion, on n'entend pas ici un rapport de raison à la manière des Geometres; mais une convenance de parties, fondée sur le bon goût de l'Architecte." [12] The issue of taste lay at the heart of eighteenth-century French treatises.

Germain Boffrand, in his *Livre d'architecture*, upheld the Perrault ideals of freedom in design, and stressed the idea that good taste was a personal and variable thing. Taste was for Boffrand a certain *je ne sais quoi* which was pleasing, or a faculty by which one distinguishes the excellent from the good.[13] But although taste is something intangible and indefinable, the first principles upon which architecture is founded are reasonable; they are convenience, comfort, safety, health, and common sense.[14]

Nature formed the germ of the arts and man has developed and refined this germ but need and utility remain the basis of building. The trunks of trees which first supported the roofs of huts gave rise to columns supporting the porches of buildings. Art gave them more elegant contours than those which nature had given to the trees. Even ornaments which man devised for his architecture have a tangible purpose or need behind them. Temples were enriched to honor the divinity and to increase the respect of the people on whom these objects have such a power. The palaces of the sovereigns were ornamented to invest them with the dignity which was noted in the temples to the gods.[15]

Boffrand's approach to architectural theory shows complete free-

[11] Le Clerc, *Traité d'architecture*, 1, 16, 17.

[12] "By proportion we do not understand (in the manner of geometricians) a relationship of reason, but a fitness of parts founded on the good taste of the architect." *Ibid.*, I, 39.

[13] Boffrand, *Livre d'architecture*, pp. 3, 4.

[14] *Ibid.*, p. 4.

[15] *Ibid.*, p. 5.

dom from stylistic prejudice. His independent viewpoint is illustrated by his words in appreciation of Gothic cathedrals. He admired the cathedrals for their consistency of design, and he praised the care which Gothic architects took in the construction of their buildings. The cathedrals impressed him with their strength in spite of their boldness and apparent lightness.[16] Boffrand criticized the Baroque practice of distorting buildings, the use of excessive and extravagant projections, and the lavish use of carved ornament which bears little or no relation to the architecture which supports it. He was sharply critical of the Rococo designer for his abuse of ornament, especially for placing interior types of ornamentation upon the exteriors of buildings.[17]

Boffrand called for architects to design in a spirit of "noble simplicity." [18] In his description of the principles of architecture as they apply to the design of a house Boffrand maintained,

> . . . each part related to the whole must have a form suited to its use; that among several ways of doing a thing there are always some which are better than others; it is necessary to find the best of these; and it is taste, inseparable from good sense, convenience, and the right proportion necessary for the use of each part, which gives the whole its merit and perfection.[19]

Boffrand's treatise continues with a thoroughly practical analysis of architectural design, emphasizing the relationship of a building to its site, adaptation of plan to the character and living habits of the occupants, and making proper allowance for climate, national differences, and the like.[20] In the last sections of his treatise Boffrand attempted to apply to architecture principles drawn from the *Poetic Art* of Horace and discusses the proportion of the superimposed

[16] *Ibid.*, pp. 6, 7.
[17] *Ibid.*, pp. 8, 9.
[18] *Ibid.*, p. 8.
[19] *Ibid.*, p. 10.
[20] *Ibid.*, pp. 10–15.

orders, but these sections are largely a repetition or application of ideas already set forth.[21] The element of morality, however, is introduced.

The sound morality which Horace advises us to use in a dramatic poem is a useful precept to employ, for public buildings, only those forms which are decent, such as bas-reliefs, pictures, ornaments, and attributes representing the actions of virtue: generosity, gratitude, and justice. Every form should inspire tranquility, respect for the laws, religions, and public consideration. Everything must be avoided which might cause the corruption of the manners of citizens, or offend honest people, or which might give sanction to libertinism. Finally, contemptible and hateful things to the eyes must be avoided, and only those forms should be admitted which can touch the public and bring them serenity of mind and which recommend pity, justice, and innocence.[22]

The *Cours d'architecture* of Jacques-François Blondel summed up ideas of architecture which its author had derived from his practice as an architect but also includes lessons presented to the students of his own professional architectural school in Paris during 1750 and the years following. It is an essentially practical set of books, devoting many pages to the proper use and qualities of building materials, to the design of foundations, to structural economy and strength and to the planning of buildings. In connection with the latter subject, the author stressed the idea of convenience, the correct relationships of the numerous parts of a building which thereby permit the occupants to pursue their appropriate activities with the least effort and the least waste motion. Good orientation, correct exploitation of available views, prevailing winds and drainage facilities, are emphasized, in short, all those things which make everyday living agreeable and convenient.[23]

[21] *Ibid.*, pp. 16–40.

[22] *Ibid.*, p. 28. This passage calls attention to the fitness, for architecture, of morality, not the morality of fitness.

[23] See Blondel, *Cours d'architecture*, *passim*. Only the first six volumes were completed by Blondel. The remaining volumes were completed by his pupil Patte.

The first volume of this *Cours* contains J.-F. Blondel's aesthetic theory.[24] Each building must have its own proper character; some will aim to be sublime, noble, and elevated, others will strive for a character that is naïve, simple, and true.[25] Proper character depends on the purpose of the building. Blondel, following the inspiration of Burke, devoted a short section to an analysis of the sublimity of architecture. Unlike Burke, Blondel rejected size alone as the source of sublimity. The sublime is achieved when beauty, regularity, convenience, solidity, and commodity, are united in the spirit of sublimity by the genius of the architect.[26] Sublimity also depends on right character. Churches, for example, should be treated with simplicity, with little sculpture, with a wise disposition of parts, in a word, with an expression appropriate to a sacred edifice. Blondel cited as good examples of sublime architecture, the interior of the Val-de-Grâce, the façade of the Louvre, the port of Saint-Denis, and the orangery of Versailles.[27]

Blondel attached great importance to the idea of *convénance* (fitness, suitability) as an aesthetic element. The disposition of the forms and their principal parts together with their decoration are "absolutely relative" to the purpose for which the edifice has been erected.[28] Style and character also depend on fitness. An edifice must, at first glance, "announce" what it is.[29] But Blondel did not simply equate beauty and fitness. He found that architectural beauty proceeds from a combination of many excellences: in the unity of the masses, in the repetition of parts, the subdivisions created by the details, excellent sculpture, and perfection of construction.[30]

[24] *Ibid.*, I, 373–466.
[25] *Ibid.*, I, 373, 374.
[26] *Ibid.*, I, 377. For Burke's theory, see pp. 93, 94 *supra*.
[27] *Ibid.*, I, 380.
[28] *Ibid.*, I, 389.
[29] *Ibid.*, I, 390. Compare the similar ideas of Boullée and Ledoux, pp. 161–67, *infra*.
[30] *Ibid.*, I, 394.

Blondel defined taste as something twofold in human nature: one, natural taste being an endowment about which we can do little; the other, acquired, is something which we can develop because it is the outcome of the use of reason. The proper sphere of taste is in connection with problems of art which are not subject to fixed, clear, rules or scientific demonstration.[31]

Blondel's use of the organic analogy varied in character. He criticized the Italian Baroque architects for rejecting "unity," and "beautiful simplicity," in favor of "la pénétration des corps, la mutilation de membres d'Architecture, le contrainte des formes," which characterize their work.[32] Elsewhere, however, his organic analogy is of the naïve kind. He compared the masculine and feminine characteristics of the Doric and Ionic orders,[33] and in a series of profile drawings, created handsome and ugly faces based upon mouldings on the entablatures of Palladio, Scamozzi, and Vignola with a view to demonstrating the superior (i.e., handsomer) proportions of the latter.[34]

Père Marc Antoine Laugier, a Jesuit scholar and diplomat who left the order and became an adviser on matters of art and architecture to princes and municipalities, wrote two works of architectural criticism, *Essai sur l'architecture* (1753), and *Observations sur l'architecture* (1755), which, according to Hamlin, constitute "the most piercing, forthright criticisms of a contemporary style of architecture ever made."[35] He not only stated his disapproval of Baroque and Rococo architecture, but set up new standards and described imaginary buildings which expressed the new standards to which he thought architecture should conform.

[31] *Ibid.*, I, 448, 466.

[32] *Ibid.*, I, 396, 397. ". . . the penetration of the body, the mutilation of the architectural members, the constraint of the forms."

[33] *Ibid.*, I, 195, 196.

[34] *Ibid.*, I (atlas), pl. X, XI, and XII.

[35] Hamlin, *Architecture Through the Ages*, p. 493.

In the *Essai*, Laugier traced the origin of architecture back to simple, primitive conditions and to simple ideas imitated originally from nature. He maintained that modern architecture should retain these qualities.[36] For example, an order of architecture was essentially a column, an entablature or beam, and a pediment, and thus it should remain, recalling the primitive shelter. Laugier admired the Maison Carrée at Nîmes because of its "noble simplicity" and its resemblance to primitive prototypes.[37] Laugier called for a return to "the necessary consequences of this simple principle," i.e., the relation of modern building to primitive prototype. Truly, the modern work will be more polished and embellished than the primitive, but it must remain essentially the same.[38]

Laugier demanded that the orders and all the elements of architecture be used simply and rationally according to their original purpose. He condemned coupled columns and other arbitrary types of irregular intercolumniation. He condemned as utterly illogical the use of the orders merely as decoration, including the use of the pilaster.[39] Entablatures must include an architrave or lintel, and a means of supporting the roof; they should be continuous and not arbitrarily broken.[40] *Frontons* (pediments) also should be logical in form. The pediment is the essentially triangular shape created by the roof slopes and the horizontal line of the beam below. He condemned the purely decorative use of the pediment, broken and

[36] Laugier, *Essai sur l'architecture*, pp. 8–10.

[37] *Ibid.*, p. 11. Germain Boffrand, in his *Livre* (1740) had used the expression "noble simplicity" to describe good architecture.

[38] *Ibid.*, p. 12.

[39] *Ibid.*, pp. 13–28. Contrast J.-F. Blondel's defense of the pilaster which begins: "Plusieurs regardent les pilastres comme une mediocrité en Architecture; ce genre d'ordonnance représentant, disent-ils, bien plus la contrainte de l'art, qu'il n'imite les beautés de la nature, et ne produisant jamais, ou que rarement, une décoration interessante. Cela peut être vrai à certains égards; mais ne peut-on pas aussi considérer les pilastres comme un genre que tient le milieu entre l'art de bâtir, et l'Architecture proprement dite?" *Cours d'architecture*, p. 289.

[40] *Ibid.*, pp. 29–34.

curving pediments, and superimposed pediments.[41] Laugier called attention to the fact that, in original usage, the order was one story in height. Only one order is to be placed over the other, and in a two-story building, the superimposed order should be located directly above the lower order.[42] The forms of doors and windows as well as their locations should be determined by use. All bizarre ornaments should be omitted from these as from all architectural elements.

Laugier did not reject all ornamentation, but ornament should correspond to the use of a building. For most types of buildings little and modest ornament is most appropriate.[43] Laugier included in his *Essai* long sections on the appropriate ornamentation of gardens and even of whole cities, but his emphasis was always on a restrained, rational approach wherein ornament is not applied arbitrarily but for a tangible and very often a practical purpose.[44]

In his discussion of commodity, Laugier did not regard this quality as the sole basis of beauty any more than he regarded structure or ornament the sole basis of beauty.[45] Laugier's emphasis was always on a generally logical, rational approach, and these are the qualities he praised along with "truth," "law," and "fixed principles." The things he condemned were "servile imitation," "caprice," and "bizarre opinions."[46] Thus Laugier seems to be a rationalist first and then (doubtless because of this) a functionalist. Nowhere in the *Essai* does there appear a concise summary of Laugier's position, save perhaps in the reference to the principle of primitive origins already cited. After his description of his ideal manner of church design, he enunciated some conclusions which clarify the ideals toward which his architecture was striving:

[41] *Ibid.*, pp. 35–38.
[42] *Ibid.*, pp. 39–48.
[43] *Ibid.*, pp. 105, 155–72.
[44] *Ibid.*, pp. 209–53.
[45] *Ibid.*, pp. 139–54.
[46] *Ibid.*, preface, *passim.*

That is my idea, and here are the advantages: (1), an architecture which has nothing but that which is natural and true, wherein all is reduced to simple rules and executed according to great principles: no arcades, no pilasters, no pedestals, nothing tortured, nothing forced; (2), an architecture of elegance and extremely refined: the wall does not appear to be nude yet there is nothing that is superfluous, nothing clumsy, nothing rude; (3), the openings are arranged in the most convenient and advantageous manner; all the intercolumniations are glazed from top to bottom, . . .[47]

We have seen that the idea of morality, i.e., truth, as well as what is "natural" for architecture, appears frequently in the *Essai* of Laugier.

Laugier's *Observations* begins with a discussion of proportion and is to a large extent devoted to proportion. Laugier regarded good proportion to be the principal essential of architecture.

Proportions are so essential to architecture, that a well-proportioned building need have no other merit than beauty of material for its effect, whereas ornament squandered on a building lacking good proportions cannot succeed. Without a knowledge of proportions, one can perhaps become a clever 'dresser' or ingenious decorator, but one shall never be a true architect.[48]

It is clear that proportion, for Laugier, did not mean merely the proportions of the orders. It had to do with many things, such as: the masses of the edifice, the subdivisions of the interior as well as the exterior, the choice of *ordonnance* relative to the type and character of the building, the accord of the parts of the whole, and the parts among themselves; in fact, each and every part of a building was a problem in proportion.[49] Laugier observed that custom or usage were really the only laws which guided those who wrote the great books on the proportions of the orders.[50] He defined proportion as the com-

[47] *Ibid.*, pp. 179, 180.
[48] Laugier, Marc Antoine, *Observations sur l'architecture*, pp. 1, 2.
[49] *Ibid.*, p. 2.
[50] *Ibid.*, pp. 3, 4.

mensurability of two dimensions in which the larger contained the smaller a certain number of times.[51] For proportions to be good, the larger must contain the smaller dimension a definite number of times.[52] Laugier rejected abstruse and elaborate mathematical formulas, but he offered certain mathematical proportions which he considered superior because they were more simple, clear, and most obvious.[53]

If, in his *Essai*, Laugier seemed to make fitness the basis of beauty of proportion, this notion is no longer applicable to Laugier as revealed by his *Observations*. He emerges as a more conservative authority, or at least, he takes a middle-of-the-road stand. A rational analysis of problems of use and structure provides the basic forms of architecture which then must be adjusted on a grid of mathematical commensuration.

Laugier's section in the *Observations* on the disadvantages of the orders of architecture returns to the spirit of the opening pages of the *Essai*. Here he points out how the orders were invented for use in warm climates and in countries with customs which were different from those of France. The orders were intended for buildings with simple plans, and for essentially rectilinear systems of architecture, whereas the France of his day required buildings of complex form, often curvilinear or mixtilinear. Laugier stressed the logical differences between the use of the orders on the exteriors of buildings and their use as elements of interior architecture. In the latter usage, for example, there is no need for a cornice. Père Laugier was very much interested in the problems of church design, hence he illustrated his thesis on the disadvantages of the orders by relating it to the problem of the design of a church which he analyzed in some detail.[54] Laugier described a church in which there would be no loss of beauty, but

[51] *Ibid.*, p. 5.
[52] *Ibid.*, p. 6.
[53] *Ibid.*, pp. 5 ff.
[54] *Ibid.*, pp. 77–128.

instead an enhanced effectiveness resulting from the application of reason and logic to problems of design.

In his book, *Die Kunstliteratur,* Julius Schlosser points out the possibility that Laugier was guilty of plagiarism because Cordemoy and Lodoli had previously put forth many of the same ideas.[55] Laugier mentions Cordemoy in the preface of his *Essai;* there is no doubt that Laugier was indebted to Cordemoy. The precise nature of Lodoli's influence on Laugier must remain a mystery because we do not possess Lodoli's own writings for comparison. However, it should be borne in mind that the ideas which Laugier expressed were not as uncommon as has hitherto been thought. The idea of fitness, the idea of expression of function, the idea of truth in architecture, the relation of architectural to natural beauty, and the correspondence of developed architecture to primitive prototype, are recurrent ideas which occur so frequently as to defy attribution to any one person.

The writings of Étienne-Louis Boullée and Claude-Nicolas Ledoux, in the emotional spirit of Revolutionary France, depart somewhat from the cooler and more strict rationalism of Cordemoy and Laugier. Boullée and Ledoux "were swayed by the emotions and the needs of the moment." [56] They had a passionate love of architecture and, like their predecessor J.-F. Blondel, sought to create an *architecture parlante.* For them, the art of architecture consisted in its expressive possibilities. The writings of these architects constitute an important part of the historical background of functionalism because they demanded an architecture which would be composed solely of necessary elements, featuring simple geometric masses, and in every way expressive of the function of the building. In this they were probably influenced by the need for economy at the time of

[55] See pp. 566, 567.

[56] Emile Kaufmann, "Three Revolutionary Architects," *Transactions of the American Philosophical Society,* XL (1952), 545.

the French Revolution, but their theory does not stress economy.

Boullée's *Architecture* was probably written during the 1790s.[57] It was not published and today the manuscript forms only a part of the *Papiers de Boullée* of the Bibliothèque Nationale.[58] The professor of architecture at the *Écoles Centrales* sought to create a poetic, narrative type of architecture; an architecture expressive of the character of the work. "Les tableaux en architecture se produisent, en donnant au sujet que l'on traite le caractère propre d'ou nait l'effet relatif." [59] The character of architecture, Boullée maintained, depends on an effective combination of masses which express and symbolize the function of the edifice. He wrote, "c'est de l'effet des masses que provient l'art de donner du caractère à une production quelconque." [60] This stress on the importance of the large masses in determining and expressing character is the significant difference between Boullée and J.-F. Blondel.

Boullée had a love for nature and favored a close relationship between architecture and nature, but he was doubtful of the value of technical advance for architecture. He deplored the fact that there was "plus de progrès dans la partie de l'architecture relative aux Sciences, que dans celles qui, à proprement parler, constitute l'art," [61] and he accused Vitruvius of paying too much attention to the mechanics of architecture, whilst he ignored the poetry of architecture.[62]

[57] *Ibid.*, p. 470.

[58] *Ibid.*, p. 469.

[59] Boullée, *Papiers*, Bibliothèque Nationale, fol. 84, as quoted by Kaufmann, *ibid.*, p. 471, n. 412. "The effect of architecture arises from the appropriate character which it presents to the observer."

[60] Boullée, *Papiers*, fol. 142, as quoted by Kaufmann, *ibid.*, p. 472, n. 424. "The effect of the masses proves to be the art of giving character to any work whatsoever."

[61] Boullée, p. 129 r. as quoted by Helen Rosenau, "Boullée, Architect-Philosopher: 1728–1799," *The Architectural Review*, CXI (June, 1952), 401. "There has been more progress in the phases of architecture related to the sciences than in those which, properly speaking, constitute the art."

[62] *Ibid.*

True architecture, according to Boullée, was not a matter of mechanical procedure, but a creation of the spirit.[63] Boullée believed that his theory of masses was derived from the study of nature. Symmetry, which he found in the most beautiful buildings, he connected to the architecture of the human body; he also found regular forms most concordant with our human constitution.[64]

Boullée loved not only the sublimity of nature and architecture, but he aimed at even picturesque combinations. At the end of his text he confessed the difficulty of reconciling the purity of elementary geometrical shapes with picturesqueness. "J'avois à craindre, en employant les moyens pittoresques . . . d'être ce qu'on appelle *théâtrical* et de m'écarter de cette pureté qu'exige l'architecture, et sans laquelle toute production porte avec elle un vice insupportable, que je crois avoir su éviter." [65] Boullée found grand effects pleasing because the human soul yearns to embrace the universe.[66] It was not always necessary that the actual dimensions of architecture be large, but the effect must be large. Little or no ornament and smooth surfaces add to the impression of size, hence these were essential to Boullée's architecture.[67]

Boullée's demand for a sublime, but prudent and practical architecture is seconded by Madame de Staël. "Toutes ces gradations, ces manières prudentes et nuancées pour préparer les grands effects, ne sont point de mon goût. On n'arrive point au sublime par degrés." [68]

[63] Kaufmann, "Three Revolutionary Architects," p. 470.

[64] *Ibid.*, p. 471, n. 414.

[65] "I had to fear that in taking the way of picturesqueness I might become theatrical. But I was anxious not to renounce that purity which architecture demands. I believe I have circumvented the risk of ambiguity." Boullée, *Papiers*, fol. 130, as quoted and translated by Kaufmann, *ibid.*, p. 473, note 443.

[66] *Ibid.*, p. 472, n. 427.

[67] *Ibid.*, p. 472, and notes 428–430.

[68] *Ibid.*, p. 472. "All of these gradations, these cautious and subtle mannerisms in order to achieve grand effects, are not to my taste. One cannot approach the sublime gradually."

Elsewhere, she wrote condemning "cette négligence du nécessaire et cette affection de l'inutile." [69]

Boullée was most interested in great monumental projects, but Ledoux concerned himself with humble houses for workmen and a great variety of utilitarian structures as well as shrines and monuments.

When Claude-Nicolas Ledoux was twenty-four years old he left the École of Jacques-François Blondel to initiate his practice of architecture. In time he became the favorite architect of Madame du Barry and through her influence designed the great national salt plant, Salins de Chaux. Ledoux suffered during the Revolution and barely escaped the guillotine. His treatise on architecture was written when the Revolution halted building activity throughout France. It was illustrated chiefly with the executed and unexecuted projects for the salt-works and for its ideal city. Ledoux spent the remains of his small fortune on the publication of his treatise which did not come out until 1804, two years before his death.[70]

Marcel Brion, characterizing Ledoux's architecture and theory, pointed out that Ledoux's design for an ideal city, which embodied utilitarian principles and social ideals, was an extension of the utopian humanitarianism of the Encyclopedists. Brion also pointed out that many of Ledoux's ideas had been stated by Jacques-François Blondel in his *Cours*.[71] Emil Kaufmann has called attention to the influence which Rousseau's attitude toward nature, education, and

[69] *Ibid.*, ". . . that neglect of the necessary and the affectation of the useless."

[70] The information contained in my biographical sketch of Ledoux was derived from the following sources: J.-Ch. Moreaux, "Claude-Nicolas Ledoux," in *Les Architectes Français—I*, ed. by Marcel Raval, p. 43; Hamlin, *Architecture Through the Ages*, pp. 550, 551; and Emil Kaufmann, "Claude-Nicolas Ledoux, Inaugurator of a New Architectural System," *Journal of the Society of Architectural Historians*, III (July, 1943), 15.

[71] Brion, "Un précurseur de l'architecture moderne, Claude-Nicolas Ledoux," *Beaux-Arts* (Jan. 22, 1937), p. 3. We have already observed J.-F. Blondel's emphasis upon convenience in planning and the practical aspects of design.

physical culture had upon Ledoux. "Inspired by Rousseau," wrote Kaufmann, "he designed the Cénobie—the House of Common Life . . .—an idyllic dwelling sheltered by extended woods, where people tired of sophisticated life, might return to 'natural' conditions." [72]

Ledoux's treatise was an impassioned plea for simplicity in architecture, for a return to essentials, for the creation of pure and expressive geometic form.[73]

Ledoux admired machines and products of engineering, and saw in them lessons for architects. "Puisse surtout l'architecte se pénétrer du besoin de connaître les lois et les ressources de la mécanique et ne pas dédaigner les principes d'un art qui peut le servir aussi utilement. N'est-ce pas au mécanicien que nous devons ces machines animées, ces ponts suspendus . . . ces écluses . . . ces dômes qui semblent menacer le ciel?" [74] Ledoux called upon architects to limit themselves to the essential and reject the accessory.[75] Marcel Brion put forth the opinion that Ledoux proclaimed all the principles of the theory of functionalism.[76] But for Ledoux, as for Boullée, the art of architecture consisted not only in utility, but in the expression of function: *architecture parlante*. Unnecessary forms, like unnecessary words, confused the meaning. Ledoux wrote, "tout ce qui n'est pas indispensable fatigue les yeux, nuit à la pensée et n'ajoute rien a l'ensemble." And added, "le cercle, le carré, voilà les lettres alpha-

[72] Kaufmann, "Claude-Nicolas Ledoux," p. 15.

[73] Ledoux, *L'Architecture considerée sous le rapport de l'art, des moeurs et de la legislation, passim*. The edition available to me was that of Lenoir, 1847, containing plates and an *Avertissement* by Daniel Ramée, but lacking Ledoux's text, hence I have been forced to draw my quotations from other sources.

[74] Ledoux, *Architecture*, as quoted in Moreux, *Claude-Nicolas Ledoux*, p. 13. "Then, above all, the architect must impress himself with the need for understanding the laws and resources of mechanics and not disdain the principles of an art which serves little purpose beyond utility. Is it not to the mechanician that we owe machines, suspended bridges . . . dams . . . and the domes which seem to menace the sky?"

[75] Brion, "Un précurseur," p. 3.

[76] *Ibid.*

betique que les auteurs emploient dans la texture des meilleurs ouvrages." [77]

Simple geometric forms such as cubes and spheres were not only the most useful for Ledoux but, following the Pythagorean and Platonic tradition, he saw in them a metaphysical connection with morality, social ideals, and nature. He associated the geometry of architectural form with the customs and ideals of the people.[78] Simple geometric forms were in themselves pure and, in addition, were symbolic of virtues. "La forme d'un cube est le symbole de l'immutabilité; on asseoit les dieux, les héros sur un cube. . . . Les Grecs appelaient un homme carré celui que l'on ne pouvait jamais détourner de la vertu ou de ses devoirs." [79] Simple geometric forms possessed the capacity for conveying spiritual meaning. "Les projets les plus simples prennent la teinte de l'âme qui les conçoit." [80] Ledoux observed the underlying geometry of nature. God, in creating, geometrizes. "Tout est cercle dans la nature," he wrote.[81]

Man's spirit can only move forward in the medium of nature, hence man's art, which is an expression of his spirit, must be founded

[77] Ledoux, *Architecture*, as quoted by Brion, *ibid.* "All that is not indispensable tires the eyes, hinders the mind, and adds nothing to the whole. . . . The circle and the square are the letters of the alphabet which authors employ in the texture of their best work." It is interesting to compare the English preoccupation with the picturesque in the 1790s with the French concern for *architecture parlant* in this period. Indeed both ideas may have had their origin in Italy. The derivation of the word picturesque from the Italian *pittoresco* indicates the Italian origin of the idea, and one of the earliest protagonists of narrative architecture was Francesco Milizia whose *Civil Architecture* was published in 1781.

[78] Hamlin, *Architecture Through the Ages*, p. 551.

[79] Ledoux, *Architecture*, as quoted by Moreux, "Claude-Nicolas Ledoux," p. 39. "The form of a cube is the symbol of immutability; the seat of the gods, the hero on a cube. . . . The Greeks called a man square if he could not be led astray from virtue and duty."

[80] *Ibid.* "The most simple projects assume the tint of the soul which conceives them."

[81] *Ibid.*, p. 46. "In nature, everything is circular." Cf. the ideas of Plato, p. 18 *supra*.

upon nature. "Quand l'art s'éloigne de la nature, ce n'est plus au coeur qu'il s'adresse, il travaille pour l'esprit et l'on sait combien l'esprit tout seul s'égare." [82] In describing his second plan of Chaux, Ledoux admonished: "Remontez au principe . . . consultez la nature; partout l'homme est isolé." [83]

The post-Perrault controversy, and the rational, revolutionary spirit of eighteenth-century France, led to a series of architectural treatises embodying some of the constituent elements of modern functionalism. Outstanding among these treatises were the writings of Cordemoy, Le Clerc, Boffrand, Jacques-François Blondel, Laugier, Boullée, and Ledoux. Their common message was an appeal for a *return* to simplicity and pure, geometric, form proportioned for human needs. Laugier was inspired by the fitness and simplicity of primitive forms, whereas Ledoux's emphasis upon the connection between the geometric structure of the cosmos and the geometrical basis of beauty and virtue is Platonic in origin. Each reflects an important aspect of the current Western intellectual revolution in which France played a conspicuous part.

[82] *Ibid.*, p. 39. "When art forsakes nature it no longer appeals to the heart; it labors for the spirit, and one knows how the spirit alone misguides itself."

[83] Ledoux, *Architecture*, S. 70, as quoted by Kaufmann, *Von Ledoux bis Le Corbusier*, p. 43. "Return to the principle . . . consult nature; isolating man on all sides."

EARLY NINETEENTH-CENTURY FRENCH ACADEMICIANS

8

THE word *academician* has frequently been taken by modernists to denote an enemy of the cause of modernism. The word has been scornfully applied to French artists connected with the École des Beaux-Arts or other professors and artists assumed to be in agreement with its principles; these principles were assumed to be completely opposite to modern principles of art. The inadvisability of rigidly equating the academician with unprogressive or reactionary views of art is demonstrated by the discovery that early nineteenth-century academicians, such as Durand and Quatremère de Quincy, contributed in no small way to functionalist thought (one may also refer to the experiences of Viollet-le-Duc at the École des Beaux-Arts later in the century).

The architect Jean-Nicolas-Louis Durand was a professor at the École Polytechnique between 1795 and 1830. He furnished text or plates for several books, but his theory of architecture can be found in his *Précis des leçons*, the first volume of which was published in

1802 (two years before Ledoux's *Architecture*), the second volume in 1805.

Durand began his introduction to the first volume of the *Précis* by criticizing the traditional Vitruvian approach to architecture from the separate viewpoints of distribution, construction, and decoration. This practice he regarded as encouraging the conception of independent arts within the art of architecture and often leading to the neglect of one or the other.[1] Durand offered, in place of this traditional approach, what he described as a new approach: one begins with a study of the elements of architecture and then learns to combine these elements in terms of general principles of composition.[2] This method of approach to architecture reached its high point in France with the publication of Gaudet's *Éléments et théorie d'architecture* early in the twentieth century.

Durand turned to the theoretical problem of imitation with respect to architecture. Should architecture imitate the primitive structure or the proportion of the human figure?[3] We have seen how Laugier, in his *Essai*, traced the origin of architecture back to simple, primitive types of structures in imitation of natural shelter. Laugier had urged that this same primitive approach be followed by modern architects and had expressed admiration for the antique Maison Carrée because of its resemblance to the primitive prototype. Durand seems to have missed Laugier's main point, that it was the forthright functional character of primitive architecture which would be imitated. Instead, Durand repeated Laugier's description of the origin, in nature, of primitive forms of shelter, and directed his criticism against all those who argue that the pleasure of architecture derives from it as an art of imitation, especially the imitation of primitive

[1] Durand, *Précis des leçons d'architecture donnée à l'École Polytechnique*, I, 2, 3.

[2] *Ibid.*, I, 4.

[3] Quatremère de Quincy was also interested in the problem of imitation with respect to architecture. See pp. 173–75 *infra*.

and natural form.[4] Then Durand turned to the comparison between the orders of architecture and the human figure made by Vitruvius. This he rejected as naïve and found no correspondence between the way the proportions of the orders vary and the variations in the proportions of the human body.[5] Durand rejected all theories which attempted to explain architectural beauty in terms of imitation of any kind of model be it natural shelter, primitive architecture, or the human figure. He also rejected decoration as the source of architectural beauty. Durand found utility to be the basis of all architecture from primitive times to the present, and this utility, he concluded, is the true end of architecture and the source of the pleasure of architecture.[6]

Utility, for Durand, did not come from the satisfaction of mere personal idiosyncrasy, whim, caprice, or selfishness. Like Hume, Adam Smith, and other eighteenth-century authors, he interpreted it morally as above all public utility and what was good for the individual. Durand explained the pleasure which the observer experiences on seeing (what we of today would call) a functional building as the satisfaction which nature has attached to "the true image of our satisfied needs." [7] Later, James Fergusson was to offer much the same explanation of the source of the pleasure derived from objects of technic beauty.

The utility of architecture, according to Durand, is achieved through its disposition. The principal object of architecture is to achieve a disposition combining a maximum of fitness with maximum

[4] Durand, *Précis*, I, 4–7. In defense of Durand one should observe that Laugier's *Essai* (pp. 8–11) is not clear on this point. Laugier seems to suggest that the decorative imitation of formerly useful or natural forms was valid for architecture. But Laugier's main point was that architectural form should be logical and fitting.

[5] *Ibid.*, I, 7–10.

[6] *Ibid.*, I, 14, 15.

[7] *Ibid.*, II, 7; cf. I, 18.

economy.[8] Fitness has three aspects: solidity, salubrity, and commodity.[9] Durand placed strong emphasis upon the principle of economy. It was his key principle. It was behind his rejection of useless decoration and his relegation of the orders to a place of minor importance.[10]

> Thus, all the talent of the architect reduces itself to resolving these two problems: 1st, with a given sum of money to make a building the most fitting that it can possibly be, as in private buildings; and 2nd, the fitness of the building being given, to make the building with the least possible expense, as in public projects.
>
> One can see by this, that in creating architecture it is fallacious to assume that beauty and economy are incompatible, or even merely compatible, for the latter is one of the principal causes of the former.[11]

Durand referred to his principles, i.e., fitness and economy, as the "true principles" of architecture.[12] Thirty-nine years later A. W. N. Pugin based his *True Principles of Pointed or Christian Architecture* on fundamentally the same ideas.

From the middle of the eighteenth century to about 1830, i.e., as long as the spirit of the Classic Revival remained a vital force, the Aristotelian idea of imitation of nature proper to art was taken over by certain writers, redefined, and applied to what were now called the "fine arts" or imitative arts of poetry, painting, sculpture, and architecture. We have previously observed Sir Joshua Reynolds's point of view. In France, the abbé Charles Batteux was admitted to the *Académie des inscriptions* in 1754, and to the *Académie française* in 1761, largely because of the success of his treatise, *Les Beaux-Arts réduits à un même principe* (i.e., the imitation of the principles of

[8] *Ibid.*, I, 16, 19.
[9] *Ibid.*, I, 16.
[10] *Ibid.*, I, 13.
[11] *Ibid.*, I, 20.
[12] *Ibid.*, I, 18.

beauty in nature).[13] This book earned for its author a reputation for brilliant scholarship which lasted well into the nineteenth century despite the adverse criticism of its metaphysical approach contained in Diderot's *Lettre sur les sourds et muets*. Diderot called the work, "un livre acéphale." [14]

Batteux maintained that the basic principle of all the fine arts was the imitation of nature, however, art was not to copy all the realities of nature indiscriminately but should imitate the principles of nature's beauty. Batteux illustrated his thesis by reference to poetry, clearly revealing his indebtedness to Aristotle's *Poetics*, a translation of which he published in 1771.[15]

Like Batteux, Quatremère de Quincy regarded architecture as one of the fine arts along with poetry, painting, and sculpture. The drama, music, and the dance were also included in De Quincy's category of fine or imitative arts. The general tendency to look to nature for guiding principles, represented by the writings of Batteux and De Quincy, has an obvious connection with the organic analogy. But beyond that, the writings of De Quincy contain several specific ideas related to functionalism.

Quatremère de Quincy's published works on, or pertaining to, architecture include the "Dictionnaire d'architecture," which appeared between 1788 and 1796 in the *Encyclopédie méthodique* of Panckoucke; the essay *Considérations morales sur la destination des ouvrages de l'art*, 1815; his *Essai sur la nature, le but et les moyens de l'imitation dans les beaux-arts*, 1823; and his *Essai sur l'idéal dans ses applications practiques aux arts du dessin*, 1837.

[13] This book was first published in 1746.

[14] Fonsegrive, "Abbé Charles Batteux," in *La Grande Encyclopédie*, V, 842, 843; and Noël, [?], "Abbé Charles Batteux," in *Biographie Universelle Ancienne et Moderne*, ed. by A. Thoisnier Desplaces, III, 265–267.

[15] Fonsegrive, "Abbé Charles Batteux," p. 842. A list of the editions and translations of Aristotle's *Poetics* is given in Butcher, *Aristotle's Theory of Poetry and Fine Art*, p. xvii.

Joseph Gwilt, whose contributions to the literature of functionalism we have already observed, accepted Quatremère de Quincy's principles of variety, analogy, and allegory, which the latter put forth in his "Dictionnaire," in the *Encyclopédie méthodique*, as the only fitting and proper bases for admitting architectural decoration.[16] However, it is not the dictionary treatise which now commands attention but rather Quatremère de Quincy's *Essai sur l'imitation dans les beaux-arts*, for it is here that the author's moralistic theory of art is fully detailed, and the English translation of 1837 must have at least given encouragement to the great English moralistic critics, Pugin and Ruskin, even though they did not agree with his Classical bias.[17]

Art is imitation, according to Quatremère de Quincy, but in an uncommon rather than a common sense.[18] Art does not copy, in a literal manner, particular natural forms; instead, art imitates the general and the universal in nature.[19] Nature sometimes fails with individuals; the artist must generalize from all of nature, not copy its details.[20] Furthermore, it is not enough to generalize from the study of a single species. Each species has its own idea of beauty, but ideal imitation is the result of a generalized study of nature.[21] Thus Quatremère de Quincy did not follow Plato's concept of typical beauty wherein ideas of beauty for each class of objects are formed by generalization from a great number of the class.[22]

We have seen that in Quatremère de Quincy's system, the architect-artist should generalize nature. How can this be done? Archi-

[16] See p. 120 *supra*.
[17] Quatremère de Quincy, *Essay on the Nature, the End, and the Means of Imitation in the Fine Arts*, trans. by J. C. Kent.
[18] *Ibid.*, p. 11.
[19] *Ibid.*, pp. 204, 205.
[20] *Ibid.*, p. 230.
[21] *Ibid.*, pp. 217–19.
[22] See p. 18 *supra*.

tecture's place on the scale of imitation is determined by its functions. The principal function of architecture is "to express moral qualities, at least those that nature shadows forth in her works, and which produce in us the ideas, and the correlative emotions, of order, harmony, grandeur, wealth, unity, variety, durability, eternity, etc." [23] The sensible qualities of architecture are not to be regarded as ends to be pursued for themselves but to lead the mind to intellectual enjoyments.[24] Thus we see that for Quatremère de Quincy, as for Plato, St. Augustine, and many more recent critics, the mind is the final judge of art, and the intellectual-moral qualities of art are foremost in importance. Quatremère de Quincy did not deny the existence of the sensual pleasure of imitation, but he relegated it to a lower order than the moral and intellectual.[25] He did not deny the importance of the satisfaction of physical needs by architecture, but in his hierarchy of value it occupied a lower place than moral and intellectual qualities. The principal aim of architecture is moral utility.

Man's most important wants are for greater morality and a better society, hence the highest function of any work of art is to contribute fully to these ends. A high degree of pleasure accompanies the satisfaction of the most lofty needs. Quatremère de Quincy explained the relationship between imitation and the satisfaction of needs, as follows:

> Nature, in according the faculty of imitating to man, intended no doubt that it should be first subservient to his wants. . . .
>
> Nature, having under every circumstance associated pleasure with wants, the faculty of imitating must consequently acquire new developments in an improved state of society. After having been exercised in fixing, by the imitative signs of objects, it came to pass that lineaments thus roughly traced by and from necessity were invested with greater perfection. . . .

[23] Quatremère de Quincy, *Essay*, p. 168.
[24] *Ibid.*
[25] *Ibid.*, pp. 190, 244.

As pleasure sprang from want, so, under another state of things, it created in turn new wants. To perpetuate the memory of benefactors or of benefits; to raise the mind to ideas of immortality by the sight of monuments; to embody and treasure up in expressive language, moral opinions, and religious sentiments: these were indeed true wants among civilized people; and to supply such would prove an end as advantageous to the imitation of the fine arts as to society.[26]

Art is, morally speaking, the same as its model.[27] As Quatremère de Quincy saw it, the act of creating a work of art was to exchange truth from material to moral.[28] But the natural properties of materials were not to be denied, in fact, the limitations of materials, if effectively expressed, can prove an added source of pleasure.[29] The artist, in whatever field, should be an inventive genius, however, the imagination of the artist-genius should not deny the laws of nature, but epitomize them.[30] Imitation, the creative act, must not result from caprice, but must submit to necessity and "the supreme laws of the nature of things." [31]

Quatremère de Quincy regarded the idea of truth as a pitfall awaiting the artist. Art should express the most important truths but not all the truths it can possibly express. "The artist should seek to express the truth, but short of the limits of his art rather than to its full limits." [32]

Each branch of art must clearly retain its identity and be true to itself even when several arts are juxtaposed. The arts may be brought together but they should not be mixed. Inspired by Lessing's *Laokoön*, De Quincy taught that every art has its own class of abstractions and metaphors inherent in its own mechanism. To put it

[26] *Ibid.*, pp. 177–79.
[27] *Ibid.*, p. 13.
[28] *Ibid.*, p. 381.
[29] *Ibid.*, p. 130.
[30] *Ibid.*, pp. 201, 204.
[31] *Ibid.*, p. 25.
[32] *Ibid.*, p. 101.

another way, each kind of art can only imitate certain limited aspects of nature. His own art is the proper vehicle for each artist; he should not try to attain objectives foreign to his own art form. Thus, when architecture, sculpture, and painting are brought together each should clearly retain its identity; architecture should not try to be sculpture, and sculpture should not seek the effects of painting.[33]

Although he did not interpret beauty as flowing automatically from the perfect solution of common use requirements, Quatremère de Quincy deserves a place in our study of the backgrounds of modern functionalism because of his insistence on the purity of the art form, the importance of morality and truth in art (especially the truthful expression of the nature of materials) and for his inclusion of architecture among the arts which are a generalized expression of the principles of nature.

[33] This is a principle which Quatremère de Quincy expressed with considerable frequency (see *ibid.*, pp. 28, 29, 67, 71–75, 113, 325). It is a principle generally associated with the highly functional architecture of today.

THE ITALO-GERMAN AXIS OF FUNCTIONALISM NEOCLASSIC AND ROMANTIC

9

In Italy during the eighteenth century, Carlo Lodoli took a strong functionalist position. Lodoli was a friar of the Franciscan order, a teacher of young Venetian nobles, and a man who gave much thought to the history and aesthetic theory of architecture. Unfortunately, he left no writings. According to the *Enciclopedia Italiana,* Lodoli did not record his ideas, but Michaud, in *Biographie Universelle,* claims that all of his manuscripts and designs were accidentally lost.[1] Lodoli's ideas are known to us through the writings of two men who knew him, Algarotti and Memmo.[2]

Francesco Algarotti, courtier, diplomat, and a man accomplished

[1] See Emil Kaufmann, "At an Eighteenth-Century Crossroads: Algarotti vs. Lodoli," *Journal of the Society of Architectural Historians,* IV (April, 1944), 23, 24.

[2] See Algarotti, "Saggio sopra l'Architettura," 1756, in *Opere del Conte Algarotti,* Venice, 1764, Vol. II, and "Lettere sopra l'Architettura, 1742–1763," in *Opere,* Vol VI; Memmo, *Elementi di Architettura Lodoliana.*

in the field of polite learning, presented Lodoli's point of view as well as his own in his essays and letters on architecture written between 1742 and 1763. Andrea Memmo's work on Lodoli, *Elementi di Architettura Lodoliana*, appeared in 1786, twenty-five years after Lodoli's death. Although Algarotti did not accept Lodoli's ideas, he presented them to his readers in an unbiased manner. He seems to have respected Lodoli's opinion and he acknowledged Lodoli's point that Baroque architecture was immoral.[3]

Lodoli hoped that someday "an entirely new architecture would arise gloriously and live on in perpetual youth." There were, he taught, two ways to create a better and truer architecture and thus overcome the past. Both of these ways he expressed in negative commandments. First, "nothing shall show in a structure which does not have a definite function, or which does not derive from the strictest necessity. . . . No useless ornament shall be admitted. Everything in contradiction to these principles is to be condemned. They are the cornerstones of architecture." Secondly, "There shall be no architecture which does not conform to the very nature of the material. . . . When architecture will have attained these two great objectives, it will then be true, honest, and reasonable." [4]

The Italian nobleman and architectural critic, Berardo Galiani, in his commentary on Vitruvius published in 1758, developed further the comparison suggested by the ancient architect between human and architectural qualities. Galiani saw the Greek orders primarily as expressive of virtuous qualities: the Doric, manliness; the Ionic, nobility; and the Corinthian, elegance. Galiani anticipated Ruskin in one respect. In commenting on the first book of Vitruvius, wherein the Roman architect described the manifold skills and extensive knowledge required of an architect, Galiani insisted that the architect

[3] Kaufmann, "Algarotti vs. Lodoli," p. 24.
[4] Algarotti, "Saggio," pp. 62–67, as translated by Kaufmann, *ibid.*, p. 27.

must, in addition, be a virtuous man if he is to create good architecture.[5]

Francesco Milizia, whom Lionello Venturi describes as "perhaps the greatest critic of architecture in the neo-classic taste," [6] put forth a summary of his point of view toward architecture in the introduction to his book, *The Lives of Celebrated Architects, Ancient and Modern*, first published in 1768. Milizia took up the idea suggested by Boffrand and elaborated by Laugier, that modern architecture should imitate the admirable qualities of the primitive. He presented general rules for architecture, stressing the rational approach to that art.

Milizia pointed out that while one would not consider copying today the forms of primitive architecture nevertheless one should see that these rude structures were the most ingenious of their times; "they were all that they had the power of being." [7] They satisfied the needs of the day as well as they could. They were as well built and as beautiful as they could be. "Every art and science is, then," he wrote, "the offspring of necessity, and grows steadily to maturity from the desire of improvement: it is the work of philosophy to bring it to perfection." [8]

Milizia regarded architecture as an imitative art, differing from other fine arts only in this: while most fine arts imitate a positive model in nature, architecture imitates the primitive prototype. The ancient Greeks were most successful in adhering to primitive prototypes and constantly improving on them from the point of view of

[5] Galiani, *L'architettura di M. Vitruvio Pollione*, pp. 4 ff. and 127 ff. The idea that a man must be virtuous in order to create good work was expressed by the Schoolmen of the thirteenth century as well as by Ruskin in the nineteenth century. See pp. 42, 138 *supra*.

[6] Venturi, *History of Art Criticism*, trans. by C. Marriott, p. 150.

[7] Milizia, *The Lives of the Celebrated Architects, Ancient and Modern*, trans. by Mrs. Edward Cresy, I, xv.

[8] *Ibid.*

beauty, convenience, and solidity until their architecture reached a high degree of perfection.[9]

Architectural perfection could be achieved by subjecting the imitation of primitive prototypes to general rules. First, architecture is subject to the rule of symmetry which is nothing more nor less than "an agreeable relation between the parts and the whole." Second is the rule of eurhythmy, a balance between variety and unity or "boredom and confusion." The third rule places matters pertaining to convenience before ornament and demands that purpose controls the quality and ornaments of a building. The fourth rule demands that there be nothing extraneous and no artifice discoverable in a building. The fifth rule concerns the use of the orders: they must perform a useful function, "and all other architectural ornaments are subject to the same laws." Sixth: "Nothing must be introduced which has not its proper office, and is not an integral part of the fabric itself; so that whatever is represented must appear of service." Seventh: "No arrangement must be made for which a good reason cannot be assigned." Eight: "Everything must be founded upon truth or its similitude. Whatever cannot really and truly exist, cannot be approved of in representation." [10] Milizia makes reason the final authority in all matters pertaining to architecture.

Milizia was less of a functionalist than Lodoli because he did not insist on absolute truth and function but accepted the appearance of truth and the appearance of function. Milizia's rules were the rules of the Doric order, whereas the rules of Lodoli were for an architecture of the future.

Germany did not produce as thoroughgoing a functionalist as the Italian Lodoli until the nineteenth century, but she may very well have produced in Christian Wolff one of the possible sources of the

[9] *Ibid.*, I, xv–xviii.
[10] *Ibid.*, I, xix.

functionalism of Lodoli and the other great revolutionary architectural theorists, Laugier, Boullée, and Ledoux.

Christian Wolff rejected the identification with Leibniz which his disciple Bilfinger originated, but his main thoughts correspond to those of the great courtier-philosopher. Wolff's historical merit lies, in part at least, on the fact that he claimed again, in the name of philosophy, the entire field of knowledge including the arts. His clear literary style, and the fact that he composed in German, contributed to the popularization of his philosophy and gave him many followers. Alexander Baumgarten, who is credited with coining the word "aesthetic" and distinguishing it as a philosophic discipline, was one of Wolff's disciples.

Wolff adopted the rational mathematico-syllogistic method recommended by Leibniz and applied it to architecture among other disciplines. For example, the eighth theorem in Wolff's *Elements of Architecture* is as follows: "A window must be wide enough to allow two persons to place themselves conveniently at it." This theorem of architectural proportion is then proved thus: "It is a common custom to place one's-self at a window, and look from it in company with another person. As now it is the duty of the architect to consult in all respects the intentions of the builder (Sect. 1), he will necessarily make the window wide enough to allow two persons to place themselves at it—q.e.d." [11] While this may seem like platitudinizing formalism, the significant basic idea expressed here is to carry on throughout the age of reason; the problem of architectural proportion must be approached rationally, with form determined by custom and usage. The idea of perfection also played a great part in the aesthetic speculation of Wolff and Baumgarten. It might be generally defined as the affirmation of the character of the whole by all of its parts without contradiction or counteraction. All things working toward

[11] Schwegler, *Handbook of the History of Philosophy*, trans. and ann. by J. H. Stirling, p. 204.

the same end constitute the principle of perfection. This is their interpretation of the formal principle, unity in variety. All formal principles are interpreted in terms of coordinated means to ends, of the logical relation of whole to part.

The pre-Kantian German illumination was strongly influenced by the Leibnizo-Wolffian philosophy. A rather numerous group of men were involved including the moral philosophers Garve, Engel, Abbt, and Basedow, and the aesthetician Sulzer. In general these men gave primary consideration to particular ends and what contributes to individual welfare; utility is the criterion of truth and beauty; the happiness of the individual is regarded as the highest principle and supreme end of all things; what serves not the subject or advances his interest is rejected. The prevailing tone of the illumination was individualistic and subjective. There was more concern for the welfare of the individual than the welfare of the larger community. Christian Wolff and the post-Wolffian illumination forms an important background for the great eighteenth-century functionalists whose job it was to find a profounder philosophical basis and a higher moral plane on which to base their functionalism.

We have seen no specifically functionalist architectural treatises produced by German architects or architectural critics comparable to the treatises of Cordemoy or Le Clerc in France during the same period, but Wolff and the philosophers of the German illumination undoubtedly had an equal influence upon later architects and architectural critics in their country.

In the second half of the eighteenth century the writings of Johann Winckelmann and G. E. Lessing contain some implications for functionalism; and Goethe, writing in the late eighteenth and early nineteenth century, was in many ways within the tradition of functionalism. Before turning to the writings of these men, it would be well to take cognizance of another possible source of inspiration for the reaction to the Baroque and Rococo styles which found expression dur-

ing the Classic Revival in the functional use of the orders and general simplicity of design.

The middle of the eighteenth century witnessed the beginning of the publication of a series of books containing careful drawings and information about Greek building sites. Leroy's *Athens* appeared in 1758, the first volume of Stuart and Revett's *Antiquities of Athens* in 1762, Major's *Paestum* in 1768, and Chandler's *Ionia* appeared in 1769. Doubtless these books called favorable attention to the beautiful simplicity of the ancient Greek buildings which illustrated their pages, if only by contrast with existing Baroque work, but the reaction against the Baroque style began much earlier. The archaeological treatises may be considered as a contributing factor but they, alone, do not explain the trend. Eighteenth-century functionalist theory was above all a product of rationalism and was not dependent on knowledge of classical precedent. Kimball and Edgell concur in this. "The rationalistic advocacy of the primitive orders by Laugier in 1752, the appeal for a 'noble simplicity and quiet grandeur' which Winckelmann made in 1755, were based rather on antithesis to contemporary art than on a real knowledge of the art of the ancients." [12]

Winckelmann, the Dresden scholar who took up residence in the home of Cardinal Alessandro Albani in Rome and became the city's Prefect of Antiquities, contributed to laying the fundations of modern archaeology and was one of the first to clearly distinguish Greek and Roman work. Winckelmann preferred Greek art to Roman and found in the former confirmation of his theory of beauty. Winckelmann appreciated the importance to architecture of simplicity, harmony of parts, fitness of form to purpose, the proper adaptation of architecture to climatic conditions, and of respect for the nature of materials, but these were only the essential foundations of beauty. He rejected ornament and even color as the source of beauty. Beauty, as Winckelmann saw it, depended upon the arrangement of basic

[12] Kimball and Edgell, *A History of Architecture*, p. 463.

volumes or contours regarded not as ends in themselves but as expressive of concepts of a refined, spiritual, or ideal nature. These concepts are not to be dreamed up in the fantastic imagination by itself. The architect can learn to create beauty by contemplating nature (the standard and pattern of art) and deriving his inspiration from that source.[13] Thus, elements of the moral and organic analogies are involved in Winckelmann's demand for an architecture of "noble simplicity."

Gotthold Ephraim Lessing, whose *Laokoön*, first published in Berlin in 1766, had a powerful impact on the literary and artistic taste of Europe, is of some importance to the historical development of the idea of functionalism. The *Laokoön* expounded what is perhaps the most important point in Lessing's aesthetic philosophy, the idea that a work of art should be true to its medium.[14] Lessing was critical of poems which were written to represent landscapes, and pictures painted or statues carved to represent events of duration. Poetry should not attempt to be a speaking picture nor to paint a silent poem. The *Laokoön* is pervaded by a spirit of reasonableness and the insistence upon the harmony of form with content in the arts. Lessing was attacked for his limited definition of beauty and for his restrained, classical attitude by the impetuous young Goethe and by J. G. Herder.[15]

Johann Wolfgang Goethe, doubtless one of the greatest figures of German Romanticism, wrote occasionally on architecture and put forth the idea that beautiful architectural form arose out of adaptation to necessities, moreover he saw connections between the beauty of architecture and organic beauty.

[13] Winckelmann, *The History of Ancient Art*, trans. by G. Henry Lodge, Vol. I, *passim*.

[14] Howard, ed., *Laokoön: Lessing, Herder, Goethe*, pp. xix–xxvii. Howard takes up the problem of antique precedent for Lessing's view and finds similarities between the ideas of Lessing and the Greek rhetor Dio Chrysostomus.

[15] Kallen, *Art and Freedom*, I, 215, 216.

Goethe's essay *On German Architecture* (1773) is an expression of his nationalistic sentiment. He was bitterly critical of the Italians and the French but eulogized his compatriot Erwin von Steinback, one of the architects of Strasbourg cathedral. In this essay Goethe criticized the Italians for being enslaved by their classic past and for the fundamental dishonesty of their architecture.

> But you would have created your own designs, and there would have flowed out of them living beauty to instruct you.
>
> Thus upon your shortcomings you have plastered a whitewashing, a mere appearance of truth and beauty. The splendid effect of pillars struck you, you wished to use them in your building and have great rows of columns too; so you encircled St. Peter's with marble passageways, which led nowhere in particular, so that mother Nature, who despises and hates the inappropriate and the unnecessary, drove your rabble to prostitute that splendor for public "cloaca," with the result that you turn away your eyes and hold your nose before the wonder of the world.[16]

Goethe's nationalism and Gothic bias made him unable to accept Laugier and the French critics who sought to bring about a more rational architecture; furthermore, he associated Laugier with classical columnar architecture and Goethe had no use for the column in any form, not even the simple shafts advocated by Laugier.[17] The idea, advanced by Laugier, that primitive construction should be the inspiration for modern architecture, was likewise reprehensible to Goethe.[18] However, when Goethe describes his conversion to Gothic in the presence of Strasbourg cathedral, we learn that he admired in Gothic the same principle, adaptation to necessities, that Laugier had insisted should be the basis of a new style.

> When I went for the first time to the Minister, my head was full of the common cant of "good taste." From hearsay, I was an admirer of the harmony of mass, the purity of form, and was a sworn enemy to the con-

[16] *Goethe's Literary Essays*, trans. and ed. by J. E. Spingarn, p. 5.
[17] *Ibid.*, pp. 6, 7.
[18] *Ibid.*, p. 6.

fused arbitrariness of Gothic adornment. Under the term, "Gothic," like the article in the dictionary, I piled all the misconceptions which had ever come into my head, of the indefinite, the unregulated, the unnatural, the patched-up, the strung-together, the superfluous in art. No wiser than a people which calls the whole foreign world "barbarous," everything was Gothic to me that did not fit into my system, from the turned wooden dolls and pictures of gay colors, with which the bourgeois nobility decorate their houses, to the dignified relics of the older German architecture, my opinion of which, because of some bizarre scrollwork, had been that of everybody,—"Quite buried in ornamentation!"; consequently I had an aversion to seeing it, such as I would have before a malformed bristling monster.

With what unexpected emotions did the sight surprise me when I actually saw it! An impression of grandeur and unity filled my soul, which, because it consisted of a thousand harmonizing details, I could taste and enjoy, but by no means understand and explain. . . . Hard it is for the mind of man when his brother's work is so elevated that he can only bow down and pray. How often has the evening twilight refreshed with its friendly calm my eyes wearied by too much gazing; it made countless details melt together into a complete whole and mass, and now, simple and grand, it stood before my eyes, and full of rapture, my power unfolded itself both to enjoy and to understand it at once. There was revealed to me in soft intimations the genius of the great builder. "Why are you astonished?" he whispered to me. "*All these masses were necessary*, and do you not see them in all the older churches of my city? Only I have given harmonious proportion to their arbitrary vastnesses. See how, over the principal entrance which commands the two smaller ones on either side, the wide circle of the window opens which corresponds to the nave of the church and was formerly merely a hole to let the light in; see how the bell-tower demands the smaller windows! *All this was necessary*, and I designed it with beauty. But what of these dark and lofty apertures here at the side which seem to stand so empty and meaningless? In their bold slender forms I have hidden the mysterious strength which was to raise both of those towers high in the air, of which alas only one stands there sadly, without the crown of five towers which I had planned for it, so that to it and its royal brother the country would do homage." And so he departed from me,

and I fell into a sympathetic mood of melancholy, until the birds of morning, which dwelt in its thousand orifices, greeted the sun joyously and waked me out of my slumber. How freshly it shone in the morning rays, how joyfully I stretched out my arms towards it, surveying its vast harmonious masses, animated by countless delicate details of structure! *as in the works of eternal Nature, every form, down to the smallest fibril, alive, and everything contributing to the purpose of the whole.* How lightly the monstrous, solidly grounded building soared into the air! how free and delicate everything about it, and yet solid for eternity! To your teaching, noble genius, I owe thanks that I did not faint and sink before your heights and depths, but that into my soul flowed a drop of that calm rapture of the mighty soul which could look on this creation, and like God say,—"It is good!" [19]

In his essay entitled *Introduction to the Propylaea* (1798), Goethe took up the issue, raised by Lessing, of pure against mixed art, an issue which was to be developed later by Quatremère de Quincy and decided strongly in favor of the former. "There is no more striking sign of the decay of art than when we find its separate provinces mixed up together. The arts themselves, as well as their subordinate forms, are closely related to each other, and have a certain tendency to unite, and even lose themselves in each other; but herein lies the duty, the merit, the dignity of the true artist, that he knows how to separate that department in which he labors from the others, and, so far as may be, isolates it." [20]

Goethe connected beauty with fitness in organisms as well as in architecture. As he saw it, "nothing is beautiful in nature but what is true according to the laws of nature." [21] The first law of nature is that the forms of creatures be well fitted to the purpose for which they were destined. *Naturphilosophie* and particularly evolutionary theory are reflected in the following statements wherein Goethe expressed his admiration for the way use, utility, necessity and beauty

[19] *Ibid.*, pp. 7–10. (Italics added.)
[20] *Ibid.*, p. 15.
[21] *Goethe's Opinions*, trans. by Otto van Wenckstern, pp. 87, 88.

are all one in the human figure and he concluded that fitness for purpose determined the beauty of all creatures.

Although Nature has her fixed budget according to which she regulates her expenditure, still the calculation is by no means exact, and there is always a surplus for ornamental purposes. To create a man, Nature made a lengthened *praeludium* of beings and shapes, which fall very short of man. Every one of them has a tendency which connects it with something above it. The animals wear what afterwards enters into the human composition in neat and beautiful order as ornaments packed together in the disproportionate organs, such as horns, long tails, manes, etc. None of these things are to be found in man, who, unornamented and beautiful, through and in himself represents the idea of perfection, who is all he has and in whom use, utility, necessity, and beauty are all one and tending to the same. . . .

If from these hints you draw the conclusion, that a creature is beautiful when it has reached the height of its natural development—well and good. But it ought first to be settled what is meant by the 'height of natural development.' If that period of growth be meant which perfectly expresses the peculiar character of this or that creature, I agree with you, especially if you add, that one of the conditions to a perfectly expressed character is, that the construction of the various members of it be proper and fit for its natural destination.[22]

Goethe admitted that nature sometimes falls short of beauty, but this was because the conditions for organic development were not always favorable.[23]

Goethe's opinion that all the parts as well as the whole of Strasbourg cathedral arose from necessity, and his interpretation of organic beauty as derived from fitness for purpose, lead one unwisely to assume that he consistently interpreted all beauty as an expression of fitness for purpose. Goethe was a prolific writer and wrote extensively about art. When Goethe discusses beauty it is important to know whether he is referring to beauty in nature, in architecture, in

[22] *Ibid.*, pp. 61, 74, 75.
[23] *Ibid.*, pp. 72, 73.

sculpture or painting. For example, in his essay *Upon the Laocoon* (1798), which was primarily an essay on sculpture, Goethe defined beauty as dichotomous, consisting of visible and spiritual beauty. Visible beauty, or agreeableness, is connected with the sensible laws of art, viz., harmony, comprehensibility, symmetry, and contrast. Spiritual beauty arises from just proportion, "and to which he who is complete in the creation or production of the beautiful knows how to subject even the extremes." [24]

In illustrating the similarity which art and nature sometimes achieve, Goethe gives us a picture of architecture which at one and the same time conforms to purpose and blends in with its natural setting.

> Since all the arts must be raised up by action and thought, by theory and practice, they appear to me somewhat like cities, of which no one can tell what soil they were built on. Rocks were broken and removed, and the very stones thus obtained were cut into convenient shapes and used for the construction of houses. Cavities were considered *very* convenient; they were turned into cellars. Wherever a solid soil was wanting, an artificial soil of masonry was substituted, and in many instances a swamp was discovered at the foot of the rock, so that poles had to be rammed in, and the building erected thereon. And afterwards, when all was complete and habitable, who could tell which was which?—which was nature and which art?—which foundation and which superstructure?—which material and which form? And how difficult it is to prove that at the earliest periods they might have managed those things more agreeably to nature, to art, and to the purpose they were destined to serve.[25]

Goethe's emphasis upon the agreement of architectural form with the demand for convenience was unusual among the German romantics. His friend Johann Schiller, whose letters, essays, and poems were published in the 1790s in *Die Horen*, a journal which Schiller established, was critical of those who would enslave beauty to mere

[24] "Upon the Laocoon," in *Literary Essays*, p. 23.
[25] *Goethe's Opinions*, p. 81.

use. Schiller identified art with play; art is a form of play, the true end of which is to unify the personality.[26] The subjective utility of art is stressed. Friedrich von Schlegel took up Schiller's thesis in his treatise on the limits of the beautiful, published in 1794.[27] August Wilhelm von Schlegel, Friedrich's brother, and F. W. J. Schelling had much to say about organic form in art and nature, but they did not stress the idea of the adaptation of architectural form to practical function. To the German romantics, organic form meant primarily organization or a harmonious relationship of parts to the whole.[28] It also had metaphysical implications.[29] Schelling, for example, conceived of the universe in terms of an aesthetic pantheism; the universe was both an organism and a work of art.[30]

One of the most thoroughgoing statements of the functionalist position with reference to architecture was formulated by an ardent German rationalist, Friedrich Weinbrenner, architect of Karlsruhe. Weinbrenner's textbook on architecture was prepared for use in his school which he began in his own house in 1801. The first volume, on descriptive geometry and shades-and-shadows, was completed in 1810. The second volume, on perspective drawing, and the third volume, on architectural theory, were published in 1819. In the latter book, Weinbrenner condemned the prevailing practice of teaching architectural students by the method of copying the antique; he proposed instead that ideas from which the judgment of perfect and beautiful form results should be sought from subjects near at hand such as drinking vessels, urns, and utensils. Such simple objects demonstrated clearly the principles of beauty which could then be ap-

[26] Kallen, *Art and Freedom*, I, 231–33.
[27] *Ibid.*, I, 236.
[28] Cf. Aristotle's opinions, pp. 21–24 *supra*.
[29] This aspect of German Romanticism is analyzed in Gode-von Aesch, *Natural Science in German Romanticism*.
[30] Walzel, *German Romanticism*, trans. by Alma Elise Lussky, p. 55.

plied to the design of buildings.[31] Some thirty-odd years later Ruskin was to conclude that the art of architecture begins in the shaping of the cup and the platter. According to Weinbrenner, perfection or beauty lies in the perfect concord of form with purpose, and the form is perfect when that objective appears to be accomplished in it so that we can call to mind nothing other than the given form for its purpose.[32] Beauty is a matter of contour, not material or color, but the nature of materials must be respected.[33] Workmanship, mechanical or technical perfection, are important but not all there is to consider. They should be considered as means to an end rather than as the ends of art.[34] The essential condition of architectural beauty is the conformity of contour lines with purpose.[35]

Weinbrenner saw great beauty in unadorned objects which were well designed for their purpose and well executed in appropriate materials but he did not reject ornament. Like the Renaissance critic Alberti and many others, as we have seen, Weinbrenner regarded ornament as a supplement to beauty; this supplement to beauty should derive its motifs from the purpose and form of the object and it, like the object itself, is conditioned by the material of which it is made.[36] The ingenious treatment of material, the intrinsic quality of material, and the ingenuity shown in the fabrication of an object or construction of a building, also possesses a kind of decorative or ornamental value.[37] Weinbrenner's *Lehrbuch* is illustrated by plates, designed for integration with the text, showing examples of classical and modern containers such as cups, mortars, vases, tubs, barrels,

[31] Weinbrenner, *Architektonisches Lehrbuch*, III, 1–3.
[32] *Ibid.*, p. 6.
[33] *Ibid.*, pp. 5, 9.
[34] *Ibid.*, pp. 8, 9.
[35] *Ibid.*, p. 6.
[36] *Ibid.*, pp. 79, 80, 83.
[37] *Ibid.*, pp. 2, 3, 8.

troughs, bottles, urns, and plates. The simplest examples are devoid of ornament and derive their beauty from refined utilitarian form, as in the classical examples, or from a sturdy, vigorous functionalism, as in the case of the modern barrels and troughs. Others have some ornament, but the ornament is applied in such a way as to help describe the form, to carry out some idea in the form, or to accent important functional subdivisions such as base, neck, or lip. In rounded objects the applied decoration consists of linear patterns which call attention to the roundness of the object. In all cases, the ornament derives its motifs from the purpose, contents, or form of the container, and is conditioned by the material of which the container is made. Sometimes, as in the case of wooden barrels, or tubs, the construction itself is decorative; the way in which the individual staves, hoops and heads are put together form an interesting pattern. A hewn trough retains the tree-trunk shape of its origin. The best of the more elaborately decorated Greek and Roman urns and vases do not deviate from the basic ideas illustrated by the simpler objects. Ornament, for Weinbrenner, consisted primarily in linear patterns. Color can contribute to our enjoyment of an object, but it is supplementary rather than essential to beauty.

We have seen, particularly among eighteenth-century British writers, that fitness for purpose has often been regarded as the only legitimate determinant of correct proportion. The Germans, from Winckelmann on, stress the importance of contour (Umrisz), rather than proportion (Verhältnis), though doubtless one involves or implies the other. Weinbrenner writes of proportion in discussing the orders. He points out that proportion depends upon use and material; the proportions of an order in wood will not be the same as for an order of stone or iron. Weinbrenner observed that the annoyance which we experience when we see proportions which violate the qualities of the material disappears when the surface is painted and we can-

not tell which materials are used. We must be able to see the material or else it does not enter into our judgment of the proportions.[38]

Weinbrenner interpreted the concepts of solidity, convenience and beauty in functional terms. He observed that

> (1) solidity, in art and science, is conceived abstractly as the fitting of materials to custom and use in conformity with statics and physics, (2) that convenience shall be acquired partly through natural and partly through conventional requirements in order to make our existence and living conditions pleasing and delightful, and that (3) beauty arises from a desire to bring to great perfection the familiar things which surround all men and to present the manifold humble things in absolute form whereby the material thing is almost spiritualized.[39]

Weinbrenner's previous statement about the achievement, through functional design, of an almost spiritual quality, suggests that ethical and moral values are involved in his analysis of architecture. According to Weinbrenner, purpose stands before form.[40] Some objects, no matter how well designed, are only capable of attaining perfection, but can never attain beauty. Doubtless Weinbrenner had in mind pig sties and corn cribs, but it is perhaps surprising to learn that he included ordinary small city dwellings in that category of objects which are not always capable of an especial beauty over and above perfection and wherein the beauty, when attained, is often only minor or fortuitous.[41] In state buildings, churches, and monuments, beauty is a coordinate and essential condition.[42] In other words, it takes a noble or lofty purpose to make a useful object beautiful in the highest sense of the word. The source of lofty purpose is public rather than private.

[38] *Ibid.*, p. 9.
[39] *Ibid.*, p. 84.
[40] *Ibid.*, p. 21.
[41] *Ibid.*, p. 80.
[42] *Ibid.*, p. 81.

Weinbrenner saw that the moral and intellectual limitations of the observer place limits on his appreciation of beauty.

> In the truly beautiful, the objective and subjective meet together, or rather both are one; where this unity is lacking, the beautiful is not recognized or the ugly is taken for the beautiful. A work of art appeals to us where it comes to meet our concepts and our feelings.[43]

The idea of fitness of form to purpose is expanded by Weinbrenner to include elevated concepts of fitness to purpose; buildings, like statues, can express nobility, strength, charm, and elegance, and it takes an observer capable of appreciating these qualities (and reacting to them both rationally and emotionally) before they can appeal to him as beautiful manifestations of fitness for purpose.

Weinbrenner wrote his *Lehrbuch* long after the original vigor of the Baroque and Rococo had been spent and before these stylistic expressions were revived in a widespread manner by the eclectics of the nineteenth century. He did not find it necessary to condemn these styles as expressions of caprice or the search for novelty. As a matter of fact, Weinbrenner did not regard novelty as unbecoming as long as it did not lead to the violation of the principles of good design; novelty has the important function of drawing attention to a good design.[44]

Weinbrenner made occasional comparisons between architecture and organic form. He applied the principle that beauty lies in the conformity of form with purpose to all organisms as well as to architecture and objects of industrial production.[45] He used the organic analogy to clarify the idea of unity in an architectural composition, and used the physical characteristics of statues, such as figures of Apollo and Hercules, to illustrate the relative nature of beauty, i.e.,

[43] *Ibid.*, p. 6.
[44] *Ibid.*, p. 79.
[45] *Ibid.*, p. 7.

the different beauties due to individual fitness of form to purpose.[46]

Weinbrenner came into contact with Friedrich Gilly in Strasbourg in 1797. He is also known to have met the revolutionary French architect Ledoux. The painter-architect Karl Friedrich Schinkel, who was fifteen years younger than Weinbrenner, belongs with the latter and Klenze among the ranks of the greatest German architects of the Classic Revival, each of whom impressed the stamp of his character upon an entire city. For Weinbrenner that city was Karlsruhe, for Schinkel it was Berlin, and for Klenze, Munich. Oddly enough, Schinkel and Weinbrenner were adversely critical of each other's work even though it was similar.[47]

In 1797 Schinkel entered the academy in Berlin and studied under David and Friedrich Gilly. The connection between the early work of Schinkel and the style of Gilly is clarified by a comparison of Schinkel's design for a *Schauspielhaus*, Berlin, with Gilly's *Schauspielhaus* project of 1800.[48] In 1820, Schinkel was appointed professor at the academy in Berlin. He intended to write a book containing the principal features of his architectural instruction but official duties as *Oberlandbaudirektor* and overwork in general prevented the completion of the intended book before Schinkel's death in 1841; all that is left are notes and sketches.[49] However, from Schinkel's notes one can obtain a clear idea of his point of view.

Schinkel advocated the creation of a new style of architecture

[46] *Ibid.*, pp. 3, 6. The use of the figures of Apollo and Hercules to illustrate the idea of relative beauty occurs with considerable frequency. It was common among British writers.

[47] Hirschfeld, "Weinbrenner," in Thieme and Becker, *Allgemeiner Lexikon der Bildenden Künstler*, ed. by Hans Vollmer, XXXV, 288–90.

[48] Grisebach, *Karl Friedrich Schinkel*, p. 72.

[49] Rave, "Karl Friedrich Schinkel," in Thieme and Becker, *Allgemeiner Lexikon der Bildenden Künstler*, XXX, 80. Schinkel's writings have been published posthumously and edited by Wolzogen, Grimm, and Rave; the commentaries on Schinkel are numerous.

which would not be at variance with the best that has been accomplished in the past.[50] Although his own work shows connections with the classical past, Schinkel believed that all historic styles should be studied, not just the Greek and Roman.[51] But above all the modern architect must study the customs and requirements of his own country and the conditions of the region and the site.[52] In addition to this idea that a truly modern style must be an expression of national, regional, and local conditions, we find in Schinkel a kind of primitivism such as we have seen in Laugier. The highly developed architecture of advanced civilizations should retain some of the qualities of primitive architecture. "Zwar durch das Monument, welches durch all Zeiten der Bildung eigentlich immer den festen einfachen Charakter behalten musz, der seine Wurzel im primitiven Zustande der Menschencultur schlagt und sich bis zum Gipfel einer hochsten Blüthe herausgestaltet." [53]

Schinkel's definition of beauty leads us to consider him from the point of view of the organic analogy, then turn to his statements as to the place of fitness for function in architecture, and conclude with some observations regarding the moral analogy in Schinkel's aesthetic.

Wolzogen has called attention to Schinkel's relationship to Schelling in so far as the former's theory of beauty is concerned.[54] Schelling's identification of the ideal and the real led him to define beauty as the perfect permeation of idea in experience. His aesthetic pantheism recalls Plotinus as well as the German Romantics: The unity of God shines through into each part of the universe. This con-

[50] Grisebach, *Karl Friedrich Schinkel*, p. 130.

[51] Wolzogen, "Schinkel als Architekt, Maler und Kunstphilosoph," *Zeitschrift fur Bauwesen*, Heft I und II, cols. 251, 252.

[52] Grisebach, *Karl Friedrich Schinkel*, pp. 130, 131.

[53] Wolzogen, "Schinkel als Architekt," col. 253. "Indeed, the intrinsic form of a monument of any period must maintain a simple character whose roots reach down into the primitive conditions of human culture while at its peak a sublime flower takes form."

[54] *Ibid.*, cols. 250, 251.

cept seems to be behind Schinkel's statement: "Die Schönheit der Form ist die innere, sichtbar gewordene Vernunft der Nature." [55]

The idea of nature, natural law, and what is natural often conditioned Schinkel's judgment. He believed that mankind's "natural function" was to fashion nature according to the consequences of its laws.[56] Architecture is never an entirely new creation because it is perceived out of nature and follows the universal laws of nature; consequently, Schinkel observed (as Quatremère de Quincy had previously observed), architecture is not less imitative than painting or sculpture.[57] Herman Grimm regarded Schinkel's central thesis to be that the work of the architect is analogous to nature.[58]

At the beginning of Schinkel's notes on the theoretical aspects of architecture he elaborated the significance of fitness as follows:

1. Architecture is the combination of various materials into a unit bound together by suitability to purpose.

2. This definition comprises the spiritual as well as material aspects of the art of building; it is clearly manifest that fitness is the fundamental principle of architecture.

3. The material edifice, which always presupposes the spiritual, is here the subject of my consideration.

4. The fitness of every building may be considered from three main points of view, these are: (a) fitness of space distribution or plan, (b) fitness of construction or its proper relation to the plan, and (c) fitness of ornament or decoration.

5. These three cardinal points determine the form, proportions, and character of buildings.

6. Fitness of space distribution or plan contains the following three attributes: (a) utmost economy of space, (b) utmost order in distribution, and (c) utmost convenience of accommodation.

7. Fitness of construction contains the following three attributes: (a)

[55] *Ibid.*, col. 250. "Beauty is the visible proof of the inner intelligence of nature."

[56] *Ibid.*, cols. 250, 251.

[57] *Ibid.*, col. 252.

[58] Grimm, *Zehn Ausgewählte Essays*, p. 338.

best possible materials, (b) best possible treatment of and fitting together of materials, and (c) most visible indication of the best materials, best workmanship, and use of materials.

8. Fitness of ornament or decoration contains the following three attributes: (a) best possible location of decoration, (b) best choice of ornament, and (c) best possible treatment of the ornament.[59]

In 1831, on the occasion of the new building of the Leipzig Augusteum, Schinkel wrote his opinions of the work of his contemporary architects from the point of view of the organic connection between façade and interior volume. He condemned the licentious attitude which resulted in the disregard of this principle, for without the truly satisfactory expression of purpose a completely satisfactory building cannot be created.[60]

Moral considerations are an integral part of Schinkel's philosophy of architecture. He felt that the creation of a new architecture was a contribution which modern man is obliged to make to the social development and general evolution of mankind.[61] Art is a fundamentally virtuous activity because the artist strives so that all may share a high order of pleasure.[62] Schinkel did not identify beauty and morality, but he regarded the further elevation of the moral to be the highest purpose of art. Beauty should be the basis upon which to build up the rational life.[63] To the question whether or not it was valid for architecture to aspire to embody an ideal, Schinkel replied, in effect, that the ideal in architecture can only be attained when a building, as a whole and in all its parts, is perfectly suited to its purpose in spiritual and physical respects; the ideal must be modified in every age according to the demands of that age.[64]

[59] Friedrich Tamms, "Schinkels Bedeutung für die Entwicklung der neuen Baukunst," *Die Baugilde*, Jahrgang XIII, Heft 5 (1931), p. 385.
[60] *Ibid.*, p. 387.
[61] Grisebach, *Karl Friedrich Schinkel*, p. 131.
[62] Wolzogen, "Schinkel als Architekt," col. 251.
[63] *Ibid.*
[64] *Ibid.*

EARLY AMERICAN CONTRIBUTIONS TO THE LITERATURE OF FUNCTIONALISM

10

One of the means by which English architectural influence was transmitted to the American colonies was the architectural book. Among these books were William Halfpenny's *The Modern Builder's Assistant* (1742), and Isaac Ware's *A Complete Body of Architecture* (1756), both of which stressed the importance of fitness of form for function. The early American builder evidently did not theorize about his art, but there was a great demand for English practical carpenter's handbooks and books illustrating house plans and elevations. When the colonies became a nation and the Americans began to publish their own architectural books they turned out similar practical manuals, which gave specific directions to carpenters, masons, and other workers in building trades, and also published books of designs. A major concern of the latter was the adaptation of Greek or Roman forms to the conditions of the new nation. Asher Benjamin, a Boston architect who conducted an architectural school, and George Biddle, architect of Philadelphia, published some of the most influential books of this type. Asher Benjamin's books, *The*

American Builder's Companion, The Practical House Carpenter, The Practice of Architecture, and *The Builder's Guide* were published in numerous editions from 1797 on.[1] The published designs of Benjamin and Biddle abstained from slavishly copying antique models or English adaptations of the antique. Talbot Hamlin has praised the fitness of these designs for American conditions.

> It is noteworthy that in all of these works the authors insist upon the fact that these are American books designed for American conditions, and that they have no hesitancy whatsoever in changing the English standards as they see fit. It was these books, with their exquisite, delicate details, which made possible those chaste wooden houses with slim-columned porticoes and rich cornices in which for the first time the stone details of the original English inspiration have finally evolved into some of the most perfect expressions of wood which architecture has known. And it is this fitness of detail to material, so beautifully shown in these widely distributed books, that made the style last on in country villages long after it had passed in the great urban centers, and which enabled the settler of the Western Reserve in Ohio to build there the gracious white houses which distinguish so many of its towns.[2]

Edward Shaw's *Civil Architecture* was almost equally influential. It was first published in 1830 and went through eleven editions up to 1876. It is a more complete builder's handbook than the books of Asher Benjamin; it has fewer designs and details but more material on geometry, mensuration, and construction.[3]

The books of the New York architect, Minard Lafever, were widely circulated. In the text accompanying his design for an ideal farmhouse in *The Young Builder's General Instructor* (1829), Lafever stressed the importance of a convenient plan and simple architecture.

[1] See Hamlin, *Greek Revival Architecture in America,* pp. 163, 164, and Roos, *Writings on Early American Architecture,* p. 13.

[2] Hamlin, *Architecture Through the Ages,* p. 564.

[3] Hamlin, *Greek Revival Architecture,* p. 164.

In designing a cottage for domestic conveniences, the designer should have in view frugality, convenience, and neatness, in a plain style. He should also be aware of the inconvenience of apartments being too large, as well as too contracted; for it is well known that in common, the Farm House is too large . . . therefore it is a duty as well as an interest devolving upon a builder never to advise a farmer to build his house more than one full story besides the basement . . . He must likewise be aware, and impress it upon the mind of the occupant, that a wide hall running through the house in any direction is room lost, and an opening for the reception of cold in the winter.[4]

But we note that Lafever did not advance the idea that the beauty of a building is a product of functional form, or even that the direct expression of a convenient plan is an important step in the direction of architectural beauty.

Aesthetic ideas were not readily developed by the writers on architecture of the early days in the United States. However, one of this country's greatest intellectuals, Thomas Jefferson, gave considerable thought to the larger problems of art and wrote about them in his letters. These letters furnished the source of information for Eleanor Berman's recent book, *Thomas Jefferson Among the Arts*. This book demonstrates that Jefferson's ideas on art were to a large extent derived from Kames and to a lesser extent from Hogarth and Burke.[5]

Jefferson's point of view toward art is described by Eleanor Berman as "functional," and Horace M. Kallen, in his introduction to Dr. Berman's book, concurs in this. Jefferson was concerned with the relation of art to morality; the highest function of art was its social function. Dr. Berman describes this.

It is impossible to separate the esthetic of Jefferson the art-lover from the "institutional utilitarianism" of Jefferson, the social philosopher. Given his world-view, he could not but gravitate towards the functional approach to art. Of paramount importance is Jefferson's distinction between the

[4] Lafever, *The Young Builder's General Instructor*, p. 157.
[5] See Berman, *Thomas Jefferson Among the Arts, passim.*

arts "which arouse the best feelings of man, which call him into action, which substantiate his freedom and conduct him to happiness" and the "subordinate" arts which "serve to amuse him only." For Jefferson was concerned with what the arts were saying and doing and not merely with their techniques.[6]

For Jefferson, there was no "pure" art, any more than there was a "pure" science, there was only "applied" art and science: the function of both was to promote human well-being, and this function conditioned art and science. Since man is a social animal, well-being can only be achieved through virtue, hence the highest function of art is to inculcate virtue.[7]

Jefferson's delight in mechanical devices is attested by the extent to which he introduced them in his estate, Monticello, to make the place more livable and enjoyable. His technical knowledge of architecture is demonstrated by the buildings which he erected; it can also be seen in his letters, such as his letter of May 27, 1817, addressed to William Thornton, commenting on the latter's specifications for brickwork and mortar to be used on the University of Virginia buildings.[8] The same letter presents conflicting evidence as to the nature of Jefferson's "functionalism." Jefferson wrote, "I admire everything that would give chaste ideas of elegance and grandeur. Accustomed to pure architecture, the mind would relish in time no other, and therefore the more pure the better." [9] On the other hand, later Jefferson relaxes his standards of purity and suggests the use of "ashlar Plaister," and the use of artificial stone for column bases and "Pateras Modillions." [10]

[6] *Ibid.*, p. 48.
[7] *Ibid.*, p. 74.
[8] Glenn Brown, "Letters from Thomas Jefferson and WilliamThornton, Architect, Relating to the University of Virginia," *Journal of the American Institute of Architects*, I (January, 1913), 21–27.
[9] *Ibid.*, p. 24.
[10] *Ibid.*, p. 25.

Jefferson's love of nature and architecture led him to blend the effects of each. He disliked a sharp contrast between building and setting. "I prefer a pale yellow for the general ground color of a building," he wrote to Thornton, "as it assimilates beautifully with the Trees, and a general Tint of Nature; while white looks cold and glaring and destroys the keeping. . . . I would advise that the site be chosen in the woods, and clear out whatever is not wanted, clumping the most beautiful and thriving of the forest Trees, in handsome groves, and leaving straggling ones occasionally, by which Nature may be so artfully imitated, as to produce a perfect picture." [11]

Talbot Hamlin describes the early American architect Benjamin Henry Latrobe, in the following terms: "brilliant as an engineer and architect, an inventor, a skilled technician in many lines, a man who could wield a trenchant and powerful pen." Hamlin continues:

A practically complete body of his letters and many sketchbooks and drawings exist, in the possession of Mr. Ferdinand C. Latrobe of Baltimore. It is hoped that eventually they may find publication; they are a priceless source of material not only on American architecture and building but also on American engineering, American speculative business, and American politics. Toward the end of his life he was considering having Rudolph Ackermann of London publish the body of his work, but the project was canceled by his premature death. His only publication of architectural interest in America, outside of controversial pamphlets about the Capitol design, is an extended, correct (as of its time), and extremely well-written article on acoustics, running to some twenty pages in the first American edition of the *Edinburgh Encyclopaedia* (Philadelphia: Joseph and Edward Parker, 1832). He also wrote for this work an article on civil architecture, which apparently was lost. The one published is merely the British article from the original publication.[12]

[11] *Ibid.*, pp. 25, 26.

[12] Hamlin, *Greek Revival Architecture in America*, p. 43, n. 18. Hamlin's recent biography, *Benjamin Henry Latrobe* (New York and London, Oxford University Press, 1955) contains hitherto unpublished material.

Frank J. Roos, Jr., writes of Latrobe: "His versatility is evidenced by the fact that he seems to have built the first railway, put the first sheet iron roof on a building when fireproofing was a new subject, and apparently utilized for the first time a steam engine to pump water." [13] Latrobe's writings on diverse technical subjects show the same versatility. In addition to the architectural writings mentioned by Hamlin, Latrobe wrote his *View of the Practicability and Means of Supplying the City of Philadelphia with Wholesome Water*, in 1799, and his *Annual Reports and Letters of Latrobe to the Hon. Albert Gallatin and Other Papers Relative to the Chesapeake and Delaware Canal* was published in 1808. He also designed a dry-dock for twelve frigates; this was never built, nor was the design published.[14]

In Latrobe, America had its first great architectural engineer. Although he was born in America, Latrobe received his professional education in England. He was a pupil of S. P. Cockerell and John Smeaton. Latrobe's pupils, Robert Mills and William Strickland, carried on the tradition of the architect-engineer in the United States.

Mills progressed further than Latrobe in the preparation of a book of his architecture, and in what is evidently a foreword to the proposed book we learn something of the principles of design which guided him. The ideas that fitness of form for function is the primary consideration in architectural design and that convenience and utility are constituent parts of beauty are contained in these notes.

> Utility and economy will be found to have entered into most of the studies of the author, and little sacrificed to display; at the same time his endeavors were to produce as much harmony and beauty of arrangement as practicable. The principle assumed and acted upon was that beauty is founded upon order, and that convenience and utility were constituent parts. . . .

[13] Roos, *Writings on Early American Architecture*, p. 14.

[14] Fiske Kimball, "Benjamin Henry Latrobe," in *Dictionary of American Biography*, ed. by Dumas Malone, XI, 20–25.

The subject of domestic economy in the arrangement of private houses has . . . undergone considerable improvement, and many useful hints are to be gathered from French works on architecture, but the author has made it a rule never to consult books when he had to design a building. His considerations were—first, the object of the building; second, the means appropriated for its construction; third, the situation it was to occupy; these served as guides in forming the outline of his plan.[15]

Although Mills' architecture is clearly within the scope of the Greek Revival style, neither Mills nor most of the leading architects of that period practiced, or attempted to justify on theoretical grounds, the close reproduction of antique forms. Intelligent architects and critics realized that original solutions for the new problems of the day must be encouraged. Talbot Hamlin makes this point clear in his *Greek Revival Architecture in America.*

The . . . growing demand for originality, for creation, in American architecture was everywhere evident, in the writings as well as the work of the best designers. It runs through all the writings of Mills. It is innate in any number of the sketches Alexander Jackson Davis made, largely for buildings never executed. And it crops up again and again in the lectures and the papers of the Franklin Institute. The layman and cultured amateur might prefer their Greek forms "straight" and admire the buildings for correctness rather than for invention, but the attitude of the architect was different.[16]

Hamlin gives an example of this from the writings of the distinguished Greek Revival architect of Baltimore, Robert Cary Long, Jr. Long wrote an essay entitled "The Degeneration of Modern Architecture," published in the *Journal of the Franklin Institute* in 1841, in which he attributed the alleged degeneration of architecture to imitation of the past.

Must we progress in goodness and in wisdom? Then, must architecture also! Is man so progressive? Then in architecture also, though, we may

[15] Gallagher, *Robert Mills, Architect of the Washington Monument, 1781–1855*, p. 170.

[16] See p. 61.

not know it or see it. Architecture must manifest the changes that are taking place in society, the greater ones, we hope and believe, that are yet to come. . . .

It is as much out of the rule of rationality to think it possible to reinvigorate architecture by forcing it into an antique mould, as to expect that, if disgusted with manhood, we can bring back simplicity and innocence by putting on the garments of youth. Architecture must grow naturally. . . . Let us all try and see which of us will first produce something in art peculiar—characteristic—suited to the age—national.[17]

The architect Thomas U. Walter said in one of his lectures before the Franklin Institute:

The popular idea that to design a building in Grecian taste is nothing more than to copy a Grecian building is altogether erroneous;—even the Greeks themselves never made two buildings alike. . . . If architects would oftener *think* as the Greeks thought, than to *do* as the Greeks did, our columnar architecture would possess a higher degree of originality and its character and expression would gradually conform to the local circumstances of the country and the republican spirit of its institutions.[18]

Architectural critics often showed the same point of view in their writings, for example the New York *Mirror*'s series of reviews of the work of William H. Ranlett as published by him in *The Architect*, which was issued in parts from 1846 to 1848. The reviewer judged the architecture on the basis of common-sense criteria.[19] A critic, writing for *The American Monthly Magazine* (April, 1835), attacked the illogical combination of dome and temple form which Town and Davis designed for the New York customs house. He described the dome as "an excrescence, which, however elegant in itself, is utterly monstrous and barbarous when added to a model of the present

[17] Robert Cary Long, Jr., "The Degeneration of Modern Architecture," *Journal of the Franklin Institute*, XXXII (October, 1841), 61, as quoted in Hamlin, *Greek Revival Architecture in America*, pp. 61, 62.

[18] Published in the *Journal of the Franklin Institute*, XXXI (January, 1841), 11–12, as quoted *ibid.*, p. 62.

[19] *Ibid.*, p. 325.

Grecian architecture, such as the Parthenon or the Thesion." He described as "vandalism" the same faults committed by Town and Davis in their design for the capitol at Indianapolis.[20] An article in the *Boston Spectator*, December 31, 1814, praised Solomon Willard's simple, unadorned design for the Bunker Hill monument, and stated: "A purer taste appears to banish superfluous ornament; and the effect is produced by correct proportion and richness of material." [21]

Andrew Jackson Downing, whose books which were published during the 1840s and 1850s applied the practical point of view to problems of the small house and garden design, stressed the importance of fitness for function and expression of purpose in design. Association enters into his theory of beauty and he saw connections between morality and beauty. Downing's obvious importance to our theme warrants considerable attention. Modern functionalists have neglected him.

According to Downing, there are three principles of beauty in architecture.

> As the first object of a dwelling is to afford a shelter to man, the first principle belonging to architecture grows out of this primary necessity, and it is called the principle of FITNESS or *usefulness*. After this, man actually desires to give some distinctive character to his own habitation, to mark its superiority to those devoted to animals. This gives rise to the principle of *Expression* of PURPOSE. Finally, the love of the beautiful, inherent in all finer natures, and its exhibition in certain acknowledged forms, has created the principle of *Expression* of STYLE.[22]

In elaborating the principle of fitness, Downing stressed the importance of a conveniently arranged plan; this is the most important consideration. Downing also included the mode of construction and the materials employed under the principle of fitness; they must be

[20] *Ibid.*, p. 324.
[21] *Ibid.*, p. 105.
[22] Downing, *Cottage Residences, or A Series of Designs for Rural Cottages and Cottage-Villas*, pp. 9, 10.

the most appropriate for the purposes and economic means of the occupants.[23] Downing distinguished between a useful building and useful building whose forms had been selected and arranged by the designer so as to articulate the function of the building. The expression of purpose gives character to a building.

> The *expression of purpose* in architecture is conveyed by features in a building, or by its whole appearance, suggesting the end in view, or the purpose for which it is intended. A church, for example, is easily known by its spire, or a barn by its plain large doors and the absence of chimneys, and the reason acknowledges a satisfaction in finding them to be what they appear, or, in other words, with the *truthfulness* of their expression. Whatever, therefore, tends to heighten the expression of purpose, must grow out of some quality which connects itself in the mind with the use for which it is designed, and a genuine mode of increasing our admiration of any building, is to render it expressive of the purpose for which it was built.[24]

Downing offers the interesting suggestion that even "the *colour* of buildings may very properly be made to increase the expression of truthfulness." [25] He does not explain this statement; the reader is abandoned on the threshold of an important subject.

In elaborating the principle of style, Downing pointed out that fitness and the expression of purpose are qualities which appeal to the rational nature of man whereas the sentimental appeal of style is a matter of association and appeal to the imagination.[26] This aspect of the enjoyment of architecture has led to the adaptation or imitation of past styles. Downing did not condemn the adaptation of past styles to present uses but he did place some restrictions on it. "In adopting any style for imitation," he wrote, "our preference should be guided not only by the intrinsic beauty which we see in a particu-

[23] *Ibid.*, pp. 10, 16.
[24] *Ibid.*, p. 19.
[25] *Ibid.*, p. 22.
[26] *Ibid.*, pp. 25, 33.

lar style, but by its appropriateness for our uses." [27] The inspiration for stylistic adaptation should be sought "in some humble nook-hidden cottage, as well as in the dome of St. Peter's." [28] The conditions of the site and economic considerations govern the adaptation of a style but they also present the architect with his opportunity.

A great deal of the charm of architectural style in all cases, will arise from the happy union between the locality, or site, and the style chosen, and from the entireness with which the architect or amateur enters into the spirit and character of the style, and carries it through his whole work. This may be done in a small cottage, and at little cost, as well as in a mansion, and at great expense; but it requires more taste and skill to achieve the former admirably, although the latter may involve ten times the magnitude.[29]

Downing believed that an architecture of refined simplicity was not only in itself beautiful because it was an expression of goodness but it had a moralizing effect upon those who lived with it. He anticipated Ruskin's *Seven Lamps* and *Stones of Venice* from this point of view:

I wish to inspire all persons with a love of beautiful forms and a desire to assemble them around their daily walks of life. I wish them to appreciate how superior is the charm of that home where we discover the tasteful cottage or villa, and the well designed and neatly kept garden or grounds, full of beauty and harmony, not the less beautiful and harmonious because simple and limited, and to become aware that these superior forms, and the higher and more refined enjoyment derived from them, may be had at the same cost and with the same labor as a clumsy dwelling, and its uncouth and ill designed accessories.

More than all, I desire to see these sentiments cherished for their pure

[27] *Ibid.*, p. 31.

[28] *Ibid.*, p. 25.

[29] *Ibid.*, p. 34. It is interesting to observe at this point that the same sort of reasonable limits were placed upon the eclectic approach to architecture by Downing's contemporary, the critic Arthur Gilman, writing two years later in the *North American Review*. For an appraisal of Gilman, see Hamlin, *Greek Revival Architecture in America*, p. 335.

moral tendency. "All BEAUTY is an outward expression of inward good," and so closely are the Beautiful and the True allied, that we shall find, if we become sincere lovers of the grace, the harmony, and the loveliness, with which rural homes and rural life are capable of being invested, that we are silently opening our hearts to an influence which is higher and deeper than the mere *symbol;* and that if we have worshipped in the true spirit, we shall have caught a nearer glimpse of the Great Master whose words, in all his material universe, are written in lines of Beauty.[30]

American literature during the first half of the nineteenth century shows much the same spirit of independence and of practical common sense toward architecture that we have observed in the writings of architects and architectural critics. Hugh Henry Brackenridge in his *Modern Chivalry,* a satirical novel published in various parts from 1792 to 1815, makes some references to architecture. Brackenridge was a friend of the architect Latrobe and possibly reflects the latter's point of view. Brackenridge judged all the objects of man by two standards, fitness for purpose and the extent to which they showed originality or imagination.[31] In *Modern Chivalry* Brackenridge described a town which his heroes came upon in their travels, and the author used this opportunity to express something of his common sense point of view toward architecture.

The settlement in which they now were, was called the back settlement; not because it was farthest back; but because it had once been the frontier. The name *back,* still continued to be tacked to it; now when it had become the midland country.

The inhabitants of this country had become wits, and improved in manners, from society and intercourse.—The females dressed better because they could afford it, than they had done years before. Their buildings were of stone, or brick, or of sawed timber, framed, instead of round, or squared logs, laid upon each other, as was the mode at an early period. Nevertheless there was still a defect of judgment in the construction of

[30] Downing, *Cottage Residences,* pp. ii, iii.

[31] Brackenridge, *Modern Chivalry,* ed. by Claude M. Newlin, p. 480.

their houses for the summer, as well as the winter seasons. They were placed, in most cases, as they ought to be, fronting the south; but without perforations, or a passage for the air, by means of windows from the west to the east. On the contrary, many of them had what they called wings; and these placed at the east and west end. The entries were small, and a kitchen placed in a wing, or at the east or west end of the house. Yet, a little thinking on original principle, would say, that it ought to be at the north end of the building, to oppose the storm which comes from that quarter, in the winter; and because in the summer, it obstructs no breeze in that direction. But it is not *lawyers or judges only that are enslaved by precedent.*

They take care also, to build in a valley, because it is near a spring head. But in the winter the court yard is muddy; and in the summer they want air.[32]

James Fenimore Cooper, in his novel *Home As Found* (1838), also urged greater fitness and invention in architecture. He regarded utility to be the substance of architecture and was critical of the vices of the Greek Revival style. He wrote:

The fault just now is perhaps to consult the books too rigidly, and to trust too little to invention; for no architecture, and especially no domestic architecture, can ever be above reproach, until climate, the uses of the edifice, and the situation, are respected as leading considerations. Nothing can be uglier, *per se*, than a Swiss cottage, or anything more beautiful under its precise circumstances. As regards those mushroom temples which are the offspring of Mammon, let them be dedicated to whom they may, I should exactly reverse the opinion and say, that while nothing can be much more beautiful, *per se*, nothing can be in worse taste than to put them where they are.[33]

Ralph Waldo Emerson never organized into a system his profound thoughts on art. His writings pertaining to art were produced over a period of many years hence give evidence of a developing viewpoint. In Emerson's published *Journals* we find the author describing St.

[32] *Ibid.*, p. 517.

[33] As quoted in Greenough, *Form and Function*, ed. by Harold A. Small, p. 66, n. 5.

Peter's church in hedonistic terms after seeing it during his tour of Italy in 1833. "I love St. Peter's church. . . . It has a peculiar smell from the quantity of incense burned in it. The music that is heard in it is always good and the eye is always charmed. It is an ornament of the earth. It is not grand, it is so rich and pleasing; it should rather be called the sublime of the beautiful." [34] Emerson was twenty-nine years old when he wrote those words. Twenty-six years later, in a lecture on beauty, we find him praising Greek art (architecture and sculpture) for its qualities of proportion, fitness to purpose, economy of means, its strict geometric form, and for the health and temperance its forms expressed.[35] The mature Emerson judged all art by these and related standards which moderns identify by the expression functionalist.

Recent writers have investigated Emerson's essays, lectures, and notes on art and have been impressed by the degree to which he was a precursor of modern functionalists.[36] Emerson's functionalism seems to be the outgrowth of two factors: his Yankee background characterized by ingenuity and Puritanism, and his personal religious or metaphysical viewpoint. Régis Michaud emphasized Emerson's interest in the useful arts.[37] Robert B. Schaffer sketched the relationship between Emerson's functionalism and his metaphysics, and Vivian C. Hopkins developed this connection in more detail.

For Emerson, fitness for function was a desirable quality in an object of art such as architecture, because it was the inevitable outcome of the creative process as he conceived it. For Emerson, art was

[34] *Journals of Ralph Waldo Emerson*, ed. by Edward W. Emerson and Waldo Emerson Forbes, III, 100, as quoted in Robert B. Schaffer, "Emerson and His Circle: Advocates of Functionalism," *Journal of the Society of Architectural Historians*, VII (July–December, 1948), 17.

[35] Hopkins, *Spires of Form*, p. 78.

[36] See *ibid.*; Michaud, *L'Esthétique d'Emerson*; Schaffer, "Emerson and His Circle"; Matthiessen, *Art and Expression in the Age of Emerson and Whitman*; and Kouwenhoven, *Made in America*.

[37] Hopkins, *Spires of Form*, p. 240, n. 32.

the complement to nature in a divinely ordered universe. Drawing inspiration from Plotinus, Bacon, Goethe, Coleridge, and the French mystic Oegger, Emerson combined organic and spiritual qualities of form into an integral relationship. Drawing inspiration from the additional sources Wren, Winckelmann, Lessing, and Alison, Emerson stressed the qualities of simplicity, appropriateness, and fitness for purpose.[38]

Emerson, like Coleridge, developed the concept "organic" to replace "imitation." [39] Before he developed his organic concept he used the term imitation to denote the metaphysical basis of architectural form. In Italy, in 1833, he wrote: "Architecture . . . seems to me ever an imitation. Accustomed to looking at our American Churches as imitative, I cannot get it out of my head that these which I now see are only more splendid and successful imitation also. . . . It is in the soul that architecture exists, and Santa Croce and this Duomo are poor far-behind imitations. I would rather know the metaphysics of architecture, as of shells and flowers, than anything else in the matter." [40] In this passage Emerson seems to suggest that actual architecture is an imitation of an idea of architecture which exists in the soul.

There are four aspects of Emerson's organic concept of form in art. The most obvious aspect is that art imitates the physical forms of nature. Second is the idea that art imitates the qualities of nature such as unity and simplicity. Third, art seeks to give the same impression as nature, and fourth, the organic concept of the creative process, is the metaphysical idea that art is spiritually organic.[41] For Emerson, the creative process was a mystical experience. Funda-

[38] Vivian C. Hopkins has discussed the influence of these men on Emerson. See *ibid., passim.*

[39] *Ibid.*, p. 67.

[40] *Journals of Ralph Waldo Emerson*, III, 146, 147.

[41] See Hopkins, *Spires of Form*, pp. 17–63, and 67; see also Matthiessen, *Art and Expression*, pp. 135–138.

mental to his interpretation of the creative process was an idea which Emerson derived from Goethe: the idea that the natural world is governed by benevolent necessity.[42] Emerson applied this to art. Since the universal mind is the sole creator of both the useful and the beautiful, Emerson reasoned, the only way for the artist to partake in the creative act is by submitting himself entirely to this primal source beyond the understanding.[43] Like Goethe, Emerson felt that art was always dependent on nature.[44] In an article which appeared in *The Dial*, Emerson wrote that a work of art will be the expression of the universal mind that formed nature, and therefore must be based on reason and necessity.[45]

> Arising out of eternal Reason, one and perfect, whatever is beautiful rests on the foundation of the necessary. Nothing is arbitrary, nothing is insulated in beauty. It depends forever on the necessary and the useful. Fitness is so inseparable an accompaniment of beauty that it has been taken for it. The most perfect form to answer an end, is so far beautiful. . . . We feel, in seeing a noble building, which rhymes well, as we do in hearing a perfect song, that it is spiritually organic, that is, had a necessity in nature for being, was one of the possible forms in the Divine mind, and is now only discovered and executed by the artist, not arbitrarily composed by him.[46]

Thus, art is the realization, by the artist, of an intuition inspired by or derived from the divine spirit dwelling at the heart of nature.

Emerson admired Edward Lacy Garbett's treatise on architecture. The book was called to his attention by Horatio Greenough. Emerson remarked that Garbett is Ruskin's scholar but "a better teacher than the master." [47] Vivian Hopkins finds it strange that Emerson should

[42] Hopkins, *Spires of Form*, p. 72, p. 72 n. 2, and p. 148.
[43] Matthiessen, *Art and Expression*, p. 135.
[44] Hopkins, *Spires of Form*, p. 74.
[45] Emerson, "Thoughts on Art, January 1841," in *Uncollected Writings*, pp. 43–47.
[46] *Ibid.*, p. 47.
[47] Hopkins, *Spires of Form*, p. 91.

regard as similar the ideas of Garbett and Greenough, even though, as she points out, Greenough recommended the treatise to Emerson as an expression of functional theory.[48] Hopkins regards Garbett's proposal that architecture express moral qualities as "a departure from the idea that a building's beauty lies in fulfillment of function." [49] As we have seen, many thinkers have seen a connection between morality, and art or functional architecture. Emerson did too. It was Emerson's remark about the "selfish and even cruel aspect" of modern machinery which inspired Garbett.[50] On the whole, Emerson rarely applied specific moral standards to art, but it must be noted that the term nature, as he used it, included morality. "The great lead us to Nature," he wrote, "and in our age to metaphysical nature, to the invisible awful facts, to moral abstractions, which are not less nature than is a river, or a coal mine,—nay, they are far more nature,—but its essence and soul." [51] At one point in his *Journal* (1833), Emerson writes of "the moral sublime" emotion expressed by nature and art.[52] And again, in *The American Scholar,* appealing for "the near, the low, the common," Emerson asked writers to show "the sublime presence of the highest spiritual cause lurking . . . in the suburbs and extremities of nature." [53]

According to Matthiessen, Emerson, Thoreau, and Whitman "felt the greatest release for their creative impulses when they could believe their work integrally subordinated to natural force, and beating in harmony with it." [54] All three expressed, in a variety of interesting ways, the idea of the organic analogy: the analogy between the work of art and nature. Thoreau and Whitman generally used the lan-

[48] *Ibid.*
[49] *Ibid.*
[50] *Ibid.*
[51] Emerson, essay on "Modern Literature," as quoted by Hopkins, *ibid.*, p. 200.
[52] *Ibid.*, p. 209.
[53] *Ibid.*, pp. 208, 209.
[54] Matthiessen, *Art and Expression,* p. 134.

guage of biology in describing art or the creative process.[55] Thoreau said in the *Week:* "As naturally as the oak bears an acorn, and the vine a gourd, man bears a poem . . . since his song is a vital function like breathing, and an integral result like weight." [56]

In *Walden,* Thoreau wrote some of his observations regarding architecture. One of Thoreau's main points was that every man should build his own home; then men would build fitting dwellings, honestly constructed, and in tune with nature.

There is some of the same fitness in a man's building his own house that there is in a bird's building its own nest. Who knows but if men constructed their dwellings with their own hands, and provided food for themselves and families simply and honestly enough, the poetic faculty would be universally developed, as birds universally sing when so engaged? But alas! we do like cow-birds and cuckoos, which lay their eggs in nests which other birds have built, and cheer no traveller with their chattering and unmusical notes. Shall we forever resign the pleasure of construction to the carpenter? [57]

According to Thoreau, the most unpretending are the most interesting dwellings; beauty will be created unconsciously if people live beautiful lives and with their own hands fashion buildings according to their character and needs.

What of architectural beauty I now see, I know has gradually grown from within outward, out of the necessities and character of the indweller, who is the only builder,—out of some unconscious truthfulness, and nobleness, without ever a thought for the appearance; and whatever additional beauty of this kind is destined to be produced will be preceded by a like unconscious beauty of life. The most interesting dwellings in this country, as the painter knows, are the most unpretending, humble log huts and cottages of the poor commonly; it is the life of the inhabitants whose shells they are, and not any peculiarity in these surfaces merely, which makes them *picturesque;* and equally interesting will be the citi-

[55] *Ibid.*
[56] *Ibid.*
[57] Thoreau, *Walden or Life in the Woods,* ed. by Ernest Rhys. p. 39.

zen's suburban box, when his life shall be as simple and as agreeable to the imagination, and there is as little straining after effect in the style of his dwelling.[58]

Thoreau was adversely critical of Horatio Greenough for allegedly advocating "inbuilding" instead of "outbuilding." Greenough was supposed to have stressed the importance of ornamental truth and to be more concerned with the cornice than the foundation.[59] Thoreau's ill-founded objections to the ideas of Greenough may indeed have come, as Matthiessen suggests, from his prejudice against anything which Emerson supported.[60] Emerson was a great admirer of Greenough; in *English Traits* we can read of his first meeting with Greenough in 1833 during Emerson's tour of Italy: "At Florence, chief among artists, I found Horatio Greenough, the American sculptor. . . . Greenough was a superior man, ardent and eloquent, and all his opinions had elevation and magnanimity. . . . He was a votary of the Greeks and impatient of Gothic art." [61] Then Emerson described Greenough's ideas.

His paper on Architecture, published in 1843, announced in advance the leading thoughts of Mr. Ruskin on the *morality* in architecture, notwithstanding the antagonism in their views of the history of art. I have a private letter from him,—later, but respecting the same period,—in which he roughly sketches his own theory. "Here is my theory of structure: A scientific arrangement of spaces and forms to functions and to site; an emphasis of features proportioned to their *graduated* importance in function; color and ornament to be decided and arranged and varied by strictly organic laws, having a distinct reason for each decision; the entire an immediate banishment of all makeshift and make-believe." [62]

The interchange of ideas between Emerson and Greenough must have helped each man develop his own theory of architecture; there

[58] *Ibid.*, p. 40.
[59] *Ibid.*, pp. 39, 40.
[60] Matthiessen, *Art and Expression*, pp. 153, 154.
[61] Emerson, "English Traits," in *Works*, ed. by Edward Waldo Emerson, V, 9.
[62] *Ibid.*, I, 9 and 10.

was not a master-pupil relationship. However, in 1852, the year of Greenough's death, Greenough visited Emerson at Concord, doubtless for the purpose of discussing the essays which Greenough was preparing for publication in book form. Emerson read the manuscript of Greenough's articles, which were not published in book form until Greenough received Emerson's approval.[63] The influence of Emerson upon the functionalist ideas on architecture expressed by his contemporaries, especially men like his fellow New Englanders Samuel Gray Ward and James Elliot Cabot, cannot be clearly determined. As we have seen, the ideas of functionalism are neither new nor peculiarly American.[64]

Like Emerson, Horatio Greenough developed his functionalism out of a rich intellectual background. Herein lies his superiority over Downing as a critic of architecture.

Greenough arrived at the main tenets of his philosophy of art in 1843. The sculptor returned home from his studio in Florence to witness the installation of his colossal seated figure of Washington and was outraged by public complaints against its semi-nudity; this led him to question the whole basis for the American standard of taste. Greenough's, "Remarks on American Art," printed in 1843 in the *United States Magazine and Democratic Review*, was the first of a series of essays on American art which culminated in 1852 with Greenough's publication (under the pseudonym Horace Bender) of *The Travels, Observations, and Experience of a Yankee Stonecutter*, a collection of his articles and notes.[65]

[63] See Schaffer, "Emerson and His Circle," p. 18, and Hopkins, *Spires of Form*, p. 90.

[64] Excerpts from the writings of Ward and Cabot can be found in Schaffer, pp. 18–20. Cabot did not develop his ideas on architecture until well after 1850.

[65] Soon after Greenough's death, December 18, 1852, Henry T. Tuckerman edited a *Memorial of Horatio Greenough*, containing much of Greenough's own book. The most recent edition of Greenough's writings is *Form and Function, Remarks on Art by Horatio Greenough*, edited by Harold A. Small. This book contains eight articles selected from the twelve in Tuckerman's edition. Printers'

Greenough's ideas are within the tradition of the Classic Revival. He admired Greek art above all. He contended for Greek principles, not Greek things; however, he believed that the principles underlying Greek architecture were the same as those underlying all great architecture.[66] Three false approaches to architecture are repeatedly criticized by Greenough: eclecticism, forcing the functions of a building into one general form, and adopting an outward shape for the sake of "the eye," association, or fashion. Greenough did not pin his hopes on reason alone; he was not a strict rationalist.[67] His aesthetic is founded on a theological and moral basis.

Elements of the mechanic, moral, and organic analogics are contained in Greenough's writings. He admired the beauty of perfected machines and saw in them an important lesson for architecture.[68] At one point he wrote that buildings "may be called machines." [69]

Greenough believed that the mechanics of the United States had outstripped the artists; the former had emancipated themselves from authority and were producing organic works hence they were closer to the Greek tradition than architects who forced the functions of modern buildings into a Greek mold.[70] The simplicity of the style of the mechanics does not indicate cheapness; it costs the untiring thought of men. As Greenough expressed it, "its simplicity is that of

errors, antique spellings and stylistic particulars have been corrected or altered, the punctuation has been simplified, and some notes have been added. Harold A. Small compiled a bibliography of writings by or about Greenough which he added as an appendix. He omitted F. O. Matthiessen's essay on Greenough in *American Renaissance*, and the portions on Greenough in Albert TenEyck Gardner's *Yankee Stonecutters*. Since the publication of *Form and Function*, additional evaluations of Greenough have appeared which should be added to his bibliography: the article on "Emerson and His Circle," by Schaffer, and the book by Vivian Hopkins, *Spires of Form*.

[66] Greenough, *Form and Function*, pp. 22, 65, 67.
[67] *Ibid.*, pp. 52, 53.
[68] *Ibid.*, p. 59.
[69] *Ibid.*, p. 65.
[70] *Ibid.*, pp. 127, 128.

justness, I had almost said, of justice."[71] Thus even Greenough's statements in praise of mechanical efficiency contain references to organic form and the morality of form. The real basis for Greenough's ideas of beauty is not so much in his admiration of the functional beauty of machines, sailing vessels, the trotting wagon, bridges, or primitive implements such as the South Sea war club, as in the moral qualities exhibited by them and the theological implications of organic form.

The core of Greenough's functionalism is as follows: Beauty is the promise of function made sensuously pleasing by a God-given instinct. Action is the presence of function. Character is the record of function. False beauty and embellishment are types of non-performance.[72] The use of admired forms and models for purposes not contemplated in their invention is a sure sign of social decline.[73]

If the normal development of organized life be from beauty to action, from action to character, the progress is a progress upward as well as forward; and action will be higher than beauty, even as the summer is higher than the spring; and character will be higher than action, even as autumn is the résumé and result of spring and summer. If this be true, the attempt to prolong the phase of beauty into the epoch of action can only be made through nonperformance; and false beauty or embellishment must be the result.

Why is the promise of function made sensuously pleasing? Because the inchoate organic life needs a care and protection beyond its present means of payment. In order that we may respect instinctive action, which is divine, are our eyes charmed by the aspect of infancy, and our hearts obedient to the command of a visible yet impotent volition.

The sensuous charm of promise is so great that the unripe reason seeks to make life a perennial promise; but promise, in the phase of action, receives a new name—that of nonperformance, and is visited with contempt.

[71] *Ibid.*, p. 128.
[72] *Ibid.*, pp. 71, 72, 76, 97.
[73] *Ibid.*, pp. 54, 55.

The dignity of character is so great that the unripe reason seeks to mark the phase of action with the sensuous livery of character. The ivy is trained up the green wall, and while the promise is still fresh on every line of the building, its function is invaded by the ambition *to seem* to have lived.

Not to promise forever, or to boast at the outset, not to shine and to seem, but to be and to act, is the glory of any coördination of parts for an object.[74]

Greenough's strongly moral and social point of view led him to respect Edward Lacy Garbett, but, at the same time, he felt that as long as there was so much cruelty and selfishness it was fruitless to attempt to make buildings which were not an expression of these vices; furthermore, Greenough believed that Garbett thought that embellishment alone was all that was needed to overcome the selfish appearance of a building. This, obviously, was a gross understatement of Garbett's point of view.

Mr. Garbett, in his learned and able treatise on the principles of design in architecture, has dissected the English house and found with the light of two words, fallen from Mr. Emerson, the secret of the inherent ugliness of that structure. It is the *cruelty* and *selfishness* of a London house, he says (and I think he proves it, too), which affects us so disagreeably as we look upon it. Now, these qualities in a house, like the blear-eyed stolidity of a habitual sot, are symptoms, not diseases. Mr. Garbett should see herein the marvelous expression of which bricks and mortar can be made the vehicles. In vain he will attempt to get by embellishment a denial of selfishness, so long as selfishness reigns. To medicate symptoms will never, at best, do more than affect a metastasis—suppress an eruption; let us believe, rather, that the Englishman's love of home has expelled selfishness from the boudoir, the kitchen, and the parlor, nobler organs, and thrown it out on the skin, the exterior, where it less threatens life, and stands only for X, or a desired solution. If I have been clear in what I have said, it will be apparent that the intention, the soul of an organization, will get utterance in the organization in proportion to the means at its disposal: in vain shall you drill the most supple body of

[74] *Ibid.*, pp. 72, 73.

him that hates me into a manifestation of love for me; while my blind and deaf cousin will soon make me feel, and pleasingly feel, that I was the man in all the world that he wished to meet.[75]

According to Greenough, character and expression result from the unflinching adaptation to use and position.[76] Following the line of reasoning Greenough applied in his criticism of Garbett, one would suppose that only moral functions could inspire beauty. We question this supposition when we read Greenough's words: "There is majesty in the royal paw of the lion, music in the motion of the brindled tiger; we accord our praise to the sword and the dagger, and shudder our approval of the frightful aptitude of the ghastly guillotine." [77] These words of Greenough seem to indicate that the *kind* of function had nothing to do with the beauty of a functional organization; it is a matter of function *per se*.[78] The realization of this seems to have troubled Greenough slightly; in his next paragraph he admitted that possibly the word "character" should be substituted for "beauty" to denote the promise of destructive functions. "Conceiving destruction to be a normal element of the system of nature equally with production, we have used the word beauty in connection with it. We have no objection to exchange it for the word character, as indicating the mere adaptation of forms to functions, and would gladly substitute the actual pretensions of our architecture to the former, could we hope to secure the latter." [79] Greenough is not as sure of himself on this point as such eighteenth-

[75] *Ibid.*, pp. 78, 79.

[76] *Ibid.*, p. 62.

[77] *Ibid.*, p. 60.

[78] Compare Greenough's rejection of independent beauty: "To assert that this or that form or color is beautiful *per se* is to formulate prematurely; it is to arrogate godship." *Ibid.*, p. 77.

[79] *Ibid.*, p. 60. Greenough's choice of the word "character" in this connection is unfortunate because, as we have seen, he defined character as the record of function. The use of the expression "mere adaptation of forms to functions," is completely out of the line of Greenough's theory of architecture.

century writers as Hume and Adam Smith, who placed public utility highest in the hierarchy of purpose for which form should be fitted.

Greenough was one of the many writers on art who took part in the long debate on the question of relative or independent beauty. For Greenough, theories of independent or absolute beauty were evil and symptomatic of the devil; all beauty is relative. The only absolute is God's law which all conceivable functions obey. "The approximation to that law in materials, in parts, in their form, color, and relations, is the measure of freedom or obedience to God, in life." [80] Again and again Greenough sought a religious justification of his point of view toward art.

Although moral and religious considerations are prerequisite to an understanding of Greenough's theory of beauty, it was primarily by means of the organic analogy that Greenough illustrated his theory. Greenough called upon the architect to consult nature "in the assurance that she will disclose a mine richer than was ever dreamed of by the Greeks." [81] He believed that the principles of construction can be learned from a study of the skeletons and skins of animals and insects.[82] The fundamental law of nature, the law of adaptation, is also the fundamental law of architecture or any other art. In nature there is no unbending model of form, no arbitrary law of proportion. The many-sided and rich harmony of nature is a many-sided response to the call for many functions.[83] Greenough believed that even the colors of nature illustrate the principle of unflinching adaptation of forms to functions.[84] Everywhere we look

[80] *Ibid.*, p. 85.
[81] *Ibid.*, p. 57.
[82] *Ibid.*, pp. 57, 58.
[83] *Ibid.*, p. 58.
[84] *Ibid.*, pp. 90, 91, 118, 119. Greenough did not prove this; it is largely a matter of faith. "I cannot believe," he wrote with reference to the pearly shell, "that the myriads are furnished, at the depths of the ocean, with the complicated glands and absorbents to nourish those dyes, in order that the hundreds may charm my idle eye as they are tossed in disorganized ruin upon the beach." *Ibid.*, pp. 118, 119.

in nature we see God's utterance; "there is one truth, even as one God, and . . . organization is his utterance." [85]

Greenough regarded the human body as "the most beautiful organization of earth," and drew an analogy between the human frame and architecture. "This stupendous form, towering as a lighthouse, commanding by its posture a wide horizon, standing in relation to the brutes where the spire stands in relation to the lowly colonnades of Greece and Egypt, touching earth with only one-half the soles of its feet—it tells of majesty and dominion by that upreared spine, of duty by those unencumbered hands." [86] Observe that the sculptor-philosopher employs the comparison of architecture with the human figure in order to demonstrate the expressive qualities of the latter. We contrast this with the naïve comparison of physical characteristics of the human body with similar forms in architecture, as, for instance, Vasari's comparison of the mouth with a door and eyes with windows in a façade. In addition to the expressive qualities of the human body, Greenough stressed the beauty of nakedness, the absence of ornament or forms which conceal the truth. "Where is the ornament of this frame? It is all beauty, its motion is grace, no combination of harmony ever equaled, for expression and variety, its poised and stately gait; its voice is music, no cunning mixture of wood and metal ever did more than feebly imitate its tone of command or its warble of love. The savage who envies or admires the special attributes of beasts maims unconsciously his own perfection to assume their tints, their feathers, or their claws; we turn from him with horror, and gaze with joy on the naked Apollo." [87] In nakedness, Greenough beheld "the majesty of the essential instead of the trappings of pretension." [88]

In many passages in Greenough's writings he infers that the ex-

[85] *Ibid.*, p. 74.
[86] *Ibid.*, p. 120.
[87] *Ibid.*, pp. 120, 121.
[88] *Ibid.*, p. 75.

pression of grace, grandeur, majesty, and other qualities which he admired, are to be achieved, not directly, but by paying attention to matters of function. Grace and majesty proclaim the capacity for graceful and majestic functions. Again we find the theological tendency in Greenough's philosophy of art when we read that the work of art has a soul which is at one with its purpose. He wrote: "in art, as in nature, the soul, the purpose of a work will never fail to be proclaimed in that work in proportion to the subordination of the parts to the whole, of the whole to the function." [89]

Greenough did not recommend that the architect study inanimate nature; he avoided reference to it. It seems fair to assume that if the question of the beauty of nature's inanimate forms had been presented to Greenough he would have been forced to deny it, because without life there can be no adaptation of forms to functions. If a landscape possessed beauty it would be because of the living things contained in it, their presence or their creations.

American architecture, on the whole, did not appear to Greenough to illustrate nature's principle of design: the adaptation of forms to functions. He was severely critical of the architecture of Washington.[90] The Yankee farmhouse, which in Greenough's day was not a

[89] *Ibid.*, p. 121.

[90] Portions of Greenough's essays are criticisms of specific buildings in which he applies his theory. He was severe in his criticism of the lack of functionalism in the buildings and landscape architecture in Washington. Criticizing the high-relief sculpture in the tympanum of the Capitol building, he wrote, "it is the translation of rhetoric into stone—a feat often fatal to the rhetoric always fatal to the stone" (*ibid.*, p. 19). Greenough compared the effect of crowding a modern building into the form of a temple (such as Thomas Jefferson's model of the Maison Carrée for the State House at Richmond) to the effect produced by an African king, "standing in mock majesty with his legs and feet bare, and his body clothed in a cast coat of the Prince Regent" (*ibid.*, p. 63). He described Robert Mills's original design for the Washington Monument which was to be an obelisk surrounded at the base by a circular Doric colonnade as "the intermarriage of an Egyptian monument . . . with a Greek structure . . . corrupting and destroying the special beauties and characters of the two elements" (*ibid.*, p. 23). Greenough's criticism of contemporary buildings was

popular type of architecture, appealed to him. He writes of the "Yankee farmhouse which seems to belong to the ground whereon it stands, as the caterpillar to the leaf that feeds him"; doubtless the simile did not seem uncomplimentary to Greenough but was intended as praise.[91] Greenough found in the purer Doric temple confirmation of the doctrine of strict adaptation; even the sculptures of the temple had an organic relation to the functions of the edifice: "they took possession of the worshiper as he approached, lifted him out of everyday life, and prepared him for the presence of the divinity within." [92] Greek temple sculpture was a translation into marble of the theogony and the exploits of the heroes. Greenough pointed out that the simple lines and planes of the Doric temple offered the proper background for these sculptures. "Why, then, those columns uncarved? Why, then, those lines of cornices unbroken by foliages, unadorned by flowers? Why that matchless symmetry of every member, that music of gradation, without the tracery of the Gothic detail, without the endless caprices of arabesque? Because those sculptures *spake*, and speech asks a groundwork of silence and not of babble, though it were of green fields." [93]

The real nature of Greenough's functionalism is disclosed by his admission that there are two legitimate classes of buildings, the organic and the monumental.

> In all remarks upon important public edifices there is a twofold subject under contemplation: first, the organic structure of the works; second, their monumental character. To plant a building firmly on the ground; to give it the light that may, the air that must, be needed; to apportion the spaces for convenience, decide their size, and model their shapes for their functions—these acts organize a building. No college of architects

severely unfavorable, but it was always the result of the consistent application of a few principles in which he sincerely believed.

[91] *Ibid.*, p. 105.

[92] *Ibid.*, p. 123.

[93] *Ibid.*, pp. 123, 124.

is a quorum to judge this part of the task. The occupants alone can say if they have been well served; time alone can stamp any building as solid. The monumental character of a building has reference to its site—to its adaptation in size and form to that site. It has reference also to the external expression of the inward functions of the building—to adaptation of its features and their gradation to its dignity and importance; and it relates, moreover, to that just distinction which taste always requires between external breadth and interior detail.[94]

Later, Greenough restated his classification of architecture.

The edifices in whose construction the principles of architecture are developed may be classed as organic, formed to meet the wants of their occupants, or monumental, addressed to the sympathies, the faith, or the taste of a people. These two great classes of buildings, embracing almost every variety of structure, though occasionally joined and mixed in the same edifice, have their separate rules, as they have a distinct abstract nature. In the former class the laws of stucture and apportionment, depending on definite wants, obey a demonstrable rule. They may be called machines each individual of which must be formed with reference to the abstract type of its species. The individuals of the latter class, bound by no other laws than those of the sentiment which inspires them, and the sympathies to which they are addressed, occupy the positions and assume the forms best calculated to render their parent feeling. No limits can be put to their variety; their size and richness have always been proportioned to the means of the people who have erected them.[95]

Monumental architecture impresses us by its expression of thought and feeling.[96] Michelangelo's Medici mausoleum is cited as an example of a monument expressive of these qualities.[97]

Greenough's classification of architecture into organic and monumental is not well integrated with his definitions of beauty (the promise of function), action (the presence of function), and char-

[94] *Ibid.*, pp. 20, 21.
[95] *Ibid.*, pp. 64, 65.
[96] *Ibid.*, p. 28.
[97] *Ibid.*, p. 29.

acter (the record of function); moreover it runs counter to his statement that embellishment is false beauty. To be consistent, Greenough should have presented a broad interpretation of function which would include the expression of thought and feeling and which would admit painting and sculpture as legitimate aids to architecture in the expression of thought and feeling.

One can only speculate as to the influence of other writers on Greenough besides Emerson and Garbett. Greenough indicated his respect for Schiller, Winckelmann, Goethe, Hegel, and Cooper, but was highly critical of Hogarth, Burke, and Reynolds.[98] Greenough overlooked the points of similarity between his ideas and those of Hogarth. Hogarth, as we have seen, had made fitness for purpose the principal determinant of beauty and expressed great admiration for the fitness and beauty of machines and sailing vessels. Greenough concentrated his criticism of Hogarth to the latter's line of beauty. Burke, whose "characteristics" were criticized by Greenough, regarded fitness as the only proper determinant of good proportion and the basis of the rational pleasure of art. Greenough's criticism of Reynolds was for his alleged suppression of Gainesborough and Wilson. To Greenough, Reynolds was a symbol of the point of view of the Academy, and Greenough was too democratic to approve of academic dictatorship in art. However, there are even points of similarity between Reynolds and Greenough. Reynolds observed the effect of fitness upon the proportions of the human body and tended to equate beauty and nature. Thus, it is entirely possible that Greenough was indebted to these writers whom he criticized so harshly.

Greenough was not a more thoroughgoing functionalist than Weinbrenner, Gwilt, Durand, and Pugin, to mention a few nineteenth-century writers who published many years before Greenough. It is known that Greenough's father dealt in real estate and built

[98] See *ibid.*, pp. 8, 46, 47, 70, 87–95, 97, 98.

some of the houses in Colonnade Row, Boston.[99] Perhaps the bookshelves of this man contained some of the many functionalistic treatises on architecture produced in the eighteenth century and in the first quarter of the nineteenth century. But this is only speculation. It is hoped that some biographer of Greenough will be able to shed more light on his readings.

The terminology of biological, and specifically evolutionary literature appears frequently in the writings of Greenough and indicates his familiarity with at least some books on these subjects. He used the word function or functional in place of fitness. Again and again he illustrated his points by reference to flowers, fruits, birds, and beasts. He wrote of species, adaptation, organic characteristics, and phenomena. However, no direct connection has been established between the idea of functionalism in architecture and the idea of evolution in biology. Biology provided a vocabulary which enriched the expression of the organic analogy, but the biologists did not contribute directly to functionalism in architectural thought. Erasmus Darwin admired the S-curve and other qualities of beauty advanced by Hogarth and Burke; he believed our sense of beauty or agreeableness was derived from the conditions of our suckling experience.[100] Herbert Spencer discussed the problem of use and beauty in *Essays, Scientific, Political and Speculative,* which included magazine articles from the 1840s. Spencer interpreted aesthetic experience as a form of play or outlet for surplus energy not required for survival functions. Spencer came to the conclusion that the integration aspect of the aesthetic experience will be beautiful if it exemplifies the law of economy and efficiency, and yields the maximum of perception to the minimum of effort. But here, Spencer is considering our experience of art, not qualities of art objects; he is considering the vital

[99] *Ibid.*, p. vii.
[100] Logan, *The Poetry and Aesthetics of Erasmus Darwin*, pp. 62–69.

economy of our perception of art: the law of least effort.[101] Neither Erasmus Darwin nor Spencer, two biological philosophers who took up the problem of beauty, found the law of adaptation to be the law of beauty.

It is regrettable that Greenough did not live to develop his ideas more completely; he died at the age of forty-seven. Albert TenEyck Gardner pays this tribute to him:

> After reading his few essays and fragmentary writings on art one begins to feel that in justice Greenough should be classed with that small select company of original minds which America produced in the early nineteenth century. If he had been given a few more years to pursue his theory to its ultimate conclusions, he would surely stand with the other leading American thinkers of the time, with Emerson, Theodore Parker, Thoreau, and Dr. Holmes. Because the Fates dealt peremptorily with him, cutting him off in his prime, because his writings are few, and his ideas not fully developed, are they any the less significant? Are his broad vision and intellectual integrity reduced to trifling because his contemporaries pushed him into oblivion in their blind rush into the horrors of civil war and on into the tawdry corruption of the "Great Barbecue" that followed in the gilded age? [102]

[101] Spencer, *Essays: Scientific, Political and Speculative*, II, 333–374.
[102] Gardner, *Yankee Stonecutters*, p. 41.

RETROSPECT AND PROSPECT

11

We have observed a great variety of functionalist and protofunctionalist interpretations of architecture, extending over a long period of time, varying from the very simple to broad interpretations of function which include the expression of thought and feeling as legitimate functions of monumental architecture.

When seen against the background of history, modern functionalism appears to have new stature; we see its shortcomings more clearly perhaps, but we can see that it is part of a great tradition involving many of the outstanding Western philosophers. It would be utterly unhistorical and illogical to conclude that our survey has revealed a prolonged, intense philosophical preoccupation with the relation of use and beauty, or even to conclude that most thinkers have agreed that there is a direct, positive connection. Until modern times the idea of utility has not been of central importance to aesthetics and aesthetics has not been the center of philosophy, but the roots of the modern aesthetic of utility must be sought in his-

torical philosophy and criticism. Some of the most profound speculation about the relation of use and beauty was accomplished in classical and medieval antiquity, and in the seventeenth and eighteenth centuries.

Functionalism implies a pluralistic, not a monistic, system of values. Functionalist criticism, observed in historical dimension, manifests a tendency to evaluate historical architecture largely in terms of moral, ethical, social, and often metaphysical ultimate values, whereas in evaluating contemporary architecture there is a tendency for the critic to stress primary or immediate values such as economy, ease of circulation, sanitary features, ease of maintenance, or good light and ventilation. But a rich hierarchy of primary and ultimate values is intrinsically connected with the generic concept of function; moreover, the line between immediate and ultimate values is not an impassable barrier. Almost every immediate value may be regarded from a more universal point of view, expanded in application or sublimated until it becomes an ultimate value. What begins as an evaluation of a specific means to a specific, immediate end may develop into a problematic question concerning human values in general, or even into a problem of ultimate values.

Our study has not revealed a clear semasiological development or orderly pattern of changes in the meaning of functionalism, but, on the other hand, the rationale of functionalism has not had an undisciplined, heterogeneous history.

To a large extent the way in which a man presents his case for a functional architecture reflects his view of the world or even his outlook on the universe. This is especially true of his attempts to establish a generalized relationship between architecture and nature. The principles derived from this aspect of the organic analogy reflect one or more of three related beliefs. First, is the belief that divine law operates in all things. Second, is the belief that all nature, from

its humblest manifestations to the universe as a whole, is art, harmony, order, and good. Third, is the belief that nature is the source, end, and test of art. Thus art is interpreted as being subject to the same laws as nature; art is interpreted by nature's standards. The set of beliefs which colored men's view of nature, encouraged them to respect nature and to recognize the futility of denying natural law, to conform to nature rather than run counter to it. This point of view was prevalent during the years *ca.* 1700–1850, but it appears in criticism earlier as with Alberti and Bacon. Although it is largely classical in origin, this viewpoint expresses well the Christian teleological consciousness. Another attitude which stems from this view of nature is an admiration for primitive life and art; this is based on the fact that the primitive is closer to nature than the highly civilized. We have observed that many writers have expressed admiration for the functional beauty of primitive art forms or have felt that civilized architecture should retain primitive simplicity and structural integrity.

The rational view of art is to a large extent responsible for functionalist theory. It has demanded clarity and simplicity. The rational mind looks for order and logic in art as in all things. The rational mind looks upon the familiar objects of existence as exponents of ideas and ideals. Rationalism, especially eighteenth-century rationalism, with its faith in principles, rules, and method, opened the door to the principle of functionalism. Men were confident in God's reasonableness and had faith in the power of man to comprehend God's rational regulations which govern the universe; thus the art critic could state confidently, without scientific verification, that the human form (the great model for art) is the supreme example of fitness for purpose. The rational view of art also led to admiration of technical and physical perfection; there was a tendency to identify beauty with perfection. With the development of perfected ma-

chinery, the rationalist could compare the perfection of art with mechanical perfection, and the idea of efficiency became a criterion of architecture.

The moralistic view of art tended to identify the good, the true, and the beautiful. Problems of beauty were sometimes approached from a rational-moral standpoint, as by Hume and Adam Smith, or from a theological-moral standpoint, as by Pugin, Greenough, and Ruskin.

The related ideas that the beauty, perfection, or chief value of an object, such as a building, depends upon its fitness for use by man, that is to say, the ideas of functionalism, are not the product of the thought of a limited school of men, nor are they by any means of modern origin. Moreover, the constituent ideas of functionalism are part of the perennial Western philosophy of life and architecture which has its roots at least as far back as the dialogues of Socrates.

Functionalism is not the product of any single philosophy or cultural movement. During the period 1700–1850, the industrial revolution, neoclassicism, romanticism, and biological science aided and enriched the expression of functionalist ideas, but functionalist architectural theory was not solely dependent upon any one of these. The vitality of the ideas of functionalism is attested by the fact that they have developed from different milieus; they arose in Greek eudaemonical philosophy, medieval theology, Renaissance humanism, Baroque science and scepticism, eighteenth-century rationalism, idealism, and utilitarianism, the romantic view of art and nature, and from nineteenth-century transcendentalism. Functionalist ideas appear in the writings of protagonists of *architecture parlante*, associationists, and even in the literature of the picturesque. Today, functionalism flourishes in an age of scientific technology and numerous conflicting philosophies.

We have seen that advocates of functional architecture generally applied mechanical, organic, and moral standards to architecture;

there is either directly stated or at least implied an analogy between architecture and the machine, the organism, or the moral being. Architecture is expected to possess some of the special qualities of each. The principal value of an analogy is to communicate an idea, not to demonstrate it. An analogy may be valid in one case but not in another; therefore it should be used with care. An analogy is rightly a kind of shorthand description of something. It helps one to conceive of certain relationships otherwise obscure. An analogy is a tool not a rule; it is illogical to use the analogy as a standard of judgment. In the long run, the validity of functionalism will be determined, not by the mere analogy, but by the general acceptability of the architectural qualities put forth in the name of the analogy.

With the development of our modern biological vocabulary, designers and critics increasingly thought about architecture in terms of functional adaptation. Now it is patently obvious that architecture, despite the fact that it possesses some characteristics in common with organisms, is an inert thing incapable of adaptation. The expression functional adaptation, therefore, if it is to have any validity beyond that of analogy, must be reserved to describe or interpret the creative process and the use to which architecture is put instead of architecture as an end product.

Adjustment may be a simple fragment of experience, but adaptation is a complex process which defies analysis. While adaptation may take place within circumscribed limits, it has an impact upon and finds fulfillment in the total environment. Even the simplest act of adaptation of a single organism is part of a cosmic process. At the human level, adaptation is largely an intelligent social process rather than purely instinctive or individual. We draw upon past experience in an active, creative process which considers the results of present decisions in a future which is to a large extent predictable as well as mysterious. A knowledge of history and a concern for the future are particularly important to a person engaged in the fine arts because

the arts are the embodiment of enduring values. In essence, functional adaptation is a group process without beginning or end. Individual acts of adaptation can be identified but these are usually temporary and not transmitted to the group, whereas the form of the individual depends upon and is modified by what the group needs to survive and flourish. The best adaptation is, therefore, a significantly creative contribution to the general welfare, the good life. This includes man's need for education and inspiration, for sheer delight and moments of prayer and contemplation; it includes the needs of the individual, localized groups, the culture, and mankind. Thus we see that man creates and uses architecture, like all art and science, in the general process of adaptation which characterizes human life, but there is no conceivable limit to the potentiality of creative adaptation.

We have seen that historical functionalist and protofunctionalist concepts have in large measure developed from attempts to clarify and explain the idea of relative beauty. We recall that Plato introduced the distinction between absolute and relative beauty in order to distinguish between the divine idea of beauty and the inferior beauty of particular objects created by man which participate more or less imperfectly in the idea. A characteristic Renaissance interpretation of beauty was a kind of absolute beauty expressed as taste (*gusto*), a subtle, felt response, a prerogative of the cultured gentleman, upon which the discernment and appreciation of beauty depends. Later, especially *ca.* 1700–1850, the question of absolute or relative beauty figured prominently in writings of critics and philosophers. The coexistence of the two types was often agreed upon, but it remained a matter of considerable controversy to define each type clearly and assign to each its due emphasis. Absolute beauty was sometimes based on purely formal rules, arithmetical ratios, geometrical configurations, or the *je ne sais quoi* of pure emotion or taste. Relative beauty was usually defined along Aristotelian lines

with frequent reference to organic concepts, ideas of morality and fitness for purpose.

The old controversy over the absolute or relative nature of beauty which brought forth many of the ideas of functionalism finds modern parallels in the field of psychology. Absolute beauty and pure taste find their modern psychological counterparts in pure aesthetic feeling and pure perception as the bases for the judgment of beauty. A minority but not insignificant school of psychologists maintains that perception is innate or autochthonous (absolute) rather than learned or derived (relative). The hedonic theory of psychology interprets human behavior in terms of pleasantness-unpleasantness responses. There is a hedonic approach to modern aesthetics. Isolated tones, colors, and forms are investigated and statistics compiled as to pleasantness-unpleasantness responses of large numbers of tested observers. Results are examined for correlation and evidence of sustained preference for particular tones, colors, and forms. There is some evidence of uniformity of responses which indicates the absolute nature of what may be called the beauty of simple tones, colors, and forms. There have been very few experiments of this statistical kind with complex objects or objects rich in meaning; data which have been gathered show great individuality of responses rather than uniformity. What uniformity of pleasant aesthetic responses has been experimentally observed for complex, meaningful wholes seems to be due to comparison with nature and such deviations from nature as have moral and ethical justification or social approval. This is an indication of the relative nature of the beauty of meaningful complexity.

I do not wish to place too much emphasis upon the findings of modern psychology briefly sketched above; I have merely introduced them as a kind of footnote to our consideration of fitness as the basis of relative beauty. The results of scientific experiments are as yet inconclusive. Except for the Gestalt and Freudian schools, modern

psychology has paid little attention to aesthetic perception. Problems of aesthetics have been approached statistically rather than from the point of view of process. Modern psychology has not formulated principles of human behavior in which to develop the idea of aesthetic perception in its complete and rightful context.

It is evident that fitness of form for purpose is one of the established historical criteria of critical judgment not only in the field of architecture but in all the arts. We must hasten to distinguish between design for use in the prosaic sense, viz., immediate practical utility, and design in the sense of purposeful, controlled form. All of the arts may work together with a common purpose. Only an extreme functionalist demands the absolute rejection of applied or integrated painting and sculpture. What is unnecessary is not necessarily unfunctional; it can have value and purpose, and add to the practical utility of an object by making it more comprehensible in form and use, or help to establish in the mind of the user appropriate ideas and emotions to complement the function of the object or celebrate and facilitate its use.

Purpose, when thought of as the *idea* of the artist, the *substance* of art, permits the extension of functionalism as a concept to all forms of art and offers almost limitless possibilities for application. There are modern functionalists who do not permit such a broad interpretation of purpose. They think in terms of architecture, refrigerators, lamps, chairs, and the like, and insist on limiting purpose to the efficient and hygienic satisfaction of man's immediate practical needs. The latter is often the controlling idea of the architect or engineer; all decisions as to material and form are governed by it. This extreme form of functionalism is one manifestation of the principle of purposeful design. It is negative in the sense that it is what is left after other values are eliminated from the generic concept of purpose, but it is positive in that it represents a new emphasis upon values which seem to be characteristic of our age and which have

contributed to the formation of a basis for the development of a new style. Between the extreme form of functionalism and the generic principle of purpose there are many degrees of deviation, many shades of opinion, and the study we have just concluded has served to define the extent to which writers down through Western history have assumed one functionalist position or another and rationalized their positions. I believe my readers will agree with me when I observe that, historically, functionalist trends in writings pertaining to architecture show considerable variety of expression and profundity of interpretation.

Functionalism is in our midst. Scarcely a month passes without the publication of some article in one of the architectural periodicals containing critical remarks, pro and con, pertaining to functionalism. It seems likely that a general idea, such as functionalism, which permits a variety of individual interpretations, will continue to inspire men. Doubtless there are persons who will have nothing whatsoever to do with any of the ideas associated with functionalism, but it is much more common to find elements of functionalism appearing in the philosophies of men who would not care to be labeled "functionalist." There is so much involved in functionalism that it is impossible to make it a partisan issue and draw a sharp line between those who are for it and those who are against it. The problem is to interpret functionalism broadly, so that it will inspire rather than restrict its protagonists and provide a sound basis for worthy creative expression.

Architecture is one of the many interrelated arts of mankind. There are many classes or categories of legitimate criteria for the evaluation of art and a great variety of interpretations within each category. The criterion of fitness, itself open to a variety of interpretations, may be linked with other criteria and go forward with added strength rather than suffer by competitive coexistence. The study of the history of functionalism awakens us to the fact that this can be done,

for it has been done at least in so far as the criteria of fitness for purpose has been related at one time or another to criteria of technique, mechanical efficiency, organic form, imitation, morality, style, character, logic, originality, appropriateness, order, expression, health, personality fulfillment, social value, symbolism, economy, monumentalism, empathy, and religion. The extent of the relationships between fitness for purpose and the criteria for the evaluation of art previously set forth has by no means been exhausted by historic or modern treatises, moreover, there may be connections between functionalism and other criteria hitherto unobserved or only faintly drawn, which may be developed by future writers.

The mere acceptance of functionalism guarantees nothing. It provides principles of convincing validity but not ready-made solutions. All this is obvious and inherent in the nature of an aesthetic. What is probably more important, the acceptance of functionalism opens the door to an enthusiasm of inestimable inspirational value, an enthusiasm for the potentiality of artistic-scientific technology. Functionalism is the only aesthetic which frankly accepts the world of technology as an important part of the pattern of culture. Today it may well indeed be the most important part. It may seem naïve to allow thoughts about engineering, machinery, and other aspects of technology to dominate architecture or any other art, but the most profound implications of this relationship have by no means been fully expressed. Moreover, it takes a measure of naïveté to get things done.

Technology in building construction has advanced rapidly without a noticeable widespread improvement in architectural design. It seems likely that the best way to advance architectural design to a position of equality with scientific technology is to join forces with it and help to direct it to the service of humanity. The machine is often associated with brutality and the whole world of technology comes dangerously close to this association. Functionalism, at its

best, has nothing to do with brutality and the inhumane. The right kind of functionalist design will not only exploit technology to its fullest but it will humanize it. This is perhaps the greatest need of our age. The best functionalists are not only inspired by technology, they are determined to exploit it in a great effort to make humanity more humane. It is not only technology in and for itself which elicits their enthusiasm, but technology as an expression of genius and for its potential as well as actual contributions to the betterment of life.

BIBLIOGRAPHY

Alberti, Leon Battista. *The Architecture of Leon Battista Alberti.* Trans. into Italian by Cosimo Bartoli and into English by James Leoni. London, Thomas Edlin, 1726. 3 vols.

Alison, Archibald. *Essays on the Nature and Principles of Taste.* Ed. Abraham Mills. New York, Harper and Brothers, 1850.

Allen, B. Sprague. *Tides in English Taste (1619–1800).* Cambridge, Harvard University Press, 1937. 2 vols.

Aristotle. *Aristotle's Theory of Poetry and the Fine Art,* with a critical text and a translation of *The Poetics* by Samuel Henry Butcher. London and New York, Macmillan and Co., 1895.

——— *The Politics of Aristotle.* Trans. into English by Benjamin Jowett. Oxford, Clarendon Press, 1885. 2 vols.

Bacon, Francis. *Essays, Advancement of Learning, New Atlantis, and Other Pieces.* Ed. Richard Foster Jones. New York, The Odyssey Press, 1937.

——— *The Works of Francis Bacon.* London, 1824. 10 vols.

Bate, Walter Jackson. *From Classic to Romantic, Premises of Taste in Eighteenth-Century England.* Cambridge, Harvard University Press; London, Geoffrey Cumberlege, Oxford University Press, 1946.

Behrendt, Walter Curt. *Modern Building, Its Nature, Problems and Forms.* New York, Harcourt Brace and Company, 1937.

Berenson, Bernhard. *The Venetian Painters of the Renaissance.* New York and London, G. P. Putnam's Sons, 1911. 3d ed.

Berkeley, George. *The Works of George Berkeley*. Ed. Alexander Campbell Fraser. Oxford, Clarendon Press, 1901. 4 vols.

Berman, Eleanor Davidson. *Thomas Jefferson Among the Arts, An Essay in Early American Esthetics*. New York, Philosophical Library, 1947.

Birnstingl, H. J. *Sir John Soane*. London, Ernest Benn Ltd., 1925.

Blondel, François. *Cours d'architecture enseigné dans l'Académie royale d'architecture*. Paris, Lambert Roulland, 1675–83. 3 vols.

——— *Nouvelle manière de fortifier les places*. La Haye, 1684.

Blondel, Jacques-François. *Cours d'architecture, ou Traité de la décoration, distribution et construction des bâtiments*. Paris, Desaint, 1771–77. 9 vols.

Blunt, Anthony. *Artistic Theory in Italy, 1450–1600*. Oxford, The Clarendon Press, 1940.

Boffrand, Germain. *Livre d'architecture*. Paris, Guillaume Cavelier père, 1740.

Brackenridge, Hugh Henry. *Modern Chivalry*. Ed. by Claude M. Newlin. New York, American Book Company, 1937.

Bradbury, Ronald. *The Romantic Theories of Architecture, in Germany, England, and France*. New York, The Dorothy Press, 1934.

Bragdon, Claude Fayette, Ralph Adams Cram, and Thomas Hastings. *Six Lectures on Architecture*. Chicago, published for the Art Institute of Chicago by the University of Chicago Press, 1917.

Brion, Marcel, "Un précurseur de l'architecture moderne, Claude-Nicolas Ledoux," *Beaux-Arts*, January 22, 1937, 3, 4.

Briseux, Charles-Étienne. *Traité du beau essentiel dans les arts*. Paris, 1752. 2 vols.

Brown, Glenn, "Letters from Thomas Jefferson and William Thornton, Architect, Relating to the University of Virginia," *Journal of the American Institute of Architects*, I (January, 1913), 21–27.

Burke, Edmund. *A Philosophical Inquiry into the Origin of Our Ideas of the Sublime and Beautiful with an Introductory Discourse Concerning Taste*. Ed. Abraham Mills. New York, Harper and Brothers, 1860.

Butcher, Samuel Henry. *Aristotle's Theory of Poetry and Fine Art*, with a critical text and a translation of *The Poetics*. London, New York, Macmillan and Company, 1895.

Caffin, Charles Henry. *How to Study Architecture*. New York, Tudor Publishing Company, 1937.

Callahan, Leonard. A *Theory of Aesthetic According to the Principles of St. Thomas Aquinas*. Washington, D. C., The Catholic University of America, 1927.

Carpenter, Rhys. *The Aesthetic Basis of Greek Art*. New York, Bombay, and Calcutta, Longmans, Green and Company, 1921.

Chambers, Frank Pentland. *The History of Taste, An Account of the Revolutions of Art Criticism and Theory in Europe*. New York, Columbia University Press, 1932.

Chapman, Emmanuel. *Saint Augustine's Philosophy of Beauty*. ("Saint Michael's Medieval Studies," Monograph Series.) New York and London, Sheed and Ward, 1939.

Clark, Sir Kenneth McKenzie. *The Gothic Revival, An Essay in the History of Taste*. London, Constable and Company Ltd., 1928; New York, Scribner, 1929.

——— "Ornament in Modern Architecture," *The Architectural Review*, XCIV (December, 1943), 147–150.

Coleridge, Samuel Taylor. *Biographia Literaria*. Ed. J. Shawcross. London, Oxford University Press, 1907. 2 vols.

——— *Coleridge's Essays and Lectures on Shakespeare*. London, J. M. Dent and Company; New York, E. P. Dutton and Company, 1907 (Everyman's Library, edited by Ernest Rhys).

Cordemoy, Abbé J.-L. de. *Nouveaux traité de toute l'architecture*. Paris, Coignard, 1706.

Cram, Ralph Adams, Claude Fayette Bragdon, and Thomas Hastings. *Six Lectures on Architecture*, Chicago, published for the Art Institute of Chicago by the University of Chicago Press, 1917.

De Honecort, Wilars (Villard d'Honnecourt). *Facsimile of the Sketchbook of Wilars De Honecort*. Trans. and reedited from the edition of Lassus and Quicherat by the Rev. Robert Willis. London, John Henry and James Parker, 1859.

Demetrius Phalereus. *On Style*, together with Aristotle's *Poetics* and Longinus, *On the Sublime*. English translation by W. Rhys Roberts, Classical Library, London, William Heinemann Ltd.; New York, G. P. Putnam's Sons, 1927.

De Wulf, Maurice. *History of Medieval Philosophy*. Trans. P. Coffey. New York, Bombay, and Calcutta, Longmans, Green and Company, 1909, 3d ed.

Dinsmoor, William Bell. *The Literary Remains of Sebastiano Serlio.* Reprinted from *The Art Bulletin,* XXIV (June, 1942). New York, 1942.

Donaldson, Thomas Leverton. *Preliminary Discourse on Architecture.* London, University College, 1842.

Downing, Andrew Jackson. *Cottage Residences, or A Series of Designs for Rural Cottages and Cottage-Villas.* New York and London, Wiley and Putnam, 1842.

Durand, Jean-Nicolas-Louis. *Précis des leçons d'architecture données à l'École Polytechnique.* Paris, Bernard et l'auteur, 1802–5. 2 vols.

Egbert, Donald D., "The Idea of Organic Expression," in *Evolutionary Thought in America,* edited by Stow Persons, New Haven, Yale University Press, 1950, pp. 336–97.

Emerson, Ralph Waldo. *The Complete Works of Ralph Waldo Emerson.* Ed. by Edward Waldo Emerson. Cambridge, Riverside Press, 1903–4. Vol. V, *English Traits.*

——— *Journals of Ralph Waldo Emerson.* Ed. by Edward Waldo Emerson and Waldo Emerson Forbes. Boston and New York, Houghton, Mifflin Company, 1904–14. Vol. III (1833–1835).

——— "Thoughts on Art, January 1841," in *Uncollected Writings,* New York, The Lamb Publishing Company, 1912, pp. 43–47.

Fergusson, James. *An Historical Inquiry Into the True Principles of Beauty in Art, More Especially With Reference to Architecture.* London, Longmans, Brown, Green and Longmans, 1849.

Fletcher, Donald Atkinson. *Introduction to Architectural Design.* New York, 1947.

Fonsegrive, G., "Abbé Charles Batteux," in *La Grande Encyclopédie.* Paris, Societé Anonyme de la Grande Encyclopédie, n.d., V, 842, 843.

Galiani, Berardo (Marchese). *L'architettura di M. Vitruvio Pollione.* Naples, 1758.

Gallagher, (Mrs.) H. M. Pierce. *Robert Mills, Architect of the Washington Monument, 1781–1855.* New York, Columbia University Press, 1935.

Gandy, Joseph. *Designs for Cottages, Cottage Farms, and Other Rural Buildings.* London, John Harding, 1805.

——— *The Rural Architect, Consisting of Various Designs for Country*

Buildings Accompanied with Ground Plans, Estimates, and Descriptions. London, John Harding, 1806.

Garbett, Edward Lacy. *Rudimentary Treatise on the Principles of Design in Architecture as Deducible from Nature and Exemplified in the Works of the Greek and Gothic Architects.* (No. 18 in Weale's Rudimentary Series.) London, John Weale, 1850.

Gardner, Albert TenEyck. *Yankee Stonecutters.* New York, Columbia University Press, 1945.

Giedion, Sigfried. *Space, Time and Architecture.* Cambridge, Harvard University Press; London, H. Milford, Oxford University Press, 1942.

Gode–von Aesch, Alexander. *Natural Science in German Romanticism.* New York, Columbia University Press, 1941.

Goethe, Johann Wolfgang. *Goethe's Literary Essays.* Trans. and ed. by J. E. Spingarn. New York, Harcourt, Brace and Company, 1921.

——— *Goethe's Opinions.* Trans. by Otto von Wenckstern. London, John W. Parker and Son, 1853.

Greenough, Horatio. *Form and Function, Remarks on Art by Horatio Greenough.* Ed. by Harold A. Small. Berkeley and Los Angeles, The University of California Press, 1947.

Grimm, Herman, "Schinkel," in *Zehn Ausgewählte Essays zur Einführung in das Studium der Modernen Kunst.* Berlin, Ferdinand Dümmler, 1871, pp. 320–346.

Grisebach, August. *Karl Friedrich Schinkel.* ("Deutsche Meister" Series, ed. by Karl Schleffler and Curt Glaser.) Leipzig, Im Insel Verlag, 1924.

Gaudet, Julien. *Éléments et théorie de l'architecture.* Paris, Libraire de la Construction moderne, 1901–3. 3 vols.

Gwilt, Joseph. *An Encyclopaedia of Architecture, Historical, Theoretical, and Practical.* Rev. by Wyatt Papworth. London, New York, and Bombay, Longmans, Green, and Company, 1899.

——— "St. Paul's Cathedral," in *Illustrations of the Public Buildings of London,* ed. by J. Britton and A. C. Pugin. London, J. Taylor, 1825–28, 2 vols., I, 1–26.

Halfpenny, William. *A New and Compleat System of Architecture Delineated.* London, John Brindley, 1749.

——— *Practical Architecture.* London, Thomas Bowles, 1730. 5th ed.

——— *Useful Architecture.* London, Robert Sayer, 1752.

Hamlin, Talbot Faulkner. *Architecture Through the Ages*. New York, G. P. Putnam's Sons, 1940.

——— *Benjamin Henry Latrobe*. New York and London, Oxford University Press, 1955.

——— *Greek Revival Architecture in America*. London, New York, and Toronto, Oxford University Press, 1944.

Hastings, Thomas, Claude Fayette Bragdon, and Ralph Adams Cram. *Six Lectures on Architecture*. Chicago, published for the Art Institute of Chicago by the University of Chicago Press, 1917.

Hirschfeld, P., "Weinbrenner," in Ulrich Thieme and Felix Becker, *Allgemeiner Lexikon der Bildenden Künstler*. Ed. by Hans Vollmer, Leipzig, E. A. Seeman (1942), XXXV, 288–290.

Hogarth, William. *The Analysis of Beauty*. London, Samuel Bagster, n.d.

Home, Henry (Lord Kames). *Elements of Criticism*. Edinburgh, John Bell, 1785. 6th ed.

Hooker, Richard. *The Works of that Learned and Judicious Divine Mr. Richard Hooker*. Ed. by Rev. John Keble. Oxford, Clarendon Press, 1888. 7th ed., revised. 3 vols.

Hopkins, Vivian C. *Spires of Form, A Study of Emerson's Aesthetic Theory*. Cambridge, Harvard University Press, 1951.

Howard, William Guild, ed. *Laokoön: Lessing, Herder, Goethe*. New York, Henry Holt and Company, 1910.

Hume, David. *The Philosophical Works of David Hume*. Edinburgh, printed for Adam Black, William Tait, and Charles Tait, London, 1826. 4 vols.

Hutcheson, Francis. *An Inquiry into the Original of Our Ideas of Beauty and Virtue*. Glasgow, Robert and Andrew Foulis, Printers to the University, 1772. 4th ed.

Johansson, Gotthard. *Funktionalismen i Verklighten*. Stockholm, Albert Bonniers, 1931.

Johnson, Philip. *Machine Art*. New York, W. W. Norton and Co., 1934.

Kallen, Horace M. *Art and Freedom*. New York, Duell, Sloan, and Pearce, 1942. 2 vols.

Kaufmann, Emil, "At an Eighteenth-Century Crossroads: Algarotti vs. Lodoli," *Journal of the Society of Architectural Historians*, IV (April, 1944), 23–29.

——— "Claude-Nicolas Ledoux, Inaugurator of a New Architectural

System," *Journal of the Society of Architectural Historians,* III (July, 1943), 12–20.

——— *Von Ledoux bis Le Corbusier.* Vienna and Leipzig, Dr. Rolf Passer, 1933.

——— "Three Revolutionary Architects," *Transactions of the American Philosophical Society,* Vol. XL, Part 3 (1952).

Kennedy, Robert Woods, "Form, Function and Expression," *Journal of the American Institute of Architects,* XIV (November, 1950), 198–204.

Kimball, Fiske, "Benjamin Henry Latrobe," in *Dictionary of American Biography.* Ed. by Dumas Malone, New York, Charles Scribner's, 1933, 21 vols., XI, 20–25.

——— and George Harold Edgell. *A History of Architecture.* (Harper's Fine Arts Series, ed. by George Henry Chase.) New York and London, Harper and Brothers, 1918.

Knight, Richard Payne. *An Analytical Inquiry into the Principles of Taste.* London, T. Payne and J. White, 1808. 4th ed.

Kouwenhoven, John Atlee. *Made in America.* Garden City, New York, Doubleday and Company, 1948.

Kubler, George. *Mexican Architecture of the Sixteenth Century.* New Haven, Yale University Press, 1948. 2 vols.

Lafever, Minard. *The Young Builder's General Instructor.* Newark, W. Tuttle and Company, 1829.

Lao Tzu. *Tao Teh King.* Trans. by Isabella Mears. London, Theosophical Publishing House, 1922.

Laugier, Marc Antoine. *Essai sur l'architecture.* Paris, Duchesne, 1755. Rev. ed.

——— *Observations sur l'architecture.* La Haye, Desaint, 1765.

Le Clerc, Sébastien. *Traité d'architecture.* Paris, P. Giffart, 1714. 2 vols.

Le Corbusier [Charles Édouard Jeannert-Gris]. *Towards a New Architecture.* Trans. by Frederick Etchells. New York, Payson and Clarke, 1927.

Ledoux, Claude-Nicolas. *L'architecture considerée sous le rapport de l'art, des moeurs et de la législation.* Paris, Lenoir, 1847. 2 vols.

Le Muet, Pierre. *Manière de bien bâtir pour toutes sortes de personnes.* Paris, 1633.

Leonardo da Vinci. *Leonardo da Vinci's Note-books.* Ed. and trans. by

Edward McCurdy. New York, Empire State Book Company, 1935.

——— *The Literary Works of Leonardo da Vinci.* Ed. by Jean Paul Richter and Irma A. Richter. London, New York and Toronto, Oxford University Press, 1939. 2d ed., revised and enlarged. 2 vols.

Lescaze, William Howard. *On Being an Architect.* New York, G. P. Putnam's Sons, 1942.

Lethaby, William Richard. *Architecture, an Introduction to the History and Theory of the Art of Building.* New York, H. Holt and Company, 1912.

——— *Form in Civilization.* London, Oxford University Press, 1922.

Logan, James Venable. *The Poetry and Aesthetics of Erasmus Darwin.* Princeton, Princeton University Press, 1936.

Longinus [Dionysius Cassius Longinus]. *On the Sublime,* together with Aristotle, *Poetics,* and Demetrius, *On Style.* Trans. by W. Hamilton Fyfe. Classical Library, London, William Heinemann Ltd.; New York, G. P. Putnam's Sons, 1927.

Loos, Adolf. *Die Schriften von Adolf Loos.* Innsbruck, Brenner, 1931–1932. 2 vols.

Lurçat, André. *Architecture, les Manifestations de l'esprit contemporain.* Paris, Au Sans Pareil, 1929.

——— *Projets et réalisations.* Paris, Vincent, Fréal et Cie, 1929.

Mâle, Émile. *Religious Art in France, XIII Century, A Study in Medieval Iconography and Its Sources of Inspiration.* Trans. from the 3d ed. by Dora Nussey. London, J. M. Dent and Sons Ltd.; New York, E. P. Dutton and Company, 1913.

Maritain, Jacques. *Art and Scholasticism, with Other Essays.* Trans. by J. F. Scanlan. New York, Charles Scribner's Sons, 1930.

Matthiessen, F. O. *American Renaissance, Art and Expression in the Age of Emerson and Whitman.* London, Toronto, and New York, Oxford University Press, 1941.

Milizia, Francesco. *The Lives of Celebrated Architects, Ancient and Modern.* Trans. by Mrs. Edward Cresy. London, J. Taylor, 1826. 2 vols.

Moreux, J.-Ch. *Claude-Nicolas Ledoux.* (Les Architectes Français—I, ed. by Marcel Raval.) Paris, Arts et métiers graphiques, 1946.

Morris, William. *The Decorative Arts.* Boston, Roberts Brothers, 1878.

Mumford, Lewis, "Function and Expression in Architecture," *Architectural Record,* CX (November, 1951), 106–12.

Newcomb, Rexford. *Outlines of the History of Architecture*. New York, John Wiley and Sons; London, Chapman and Hall, 1939. Part IV.

Noël [?], "Abbé Charles Batteux," in *Biographie Universelle Ancienne et Moderne*, nouvelle édition. Ed. by A. Thoisnier Desplaces, Paris, Michaud, 1843, III, 265–67.

Palladio, Andrea. *The Architecture of A. Palladio in Four Books*. Trans. and ed. by Giocomo Leoni. London, 1742. 2 vols.

Panofsky, Erwin, "The History of the Theory of Human Proportions as a Reflection of the History of Styles," in *Meaning in the Visual Arts*. Garden City, Doubleday Anchor, Doubleday and Company, 1955, pp. 55–107.

Parker, De Witt Henry. *The Analysis of Art*. New Haven, Yale University Press; London, Oxford University Press, 1926.

Perrault, Claude. *A Treatise of the Five Orders of Columns in Architecture*. Trans. by John James. London, 1708.

Pevsner, Nikolaus. *The Pioneers of the Modern Movement, from William Morris to Walter Gropius*. New York, Frederick A. Stokes Company, 1937.

Plato. *The Dialogues of Plato*. Trans. by Benjamin Jowett. New York, Liverwright, 1926.

Plinius Secundus, C. *The Elder Pliny's Chapters on the History of Art*. Trans. by K. Jex-Blake. London, Macmillan and Company Ltd.; New York, The Macmillan Company, 1896.

Pope, Alexander. *The Poetical Works of Alexander Pope*. Ed. by Rev. H. E. Cary. London and New York, Routledge, Warne, and Routledge, 1861.

Pugin, Augustus Welby Northmore. *An Apology for the Revival of Christian Architecture in England*. London, J. Weale, 1843.

——— *Contrasts, or A Parallel Between the Noble Edifices of the Fourteenth and Fifteenth Centuries and Similar Buildings of the Present Day Shewing the Present Decay of Taste*. London, 1836.

——— *The True Principles of Pointed or Christian Architecture*. London, Henry G. Bohn, 1853.

Quatremère de Quincy, Antoine Chrysostôme. *Essay on the Nature, the End, and the Means of Imitation in the Fine Arts*. Trans. by J. C. Kent. London, Smith, Elder, and Company, 1837.

Raval, Marcel Hubert. *Claude-Nicolas Ledoux, 1736–1806*. Commen-

taires, cartes, et croquis de J.-Ch. Moreux, Paris, Arts et Métiers Graphiques, 1946.

Rave, P. O., "Karl Friedrich Schinkel," in Ulrich Thieme and Felix Becker, *Allgemeiner Lexikon der Bildenden Künstler*. Ed. by Hans Vollmer, Leipzig, E. A. Seeman (1936), XXX, 80.

Reynolds, Sir Joshua. *Discourses Delivered to the Students of the Royal Academy*. With introduction and notes by Roger Fry. London, Seeley and Company Ltd., 1905.

Roos, Frank J. *Writings on Early American Architecture*. Columbus, The Ohio State University Press, 1943.

Rosenau, Helen, "Boullée, Architect-Philosopher: 1728–1799," *The Architectural Review*, CXI (June, 1952), 397–402.

Ruskin, John. *The Works of John Ruskin*. Library Edition. Ed. by E. T. Cook and Alexander Wedderburn. London, George Allen; New York, Longmans, Green, and Company, 1903. 39 vols.

Sartoris, Alberto. *Gli Elementi dell' Architettura Funzionale*. Milano, Hoepli, 1935.

Scamozzi, Vicenzo. *Oeuvres d'Architecture de Vincent Scamozzi*. Leyden, 1713.

Schaffer, Robert B., "Emerson and His Circle: Advocates of Functionalism," *Journal of the Society of Architectural Historians*, VII (July–December, 1948), 17–20.

Schelling, Friedrich Wilhelm Joseph von. *The Philosophy of Art, An Oration on the Relations between the Plastic Arts and Nature*. Trans. by A. Jackson. London, John Chapman, 1845.

Schlegel, Frederick von. *The Aesthetic and Miscellaneous Works of Frederick von Schlegel*. Trans. by E. J. Millington. London, Bohn, 1849.

Schlosser, Julius, Ritter von. *Die Kunstliterature, Ein Handbuch zur Quellenkinde der Neuren Kunstgeschichte*. Vienna, A. Schroll, 1924.

Schwegler, Albert. *Handbook of the History of Philosophy*. Trans. and ann. by J. H. Stirling. Edinburgh and London, Oliver and Boyd, *ca.* 1871. 3d ed.

Scott, Geoffrey. *The Architecture of Humanism*. Boston, Houghton Mifflin Company, 1914.

Semper, Gottfried. *Der Stil in den technischen und tektonischen Künsten,*

oder praktische Ästhetik. Munich, Friedrich Bruckmann, 1878. 2 vols.

Serlio, Sebastiano. *Extraordinario libro*. Vince, 1557.

——— *Il primo quinto libro d'architettura*. Paris, 1545–1547.

Sfacllos, Charalambos. *Le Fonctionnalisme dans l'Architecture Contemporaine*. Paris, Vincent, Fréal et Cie, 1952.

Shaftesbury, Anthony Ashley Cooper, third earl of. *Inquiry Concerning Virtue*. London, Toland, 1699.

——— *Miscellaneous Reflections on the Preceding Treatises and Other Critical Subjects*. London, 1711. (Added as a third volume to the two volumes of collected essays entitled *Characteristics of Men, Manners, Opinions, Times*.)

Smith, Adam. *The Theory of Moral Sentiments*. Ed. by Dugald Stewart. London, G. Bell and Sons, Ltd., 1911.

Smith, Norman Kemp. *The Philosophy of David Hume*. London, Macmillan and Company Ltd., 1941.

Soane, Sir John. *Lectures on Architecture*. Ed. by Arthur T. Bolton. (Publication of Sir John Soane's Museum, No. 14.) London, Jordan-Gaskell, 1929.

Spencer, Herbert. *Essays: Scientific, Political, and Speculative*. Library Edition. London and Edinburgh, Williams and Norgate, 1891. 3 vols.

Stephen, Leslie, "Archibald Alison," in *Dictionary of National Biography*, London, Smith, Elder, and Company, I, 286, 287.

Suger, Abbot. *On the Abbey Church of St.-Dénis and Its Art Treasures*. Ed. trans. and ann. by Erwin Panofsky. Princeton, Princeton University Press, 1946.

Sullivan, Louis Henry. *The Autobiography of an Idea*. New York, Press of the American Institute of Architects, 1924.

——— *Kindergarten Chats*. Lawrence, Kansas [?], Scarab Fraternity Press, 1934.

——— *Kindergarten Chats*. New York, Wittenborn, Schulz, 1947. Rev. 1918.

——— *A System of Architectural Ornament According with a Philosophy of Man's Powers*. New York, Press of the American Institute of Architects, 1924.

Summerson, John Newenham. *Heavenly Mansions and Other Essays on Architecture*. London, Cresset Press, 1949.

Tamms, Friedrich, "Schinkels Bedeutung für die Entwicklung der neuen Baukunst," *Die Baugilde*, Berlin, XIII (1931, Heft 5), 385–95.

Tanzer, Helen H. *The Villas of Pliny the Younger*. New York, Columbia University Press, 1924.

Taut, Bruno. *Modern Architecture*. London, The Studio; New York, Albert and Charles Boni, 1929.

Thompson, D'Arcy Wentworth. *On Growth and Form*. Cambridge, University Press, 1917.

Thoreau, Henry David. *Walden or Life in the Woods*. (Everyman's Library, edited by Ernest Rhys.) London and Toronto, J. M. Dent and Sons Ltd.; New York, E. P. Dutton and Company, 1927.

Ulrich, Cynthia, "Form versus Function," *Vassar Journal of Undergraduate Studies*, XI (May, 1938), 50–61.

Van De Velde, Henri. *Der Neue Stil in Frankreich*. Berlin, Ernst Wasmuth, 1925.

Vasari, Giorgio. *Vasari on Technique*. Trans. by Louisa S. Maclehose, ed. by G. Baldwin Brown. New York, E. P. Dutton and Company; London, J. M. Dent and Company, 1907.

Veblen, Thorstein. *The Theory of the Leisure Class*. New York, The Modern Library, 1934.

Venturi, Lionello. *History of Art Criticism*. Trans. by C. Marriott. New York, E. P. Dutton and Company, 1936.

Vincentius Bellovacensis. *Speculum Doctrinale*. Venice, Lichtenstein, 1494.

Viollet-le-Duc, Eugene Émmanuel. *Discourses on Architecture*. Trans. by Henry Van Brunt. Boston, James R. Osgood and Company, 1875. 2 vols.

Vitruvius Pollio, Marcus. *The Ten Books on Architecture*. Trans. by Morris Hicky Morgan. Cambridge, Mass., Harvard University Press; London, Oxford University Press, 1914.

Walzel, Oskar. *German Romanticism*. Trans. by Alma Elise Lussky. New York and London, G. P. Putnam's Sons, 1932. 5th ed.

Ware, Isaac. *A Complete Body of Architecture*. London, 1756.

Weinbrenner, Friedrich. *Architektonisches Lehrbuch*. Tübingen, Johann Georg Cottaischen, 1810–19. 3 vols.

Whitehead, Alfred North. *Science and the Modern World*. New York, The Macmillan Company, 1925.

Winckelmann, Johann Joachim. *The History of Ancient Art.* Trans. by G. Henry Lodge. Boston, James R. Osgood and Company, 1880. 4 vols.

Wolzogen, A. Freiherr von, "Schinkel als Architekt, Maler und Kunstphilosoph," *Zeitschrift für Bauwesen,* Berlin, XIV (1864, Heft I und II), cols. 251, 252.

Wren, Sir Christopher. *Life and Works of Sir Christopher Wren from the Parentalia or Memoirs of His Son Christopher.* London, 1903.

Wright, F. L., and B. Brownell. *Architecture and Modern Life.* New York and London, Harper and Brothers, 1937.

Wright, Frank Lloyd. *Frank Lloyd Wright on Architecture: Selected Writings 1894–1940.* Ed. by Frederick Gutheim. New York, Duell, Sloan, and Pearce, 1941.

Xenophon. *Memorabilia and Oeconomicus.* With an English translation by E. C. Marchant. London, Heinemann, 1923.

Zevi, Bruno. *Towards an Organic Architecture.* London, Faber and Faber Ltd., 1950.

Zucker, Paul, "Functional Architecture," in *Encyclopedia of the Arts.* Ed. by Dagobert D. Runes and Harry G. Schrickel, New York, The Philosophical Library, 1946, pp. 375, 376.

——— "The Paradox of Architectural Theories at the Beginning of the 'Modern Movement,'" *Journal of the Society of Architectural Historians,* X (October, 1951), 8–14.

INDEX