ABSTRACT

THE CONTRIBUTIONS OF PIERRE PATTE AND PAOLO LANDRIANI TO EUROPEAN NEO-CLASSIC THEATRE ARCHITECTURE

By

Briant Hamor Lee

The purpose of this study is three fold: (1) To determine the connection between the re-emergence of Neo-Classicism in the mid-eighteenth through the early nineteenth-centuries and the architecture of the same period. In attempting to achieve this end it was necessary to define some of the basic concepts explored and for this purpose the writings of Pierre Patte, French architect (1723-1814), and Paolo Landriani, Italian architect and scenic designer (1755-1839), have been used. (2) To present materials found in selected theoretical writings of these men, as related to theatre architecture and theatre history. Their works have been translated and selected portions are in the appendices of the study. (3) To establish the importance of Patte and Landriani relative to the Neo-Classic period, Neo-Classic theatre architecture, and Neo-Classicism in theatrical production. Their contributions to architectural theory and aesthetics will be related to Neo-Classic art and aesthetic thought. Their contributions to theatrical production techniques, as an adjunct study of their architecture, will be explored, thus pointing their major contributions to theatre history.

The major source of the study, the translation of primary materials, includes Patte's Essai sur l'architecture theatrale, and a portion of his articles in the Mercure de France. Paolo Landriani, professor and scenic designer at the Teatro della Scala, translated Patte's Essay and commented extensively upon it in a collection of essays edited by Dr. Giuglio Ferrario, published in 1830. Other of Landriani's ideas were found in his Osservazioni sui Teatri e Decorazioni, of 1818, which is included for its material on architecture and box sets. The works of neither of these men seem to be known.

Patte's Essay with Landriani's answering Observations make an excellent contrast of the ideas and works of two similar yet divergent schools of thought within the aesthetic of Neo-Classic theatre architecture. It is the primary intention of this study to present the works of Patte and Landriani in the light of their definition of Neo-Classic theatre architecture.

An adjunct of the study will be the presentation of Patte's work on lens and reflector system stage lighting equipment (1781). He suggested that such equipment be used to front-light the stage, and side-light wings, from above, thus obviating the use of footlights. Another adjunct of the study will be the discussion of Landriani's works on defining the uses, advantages, and disadvantages of the box set (1818).

The conclusion of the study is that based on the works of Patte and Landriani, and substantiated by additional study, there does appear to be a well defined style of Neo-Classic theatre architecture in the eighteenth-century. A further point of the study is that the two major contributors to the Neo-Classic style of theatre architecture should not only be remembered for their contributions to theatre architecture, but also for their contributions to theatrical production.

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Briant Hamor Lee

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Peoria Public Library, Bradley University Library, Ohio State University Library, Ohio Theatre Collection, Lincoln Center Theatre Collection, Columbia University Libraries, The Graduate Library of the University of Michigan, The Indiana University Rare Book Library, the Princeton University Library, The Library of Bowling Green State University, Notre Dame University Library, The Library of the British Museum, and the Biblioteca of the Teatro alla Scala in Milan.

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CHAPTER I

THE PROBLEM AND INTRODUCTION

The purpose of this study is to undertake a detailed analysis and description of the style of eighteenth-century theatre architecture known as the Neo-Classic. This will be achieved by undertaking: (1) the translation of the theoretical works on theatre production and theatre architecture of Pierre Patte (French - 1723-1814), and Paolo Landriani (Italian - 1755-1839), (2) the translation of the introductory and editorial remarks of Giuglio Ferrario (Italian - 1767-1847), editor and publisher of the 1830 edition of Patte and Landriani's works, (3) research into the Neo-Classic historical period of the middle and late eighteenth-century, (4) analysis of the philosophic, artistic, sculptural, and architectural production of the Neo-Classic period, (5) relation of this artistic production to the conception of a style, (6) relation of the Neo-Classic style to the works of Patte and Landriani, (7) discussion of the significance of the works of Patte and Landriani, and finally (8) discussion of the significance of a Neo-Classic style of theatre architecture.

Hard and fast categorization of historical dates would be difficult to use in any study dealing with philosophical and artistic ideas, but for the sake of strict

chronology this study can be dated around 1780 through 1830. These dates happen to be the dates of the primary materials translated and made available for the first time in English by this study; but in a larger sense, these dates seem to correspond with the period of the development, the height, and the decline of the Neo-Classic style.

Artistically, the middle eighteenth-century is known for the re-emergence of the influence of historic classicism.[1] This study, therefore, attempts to determine the significance and influence of the Neo-Classic style as it related to architecture, and specifically to theatre architecture.

This period was known for the development of the humanistic and scientific researches which led to the Industrial Revolution of the nineteenth-century.[2] The study will also attempt to relate some of the optical and accoustical theories mentioned in Patte and Landriani, an outgrowth of the scientific temperament of the period, to ascertain if these theories have any significance.

An avowed purpose of this study is to determine the connection between the re-emergence of Neo-Classicism in the

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[1] Encyclopedia of World Art (New York: McGraw Hill Book Co., Inc., 1965), p. 514; see also Lieth, p. 9; Rosenblum, pp. 45-49; Rowland, p. 281; and Vermeule, pp. 156-158; detailed references follow.

[2] Herbert Heaton, "Industrial Revolution," Encyclopedia of the Social Sciences (New York: The Macmillan Company, 1932), VIII, IND-LAB, pp. 3-12.

mid-eighteenth-century through the early nineteenth-century and the architecture of the same period. In attempting to achieve this end it will be necessary to define some of the basic concepts to be explored.

First, the era of Neo-Classicism can be defined generally as that period when historical classicism was the prime influence on artistic and philosophical thought. This period would extend from the dates of the writings of Winckelmann, Milizia, Mengs and others of the 1750's and 1760's through the expiration of the vital influence of historic classicism, due to the influence of Romanticism, in the second quarter of the nineteenth-century.[3]

Second, one of the most useful definitions of style relating to architecture, which can be specifically applied to theatre architecture, is that of Nikolaus Pevsner in his Outline of European Architecture. Pevsner goes to great lengths in his Introduction to discuss and define architecture as art. One of his primary distinctions is that the term architecture applies only to buildings designed with a view to their aesthetic appeal. He discusses three ways in which buildings may cause aesthetic sensations:

> First, they may be produced by the treatment of the walls, proportions of windows, the relation of wall-space to window space, of one story to another, of

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[3]Henry-Russell Hitchcock, Architecture in the 19th & 20th Centuries (Baltimore, Maryland: Penguin Books, 1958), pp. xxi; see also Encyclopedia of World Art, p. 514.

> ornamentation such as the tracery of a fourteenth-century window, or the leaf and fruit garlands of a Wren porch.
>
> Secondly, the treatment of the exterior of a building as a whole is aesthetically significant, its contrasts of block against block, the effect of a pitched roof or flat roof or dome, the rhythm of projections and recessions.
>
> Thirdly, there is the effect on our senses of the treatment of the interior, the sequence of the rooms, the widening of a nave at the crossing, the stately movement of a Baroque staircase.
>
> Spatial qualities distinguish the aesthetic sensations of architecture. The first sensation is two-dimensional as is the work of the painter. The second is three-dimensional, and as it treats the building as a whole, as volume, as a plastic unit, it is the sculptor's aesthetic. The third is three-dimensional, also, but it concerns space and as a result is the architect's own way, more than the others. This spatial quality is what distinguishes architecture from painting and sculpture.[4]

The conclusion which Pevsner draws is that the history of architecture is primarily a history of man shaping space.[5] A working definition, then, of a style of architecture is a setting down of the characteristics of the manner and motives of the way in which man at a particular period of time shaped space architecturally. How and why man shaped space at a particular time is a way to define the style of what he designed and built.

The third definition needed for the use of this study is a working definition of Neo-Classic style, in general and in particular. For a perhaps over-simplified

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[4]Nikolaus Pevsner, An Outline of European Architecture (Baltimore, Maryland: Penguin Books, 1943, reprinted 1964), p. 15.

[5]Ibid., p. 16.

definition of Neo-Classicism as applied to style, one can turn to Wolf's, Dictionary of the Arts:

> . . . a term in art and architecture applied to the period centering about the turn of the 19th century, representing a reaction to the luxury and elegance of Louis XV. There was a suave refining of lines and contrasts, the growth of dignity and simplicity, the stressing of horizontal lines, and a general sincerity in the recreation of classic forms in subdued fashion. . . . In architecture, modified forms of Roman temples, baths, basilicas, and other public structures were adapted to all contemporary buildings. . . . Term originated with Winckelmann as Neuklassik, and appears to have been induced by the discovery of Pompeian art in the 18th century.[6]

The broad elements of the Neo-Classic style of architecture have been variously treated by art historians and art critics.[7] In this study the writings of Patte and Landriani will be related to this body of critical and philosophical work, and their own writing on theatre architecture will be used to help define the Neo-Classic style as it developed in theatre architecture.

Pierre Patte was one of the few Neo-Classic architects to have dealt extensively with theatre architecture.[8] He received his training and did his early work as an architect and engraver in Paris in the mid-eighteenth-century.

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[6]Martin L. Wolf (ed.), Dictionary of the Arts (New York: Philosophical Library, 1951), p. 461.

[7]See bibliography, ref. Leith, Rosenblum, Rowland, Vermeule, Hitchcock, Pevsner, Wolf, Addison, Kaufman, Hauser, Sypher, Hawley, Cichy, and Winckelmann.

[8]Larousse Dictionaire du XIX Siecle, Vol. X.

He is known to have travelled extensively in Italy and the middle-east.[9] For a period of years, he was employed as an engraver in which capacity he worked on Diderot's Encyclopedie.[10] Patte illustrated a portion of J. F. Blondel's series, Cours d'architecture.[11] A few years after Blondel's death, Patte was employed by Blondel's publisher to complete the Cours d'architecture series.[12] He accomplished this with the addition of two volumes of text, vols. 5 and 6, and a volume of illustrations, vol. 3. Seeing a lacuna in the Blondel work in the area of theatre and auditorium architecture, Patte wrote his own, Essai sur l'architecture theatrale, . . . , in 1782.[13] In this text Patte set down principles for the design of theatre auditoriums. For the next fifty years his text was a major source for information on the design of theatre auditoriums.[14] The book is a fascinating mixture of Neo-Classical architectural theory and

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[9]Larousse, Dictionaire Generale des Artistes de l'Ecole Francaise (Paris: Libraire Renourd, 1885), p. 218.

[10]Mae Mathieu, Pierre Patte, sa vie et son oeuvre (Paris: ALCAN, Presses Universitaires de France, 1940), p. 332.

[11]Ibid., p. 324.

[12]Pierre Patte, Essai sur l'architecture theatrale (Paris: Desaint, Libraire rue di Roin, 1782), pp. 206-207.

[13]Ibid., p. 207.

[14]Giuglio Ferrario (ed.), Storia e Descrizioni de Principali Teatri . . ., (Milan: dalla tipografia del Dottor Giuglio Ferrario, 1830), p. viii.

Industrial Revolution pre-scientific application, and as a result is a superior example of its genre. The theoretical sections of the book will be incorporated into this study. The book was used extensively by other architects. It was also the source of some controversy and was discounted to a considerable extent by a number of Italian architects.[15]

One of the Italians who took the strongest exception to Patte's work was Paolo Landriani.[16] Landriani was an architect, on the design staff at the Teatro alla Scala in Milan, and also Professor of theatre architecture, scenic design, and perspective drawing at the Brera Academy of Fine Arts in Milan.[17] Landriani wrote extensively on drawing, scenic art, and theatre architecture.[18]

In 1830, Dr. Giuglio Ferrario published a translation of the Patte text. This book included not only the Patte Essai, in translation, but Landriani's rebuttal. It was entitled, Osservazioni . . . . sur alcuni articoli del

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[15]Mathieu, op. cit., p. 179.

[16]Paolo Landriani, Osservazioni . . . . sur alcuni articoli del saggio di M. Patte . . . . (Milan: Ferrario, 1830), pp. 257-291.

[17]Elena Povoledo (ed.), "Paolo Landriani," Enciclopedia dello Spettacolo (Rome: Casa Editrice Le Maschere, 1960), Vol. V, pp. 1204-1206.

[18]Paolo Landriani, Osservazioni sui difetti prodotti nei teatri dalla cattiva costruzione . . . . (Milan: dalla C. R. Tipografia, 1815, 1818, 1821, and 1824), original text plus four additions, including plates. 1818 addition called, Osservazioni su teatri e decorazioni, will be referenced separately later.

saggio di M. Patté . . . . ., and in it Landriani took considerable exception to Patté's theories.[19] The Osservazioni . . . . ., includes Landriani's description of the major characteristics of Italian Neo-Classic theatre architecture. As a result, in Ferrario's one-volume edition of Patté and Landriani, we have available a comparative study of both French and Italian Neo-Classic theatre architecture.

A study relating the writings of these men to the main currents of Neo-Classicism and Neo-Classical architectural style should contribute considerably to the general body of theatrical and architectural history.

It is hoped that the discussion of Neo-Classic style as it relates to theatre architecture will serve to stimulate additional interest in the area of theatre architecture as it relates to general architecture styles and also will encourage more exhaustive studies relating theatre architecture and European theatre history. Further, it is hoped that, due to this study, the significance and characteristics of the Neo-Classic style of theatre architecture, falling as it does between two better known and more fully explored stylistic influences, the Rococo and the Romantic, will be better identified and understood.

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[19]Pierre Patté, Saggio sull'architettura Teatrale . . . . ., in Ferrario's, Storia e descrizioni . . . . ., which also includes Landriani's, Osservazioni . . . . sur M. Patté . . . . (Milan: 1830).

Although many works have been written concerning painting and sculpture in the Neo-Classic style, there has been a paucity of published material concerning architecture in this style. Nikolaus Pevsner's, An Outline of European Architecture, has proved to be an excellent source for broad discernment of historical periods and styles of architecture.[20] One of the more useful sources in the area of architecture has been Henry-Russell Hitchcock's, Architecture in the 18th & 19th Centuries.[21] This book covers the main points of the entire historical period, as does Pevsner; and while the Hitchcock work is more detailed on architecture, it does not constitute a comprehensive study of the theatre architecture of the era. Other useful books which deal with styles previous to or following the Neo-Classic are, Addison's, Romanticism and the Greek Revival,[22] Rowland's, The Classical Tradition in Western Art,[23] and Kaufmann's, Architecture in the Age of Reason, Baroque & Post-Baroque in England, France & Italy.[24] These

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[20]Pevsner, op. cit.

[21]Hitchcock, op. cit.

[22]Agnes Addison, Romanticism and the Greek Revival (New York: Gordion Press, Inc., 1967).

[23]Kenneth Rowland, The Classical Tradition in Western Art (Cambridge, Mass.: Harvard University Press, 1963).

[24]Paul Emil Kaufmann, Architecture in the Age of Reason, Baroque & Post-Baroque in England, France & Italy (Cambridge, Mass.: Archon Books, 1966).

books were most useful for determination of the chronology of, and within, the periods, and for discernment of styles within the historical periods.

Developments in the history of European Neo-Classic theatre history have been touched upon by only a few authors. The developments of the middle-eighteenth through the early nineteenth centuries in theatre architecture have been recorded, but only briefly, by Allardyce Nicoll in his Development of the Theatre.[25] More recently, Oscar Gross Brocket has dealt with this period and style in only slightly more detailed fashion.[26] Neither of these authors discuss the architecture of the theatres of the Neo-Classic period nor its style in extensive detail, at best mentioning the names of one or two theatres built at the time, with no indication of style.

Standard international biographical sources were used as a starting point in establishing the identities of the major figures involved in the study, among others: Thieme and Becker, Algemeines Lexikon der Bildenden Kunstler; the Enciclopedia dello Spettacolo, both for biographical and general reference; the Dictionaire Generale des Artistes

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[25]Allardyce Nicoll, The Development of the Theatre (4th ed. rev.; New York: Harcourt Brace and Company, 1957).

[26]Oscar Gross Brocket, History of the Theatre (Boston; Mass.: Allyn and Bacon, Inc., 1968), ref. pp. 363-399.

de l'Ecole Francaise; the Larousse Dictionaire du XIX Siecle; the Grand Larousse Encyclopedique; and others. The writings of Patté and Landriani have been mentioned previously, selections of their theoretical works will be found in the text of this study. There are only two books which touch on the life and works of these two men, outside of their own writings--Mae Mathieu's monograph, "Pierre Patté, sa vie et son oevre,"[27] and Carlo Ferrari's, La Sceno-grafia.[28] The Mathieu work is concerned with the life and general architectural works of Patté, as a result, she gives small notice to his theatrical writings. The Ferrari work, the best one-volume work on Italian scenic art, is of interest for the general comments on the artistic style and accomplishments of Landriani as scenic designer.

Besides architectural description, analysis and criticism, there are other media which have been helpful to this study for determination of the nature of the architectural thought of the Neo-Classic period and style. These media include decorations erected for only occasional use (such as stage sets), designs made by architects without prospect of execution, and the fantasy designs of both architects and artists. These sources are useful because, to an extent, they are less subject to materials, the wishes

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[27]Mathieu, op. cit.

[28]Carlo Ferrari, La Scenografia (Milan: no pub., 1902).

of patrons, the chances of site, etc., and, as a result, they tend to express something closer to the pure ideal envisioned by the architect. Some architectural drawings are available; their source value cannot be underestimated. Theatrical decorations are also particularly instructive since they reveal how far the artist could go without becoming unintelligible to the public.[29] Stage designs, though, have always been conditioned by technical factors.

The fullest freedom of visualization in the artistic style of a period belongs only to those designs emanating from the unrestricted fantasy of the designers and architects working at that time. In consideration of which, this study includes not only the illustrated theoretical writings of Pierre Patté but also the illustrated scenic design lectures and theoretical writings of Paolo Landriani.

In that Patté was writing for himself, theoretically and innovatively, his lack of restriction placed his work closer to the heart of the Neo-Classic style, in effect a pure expression of the Neo-Classic style in theatre architecture. It is of interest, and germain to the point raised above, that Landriani found his contemporaries ready to accept the ideas expressed in his lectures on the Box Set, as evidenced by his exposition of its uses and effectiveness in the printed lectures from the Brera Academy. Both of

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[29]Kaufmann, op. cit., p. viii.

these men presented ideas new for their time but which their period was ready to accept, though some of their ideas did not come into common theatrical currency until some time later.

Research for this study was necessarily selective and limited. Within the period, artistic influences are considered only as they affect architecture. Architecture is considered, not as a whole, but as the general elements of the subject are related to theatre buildings and auditoriums. Primary sources, the writings of Patté and Landriani, have been translated and the theoretical portions will be included herein, and relied upon heavily. Secondary sources also have been used since much aesthetic discussion occurs after the period of artistic production has occurred. Therefore, these secondary sources will have to be relied upon for placement of the elements of the style in time and for relating the artistic works within the framework of the style.

Once the problem is identified, limited, and introduced, the study is developed along fairly simple lines. The preliminary work of the study involved two elements: (1) the research, which was accomplished following standard historical and stylistic search and identification techniques; and (2) the translation of primary materials, including cross-referencing between French and Italian versions of the works involved. As the translation developed over a period of three years, it was found that the research complemented and

augmented the author's work in translating, and vice versa. The study has been designed to complement research done on the Neo-Classic style in the areas of art, architecture, theatre history, as well as theatre architecture. The study will furnish materials for further investigation in each of these areas.

Chapter II traces the evolution of the Neo-Classic period of the late eighteenth-century. Historic classicism as an influence on artistic and cultural life first gained strong effect as a basis of the Renaissance, and was to emerge literarily in the seventeenth-century in France, and later artistically and architecturally in the eighteenth-century, particularly in France and Italy. The re-emergence took inspiration from the archaeological studies of newly discovered ancient cities, buildings, and works of art. The archaeological classicism introduced in the early eighteenth-century was imbued with a more intensely antiquarian approach to the great traditions of the past than had ever been seen before.[30] This phenomenon, which Rowland calls the "Neo-Classic Resurgence,"[31] is to be partly explained by the tremendous excitement provided by the discoveries of Pompeii and Herculaneum. The intensity of this revival can be interpreted in the light of certain political

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[30]Rowland, op. cit., pp. 281-288.

[31]Ibid.

and social factors, also. The simplicity and austerity of the classical ideal appealed to the revolutionary generation in France of the middle-eighteenth-century, which was revolting against the sensuality, insincerity, and pseudo-sophistication of the court and art of Louis XV. The ideal of Neo-Classic art, with its purity, harmony, and regularity, completely suited the somewhat puritanical idealism of the period.[32] A part of Chapter II will be used to show the background of eighteenth-century Neo-Classicism. The chapter will conclude with a more comprehensive definition and description of the characteristics of the Neo-Classic style of architecture.

Chapter III will relate the work of Pierre Patté and Paolo Landriani to the Neo-Classic style of architecture, both through their theories and through examples of their works. This chapter will also point out the distinctions Landriani drew between French and Italian theatres. Each section of their theoretical writings, as they appear in the Appendices, will be introduced, showing pertinent points of their relationship with Neo-Classicism and the Neo-Classic style of architecture.

A treatment of the unique contributions of Patté and Landriani to the field of theatrical production and aesthetics

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[32]Kaufmann, op. cit., p. 163; and passim, Newman, William S., The Sonata in the Classical Era (Chapel Hill, North Carolina: The University of North Carolina Press, n.d.), Vol. II, p. 11.

will be contained in Chapter IV. These contributions will be discussed and related to their work in architecture. In theatre history, it is extremely difficult to pinpoint dates for the development of many commonly recognized elements of theatrical production. The aesthetic impact and continuing influence of new techniques in production are difficult to identify, particularly when not associated with some dramatic or operatic work of lasting value. Both of these men recorded their ideas concerning techniques of production; their expression of these ideas would seem to predate commonly acknowledged chronology. Patté's discussions in 1781 and 1782 of the use of lens and reflector systems in stage lighting equipment to cross light the stage from the front and above, seem to predate our previous knowledge on this subject. Similarly, Landriani's discussion in 1818 of the design, use, advantages and disadvantages of the box set or scena parapettata, would appear to predate accepted use of this type of staging.

Whether these works do actually predate established chronology is not the primary concern of this study; but this facet of the work of these men is presented here as typical of the accomplishments of the architect-designers of this period.

The final chapter of the study attempts to assess the value of the material resulting from the investigations reported in the preceding chapters and to draw some general

conclusions concerning the value of the historical and artistic style of theatre architecture which has become to be known as the Neo-Classic.

CHAPTER II

NEO-CLASSIC ARCHITECTURE

An understanding of the re-emergence of Neo-Classicism in the eighteenth-century will provide a frame of reference within which the elements of an architectural style can be discerned, and within a part of which we will be able to identify and characterize the Neo-Classic style of theatre architecture.

A number of overlapping artistic styles were influential in varying degrees throughout the period. The most easily recognized are: the last vestages of the late Baroque, the declining influence of the Rococo, Neo-Classicism, and the beginnings of the Neo-Gothic. Though a number of similar elements might commonly influence both architecture and writing, this study will deal with Neo-Classicism in architecture and not with Neo-Classicism in literary forms.

Until recently the Rococo and the Romantic eras have been the periods of artistic influence most easily defined.[1] A regrettable result of this over-simplification of style-periods has been the ignoring of overlapping and transitional

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[1]Wylie Sypher, Rococo to Cubism in Art and Literature (New York: Vintage Books, Random House, 1960), pp. xviii-xxvi, and passim.

styles, such as the Neo-Classic.[2] The turmoil and spiritedness of this period have made it difficult to draw clear inferences about the architecture of the period.

Architecture in the later years of the eighteenth-century was not free from the spirit and love of change which pervaded the entire era.[3] The "love of change" does not imply necessarily a desire for something new but is a sentiment which can be content with something different.[4] There was considerable reaction against what was considered late Renaissance styles, especially the Rococo.[5] Far from tending toward an anonymous and repressive uniformity of style and expression, architecture offered allusions to Graeco-Roman antiquity in terms of subject matter; borrowing classical forms fully as varied and contradictory, if not more so, than in the architecture found under such style-classifications as: Renaissance, Mannerist, Baroque, and Rococo.[6]

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[2]Arnold Hauser, The Social History of Art, Rococo, Classicism, Romanticism (New York: Vintage Books, Random House, n.d.), Vol. III, pp. 138-144, and passim.

[3]Addison, op. cit., pp. 20-21.

[4]Hauser, op. cit., p. 141.

[5]Robert Rosenblum, Transformations in Late Eighteenth-Century Art (Princeton, N.J.: Princeton University Press, 1967), p. 47.

[6]Ibid., p. 45.

This was the time when the effects of classical education turned men southward. All of Europe turned toward the archaeological scavi, not only in Italy but also in Sicily, Greece, and the Near East, as a source of inspiration in the arts.[7]

This was the height of the resurgence of Neo-Classicism; when, as never before, the passion for antiquity burned in the breasts of connoisseurs and artists of every nation. Rome was the seat of a multiplicity of artistic establishments, centered in the academies, dedicated to instructing students to paint in the grand manner. Mythology was a symbolism common to all, and the study of Latin, Greek and ancient history inspired man with visions of the Rome of the Caesars and Augustus, and the Athens of the Golden Age. There was a new fervor and excitement in the great discoveries which were reshaping and enlarging man's view of his classical past.

Equal in importance to the excitement inspired by the excavation of ancient cities was the dissemination of knowledge about the ancient world through the publication of illustrated books.[8] These early books made visual evidence available of the wealth and extent of the art and

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[7]Rowland, op. cit., p. 281.

[8]Henry Hawley, Neo-Classicism, Style and Motif (New York: (Cleveland Museum of Art, Harry N. Abrams, Inc., 1964), pp. 9-17.

architecture of the ancient world. But it was for others to rhapsodize and theorize about these works, thus producing the philosophical impetus of Neo-Classicism.

The most important theorists of Neo-Classicism were Winckelmann and Milizia; in their writings they codified the ideas of the period at a time when the new formal interests and tastes had just begun to be established.[9]

The recognized prophet of Neo-Classicism, and by far its best known exponent, was the German, Joachim Winckelmann (1717-1768).[10] Among art historians, Winckelmann is considered to have been the pre-eminent mind of his time.[11] He studied history at the University of Dresden, where he began his copious writings on Greek works of art. For a time he was attached to the court of Saxony, where his attention wandered from the Baroque sculpture of the gardens to the copies of classical sculpture crated up in the cellars of the palace.[12]

In 1755, Winckelmann arrived in Rome to study at first hand the marbles of the Capitoline and Vatican Museums and those of the Villa Albani.[13] Fortuitously, he became

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[9]Encyclopedia of World Art, p. 518.

[10]Rowland, op. cit., p. 284.

[11]Encyclopedia of World Art, p. 520.

[12]Bodo Cichy, The Great Ages of Architecture from Ancient Greece to the Present Day (New York: G. P. Putnam's Sons, 1964), pp. 365-366.

[13]Ibid., p. 366.

attached to the household of Cardinal Albani and was able to study actual examples of ancient works, eliciting from them the fundamental principles of Greek art.[14] He published his Geschichte der Kunst des Altertums in Dresden in the following year.[15]

According to Winckelmann the great dream of art had been realized by the Greek artists. The images they created, free from human failings, were the visual expressions of a spiritual nature conceived by the intellect alone. Rowland identifies the following statement by Winckelmann as the motto of the Neo-Classic resurgence, the first reconciliation of art and literature as the manifestations of a single ideal:

> The noble simplicity and serene greatness of Greek statues is the true characteristic of Greek literature of the best period . . . Perhaps the draughtsmanship of the earliest Greek painters resembled the style of their finest tragic poets.[16]

Beyond his definition of the qualities to be discovered in Greek art, Winckelmann's real contribution was that he made people look at classical art with enthusiasm and love. He popularized classical art and for the first

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[14]Encyclopedia of World Art, p. 520.

[15]History of Ancient Art, 1764.

[16]Rowland, op. cit., p. 286, quoting Winckelmann's Thoughts on the Imitation of Greek Works of Art in Painting and Sculpture.

time arranged it in a truly scientific fashion.

Another person strongly influenced by the times, by classical discoveries, and by his contemporaries, was Milizia, an independent, controversial thinker, who expressed pioneering ideas regarding architecture and city planning in his works.[17]

Milizia was sensitive to the problem of individual freedom and was aware of the necessity of a renewal of this spirit, which he sought in the art of the Greeks, who he felt had known how to render the ideally beautiful by taking the best from nature. He did not require the artist to imitate Greek models, but to follow the Greeks in their mode of observing nature. In his Principii d'architettura civile, 1785, he states,

> . . . architecture is one of the fine arts because it derives from a model in nature from which the most beautiful elements are selected. Everything in architecture must have a function and should, therefore, be determined by necessity. In order to attain perfection in a building, the architect should first pursue beauty, which consists in symmetry, eurythmy, and suitability; secondly, he should strive for comfort (i.e. location and form of the building and the distribution of its parts); finally he should aim for solidity. The artist is left free to realize his work once he has been made aware of the requirements of architecture.[18]

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[17]George C. Williams (ed.), Bryan's: A Biographical Dictionary of Painters and Engravers (London: G. Bell's Sons, Ltd., 1926), Vol. IV, M-R, p. 80.

[18]Milizia, Principals of Civil Architecture, 1785, and Concerning the Art of Viewing Fine Art, 1781, both cited in Encyclopedia of World Art, pp. 525-526.

Milizia's ideal of beauty is achieved by a selective process requiring much conscious study and imagination. Winckelmann had stated an essentially transcendental conception of beauty; Milizia, however, implied a humanistic principle of creative freedom, though within certain limits.

The works of the philosophers and artists of Neo-Classicism show that classicism pervaded architecture from the mid-century onwards. This fact is pointed out more often in histories of architecture than in histories of painting and sculpture, where concentration upon individual masters of genius has often meant that questions of historical development have been neglected.[19] As a result the frequently composite architectural images of the period may well have contributed to the greater awareness of classicism in architecture than in painting and sculpture.[20]

An older European tradition was of great importance for the beginnings of Neo-Classicism in architecture. During the late Renaissance, the architect Palladio, together with his Roman mentor, Vitruvius, were widely admired and imitated, in England and to a lesser extent in France and Northern Italy.[21] Though Paladian architects employed the vocabulary with what they felt to be great purity and

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[19]Rosenblum, op. cit., p. 108.

[20]Hauser, op. cit., p. 139.

[21]Hawley, op. cit., p. 16.

correctness, their aim was to equal the beauty of Graeco-Roman architecture, not to copy it literally and in its totality. The already established Palladian taste probably contributed significantly to the quick acceptance of the Neo-Classic style when it was disseminated from Italy to France.[22]

In the 1750's the official French critics agitated for the severer style of interior architecture and decorations which had been popular about 1700.[23] In the same decade, a small number of private patrons employed designers to create interiors for them which displayed the full vocabulary of decorative motifs of the early Neo-Classic style.[24] As elsewhere, the Neo-Classic style in France demanded few modifications of the traditional in external architecture.

At first, the Neo-Classic style in architecture was characterized by the application of decorative motifs, often copied directly from ancient sources, to buildings and objects which retained their traditional forms.[25] But the style seems to have followed a more consistent pattern of development and at a somewhat later date, structure, as well as ornament, became imitative of Graeco-Roman examples.[26]

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[22]Hawley, op. cit., p. 18.

[23]Ibid.

[24]Ibid.

[25]Encyclopedia of World Art, p. 546.

[26]Ibid.

Since Winckelmann had championed it, Greek art had been widely considered both earlier than and superior to Roman art.[27] However, in mid-eighteenth-century Europe, Greek art was little known. It was Roman architecture, therefore, which was initially important as a source of influence for Neo-Classicism.[28] Several decades were needed for the accumulation of sufficient knowledge of Greek architecture to permit its widespread imitation.[29]

Though there were many possible sources for ancient modes of architecture to imitate: Etruscan, Medieval, Gothic, Teutonic, Rustic, Celtic, Gaelic, etc., it was the formal and associative power of the Graeco-Roman tradition which dominated architectural practice.[30] These stimuli were absorbed by architects and patrons and, as a result, late eighteenth-century interpretations of Graeco-Roman architecture were susceptible to as great a flexibility of formal vocabulary and emotional evocation as can be found in the painting and sculpture of the same period.[31]

Rather than attempt to trace in detail the history of specific elements of the formal vocabulary of Neo-Classic

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[27]Hawley, op. cit., p. 19.

[28]Ibid.

[29]Ibid.

[30]Rosenblum, op. cit., pp. 108-109.

[31]Ibid., p. 109.

architecture, it might be better at this point to condense the study to a brief description of the chief elements of the style, agreeing with Hawley in his remark that,

> . . . from about 1755 until the end of the Revolution, architectural ideas were freely exchanged among England, France and Italy and therefore it is impossible to give, with complete assurance, credit for innovations of style either to individuals or even to national schools.[32]

To attempt to generalize concerning an architectural style, except under the conditions suggested by Hawley, might appear presumptuous, but it would appear that such a generalization might save needless detailed diggings for specific small points.

The definition of a Neo-Classic style of architecture must stem from the architect, as Milizia has pointed out, and extend beyond the architect to his ideas and ideals of beauty as related to his classical past. Neo-Classic architects sought rationality in their building. They strove for clarity in the disposition of rooms, for new proportion, simplicity of form, symmetry of parts, and a certain polish in contours and surfaces, in a triumph of light and elegance.[33] The Doric, Ionic, and Corinthian orders were used; the Composite order was excluded as a later-day bastardization of form. A single order of columns

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[32]Hawley, op. cit., p. 18.

[33]Encyclopedia of World Art, p. 543.

or pilasters set on a raised platform or stylobate replaced the superposition of orders. Decoration was always sober and of slight importance in the overall conception.[34] Color was either wholly eliminated or reduced to a few delicate tints; in general, white surfaces were favored.

Though the models most often used were those of ancient Greece and Rome, to a lesser extent the work of Palladio was also used as a model. His style was viewed, though, in a different light from that in which it had been considered in the past. Instead of seeking the Renaissance ideal for inspiration, what was sought was solidity, simplicity, and forms which reflected the antique tradition.[35]

Around 1800, impersonality and, perhaps even more notably, internationality of expression provided a universalized sense of period rather than a sense of particular nation or region.[36] The simple forms, integrity of surface and continuity of line, so indicative of the Neo-Classic style of architecture were to pervade all aspects of building practice of the era.

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[34] Encyclopedia of World Art, p. 544.

[35] Hawley, op. cit., p. 16.

[36] Encyclopedia of World Art, p. 544.

CHAPTER III

THE THEORETICAL WORKS OF PIERRE PATTÉ AND PAOLO LANDRIANI

The chief contribution of Pierre Patté to the field of theatre architecture was his 1782 publication, Essai sur l'Architecture théatrale. In this work Patté expressed his own theories on the ideal shape and form for a theatre and its auditorium. He drew extensively from his background in classical art and architecture and from his experience of the newly elucidated precepts of optics and accoustics.[1]

The book was widely referred to throughout the latter part of the eighteenth-century and into the early nineteenth-century as well.[2] Its value as a reference text on theatre architecture was such that Dr. Giuglio Ferrario, head Librarian of the Braidensian Library, essayist, and book publisher, commissioned Paolo Landriani to translate and comment upon it. The work was published in 1830, including both Patté's, Essay, and Landriani's, Observations, as well as Ferrario's survey Essay on theatre history. The work

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[1]Patté referred in particular to Fr. Kirker's Musurgia Universalis, and to M. l'Ab. Nollet's Lecons de Phisique experimentale.

[2]Outside of reference to its widespread use in Ferratio's Preface, there is also reference in Saunders, George A Treatise On Theatres (London: 1790), p. ix.

was entitled, Storia e Descrizione de'Principali Teatri. In it we have both the early Neo-Classic writing of Patté and the late Neo-Classic rebuttal of Landriani; in one volume: a guide to the working architect's thoughts on architectural theory for theatres and auditoriums.

The height of the Neo-Classic resurgence would seem to be bracketed between the essays in the Ferrario volume. Further, because of the nationalities of the authors, the text and observations give an insight into the particular nationalistic interests and opinions of each man. To show the possible value of this unique work, architecturally, theatrically, and stylistically, is the task of this study.

In order to relate the works of Patté and Landriani to each other, to the period, and to the Neo-Classic style, reference will be made to the translated theoretical sections of their writings, enclosed herein. Beginning each section of this translation will be commentary and exposition dealing with the work to follow. The running commentary of the author will attempt to relate the work of Patté and Landriani to specific Neo-Classic elements, as detailed previously in Chapter II.

The significance of the theoretical and aesthetic writings of Patté and Landriani, as found within their architectural work, will be dealt with in Chapter IV. Also included in Chapter IV will be some of Landriani's work which deals specifically with stage scenery and Box Sets.

The order of arrangement of the sections of translated materials will be that in which they were extracted from the original text. The author's commentary will follow that order, introducing each section, except where several sections can best be related and summarized at once.

STORIA E DESCRIZIONE

DE' PRINCIPALI TEATRI

ANTICHI E MODERNI

CORREDATA DI TAVOLE

COL

SAGGIO

SULL' ARCHITETTURA TEATRALE

DI

M.r PATTE

ILLUSTRATO CON ERUDITE OSSERVAZIONI

DEL CHIARISSIMO

ARCHITETTO E PITTORE SCENICO

PAOLO LANDRIANI

PER CURA

DEL

DOTTORE GIULIO FERRARIO.

MILANO

DALLA TIPOGRAFIA DEL DOTTOR GIULIO FERRARIO

contrada del Bocchetto N. 2465

Figure 1. Title Page of Ferrario Edition

HISTORY AND DESCRIPTION

OF PRINCIPAL THEATRES

ANCIENT AND MODERN

ACCOMPANIED WITH ENGRAVED ILLUSTRATIONS

WITH THE

ESSAY

ON THEATRE ARCHITECTURE

OF

M. PATTE

ILLUSTRATED WITH THE LEARNED OBSERVATIONS

OF THE MOST CLEAR

ARCHITECT AND SCENIC ARTIST

PAOLO LANDRIANI

---

under the editorship

of

DR. GIUGLIO FERRARIO

MILAN

FROM THE PRINTING-WORKS OF DR. GIUGLIO FERRARIO

DISTRICT OF THE BOCCHETTO, NO. 2465

MDCCCXXX (1830)

Figure 2. Translation of Ferrario Edition Title Page

The book, Storia e Descrizioni de'Principali teatri,[3]. . ., under the direction of Dr. Giuglio Ferrario, was first advertised in 1827 in a Prospectus including a series of books to be issued from his publishing house.[4] When the book first appeared, some three years later, it included, among other things, Dr. Ferrario's introductory comments on the collected essays therein.

Dr. Giuglio Ferrario was the chief Librarian of the Braidensian Library, at that time the Royal Imperial Library of the Province of Lombardy, located in Milan. He was also proprietor of a printing and publishing house, under his own name.[5] From the publishing house, his own two major works were issued, Il Costume antico e moderno,[6] 1817-1834, which was compiled with the help of a variety of collaborators, and his Storia ed Analisi degli antiche Romanzi di Cavalleria,[7] in 1828.[8] His house was also well known for the publication of a collection of Poesie rusticoli

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[3]Its title page, in facsimile and a translation of it appear on the two pages preceding.

[4]No copy has been found of the Prospectus, reference to it is found in Ferrario's Introduction.

[5]Dizionario Enciclopedico Italiano, ref. cit. Ferrario.

[6]Ancient and Modern Costume.

[7]History and Analysis of the Ancient Novels of the Cavalry.

[8]Enciclopedia Italiano, ref. cit.

illustrate,[9] 1808, and Le classiche stampe dal commciamenta della caliografia, fino al presente,[10] in 1836. Ferrario's tastes as a publisher were catholic, ranging from literature through all of the fine arts; his publications reflect his interests, as do his frequent articles in the Biblioteca Italiana.[11]

In his Introduction Ferrario sought to defend the architects of his era. Though he had written an extensive history of ancient theatres,[12] he was sure that the contemporary efforts of theatre architects were the logical and just culmination of the ideals and spirit of the ancients. He deplored those who attempted to denegrate the efforts of contemporary architects, saying that the theatres of his day were, ". . . incontrovertible proof of the valor and genius of our builders, (and) that these magnificent theatres have been erected and are luxurious competitors with the theatres of the ancients."[13]

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[9]Illustrated Rustic Poetry.

[10]Classic Prints from the Beginning of Caligraphy up to the Present.

[11]A period review published in Milan, of which Landriani was a member of the board.

[12]Ferrario's ruminations on ancient theatres have been replaced by later and archaeologically much better studies, ref. Bieber, Bulle, Fiechter, etc.

[13]References to the translation text will be found as part of the text of the section of materials discussed in the commentary.

In the course of the Introduction Ferrario describes Patté as one of the few architects of the era who, ". . . with his scientific work on theatre architecture has endeavored to raise theatre architecture to the highest plane of perfection." Ferrario's praise is based on Patté's work and its reputation. He goes on to praise equally the work of Paolo Landriani, Milanese scenic designer and Professor of Perspective at the Brera Academy, who had prepared the Patté work for publication.

While he was in the process of translating the Patté Essay, Landriani noted his considerable exceptions to many of the points raised by Patté. Rather than alter the Patté text, or "correct" it, Landriani made a separate series of "observations" or rebuttals, which Ferrario published following the Patté text. The Landriani Observations will establish the basis for a comparison between the works of these two men and also a comparison between the French and Italian Neo-Classic in theatre architecture.

There are arguments which Landriani approaches in some of the later observations which do not deal directly with the Patté Essay. One such discussion concerns whether or not the ancients had a regular system for perspective drawing. The argument is neither answered one way nor the other, but Landriani gets off into a discussion of the faults of his contemporary scenic designers. His main point was that their work suffered from a "getting away from" the

regular rules of perspective in their works. These extensive arguments have not been included in the translated sections of this study as not being particularly germain to the problem.

In the close of his Introduction, Ferrario mentions a section of the text, again outside of this study, but which includes a ". . . confrontation between the perspective art of the painters of the barocca[14] manner and those of the pure style, generally handled as our own style." Obviously, we have here a Neo-Classic purist reacting against the uncontrolled excesses of the previous era, the Baroque.

Ferrario's smaller Introduction to his own Essay is of interest to this study in that it enumerates the sources available for the study. As mentioned previously, Ferrario's study of ancient theatres has been superceded by later studies of classical theatres, such as those by Margaretta Bieber and the German school of theatre architecture archaeologists.

Ferrario's intent in writing a history of theatres was, as he put it, ". . . to compliment the flower of the most select society," by giving them, ". . . a brief historical survey of theatres from their origins up to the present

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[14]A literal translation of the word, "barocca," would be "loose and awkward," or a style which now is known as the Baroque.

day."

The material used for this study can be introduced best by the translator's preface (see Appendix C) which Landriani attached to Patté's Essay in which he recognizes the work as, ". . . one of very few, I believe, which fully satisfies its intended scope." It was for this reason that Landriani undertook to translate the Essay, making it available to Italian architects in their own language.

Landriani points out that Patté made use of some theatres which had burned after 1775, establishing that the research must have been done before that year.[15] Landriani incorporated into the work his own description of the Teatro della Scala to bring the whole study up to date.

Landriani explains, in commenting on his motives for making observations to accompany the Essay, that, ". . . the gusto of the Italian theatre genre is somewhat different than that of the Frenchman." This helps to explain some of his motives, and for the rest he lays their basis to his own reason, which tells him to take exception with Patté.

Following this brief rationale for the existence of the Patté work in Italian, is the text of the Essay, with an Introduction, to be found in Appendix D.

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[15]This point is verified by Mathieu in her monograph, Pierre Patté, sa vie et son Oeuvre, op. cit., p. 324.

SAGGIO
SULL'ARCHITETTURA TEATRALE

OSSIA

DELLA STRUTTURA PIU' VANTAGGIOSA

PER UNA SALA

DA SPETTACOLI

RELATIVAMENTE AI PRINCIPJ

DELL'OTTICA E DELLA SCIENZA DELLA MUSICA

CON UN ESAME

DEI PRINCIPALI TEATRI D'EUROPA

ED UN'ANALISI

DEGLI SCRITTI PIU' IMPORTANTI

SOPRA QUESTA MATERIA

DEL SIGNOR

PATTE

ARCHITETTO DI S. A. I. IL PRINCIPE PALATINO
DUCA REGNANTE DE' DUE PONTI

PARIGI 1782 TRADUZIONE DAL FRANCESE.

Figure 3. Title Page of Patté's Essay.

ESSAY

ON THEATRICAL ARCHITECTURE

OR

CONCERNING THE MOST ADVANTAGEOUS CONSTRUCTION

FOR A THEATRICAL HALL

RELATIVE TO THE PRINCIPLES

OF OPTICS AND THE SCIENCE OF MUSIC (ACCOUSTICS)

WITH AN EXAMINATION

OF THE PRINCIPAL THEATRES OF EUROPE

AND AN ANALYSIS

OF THE MOST IMPORTANT AUTHORS

ON THIS MATERIAL

BY M. PATTE

ARCHITECT OF S.A.I., THE PRINCE PALATINE

REIGNING DUKE OF THE TWO BRIDGES

PARIS, 1782, TRANSLATED FROM THE FRENCH

Figure 4. Translation of Patté's Essay, Title Page.

Introducing his Essay, Patté frankly admits that there had been considerable discussion concerning the ideal shape for an auditorium. He establishes his avowed purpose for making his own study of theatres and their shapes as a wish to rectify a major fault in all previous studies. That error, he says, was that the previous studies had not fully researched all of the various elements involved in the design of the theatrical hall. He will do just this type of study.

He maintains that for the greatest benefit to be derived from a theatre the auditorium must be of a shape to best benefit the audience. He argues that the eyes and ears are the only judge which ultimately can be used for determining the greatest benefit of a theatrical hall. Therefore, a hall must be designed with the limitations of the eyes and ears in mind. To understand how the eyes and ears work you need to know how sound and vision work. This is where he proposes to commence his discussion.

Patté concludes that once you understand the functioning of sound and vision, and their relationship to the eyes and ears, you can determine how best to augment these agents of audience pleasure, the pleasure of the theatrical performance.

The first part of Patté's Essay, Chapter I, Appendix E, deals with sound, its production, augmentation, and modification. His study is a rather naive approach to the

subject. It is not verifiable whether he is aware of Priestley's writings on sound wave theory.[16] He does not refer to Priestley, nor does he use the term wave in any of his discussion of sound. Though he does not use the sound wave theory approach to the subject, his approach is a surprisingly workable one and for his purposes explains the phenomena. He argues inductively throughout the study, but comes up with some solid results, nonetheless.

A number of Patté's points are quite good. First, it is necessary to remember that the shape of a hall will necessarily affect the reflections of sound to the ears of the auditors, therefore it is necessary to consider the shape of the hall when designing that hall.

Patté's discussion of sound rays is so very close to what can be identified as sound waves that it would be an easy trap to fall into if one interchanged the two words. His use of rays is consistent with his argument that sound works as a body and similarly to light rays. Therefore his argument cannot be construed as the same as for sound wave theory. His final argument, in favor of the elliptic shape for a theatrical hall, is worked out in terms of his understanding of sound.

Patté discusses at length the various shapes which could conceivably be used for a theatrical hall, and then

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[16]Joseph Priestley (1733-1804).

proceeds to discount each, except the elliptic, for accoustic reasons based upon his previous argument. One point which he brings up would still appear to be an applicable "rule-of-the-thumb" for theatre auditorium design. He states, ". . . at more than seventy-two feet an ordinary voice must strain to make itself heard and to be distinguishable in its articulations in a closed and covered place." He would maintain as a result that it is important to reduce the distance a voice must be projected to that distance, that a hall should have that limit maintained for its size.

Patté concludes, beyond making use of the seventy-two feet distance for voice travel and construction of the hall in the elliptic shape, that one need do only two things to achieve all of the effect of the voice possible, ". . . first, line the inner surface of the hall with materials which are sonorous or elastic, which would be wood, . . . second, avoid everything which would hinder the free reflection and reverberation of the voice, which might strike it."

His last point, which arises later also, is consistent with the Neo-Classic desire for the simplification of surface decoration or modulation. One also suspects that his argument for the use of the plain elliptic shape, derived as a conic section from nature, might also partially stem from a desire to keep to a basic geometric shape, avoiding any of the later, composite, man-made shapes, such as the bell-shape, racquet-shape, oval, or horse-shoe-shape (which he especially

decried).

Patté begins his discussion of audience sight of the stage and stage action in Chapter II, Appendix F, by admitting that it is not possible for all seats to see ideally because not all seats can be located ideally. He maintains that though not all seat locations can be ideal, there are some actions which can be taken to help the sightlines from all of those seats which are under some visual disadvantage.

To begin with, he says, ". . . there is not a person who has not noticed that he ordinarily suffers some loss in ability to discern movements and expressions of faces at a distance greater than sixty to seventy-two feet." Obviously he desires to establish the same limits for both sound and sight. He continues, ". . . one can readily understand that the major depth of an auditorium must naturally be limited in respect to sound and vision. There must not be more than seventy-two feet from the place of the scenery to the most distant seat." Another of his contentions, regarding seating locations, is not raising seat on the sides of the hall, i.e. the side boxes or galleries, higher than 30° above the level of the stage, and in no case higher than the height of the proscenium opening. His reason is that viewing objects from greater than a 30° angle creates unnatural distortions and foreshortenings in those objects. Therefore, those in the side seats, if outside of a 30° angle from the stage, could not enjoy to the fullest the action of the play nor the visual beauty of the scenic effects.

Patté suggests that the architect use a triangle with its base at half the depth of the stage and its apex in any seat in the auditorium to determine and insure freedom of sight of all of the stage, ". . . the sides of which (triangle) (must) not be interrupted under any pretense, whether by proscenium, by its aperture, or by some other intervening body."

In commenting upon scenery Patté makes an interesting observation:

> . . . Those who see the scenery from all the other places (except from the floor or the boxes which directly face the stage) in the auditorium are in some manner in a forced situation in relation to it, either too low, too high, or too much to one side. This is the great superiority which real or artificial (three dimensional) relief will always have over that which is only painted. The first (three-dimensional relief) has a multitude of points of view which seem fully natural, in spite of their variety. The second (flat, painted relief) has one point of view, one picture, a theatrical decoration or a perspective elevation, and does not have truly more than one single side, one single place from which it has a reasonable effect. Outside of that place, one can not look at it except in a defective manner.

Patté goes on to indict scenic designers for not being able to correct the problems in their use of flat painted objects, and says that not only is the habit not good, but that he doubts that the scenic designers would be able to, ". . . lose those considerations which make the habit senseless."

In Chapter III, Appendix G, Patté reconciles the considerations of sight and sound with the practicalities of actually making use of the elliptic shape for a theatrical

hall. To guarantee complete understanding, he does a step-by-step analysis of the actual use of an ellipse for an auditorium. Once he has established the general shape, he shows how to sub-divide it for each of the major parts of the auditorium.

Patté moves into one of his major points of contention in this chapter, a point wherein he argues against those who would be complete classic purists in the Neo-Classic use of the ancients and their theatres as models for contemporary theatres. "It would be a great error to attempt to render a theatre like those of the ancients adapting it to our ends, i.e. of good sight and hearing." As he had pointed out earlier, the ends of the ancients and those of his contemporaries were the same--the enjoyment or pleasure of the theatrical or lyric performance. But, he says:

> . . . when you are certain of the success of the intent . . . everything must be subordinated to the two essential considerations of sight and hearing in the execution of these edifices . . . we do not see for what reason (therefore) you would have to be free to affirm at all times the doubtless advantages which would redound to the public.

Patté concludes with a discussion of how one should gain practical experience in developing an awareness of the accoustics and sightlines of any theatrical or lyric hall. Quite simply, he states, ". . . move around . . .," listen, and look at the hall and stage from a variety of locations, and then, draw your own conclusions concerning the worth of the hall. Only in this way, he contends, will one be able

to learn the most about these considerations in the design of an auditorium.

Between Chapters IV and XII, Patté covers, in a detailed foot by foot, measured description, a series of ten theatres, for plans of which see Appendix KK. All of these theatres were built before the period of the study, or done in circumstances which preclude their inclusion in the study (i.e. built by a variety of architects, remodelled extensively, burned, etc.). Patté's discussion of these older theatres would add little to our understanding of his theories, and thus, these chapters have been left out of the Appendices. The floor plans and cross-sectional drawings of the theatres have been included here for their visual and historical interest. Patté, though, makes no further reference to them in the rest of his Essay.

Patté's XIIIth Chapter, Appendix H-L, is a study of his own textual sources, wherein he discusses the authorities used to formulate his ideas on theatre architecture. He frankly acknowledges his sources, and at the same time discusses his agreement or disagreement with each source cited.

The first source cited is Count Allessandro Algarotti's Essay on the Opera of 1762 (see Appendix H-L), which Patté commends for its points on the use of what is basically a fire-proofed structure of stone and brick, lined with wood and wood paneling for accoustic effectiveness. It

is from Algarotti that Patté suggests that the hall not be designed larger than the human voice.

Algarotti, according to Patté, suggests an interesting arrangement of the stage space for the best effectiveness of the voice. His point is that the apron of the forestage be made to "thrust" outward many feet in front of the stage, thus placing the actors almost in the middle of the audience. Algarotti claimed that such an arrangement should not endanger their being heard marvelously by everyone. Patté disagrees with Algarotti on this point because,

> . . . the actors must be inside the mouth of the theatre (imboccatura del teatro-proscenium), within the scene, far from the eye of the spectators, must assume their part of the sweet deception (inganno) wherein everything is ordered in the scenic representation . . . This thing must not be done, so that they will not be shown from the side, so that they cannot also turn their backs to a good part of the audience, and so that many other inconveniences may not follow and thus cause a great disgrace, which might be seen but not paid for!

Patté is arguing in favor of the truth and naturalness of the actor as seen within the scenic reality of the stage, behind the proscenium. Algarotti, for vocal reasons, argues a point which we would consider might lead to an even more natural and truthful presentation.

Algarotti, according to Patté, then goes into a discussion of points with which Patté disagrees, including shape of hall (semi-circular) and use of materials for sonorous or accoustic effect. Patté takes exception to the general tone of this part of the Algarotti work, for the

Count does not substantiate his points analytically. Also, he notes that Algarotti's emphasis on the spaciousness and sumptuousness of the boxes is based upon the Count's intimate knowledge of Italian theatres, especially those of Venice, wherein the boxes are used for private as well as public entertainments, such as the elegances of conversation, the reception of visitors, etc., to say nothing of viewing the performance.

The second source discussed (see Appendix H-L) is Cavalier de'Chaumont's Veritable Construction d'un Théatre d'Opera a l'usage de la France, suivant les Principes des Constructeurs Italians. Though, as usual, Patté takes exception to much of what this author has to say, he has adopted four of the Cavalier de'Chaumont's causes for the loss of sound in a hall as valid points to be considered in the construction of a hall.

De'Chaumont's point concerning aisles at the sides of the hall, under the first row of boxes, as a place wherein sound is swallowed up, is accepted. The point that the doors of the hall should be on the sides of the hall and not on the wall facing the stage is also accepted by Patté. De'Chaumont proposes a point in passing and Patté picks up the point, which is to distinguish later French and Italian theatre constructions. The point is that the balconies be just that, open balconies, without being broken up into a series of pigeon-hole boxes. With

such an arrangement, it is argued that the sound can better circulate in the hall, to the benefit of all. De'Chaumont argues that this can be accomplished by framing the balconies with cantalevered beams balanced within the walls and floors during their construction. Patté makes extensive use of this idea later in the text in his proposed ideal theatre.

Cochin's Le projet d'une Salle de Spectacle, pour un Théatre de Comedie, is the third source cited by Patté (see Appendix H-L). Cochin's idea of an ideal theatre would seem to be a cross between the floor plan of the theatre of Vicenza (Teatro Olimpico) which he recommends highly, and a prosceniun with tripartite stage like that of the theatre of Imola (Teatro d'Imola). Patté argues against the plan of Cochin's theatre in several ways. First, he claims that it is against the natural projection of the voice, being too wide. Second, he argues that being as wide as it is, the forestage apron would project into the audience some twenty feet, thus removing the actors on the forestage from the verisimilitude of the stage action.

While Patté admits that Cochin has a good point in his discussion of the old theatre of the Comedie Francaise, he counters that the solution is not the extreme width which Cochin proposes. Patté also suggests that Cochin's idea of having removable panels at the rear of the boxes, allowing for their removal and the addition of extra rows of seats in the halls, might be interesting and economically

a good solution to the problem of first night and premier crowding. He discounts the solution, though, on the grounds that it would defeat any advantage to the accoustics which might be gained in any other way.

The next reference cited is Monsieur M. M.'s Exposition des principes que l'on doit suivre dans l'ordonnance des théatres modernes, Appendix H-L.[17] When Patté discusses this work he goes to great lengths to express his appreciation for the detail to which the author has gone in laying down principles for the design and execution of a theatrical hall. At the same time, he cannot help but express regret that Monsieur M. M. had not been even more explicit in detailing several points.

Monsieur M. M.'s discussion, alla Patté, concerning sound is very close to what becomes wave theory, but his analysis of sound as being a phenomenon which will return or be reflected directly back upon itself, is in error. Patté points this out and comments upon it as being what led Monsieur M. M. to assume that any shape for a small hall would be appropriate. It also led to M. M.'s later pronouncements concerning circular and elliptically shaped halls.

Patté points out that M. M. did not apply the Cartesian principle of Physics, the equality of the angles of

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[17]Monsieur M. M. is never identified by more than his initials, apparently a common practice of the era.

incidence and reflection, when sound is reflected from a surface. M. M. assumed that sound was reflected directly back to its source from a hard and sonorous surface, therefore he recommended the use of a circularly shaped hall for the best effect. He also argued that the circularly shaped hall would produce the best sight lines for the audience. Patté disagrees, for M. M. had argued that sight lines should have been developed using the rear of the stage as the source of all being able to see, which would have led to sight distortions for those seated at the sides.

It is also from Monsieur M. M. that Patté draws and developes further his ideas on the openness of the balconies. M. M. suggested that for the better circulation of sound it would be advisable to use simple (low) barriers between sections of the balconies, rather than split up the balconies into something looking like pigeon coops.

Patté also argues against boxes, in an inserted commentary, from the point of view that their use in a design requires an excessive width for a hall. This is a point of no concern for M. M. in that he suggested the circular hall, which would have considerable width by its nature.

Patté argues against the circular hall from the point of view that the natural projection of the voice is forward from the body and not lateral; as a result the extreme width of the circular hall would be against the nature of the projected voice, and therefore, bad.

Patté concludes his comments on the writing of Monsieur M. M. that while he had developed some tenable points, he had developed them after the fact. M. M. did not go to what Patté considered to be primary sources or causes for the design, therefore, he discounts the results which M. M. achieved. Yet, at the same time, Patté admits that M. M. came forth with some excellent and useful points. Patté's final remarks are the usual. He laments that M. M. had not appended some drawings to his work to illustrate the points so badly in need of illustrating.

The fifth section of Patté's chapter XIII deals with the Prospectus of a book, Noveau Théatre tracé sur les principes des Grecs et de Romains, never published due to the death of its author, Monsieur M. Damun (see Appendix H-L).

Damun acknowledged again, alla Patté, a principle also well accepted by other architects of the era. He maintained that the architect should begin to design a theatrical hall from the principles of sight and sound, and not from the approach of the various ordered rules of general architecture.

Damun's proposed theatre plan appears to be similar to the plan for the Teatro Olimpico of Vicenza, except that he proposed a semicircular plan instead of a semi-oval as in the Teatro Olimpico. Damun argues against the use of a proscenium as it comes too close to the first set of wings and usually has nothing to do with the scenery, on that set of wings or anywhere else on stage. He further argues against

the use of a series of small wings on each side of the stage, having become enamored of the Roman-Vitruvian idea of Periaktoi or triangular scenic prisms on each side of the stage.

Patté refrains from saying more than that he would have found Damun's text of interest, if it had actually emerged, but in that it did not, he does not feel that it would be fair or delicate to comment. Patté does say that he feels that the basic idea of the proposed semi-circularly shaped hall would suffer from the same problems that the plan proposed by Monsieur M. M. would have had, and these have already been discussed.

The sixth part of Patté's XIIIth chapter deals with several sources of passing interest (see Appendix H-L). The section deals with the writings of J. F. Blondel, Cours d'Architecture, with a plan for a theatrical hall by Roubo, Traite de la construction des Théatres et des machines théatrales, and discusses the lectures by Noverre for his yet unpublished book on theatre architecture, Observations su la construction d'une nouvelle Salle d'Opera.

Patté's association with Blondel covers a period of many years.[18] Patté illustrated Blondel's Cours d'Architecture while Blondel was alive and added two books to it

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[18]Mathieu, op. cit., pp. 324-327.

after his death.[19] He was considered enough of an expert on Blondel to have been invited to write on him after his death, and ultimately was given his seat as Professor at the Académie Royale de l'Architecture.[20]

It is difficult to know whether Patté's comments on Blondel's Cours d'Architecture come from the actual text or from his own personal discussions with Blondel in reference to theatre architecture. Patté does maintain that he wrote this Essay as a companion piece to the Cours d'Architecture, because Blondel in his original conception of the Cours did not include anything on theatre architecture.

Patté's comments on Blondel, whatever their source, do supply some interesting material. Blondel advised that it would be useful to remove boxes and supply instead continuous galleries, one of many sources used by Patté for this point. Blondel recommended that the floor of the hall be wooden, instead of brick, and that there be benches, instead of having the audience stand, as had been the older custom. Finally, Blondel suggests, and Patté objects, that the orchestra, that is the members of the orchestra, be split into two parts and located above the balconies on either side of the stage, thus leaving the hall entire

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[19]John Fleming, High Honour, and Nikolaus Pevsner (eds.), The Penguin Dictionary of Architecture (London: Penguin Books, 1966), p. 31.

[20]Mathieu, op. cit., p. 326.

between the stage and the hall. On this point, Patté objects, saying that such an arrangement would make the orchestra very difficult to conduct. Later on, in his own text, Patté has another rationale for placing the orchestra between the parterre and the stage.

The plan for a stage suggested by Monsieur Roubo would appear to be like that of an ancient theatre, yet in the abbreviated verbal description of Patté, Roubo's theatre sounds almost like the description of a contemporary thrust stage. Patté argues with the plan from many points; the circular design he would argue would be against the best principles of accoustics, the extreme expanse of the proscenium arch at the sides of the stage he would argue would be against the sight lines of the audience, and the extreme thrust of the apron of the forestage he would argue would be wrong because actors on it would be too far removed from the illusion of the presentation of the play within the stage.

Patté's exposition of the lecture by Noverre on the defects of the old Paris Théatre d'Opera is quite interesting in itself. Unfortunately Patté did not go into greater detail in reporting the lecture, but that was not his prime purpose.

The main point brought out was Noverre's suggestions on fire prevention and protection for the stage by the use of water reservoirs and hoses placed handily near to the

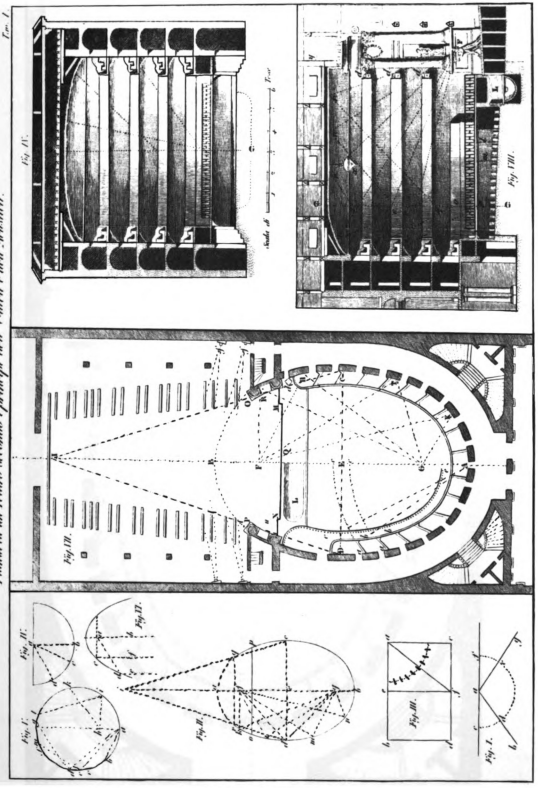

Figure 5. Composite Plan of Patté's Ideal Theatre.

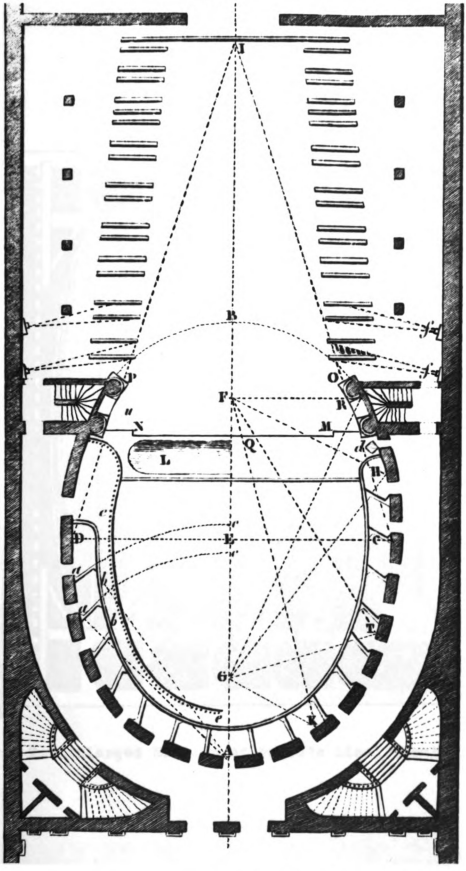

Figure 6. Enlarged Floor Plan of Patté's Ideal Theatre.

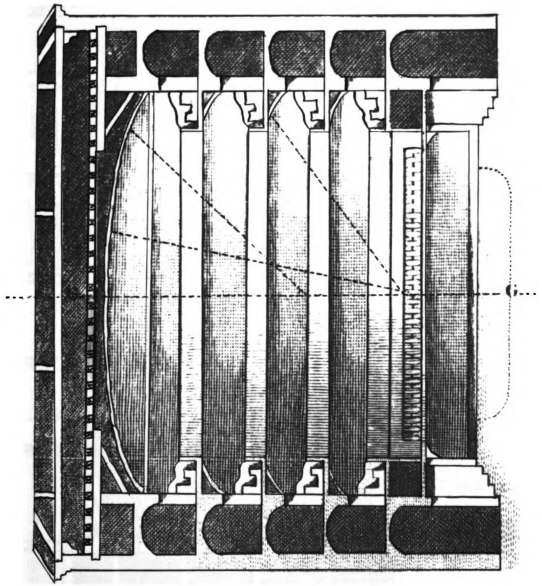

Figure 7. Enlarged Section of Patté's Ideal Theatre.

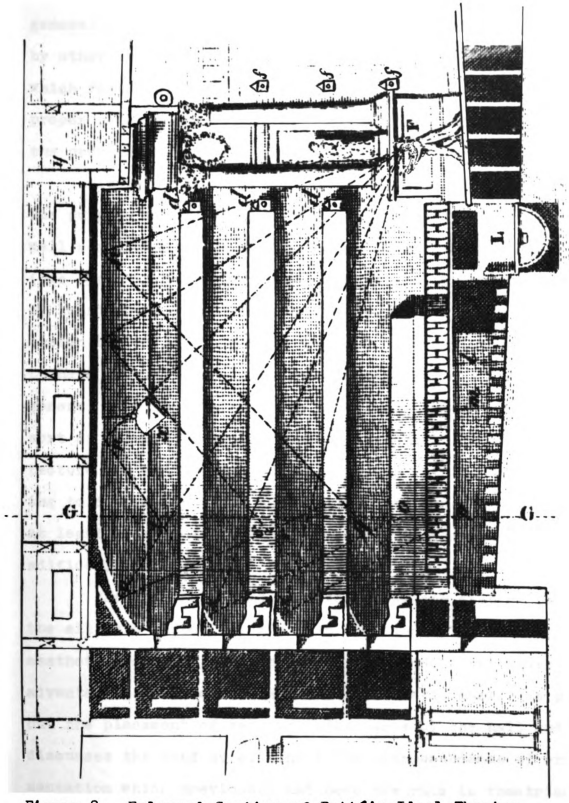

Figure 8. Enlarged Section of Patté's Ideal Theatre.

stage. Noverre's other comments would seem to have been generally along the lines of many points previously raised by other authors cited. His most emphatic point, and one which Patté quoted at length, was a discussion of the proper relationship to be maintained between the audience, the proscenium, and the stage.

It is in his Chapter XIV that Patté settles down to the purpose of the study, that is actually to apply his well researched ideas to the design of a theatrical hall (see Appendix M-W). He makes some general comments, by way of introduction, and then begins the task of the actual design of the hall. One of the basic concerns which seems to have driven Patté to write his Essay was that most of general architecture could be that time be reduced to some sort of rules or orders of general practice. Theatre architecture was not governed by such rules; what he was attempting to do was to create and substantiate a set of rules or at least guidelines for the design and construction of such edifices.

Having argued himself into confessing that he prefers the elliptic shape, for the best of scientific as well as aesthetic reasons, Patté proceeds to discuss that shape's advantages, outside of the obvious accoustic ones. He points out the placement of various major parts of the hall and discusses the need to eliminate the overabaundance of ornamentation which previously had been the rule in theatrical

hall décor. He argues against,

> . . . columns, capitals, pedestals with their ornamentations, matting, draping, reliefs, figures, and ornaments in relief, all of those things . . . not suitable . . .

Chapter XIV is divided into ten sections. The first part introduces his major points concerning the design of a theatrical or musical hall, Appendix M. It includes his general comments against ornamentation, a Neo-Classic reaction against the excesses of the Rococo. It also includes his basic layout of a theatrical hall within an ellipse and indicates where, within that shape, the various parts of the hall should be found.

The second section of the chapter discusses the disposition or arrangement of the Boxes, Appendix N. As a matter of fact, he suggests the elimination of boxes and the substitution of open galleries. Patté's comments concerning the availability of an abundance of exits in the balconies would seem to us to be obvious, but as he points to ten major theatre fires in Europe which had occurred within the preceding twenty years, perhaps such a point was not so obvious.

The third section of the chapter is a discussion of the arrangement of the Parterre or Platea, Appendix O. Patté maintains two points, (1) that there "always" be seats or benches on the parterre floor, and (2) that the parterre floor be sloped toward the stage. Further, he

suggests that the first row of boxes be raised above the level of the floor for sight line reasons, that the doors onto the platea be on the sides of the hall adjacent to the proscenium wall, that they open out from the hall, and that the floor be made of wood for accoustic reasons.

Part four of Chapter XIV discusses the location and disposition or arrangement of the orchestra pit, Appendix P. His design for an orchestra pit includes a vault under its floor which would function as a resonating chamber. There would be devices like trumpets at the ends of the vault to direct the sound from the chamber toward the hall. This would appear to be an attempt to increase the strength of the pit orchestra's sound. At that time the accepted orchestral sound depended upon the extensive use of the lighter instruments, strings and woodwinds. As a result, their sound needed to be augmented. Later, with the introduction of brass instruments into pit orchestras, the emphasis needed to be shifted to try to keep the sound of the orchestra from overpowering the vocal sound. This led to Wagner's attempts to deepen and extend the pit at Bayreuth.[21] It was the shift in instrumentation which led to the later change in the design and use of the orchestra pit. One point which Patté raises bears discussion.

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[21]This argument is based on extended discussions with William D. Elliot, Musicologist, Department of Music, Ball State University, Muncie, Indiana.

> It is generally agreed that the orchestra should be located between the stage and the parterre. With the orchestra in this location the spectators gain some distance from the place of the scenery and this distance contributes to the illusion, which always has need for a certain distance to produce its effect.

This is precisely the argument used by Wagner for the "mystic gulf" at Bayreuth, many years later.[22]

The next part of the chapter, section five, deals with the design and construction of the ceiling of the hall (see Appendix Q). Patté argues that, after the walls, the ceiling is the most important element for the sonority of the hall, and, therefore, should make use of the elliptic shape.

Patté's next section, part 6, incorporates a discussion of the design, arrangement, and uses of the proscenium, Appendix R. He says that, ". . . it is necessary to think of the proscenium . . . like a mixing place between the hall and the stage, destined to prepare the aperture of the stage."

Part seven deals with the stage and its space arrangement. Patté at first maintains that any good stage machinist should be able to develop the machinery for any stage, Appendix S. He argues that the size of the stage depends upon the size of the plays intended to be done upon it. He argues that there is a strong relationship between the hall

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[22]Patté's point is in contradiction with Oscar Brockett's comments concerning Wagner in History of the Theatre, p. 588.

and the stage in that the audience seated in the hall must be able to see and hear all that is going on within the stage. He picks up some points from Noverre's lecture on the faults of the old Paris Opera house and makes suggestions for the space necessary for the good use of the back stage space. He concludes his comments on the stage by arguing that if one allows extra width for the stage then one could use fewer but wider wings. As a result you would have a more verisimilar result in the scenic depiction.

Patté's next section, part 8, Appendix T, wherein he deals with the lighting of the auditorium and the stage and its scenery, will be dealt with in the next chapter of this study. The type of lighting instruments he suggests for lighting the stage would obviate the use of footlights for lighting both stage and scenery. He also suggests the use of softened indirect light for the auditorium, in contradistinction to the direct and brilliant lighting on the stage.

The particular point to be gained from Patté's section nine of Chapter XIV, Appendix U, is his understanding of the movement of large groups of people around within a theatre building and his understanding of the feelings of the mass-audience. He points out that the accessories to a great theatrical hall are as a, ". . . great hearth with few entrances but many exits, because going to the performances one arrives after the other, but at the moment that it is finished, all crowd together to exit at once!"

The last section of this chapter is a detailed description of Patté's own application of his principles to an ideal theatre, Appendix V. He shows not only how to derive the basic elliptic shape, but also how it is divided for the various parts of the hall. It is in this section that he goes into detailed use of the ellipse and its modifications in actual application to use as the basis for a hall. This section and his illustrations are an epitomization of all of his ideas.

Patté concludes his detailed study, Appendix W, working as he had proposed from broad basic principles toward specific applied constants, commenting that, ". . . as the ancients gave certain rules for the construction of their theatres, analogous to their customs and the vast size demanded, thus, perhaps, one will find other similarities between their lives and ours . . ." He had accomplished what he had set out to do, write a well researched, well conceived guide for the "architecting" of theatrical and lyric halls.

Given our additional almost two hundred years of experience in the art and craft of theatre architecture, we might tend to look at his effort as rather naive. It must be remembered, though, that this architect was writing before modern physics, before modern accoustics, before the endless sophistications of the Industrial Revolution, before the philosophy in architecture based on the

exploitation of the material toward new and unexpected ends, before reinforced concrete and steel; he was working with the materials of his own day and he envisioned a form of a theatrical hall within his own reach, but at the same time, advanced beyond his own day.

Directly following the Patté Essay are found Paolo Landriani's Observations on the Essay (see Appendix X-EE). The Lombardian, or Milanese, scenic designer and theatre architect, Paolo Landriani, had already written extensively on the subject of theatre architecture, when he was invited by Dr. Giuglio Ferrario to translate M. Patté's Essay for the Italian reading public. Landriani maintains in his own preface to the Patté Essay that in an effort to do justice to the original he had abstained from making corrections in the text and had instead the intention of appending a series of "Observations" in which he would express his own ideas on theatre architecture.

Landriani's background in theatre was as a scenic designer. He was a student of Pietro Gonzaga and probably attended the Ducal Academy of Milan.[23] His artistic work was influenced by his master, Gonzaga, and also Canaletto

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[23]Thieme, Ulrich and Felix Becker, Allgemeines Lexikon der Bildenden Kunstler von der Antike bis zur gegenwart (Leipzig, Verlag Von E. A. Seemann, 1928), Vol. xxii, p. 34.

OSSERVAZIONI

DELL'ARCHITETTO E PITTORE SCENICO

SIGNOR

PAOLO LANDRIANI

SU L'IMP. R. TEATRO

ALLA SCALA IN MILANO

E SOPRA ALCUNI ARTICOLI

DEL *SAGGIO*

DI M. PATTE.

Figure 9. Title of Landriani's Observations.

OBSERVATIONS

of the architect and scenic designer

signor

PAOLO LANDRIANI

on the Imperial Royal Theatre

LA SCALA in Milan

and concerning certain parts

of the ESSAY

of M. Patté

Figure 10. Translation of Landriani's Title to Observations.

and the Galliari family.[24] He began his design career at the Teatro Argentina in Rome, between 1790 and 1792, and returned there occasionally through 1796.[25] From the Fall of 1792, he was a part of the production organization of the Teatro della Scala in Milan, where he worked alternatively with Giovani Pedroni, Carlo Caccianiga and Giovani Fuentes.[26] While connected with the Teatro della Scala, he educated a generation of scenic designers, including: Pietro Ganna, Allesandro Sanquirico and Giovanni Perego.[27] Perego and Landriani collaborated on a series of designs during the Teatro della Scala seasons of 1801, 1806, and 1810.[28] After leaving the staff of the Teatro della Scala he became Professor of Drawing and a member of the Commission of the Brera Academy.[29] He was also a theoretical consultant for the review, Biblioteca Italiana.[30]

The theoretical work for which he is best known is his Osservazioni sui difetti prodotti nei teatri dalla

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[24]Ferrari, Carlo, La Scenografia (Milan, 1902), p. 128.

[25]Enciclopedia dello Spettacolo, pp. 1204-1206.

[26]Ibid.

[27]Ferrari, op. cit., p. 128.

[28]Enciclopedia dello Spattacolo, pp. 1204-1206.

[29]Ibid.

[30]Ibid.

cattiva costruzioni del palcoscenico,[31] Milan, 1815-24. This text was issued over a period of nine years in four parts, of which the first part is the best known. The book, as a whole, comprises a publication of Landriani's notes and lectures on theatre architecture, scenic design, and scenic drawing. In that some of the theoretical sections of this book apply to the realm of this study, select sections of Landriani's Osservazioni sui defetti prodotti nei teatri dalla cattiva costruzioni del palcoscenico, will be included herein.

The second and third sections of Landriani's Osservazioni sui defetti . . ., include his detailed discussion of the Box Set, its design, use, advantages, and disadvantages. The pertinent sections of part two and three of the book will be included in Chapter IV of this study.

Landriani organized his Observations on Patté's Essay into a series of specific points of argument. He did disagree with Patté, in general and specifically on many points. The organization of this section of the study will be similar to the first part of this chapter, but the discussion will include comments on the argument between these men.

Observation A begins with a description of the Teatro

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[31]Observations on Defects Produced in Theatres from Badly Constructed Stages.

della Scala, which had been built after Patté (see Appendix X. Patté had included a description of the older, burned, Milanese Royal Imperial Theatre, but Landriani substitutes with this description the contemporary Teatro della Scala. Though the detailed measurements of the hall are curious, one can find the same information in the enclosed plans and sections of theatres.

Landriani immediately takes exception to Patté's argument in favor of the elliptically shaped hall, arguing that the hall of the Teatro della Scala is of the horseshoe shape and exhibited excellent accoustics. Landriani further argues in favor of boxes, superimposed one over the other and with dividing walls, stating that not only have the accoustics of the hall been found to be excellent but that the cost of the boxes's rent had been raised without issue from the public, due to the quality of the box's accoustics. Landriani agrees with Patté that the ceiling is of primary importance accoustically, but maintains that in the Teatro della Scala, it is the ceiling which is the prime cause for the excellence of the accoustics. Landriani further argues that the shape of the ceiling needs to be more like that of the sounding board of a harpsichord, flattened and made of wood, rather than curved and made of plaster. The argument is a distinction between the ceiling as a reflecting surface and as a reverberating medium; plaster as against wood panels.

Another point in which Landriani finds inconsistency in the Patté ideal is the point concerning the use or non-use of ornamentation in relief. Patté had argued that ornament in relief was detrimental to the reflection and reverberation of the sounds. Landriani maintains that, because it is the ceiling which is the main accoustic feature of the hall, ornament in relief is not only not detrimental to the circulation of sound but visually is necessary to tie the ornament of the proscenium to that of the rest of the hall.

This is the manner in which Landriani opens his observations on the Essay of Patté. The frankness of his opposition to many of the main points made by Patté makes one admire the restraint which he maintained in doing his translation of the work.

In his comments on Patté's use of the elliptic shape Landriani, naturally, expresses the accepted Italian preference for the horse-shoe shaped hall, Appendix Y. Landriani maintains that the shape of the horse-shoe is the one, ". . . most commonly adopted . . . as the most beautiful." He also argues that the ellipse is really a squashed circle and therefore is not as natural as Patté had claimed. At the same time Landriani claims that the horse-shoe shape, using as it does the perfect semi-circular back, is more natural and at the same time comes closer to the ". . . beautiful shape of the theatres of the ancients."

In reply to Patté's contention that open galleries give better accoustical properties to a hall by allowing for the freer circulation of the sound, Landriani states that if this were true then the accoustics of the Teatro della Scala would be terrible. This is not the case, both according to Landriani and also according to world opinion since that time (see Appendix Z).

Landriani allows, in his Observations D, in Appendix AA, that he does not wish to get into an argument with Patté on the advantages or disadvantages of galleries or boxes. He does point out, though, that under Italian custom, " . . . the person you find in a box is as in his own house, (and) on the contrary, the one who you find in a corridor (or open gallery) is as if in a public square." Landriani goes on to argue that the individual box serves to reverberate the sound as distinguished from the point of Patté that the open gallery serves to reflect the sound. The argument goes further that whether full of people or not the box will still reverberate sound, but an open gallery if empty reflects sound well, but if full will only tend to muffle or swallow up the sound.

In his Observation, marked E, Landriani claims that Patté would leave the arrangement of the stage space to the machinist without consultation with the architect (see Appendix CC). Landriani would have it that the architect, designer, and machinist would all work on the stage space

in collaboration to perfect the entire theatre as an organic whole. Patté suggests an almost complete separation between the stage and the hall, except for the flow of sound and vision, while Landriani suggests a unity between the stage and hall bound by sight and sound. The different uses of the French and Italian theatres, discussed later, will suggest the reasoning back of the separate points of view of the two men.

The discussion in Landriani's Observation F will be commented upon in Chapter IV of this study (see Appendix BB). He argues the Italian point that the hall must be more brightly lighted so that the audience may associate with each other in the openness of the platea or within the homelike confines of their boxes. He does admit that, when available, Patté's lighting instruments would be preferable to the smoke and distortions of the footlights.

Landriani's comments on the parallels and differences between French and Italian theatres are very enlightening (see Appendix DD). He draws the differences not only between the architectural arrangements of each, but also mentions some of the distinctions between production methods and the way in which they are affected by the differences in structures.

The different uses of the halls have already been mentioned. Further, it appears that the Italians still used the custom of the standing audience on the platea for

certain performances on specific occasions.

He explores the point which arises from the difference between the French parterre, on a level one floor above the street, as contrasted with the Italian platea, which was on street floor level. He argues against the traffic problems in the French theatre, wherein all movement to and from the hall must be up and down stairs. Then, he argues in favor of the benefits to be gained from the French arrangement of the stage. The French stage and its cellar, being above the ground, did not have the problems of the Italian stage with its damp and rotting cellar below ground. His argument seems at a draw with respect to favoring either the safety of the one or the convenience to the stage of the other. Though he does make a final point in terms of safety, concerning the increased ease of exiting from the street floor level platea of the Italian theatre, he does admire the dryness afforded the French stage cellar.

Landriani's comments concerning the use and loading of the wings of the stage, sound very much like the remarks of a working scenic designer. He decries the Italian habit of loading down the tele (corresponds to both mot and ferm, as used) with several quinte (flats), as apparently was the Italian custom. He admires the French habit of striking all flats from the movable wings as soon as they were no longer to be used for the production. He allows that the French custom of having readily accessible storage space

for the struck flats is far more desirable than the Italian usage of lashing flat, over flat, over flat, over those already there, until the tele no longer could function properly.

One of Landriani's points is to mention the "red draped wings," which were used as a convention in stage presentations of the era. Apparently, when there was not time to paint a complete set of wings for a stage setting, the convention was to use red draped wings for masking of the off-stage areas. This convention would correspond to our contemporary use of "flown" black "legs" and "borders." Landriani complains of this accepted convention. It offended him. Yet, he allowed that at times its use simplified the staging of a production. How familiar that sounds!

Landriani's final section of comments, found in Appendix EE, is a gathering of his ideas concerning the size, shape and arrangement of the stage as these relate to the hall and to the needs of the productions planned.

He maintains the Italian Opera house convention of recognizing the square as the best shape for the proscenium, but later admits that, " . . . the opening of the proscenium, whichever is larger, becomes almost equal to that of a little theatre, because above the wings, for the most part, it is closed by a large, stable panel (or teazer) for a good third or more of the opening of the proscenium."

The next major point which he discusses involves the

relationship of the depth and width of the stage and the needs of the productions done on it. He maintains that the most important dimension of the stage, with respect to the grandiosity of the production, would be the width. With width, he claims, one can create in perspective the appearance of whatever depth one desires. If your stage is too deep, he allows that the designs would all have a tendency to look like narrow deep streets. He argues for wider tele, which would demand, for their proper functioning, wider spaces at the sides of the stage. Wider tele carrying wider quinte can show in perspective any scene which the designer desires, and in fewer pieces, and with less weight, and with less fragmentation of the visual effect.

His final point concerning the depth of the stage is that more depth obviously places the tele and quinte at such a depth from the footlights that they could not possibly be lighted.

A point of historical curiosity which he reveals is that the stage of the Teatro della Scala originally had built into the floor a second set of footlights at some point, part way back on the stage. Without explaining the reason, he says that this second set of footlights had been removed.

Landriani's Osservazioni sui Teatri e Decorazioni appeared in 1818 as the second part of his published lectures from the Brera Academy, where he was Professor of

Perspective (see Appendix GG).[32] In that capacity his lectures ranged over the areas of scenery, stage craft, theatre architecture, accoustics, drawing, perspective, cast shadows, and other similar subjects.

This particular lecture series precedes Landriani's translation of the Patté text by some time. Patté's text was available to Landriani at the time of its publication, of course. Chapter I of the 1818 part of the whole, four-part, body of lectures (1815-1824) deals with the lay-out of the hall of what can be called the typical or ideal Neo-Classic Italian theatrical or lyric hall. Thus this chapter is Landriani's answer to Patté's work on the ideal theatrical hall.

Pierre Patté was not the only architect or theatre enthusiast to be interested enough to have written about the field of theatre architecture during the Neo-Classic era. But Patté was one of the first architects to have written from extensive research, in depth, trying to formulate rules or guidelines, and successfully completing a coherent treatise on the subject. His work, by itself, is important in that it reflects late eighteenth-century thinking on the subject. What also makes the work by Patté unique is that it was translated and commented upon by Landriani. As a result, in one source, we have both the

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[32]Observations on Theatres and Scenery.

French and Italian views on Neo-Classic theatre architecture.

The theoretical sections of this book, Ferrario's Descrizione de principali teatri, present the meat of the thought of both of these men. The added section from Landriani's lectures gives a fuller view of his ideas concerning a particularly Italian part of Neo-Classic theatre architecture.

Both men were caught up in the current of the Neo-Classic resurgence. This is evidenced by their interest in things classical. They spend a great deal of their time either agreeing with the principles of the ancients or carefully refuting the practices of the ancients because of new-found scientific practices.

The particular development of the writing of the Patté book is not new. He uses an already accepted formula for such books, as seen in Blondel's Cours d'Architecture. He acknowledges the intention of making his own Essay to be an extension of the Cours into an area not covered by it.

Nor was Landriani's commentary the only reaction to Patté. In 1790, the Englishman, George Saunders, published his not too original Treatise on Theatres.[33] Saunders picks a few generalities from Patté and Noverre and proceeds to build a case for a round-halled theatre. He does recognize

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[33]George Saunders, Treatise on Theatres (London: privately published, 1790).

Figure 11. Title Page of Landriani's Observations on Theatres and Scenery.

ADDITIONS TO THE OBSERVATIONS
ON THEATRES AND ON THE SCENERY OF
PAOLO LANDRIANI

Member of the C. R. Academy
of the Fine Arts of Milan

MILAN
from the C. R. Printery
MDCCCXVIII
(1818)

Figure 12. Translation of Observations on Theatres and Scenery Title Page.

Patté as, ". . . the first who attempted to lay down some principles on which to proceed."[34] The only other point which Saunders mentions relevant to our study was that,

> Monsieur Patté has proposed a method to light the avant-scene without that tormenting line of lamps at the foot of the stage, which wrongs everything it illuminates. He would have reverberators (sic) placed at the extremity of the boxes, on each side of the stage; and this has been practiced in small theatres with success, particularly at Blenheim, and it is well worth trying in larger ones.[35]

Patté's influence was felt in Europe for quite a time, resulting in the Landriani translation, among other things. At the same time, Landriani's comments give us the contrast of the Italian philosophy and approach to theatre architecture at the time.

As mentioned above, in Chapter II, the Neo-Classic style had many aspects in common throughout Europe, but in the detailed exploration of something as unique as the thoughts and expressions of the artistry of two individuals, the differences must stand out. Indeed, they do.

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[34]Saunders, Treatise on Theatres, p. 23.

[35]Ibid., p. 54.

CHAPTER IV

ADDITIONAL WORKS OF PATTÉ AND LANDRIANI ON THE THEATRE

In a study of theatre history it is extremely difficult to pin-point dates for the development of commonly recognized elements in either theatre architecture or theatre production. The attempt of this study, so far, has been to treat, exhaustively, the subject of the architectural style created by Patté and Landriani. But theatre architecture was not the only area that these men worked in. Both Patté and Landriani wrote down many of their ideas concerning theatrical production and production techniques. Often they cross-referened their discussions of architecture with considerations concerning contemporary theatrical production. Some of their points of argument have been mentioned in passing in the preceding chapters, I and III.

In this chapter some of Patté and Landriani's, possibly unique, ideas on theatre aesthetics and production techniques will be presented. The expression of these ideas would seem to pre-date commonly acknowledged chronological references in those areas.

To limit a discussion of the contributions of these men to their work in architecture would be to do them a grave disservice. Patté's ideas on aesthetic distance,

previously mentioned, and on lighting for performances are important contributions to theatrical production. Landriani's discourse on Box Sets, setting back chronology on the development of this staging form by roughly 25 years, must also be considered in its proper historical perspective.

The contributions of these men, both in theatre architecture and in theatre production, merits inclusion in this study of some notice of their work in the area of production.

An article in the July, 1781, Mercure de France, an unillustrated magazine, contains Patté's first public discussion of the use of lens and reflector system stage lighting equipment. Later, in his Essay, in the eighth section of Chapter XIV, is contained his enlargement of the use of a lens and reflector system for stage lighting. This would seem to pre-date our previous knowledge on this subject.

Similarly, Landriani's discussion in his Observations on Theatres and Scenery, of 1818, of the design, advantages, and disadvantages of the box set or scena parapetata, would appear to pre-date concrete evidence of the accepted use of this type of staging.

Whether these works do actually pre-date established chronology is not the primary concern of this study. This facet of the work of these men is presented here as typical of the type of accomplishment achieved by the architect-designers of the Neo-Classic era.

The discussion of Patté's thoughts on stage lighting and Landriani's rebuttal were not included in the body of the commentary on the Essay in the last chapter. This commentary will be found herein. Also to be included in this chapter will be a detailed discussion of Landriani's Chapters II and III from his 1818 additions to Teatri e Decorazioni. For the sake of clarity, illustrations and details from illustrations will be included in the text of the chapter. For form of the chapter will be similar to that of the last, with commentary following the translated material.

Patté's July, 1781 article in the Mercure de France, was entitled, Observations sur les moyens de rassurer le Public en cas de l'événement du seu pendant le Spectacle. The article can be described as a preview of his book. He covers, in the briefest detail, some of the major points to be explored in the Essay. One of the points discussed is the use of safe stage lighting equipment. It suggests a type of equipment to light the stage from above and in front of the proscenium, making for a more natural picture on the stage. He suggests that the safety to be gained from enclosed light sources would equal the audience's joy at not having to look at the stage picture through the heat distortions of the footlights. He concludes that his thoughts are presented to increase the public safety.

The following year, when he published his Essay, he included a section, Chapter XIV, section 8 (see Appendix T),

wherein he discusses the lighting of the stage using lens and reflector system equipment. This section is of extreme interest because it pre-dates other discussions of this type. He introduced the subject in the article in the Mercure de France; which was short and unillustrated and as a result his intentions were not completely clear. In the Essay he expands the discussion of the type of instruments and their uses, and includes both plan and cross-section views of the instruments and their proposed positions in the theatre (see following two plates). Patté advocates the use of lighting instruments which incorporate both reflectors and lenses, with the flame in an enclosed and vented housing. These instruments would be flexibly mounted on pivotable frames. Their light would be directable onto the scenery or stage as desired. They would be much more fire-proof than the open light battens (porta-lumi or lunettes) which were the standard light source at the time. He argues that such lighting instruments could be mounted at some distances from the combustible scenic materials of the stage, and that the resulting safety to the audience was greatly to be desired.

Further, Patté comments upon the effect such lighting instruments would provide. He details two mounting positions for instruments. The first is on vertical, pivoting frames mounted on the walls of the wings, above the stage floor. These instruments he says would " . . . give a

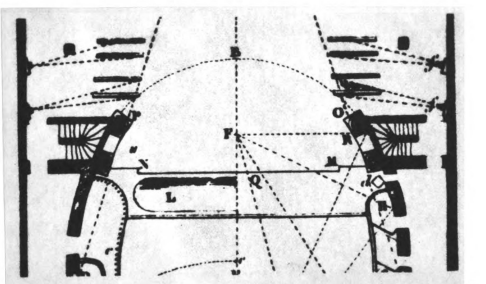

Figure 13. Detail of Patté's Theatre Plan, Indicating Lighting Instruments.

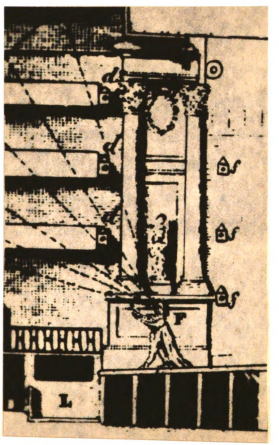

Figure 14. Detail of Patté's Theatre Section, Indicating Lighting Instruments.

vivacity to the colors . . ." of the painted scenery, producing in the perspective a " . . . sweetness and an appropriate accord for deliciously alluring the eyes of the spectators." He maintains that the strongly "thrown" light could achieve effects of light and shadow not achievable in painted scenery.

Further, Patté argues that the footlights could be dispensed with. He describes the effect of the heat waves created by the footlights and the obvious distortions to the view of the audience created by those heat waves. He suggests that open flame causes the actors and singers to cough from its smoke, and that the increasingly dense smoke in the hall is injurious to the sight, to say nothing of what it does to the decor of the hall.

To remove this source of aggravation, Patté suggests that the lens and reflector lighting instruments could be used <u>in</u> the auditorium, <u>also</u>. "It would not take more than mounting three reflector lamps next to the stage end of the balconies, on one side and the other, at the widest part of the hall, where the railing of the second, third, and fourth balcony begins." His argument continues, " . . . thus the reflector lamps can advantageously direct their light, and embrace with their rays the totality of the proscenium. With this method, instead of finding the scenic objects ridiculously illuminated from below to above, they would be lighted from above to below, as would the Sun. <u>Thus, they would appear to have a natural appearance.</u>"

Patté goes on to point out that for the audience the reflector lamps being on the sides would no longer produce heat ray reflections of the visual image of the stage. Beyond that, Patté points out that because this sort of lighting instrument could be chimneyed or vented all fumes could be directly exhausted to the outside, and if built properly the auditorium lighting instruments could even be lighted from the corridors, thus obviating the need for any open flame in the theatrical or lyric hall.

In the last paragraph of this section of the chapter, Patté argues in favor of a simple chandelier in the middle of the ceiling of the hall, functioning by the use of reflected indirect light. The result would be " . . . the light bouncing on the smooth and polished surfaces of the cover would shed a sweet and soothing splendor, which would make a contrast with that of the stage which would be live and brilliant."

Truly on these points Patté, if not an innovator, was at least far ahead of his time in the application of the use of reflector and lens systems to the lighting of stages.

The discussion of the lighting or illumination of performances by Landriani centers around a point of nationalistic custom concerning the uses of a theatrical hall (see Appendix BB). By the time of Patté, French theatres were being built solely for the purpose of the presentation of theatrical works. Some other uses of the theatrical hall

occurred but the idea of a social-recreational function occurring in the entire hall-stage complex of a public theatre was no longer acceptable.[1] The reason was that in the French theatre the parterre floor was built on a slope with benches attached to it, thus obviating its use for banqueting or dancing. Banquets were still held in theatres in France, and especially those of Paris, but they were held on the stage.[2]

On the contrary, in Italy two kinds of social-recreational functions occurred in the hall-stage complex. First, and most commonly, were the private uses made of the boxes. Landriani refers to a man's box being ". . . as his home . . ." wherein one could entertain in conjunction with the performance or separately from it. Second, due to the flat floor of the platea, with its removable seating, this part of the hall was often used for grand balls or banquets, as well as its more usual function as a standing or sitting place for observing performances.

The point of distinction concerning the lighting of the hall becomes evident when you consider that in France the hall was considered secondary in importance to the stage. Therefore that hall was lighted softly, as Patté suggests,

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[1]Marvin Carlson, The Theatre of the French Revolution (Ithaca, New York: Cornell University Press, 1966), passim.

[2]Ibid.

while the stage should be more brilliantly lighted. It was for that reason that Patté suggested the use of reflector and lens units to light the stage and indirect light for the hall.

In Italy, Landriani argues, the lighting of the stage and hall are of equal importance. The social function of attending a theatrical event, he maintains, is only partially fulfilled by the viewing of the performance. If the performance is dull, then the evening can be saved in the Italian theatre by being able to withdraw socially into one's own box, drawing the curtains, sending out for supper, and entertaining one's friends.

In order best to illuminate the hall, in its entirely so one may see who is there, Landriani suggests that one does not have any choice but to employ a large chandelier, with small wall sconces in each box. He argues, though, that care must be used in the design of the chandelier that it does not cast annoying rays of light from its crystal facets. These refracted shafts of light tend to destroy the effects of the scenery, he says, and to dazzle the eyes of the spectators.

A much more important contribution to theatre history would be Landriani's comments and discussion of the Box Set, which appeared in his Observations on Theatres and Scenery in 1818. In Chapter II of that book, entitled, Sulla Scena Parapetatta, . . ., Landriani defines, describes, and

discusses the use, advantages and defects of the Box Set. Chapter III, following, deals with adding three-dimensional elements to the flat side walls and ceiling of the box set.

Landriani defines the Box Set as,

> . . . that type of scenery which on the stage space is formed with individual flats joined in the form of walls, and placed in such a way that they would comply with or follow the structure of the real plan of the actual locale, but which is somewhat restricted, foreshortened, or perceived in perspective, in which the space given is fixed by the designer, or must be fixed because of the needs of the performance.[3]

As if this definition might be thought inadequate, Landriani goes further,

> These scenes are created in order that the usual openings between one wing and the next are not seen, the openings staying completely closed, and they have their ceiling equally closed, the ceilings made of flats, horizontally above the others; so there is no need for the introduction of masking pieces, expressly to cover defects in the lines of sight of the spectators seated in the flanking boxes.

Landriani then moves on to discuss the advantages and defects of the Box Set, as compared to the wing and drop type of set:

> We now have the advantage with this type of scenery of being able to place on the flanks of the set - doors and windows - with much more truth and of such a size that they are better suited to need. There is not the embarassment or the obligation (for the actor) of being seen in a small space, as between wings, as we have seen in the other type of scenery. It would seem that a stage setting, covered in such a way on every side, would give a better illusion of whatever it represented, not having the distraction of extraneous objects which

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[3]The Enciclopedia dello Spettacolo defines the scena pararettata similarly, maintaining it as a late nineteenth-century scenic convention, though, ref. pp. 1609-1610.

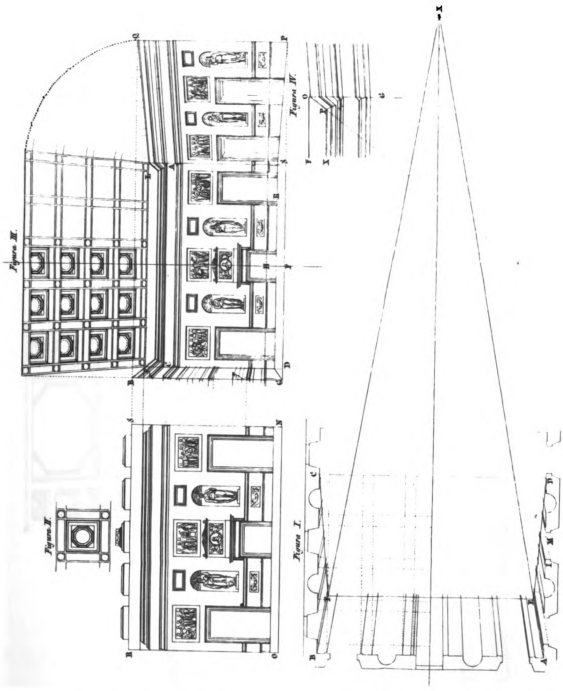

Figure 15. Landriani's Plans for a Box Set, Based Upon An Actual Room Plan.

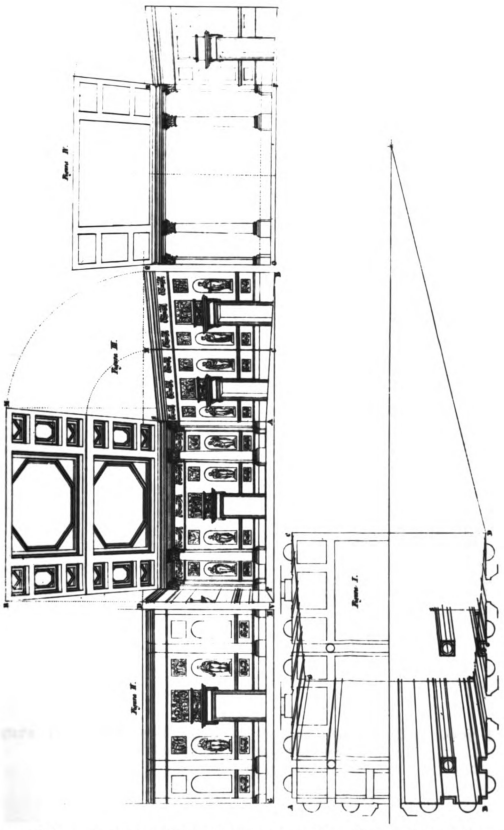

Figure 16. Landriani's Plans for a Box Set, Based Upon An Actual Room Plan, With Columns Across the Center of the Room.

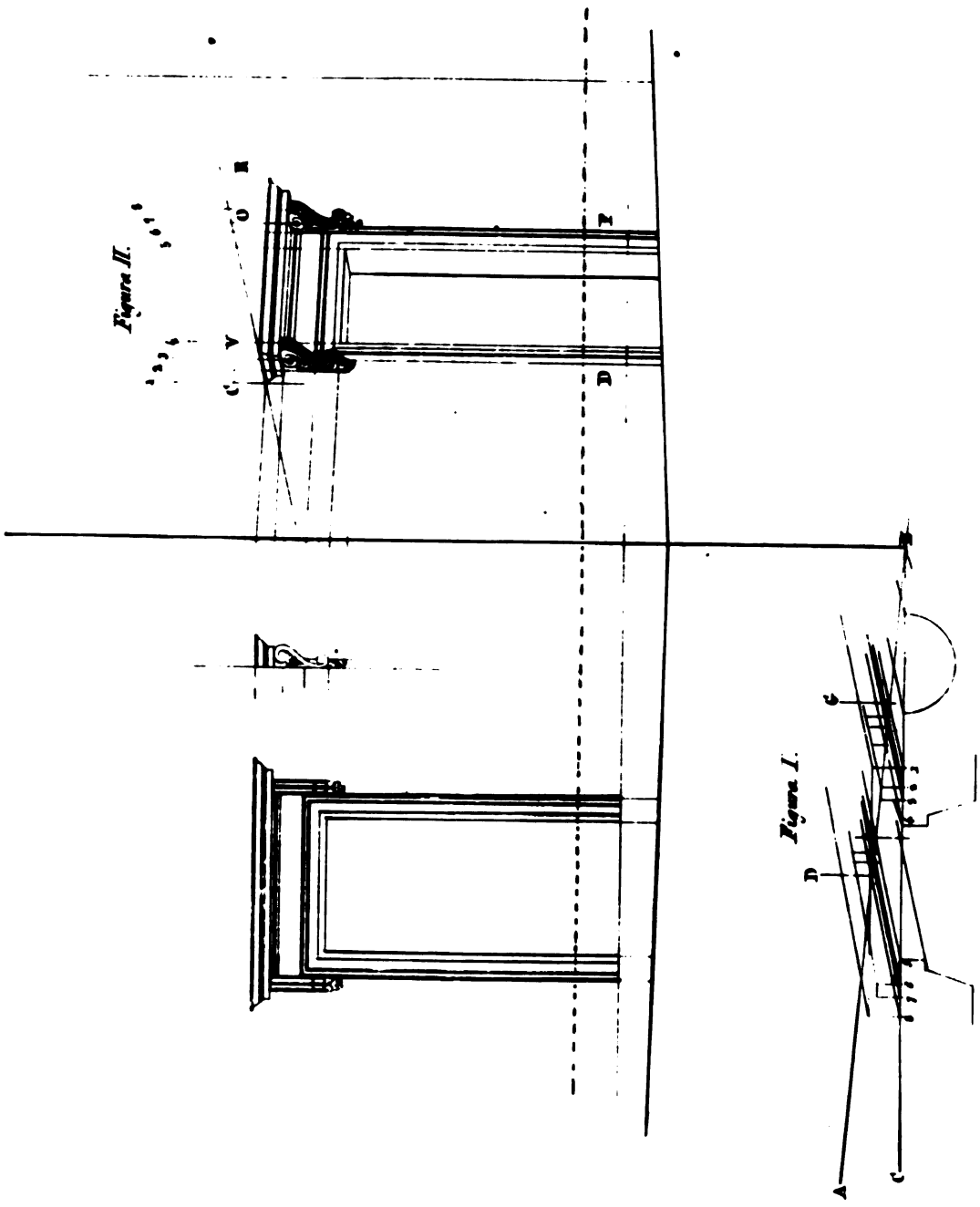

Figure 17. The Drawing of a Forced Perspective Door for the Side Wall of a Box Set.

ordinarily appear in the open flanks of the other type of scenery (wing and drop).

The Box Set is not claimed to be a "cure-all" for the ills of the wing and drop type of scenery; Landriani also enumerates the ills of the Box Set:

> . . . the defect of having part of the set escape from view on the side walls, as . . . on the flanks of the box set.

He also discusses the technical problems of using Box Sets in the theatres of his time:

> The idea of the box set must be limited always by the limitations of the stage space and by the heighth of the flats, which must not exceed a given measurement because of transportability . . . for the easy changing of the scenery and an easy amount of time for that action . . . due to the construction of the flats, a flat ceiling is always called for.

Nor is this Landriani's only concern,

> . . . the striking of the (box) set is also restricted to a limited number of pieces of scenery . . . (and) that scenery, however grand it may appear, must never in fact be grandiose . . .

Thus he warns against the use of more than flat-painted walls to make up the encircling flats and ceiling of the box set, for the best technical reason possible, one could neither move nor store a three dimensionally built box set.

The rest of this chapter and the whole of Chapter III deal with taking the floor plan of an actual room and reducing it to a forced perspective floor plan, and subsequently to a completely forced or foreshortened reproduction of that room as a box set.

Landriani's concluding remarks are particularly relevant to the design of a box set for an Opera House with galleries of boxes extending on the sides up to the proscenium wall.

> But what is the good of designing box sets? They will always have the observed defect of their side walls never being exactly in correspondence with perspective. One will always be able to see objects designed, as if of a natural size, with their flanks visible, yet naturally it would not be possible to see those sides. The objects would be all foreshortened in one way or another. But this has always been given to the art for the necessity of making the depth and width of the stage visible from the platea. Really in life you might not see these objects if they were constructed as from life. A final point, you can never see the (box) scene sufficiently from the sides (of the hall), the light of the footlights escapes. The lighting is particularly bad when there are no jutting (masking) pieces (in the ceiling) to hide a break, for hanging suitable lights (such as open flame border-lights--porta-lumi).

It is perhaps appropriate that it is Patté the architect who made the distinction between the lighting of the stage and the house and for that and other reasons suggested the improved method of lighting the performance. Landriani, the considerably experienced scenic designer, was the one to have delineated the box set. Each man, through wanting to improve the theatrical experience, contributed what can be described as a lasting improvement of that experience, though little realizing the effect they were to produce.

CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of this chapter is to summarize and draw conclusions based on the findings of the study. The plan of the chapter will consist of three parts: (1) summarizations, (2) conclusions, and (3) an interpretation of the conclusions, drawing some personal implications and inferences.

The working hypotheses of the study can be stated as a series of questions: (1) Was there a Neo-Classic style of theatre architecture? (2) What was the relationship of Patté and Landriani to that architectural style? (3) What is the position of Patté and Landriani in theatre history?

Having explored the period, the stylistic sources, translated primary materials, and having explored the lives and works of the architects involved, it is the purpose of this chapter to recapitulate the findings of the study; in an attempt to answer the above questions. Since there seems to be some disagreement among art critics and architectural historians on the Neo-Classic style in their media, and a general lack of expression on the Neo-Classic style of theatre architecture by theatre historians, it seems consistent to report in this chapter a summary of the conclusions found by the study.

The Neo-Classic period has been identified as that period in the eighteenth-century in which historical classicism was the prime influence on artistic and philosophical life and thought. This period would extend from the dates of the writings of Mengs, Winckelmann, Milizia and others in the 1750's and 1760's through the expiration of historical classicism as a vital influence, due to the rising influence of Romanticism in the early part of the nineteenth century.

The definition of a Neo-Classic style of architecture must stem from the architect, as Milizia has pointed out, and extend beyond the architect to his ideas and ideals of beauty as related to his classical past. These architects sought a new proportion, a simplicity of form, a symmetry of parts, and a certain polish in contours and surfaces, and above all, in everything a triumph of light and color. The preference for simple geometric shapes and smooth plain surfaces is common to all Neo-Classic architecture, aimed at achieving the effect of solid, unbroken mass. The simplicity of forms, integrity of surface, and continuity of line, so indicative of Neo-Classic architecture, growing as it did from the antiquarian interest of the early eighteenth-century into the full-blown philosophy and practice of art, sculpture and architecture, were to pervade all aspects of the architectural practice of the period.

The lives of both Patté and Landriani chronologically

relate to the period of Neo-Classicism. To say that they were Neo-Classically influenced and inspired is a foregone conclusion. A restatement of a few points concerning the life and works of these men would draw the connection more fully.

Patté was raised and trained in the Rococo Paris of the court of Louis XV and the Regency salons. He was known to have traveled extensively in Italy and the Near East. He published illustrated treatises on some of the archaeological scavi which he had visited. He was available at the right time and place to have been influenced by the proponents of Neo-Classicism. According to Mae Mathieu, in her monograph on him, he was exposed to their thought and was profoundly influenced.

Patté's writings continually refer to the works of the "ancients." It is obvious that he had studied ancient theatres, had read Vitruvius, and had actually been in the ruins of some of the extant ancient theatres. He had also seen copies of ancient theatres, such as the Teatro Olimpico at Vicenza. On the strength of these many points of contact and reference it is argued that Patté and his theories are the product of a background strongly influenced by Neo-Classicism.

To show the connection between Landriani and Neo-Classicism is no more of a task. He was trained in Milan at the Ducal Academy. His first major position, as designer

and scenic painter, was in Rome, between 1790 and 1792, at the Teatro Argentina. From 1792 onward, he was associated, first, with the Teatro alla Scala, and then, with the Brera Academy in Milan. Though he was trained somewhat later than Patté, he was ideally situated to be directly influenced by the mentors of Neo-Classicism.

The lectures and the Observations on Patté invoke the aid of the ancients, wanting to emulate their example, acknowledging their influence, their art, and their society.

The illustrations included from his lectures can be identified as Neo-Classic in style, because of the simplicity and integrity in their use of line. He uses large, flat spaces, simple flat painted friezes, flattened pilasters against the walls, details freely lifted from sources on newly discovered classical remains.

The connection of Landriani, like that of Patté, with Neo-Classicism, based on the many references mentioned, is as mentioned above a foregone conclusion.

To demonstrate the existence of the proper philosophical sentiments in either Patté or Landriani for the execution of Neo-Classic works of architecture would be next to impossible. But, it is possible to show in their works many of the elements which characterize the Neo-Classic in architecture.

One could argue from Patté's general architectural works, or his illustrations, but for the purposes of this

study it is necessary to show the connection of his theatre architecture to general Neo-Classic architecture. In the case of Landriani, one must argue from his writings and from his non-architectural illustrations, for lack of a better source. One could argue from his illustrations in favor of a Neo-Classic style in his scenic art, but, again, this would be outside of the realm of this study.

Both of these men argue in favor of the use of simple geometric shapes in the basic design of the theatrical hall. Their rationale is based on simplicity, on closeness to nature, on the example of the "ancients," and also upon physics, as they understood it. The Neo-Classic insistence on the use of smooth, plain surfaces is used by Patté in his arguments in favor of open galleries in the hall, and for the plainness of the curve of the ceiling. He rationalizes the use of plain surfaces on the best of accoustic grounds, but he also insists that for aesthetic reasons it would be more pleasing in appearance. This is also his argument relating to the continuity of line, i.e., the simple continuous line of the open galleries. He also argues against any great amount of decorative detail or relief in the body of the hall (except at the opening of the stage), both for accoustic and aesthetic reasons.

Using many of the same basic points Landriani argues in favor of many of the aspects of Italian theatrical halls. Though many of his points contradict Patté's ideas, they are

consistent with the aesthetic of Neo-Classicism. For example, Landriani argues that the halls found in Italy, with their multi-curve horse-shoe shape, have the requisite openness and simplicity of shape desired by the "ancients." He also argues that the multiplicity of boxes lends a continuity to the line of the relationship of one box to the next. He maintains that because the ceiling is accoustically the most important part of the hall, then that part must, of course, have a necessary planeness to its surface. The rest of the hall, though, could be decorated, because the "ancients" would have it that way, like the gallery at the rear of the ancient theatres.

Each of the elements of the Neo-Classic style of architecture may be found in the over-all conceptions and in the details of the work of Patté and Landriani. The differences between the results of the two men may be explained by their different nationalities and by their being two different artistic personalities, they each saw the same general subject somewhat differently.

Patté's ideas on the use of lens system stage lighting equipment, which was endorsed by Landriani, was introduced into the study to show the breadth of the artistic interests of the man. The technical innovativeness of his ideas and the novelty of their application, coupled with the fact that his ideas were perhaps before their time historically, makes the inclusion of this material in this

study not only of interest but necessary.

The same may be maintained concerning the material by Landriani on the Box Set. Little is known of the origins of the box set. Landriani's lengthy treatise may well predate any other comparable study.

Though the problem of the establishment of historical precedence is not within the scope of this study, the contribution of Patté to lighting and Landriani to scenery, whether these contributions precede others or not, are of sufficient magnitude to warrant their inclusion in a study on theatre and architectural history.

Based upon the findings in each of the areas of Neo-Classicism studied, the following is evident in answer to the above questions: (1) There was a Neo-Classic style of theatre architecture. But, it tended to be a composite of the influence of the "classical past," in general. As a result, Greek, Roman, and other "classical" elements tended to appear mixed in the resulting work. The definition of a style, per se, was not so fully drawn as in other more easily recognizable styles, such as the Palladian classical of the Renaissance, or Inigo Jones's variations in English architecture. The signature of the Neo-Classic architect was recognizable, but also to be seen and felt was the personality of the architect as individual. Neo-Classicism tended to be a philosophical and aesthetic milieu within which the architect worked, encompassing himself, his approach, his creative vision, as well as his production.

The answers to questions (2) and (3) have already been presented in a variety of ways. Such a study would not have been possible but for the attempts of Patté to categorize the design of theatrical halls into a set of rules or principles. The reaction of other architects, such as Landriani, makes their combined effort an excellent historical source, but one wonders if Landriani's reaction might not have paralleled the reaction of other architects who would have rejected the rules of Patté. Perhaps this is the reason for the lack of recognition of the work of these men. Academic rules tend to become academic and the source of academic revolt.

Certain inferences have been suggested to this author during the course of translating the primary materials for the study and during the actual writing of the study. One of the obvious values of the study was the exploration of an area of theatre history little explored by others. Perhaps there was a reason; the period followed the spectacular reigns of the Louis, but preceded the literary and dramatic ferment of the Romantic, the Sturm and Drang, and the much later Realistic developments of the late nineteenth-century. For dramatic theatre this period was not one of great interest; for the Operatic theatre, on the other hand, much was happening. As a result for theatre architecture, the design and construction of opera houses was a vital and active process. For the scenic designer, the design for operatic

production was the area wherein the public interest was to be found. For the dramatic theatre historian, then, the period may be by-passed lightly and superficially. To date books on dramatic history have by far outnumbered books on the history of architecture and theatrical production. It is hoped that this study fills a gap in the history of the theatrical experience in general.

A secondary purpose of the study was to attempt to establish some criteria for discovering styles in theatre architecture. These criteria have been alluded to in Chapters I and II, and worked with in Chapter III. One major question concerning the successful completion of the task needs to be answered: Is it possible to establish a style of theatre architecture?

In any art form there are rules and criteria against which critics and historians are constantly attempting to measure art objects. In painting there are standards and criteria for good composition and for measuring form and style. In music there are criteria for the sonata and symphony, for composition and harmony, and for tone and balance. In drama there are criteria which critics use to measure plot, action, exposition, dialogue, language, and many of the visual elements of production.

The critic or historian who maintains that his, or any, criteria are perfect yardsticks for discovering the style of an art object, forgets the nature of the object he

is studying and the process through which it was brought into being. Every artist is different; every artistic impulse is different; and every creative process under which an artist works is singular and unique.

Architects usually do not create works in order to conform to a particular style set up in advance by critics, theorists, or the works of other architects. Those architects who attempt to work in this fashion are written off as "hack" copyists, with the copy rarely having the spontaneity of the original. In other words, no criteria can perfectly measure an artistic product, and no artistic product can perfectly measure up to outside criteria.

The problem is further complicated when one considers that the criteria employed, i.e., Pevsner's contentions concerning style in architecture, apply to general architecture. To attempt to apply these criteria to the specialized area of theatre architecture, with its parallel but, nonetheless, divergent historical antecedants and influences, might seem unworkable in specific cases.

This is not an attempt to excuse the study, or the criteria; we are, after all, dealing with artists doing artistically creative projects. If as a result the criteria do not exactly fit all of the elements of the field, then a negative answer is not requested to the question concerning the establishment of a style. The request is merely made that the reader consider this study to be an attempt to

reconcile measures of style criteria for a general field with those special elements of a smaller area within that field. To fit the general field, the criteria of necessity must be broad enough to cover the whole area, as a result within the specialized area of theatre architecture some of the style elements of general architecture criticism may not exactly apply.

In summary of this point, it is the opinion of this author that the criteria of general architecture used in the study, and applied to theatre architecture, although possibly not perfect, appear practical and may be useful in other research seeking new insights into the styles of theatre architecture in other historical periods.

This study cannot make the claim that Neo-Classicism produced a new and entirely different approach to the problems of theatre architecture. What the Neo-Classic architects did was to approach the idea of the design of a hall from a set of basic and rationally thought out points: (1) They maintained that one should consider the use of the hall, as the first and most important question to be answered. (2) They established and maintained the integrity of the stage-auditorium complex. (3) They argued for the recognition of the use of accoustic and visual limitations in the design of a hall. The combination of these basic points established the groundwork upon which they set out to build a theatrical or lyric hall.

Working from the same considerations, one might expect some consistency in Patté's and Landriani's results. Patté's arguments on the design of a hall have a freshness, a novelty, and a consistency with the Neo-Classic ideal which can be contrasted very strongly with the works of the Rococo theatre architects. Landriani, though he speaks the right language, the rhetoric of Neo-Classicism, is more strongly bound by traditional late-Baroque Italian conceptions of theatre architecture. He could not break as cleanly from his immediate past as had his colleague, Patté.

The conclusions of this study suggest several areas for further exploration. Only recently have studies been made in depth of the physical conditions under which plays have been produced; in the past these studies have been limited to periods of literarily great dramatic activity. It can be argued that these periods of less vital dramatic or literary activity have been the periods when due to necessity theatrical production techniques have taken a more active or more dominant place in theatrical production. Perhaps it was during the production of the work of some one of the lesser known or "hack" playwright's works that one of the, as yet sourceless, technical production techniques was first discovered and used, such as the use of the box set.

One area which needs considerable study is the area of the history and development of theories of accoustics. In trying to trace the thought of the period on the subject

of accoustics, this author found no central source, and only the merest mention of the history of the development of theories of accoustics. Of course there is good reason for this; contemporary accoustical theory would seem to have the answers to most theatrical accoustical problems. Though there have been written studies of accoustics dating from the ancient Greeks, there is little to show the effects of any of the accoustic theories as related to theatrical production at any period.

Since the rediscovery of Vitruvius, Ten Books of Architecture in the fifteenth-century and their publication in Italian in the sixteenth-century, architects of many countries have written similar treatises on general architecture. Many times they have included a book or section on theatre architecture. While many of these books have been found and some have been made available in translation, there are many other titles still to be explored. These works need to be made available both for the sake of theatre history and for the use of architectural historians. The same hall or auditorium may be used both for dramatic and operatic productions, many discourses on lyric theatre, and on the construction of opera or lyric theatres contain material on the design of theatres. Many operatic scripts and scores, in the original hand, contain marginal annotation on scenic production, for that matter.

Landriani designed eighty-five productions for the

Teatro della Scala. He produced an uncounted number of productions for the Teatro della Canobiana, the dramatic theatre run by the same royal Imperial management in Milan. His productions need to be explored, perhaps through production books, scores, and manuscripts at the libraries of the Teatro della Scala, the Brera Academy, or at the municipal museum of the Pallazzo Sforzesco, for clues to his actual use of a box set.

Just as there has been made an argument for a Neo-Classic style of architecture in theatres, so there could be an argument made for a Neo-Classic style of scenic art in this period; an interim style between the late-Baroque scenography of the Galli's of Bibienna and Galliari's of Bologna and the Romantic scenic design of Sanquirico (Landriani's best known student). One of the elements of a Neo-Classic style of scenic art, due to the influence of Landriani, would have to be the convention and use of the box set.

One last point: There were working in Europe during the Neo-Classic period many architects. During that time many theatres were built. This study has centered on the work of one architect and the reaction of one scenic designer/architect. Their work appears to be indicative of the period. They contributed considerably to the body of knowledge on theatre architecture; they contributed substantially to the realm of theatrical production and therefore the study is valid. But, just as this author has found the writings of

Patté and Landriani waiting to be explored and reported, and risking the possibility of sounding overly dramatic, who is to say that there might not be even more interesting sources, as yet unfound.

BIBLIOGRAPHY

BIBLIOGRAPHY

Addison, Agnes. Romanticism and the Gothic Revival. New York: Gordion Press, Inc., 1967.

_____, "Some Aspects of Greek Architecture, Including a Study of the Neo-Grecian Style in Europe," Journal of the Royal Institute of British Architects, January, 1932.

Artz, Frederick. From Renaissance to Romanticism. Chicago: University of Chicago Press, 1962.

_____, "Aspects of Neo-Classicism," Apollo, November, 1963.

Barzun, Jacques. Classic, Romantic, and Modern. New York: Doubleday Anchor Books, 1961.

_____. The Energies of Art. New York: Vintage Books, 1956.

Bénézit, E. (ed.). Dictionaire Critique et documentaire des Peintres, sculpteurs, ... Paris: 1911-1923.

Bessone-Aurelii, Antonietto-Maria. Dizionario degli Scultori ed Architetti italiani. Genoa: Casa Editrice Dante Alighieri, 1947.

Brockett, Oscar Gross. History of the Theatre. Boston: Allyn and Bacon, Inc., 1968.

Carlson, Marvin. The Theatre of the French Revolution. Ithaca, N. Y.: Cornell University Press, 1966.

_____. Catalogo del Museo Teatrale alla Scala. Milan: 1914.

Cichy, Bodo. The Great Ages of Architecture from Ancient Greece to the Present Day. New York: G. P. Putnam's Sons, 1964.

Deville, Etienna. Index du Mercure de France. Paris: Libraire Jean Schemet, 1910.

_____. Dizionario Enciclopedico Italiano.

_____. Dictionaire Generale des Artistes de'l'Ecole Francaise. Paris: Libraire Renouard, 1885.

Deville, Etienne. Enciclopedia Italiana.

_____. Encyclopedia of World Art. New York: McGraw Hill Book Co., 1965.

Esposa, Hyos de J. (ed.). Enciclopedia Universal Ilustrada Europeo-Americana. Barcelona: n.d.

Fleming, John, Honour, Hugh, and Pevsner, Nikolaus. The Penguin Dictionary of Architecture. London: Penguin Books, 1966.

Ferrari, Giuglio. La Scenografia. Milan: Hoepli, 1902.

Gatti, Carlo. Il Teatro alla Scala nella Storia e nell'Arte: 1778-1963. Milan: Ricordi, 1964.

Giedon, Sigfried. Spatbarocker und romantischer Klassizismus. 1922.

Hauser, Arnold. The Social History of Art. New York: Random House, 1951.

Hautecoeur, Louis. Histoire de l'architecture classique en France. Paris: J. Picard et Cie., 1963.

Hawley, Henry. Neo-Classicism--Style and Motif. New York: The Cleveland Museum of Art and Harry Abrams, Inc., 1964.

Heaton, Herbert. "Industrial Revolution," Encyclopedia of the Social Sciences. New York: The MacMilan Company, 1932.

Hitchcock, Henry-Russell. Architecture in the Nineteenth and Twentieth Centuries. Baltimore, Maryland: Penguin Books, 1958.

_____. Indici e Cataloghi, XII, Disegni antichi e moderni, posseduti dalla R. Galleria degli Uffizi di Firenza, Vol. I, Series IV. Rome: 1894.

Irwin. English Neoclassical Art, Studies in Inspiration and Taste. London: Faber & Faber, Ltd., 1966.

Kaufmann, Emil. Architecture in the Age of Reason, Baroque and Post-Baroque in England, Italy and France. Cambridge, Mass.: Archon Books, 1966.

Kimball, S. Fiske, "Romantic Classicism in Architecture," Gazette des Beaux-Arts, XXV, 1944.

Lance, Adolphe. Dictionnaire des Architects Francais. Paris: 1872.

_____. Larousse Dictionnaire du XIX Siecle.

_____. Grand Larousse Encyclopédique.

Lavagnino, Emilio. L'Arte Moderna dei Neoclassici ai contemporanei, storia dell'arte classica e italiana. Turino: 1961.

Leith, James. The Idea of Art as Propaganda in France, 1750-1799, A Study in the History of Ideas. Toronto: University of Toronto Press, 1965.

Meeks, Carroll. Italian Architecture: 1750-1914. New Haven, Connecticut: Yale University Press, 1966.

Michel, A. Historie de l'Art. Paris: Libraire Armand Cohn, 1925.

Newman, William. The Sonata in the Classical Era, The Second Volume of A History of the Sonata Idea. Chapel Hill: The University of North Carolina Press, 1963.

Nicoll, Allardyce. The Development of the Theatre. New York: Harcourt, Brace & World, Inc., 5th ed. rev., 1966.

Panofsky, Erwin. Meaning in the Visual Arts. Garden City, N. Y.: Doubleday Anchor Books, 1955.

Pelles, Geraldine. Art, Artists & Society. Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1963.

Pevsner, Nikolaus. An Outline of European Architecture. Baltimore: Penguin Books, Inc., 1943.

Povoledo, Elena, editrice scenografia. Enciclopedia dello Spettacolo. Rome: Casa Editrice Le Maschere, 1960.

Rosenblum, Robert. Transformations in Late Eighteenth Century Art. Princeton, N.J.: Princeton University Press, 1967.

_____, "Neoclassicism Surveyed," Burlington Magazine, January, 1965.

Rowland, Gilbert. The Classical Tradition in Western Art. Cambridge, Mass.: Harvard University Press, 1963.

Runes, Dagobert and Harry Schrickel. Encyclopedia of the Arts. New York: Philosophical Society, 1946.

Sypher, Wylie. Rococo to Cubism in Art and Literature. New York: Random House, 1960.

_____. Four Stages of Renaissance Style. New York: Doubleday Anchor Books, 1955.

Tapie, Victor-L. The Age of Grandeur. New York: Praeger, 1960.

Thieme, Ulrich, and Felix Becker. Allgemeines Lexikon der Bildenden Kunstler von der Antike bis zur Gegenwart.

Vermeule, Cornelius. European Art and the Classical Past. Cambridge, Mass.: Harvard University Press, 1964.

Vianello, Carlo. Teatri, Spettacoli, Musiche a Milano nei secoli scorsi. Milan: Libreria Lambarda, 1941-XIX.

Wasmuth, Ernst. Wasmuth's Lexikon der Baukunst. Berlin: Verlag Ernst Wasmuth, 1932.

Watson, "Neo-Classicism on Both Sides of the Channel," Apollo, Spring, 1960.

Williams, George (ed.). Bryan's: A Biographical Dictionary of Painters and Engravers. London: G. Bell's Sons, Ltd., 1926.

Wolf, Martin (ed.). Dictionary of the Arts. New York: Philosophical Society, 1951.

GENERAL REFERENCES

Aloi, Roberto. Architetture per lo Spettacolo. Milan: Hoepli, 1958.

Anderson, Eugene, et. al. Europe in the 19th Century. Indianapolis, Indiana: Bobbs-Merrill, 1961.

Bates, Alfred (ed.). Italian Drama. New York: Smart and Stanley, 1903.

Blunt, Anthony J. Art & Architecture in France, 1500-1700. Baltimore, Maryland: Penguin Books, Inc., 1953.

Brockway, Wallace, and Herbert Weinstock. The World of Opera. New York: Random House, Inc., 1966.

Gombich, E. H. The Story of Art. New York: Phaidon, 1964.

Grout, D. J. A History of Western Music. New York: W. W. Norton, Inc., 1960.

Kennard, Joseph. The Italian Theatre. New York: William Edwin Rudge, 1932.

Miller, Hugh. History of Music. New York: Barnes & Noble, COS, 1953.

Ridolfi, R. (ed.). Biblioteca di Bibliografia Italiana.

Rowen, Herbert. A History of Early Modern Europe, 1500-1815. Indianapolis, Indiana: Bobbs-Merrill, 1960.

Sartori, Claudio. Dizionario degli Editori musicali italiani (tipografi, incisori, librai, editori). Firenza: Leo Olschki, 1958.

APPENDICES

APPENDIX A

PREFACE TO FERRARIO'S, HISTORY AND DESCRIPTION OF PRINCIPLE THEATRES

FROM DOCTOR GIUGLIO FERRARIO TO THE LOVERS OF THE FINE ARTS

PREFACE

Whereas it has been published[1] by me that theatres even today in nearly all the unified nations are in the habit of forming the most pleasant and most instructive entertainment for every social condition of man; those who do not have a theatre, as a result of a somewhat too small town, are those who do not desire to possess one, and do not have even that basis for the assertion made in a recently published work, ". . . to us moderns, theatre turns out to be dull and tasteless, the most indifferent thing in the world."[2]

While I have sought to bring to light a work directed towards making known and representing with monumentality, not only the most grandiose and best designed theatres of the ancients, but also those of the moderns, besides those which have been generally constructed on the designs of the most famous and best preserved artifacts, or as a result of the munificance of a prince, or as a result of the generosity of opulent citizens, who for a wager compete to make them more magnificent and as a result some of the most studied and rich of our architecture, and always more adapted to the diverse kinds of performances and to the places and times destined to be represented in them. I do not know the true conception or what could be the apparent reason which caused someone to frankly affirm that, ". . . the ancients as a result of the model and for its execution hired the most famous architects and artists of the century and that, instead, we seek the least esteemed in good works in order to spend less, and that, therefore, their theatres were the best of architectural works, as ours are the best of economic works."[3] If we here return to the author of the cited preface, he includes, from the most profound veneration of the ancient temples, after having called them to mind, the scena of the Romans, covered with silver and gold and ivory. He also describes the extraordinary magnificance of Marcus

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[1]Ferrario's Footnote: See the prospectus of this History and Description of Principle Theatres published by me in 1827 along with that of History and Analysis of the Ancient Cavalary and of Romantic Poets of Italy, etc.

[2]See the Preface to the Elements of Mimicry by Domenico Buffelli, Milan, 1829.

[3]Ferrario does not footnote the source.

Aemilius Scaurus[4] who erected a temporary theatre of three orders in height with 366 columns of marble in the first order, of crystal in the second order, and of hardwoods in the third order, in the niches of which were placed 3000 statues of bronze. In another place in the text, he enumerates, just as magically, other theatres, easily describing them from what little literature exists or from the non-existant illustrations from art, he accomplishes what even the most valiant artists have not been able to do.[5] He finally concludes that, ". . . the difference between the theatres of the ancients and ours is equal to that between their scenarios and clothing and our scribblings and rags, both in quality and in number."

Thus it is written in Italy, where exist the most sumptuous theatres of Europe, erected on the designs of the most famous architects! Thus it is written in our land where the immortal Piermarini raised the most vast and best designed theatre in Europe (Teatro alla Scala).[6] In our land where the most excellent and celebrated school of art has been formed (the Brera Academy), where the scenic art has risen today to that point certainly unknown to the ancients, and where any equally less perilous or arduous undertaking would be thrust aside!

This history is a description of the most celebrated theatres of every nation. The designs, herein, are presented with all the exactness with which a just idea of them may be conceived. The observations are made by the most valiant of architects, who by passing judgment on their own works are making known those modifications which should be avoided and which followed for the sake of those who seek to conduct theatre architect toward major perfection. The book will include a succinct and learned history of painted scenery and the erudite recollections of the ancients on perspective. These things give compliment to this work now presented to you. This book will make changes in the minds, it is my thought, of even the most fanatical lauditory of antiquity and will cause appreciation, as will be agreed, of the work and the thought, not by the least valued but by the most celebrated and select architects, for its contribution to the construction and ornamentation of modern theatres.

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[4]Identified from A Smaller Classical Dictionary (London: J. M. Dent, Ltd., reprinted 1920), pp. 468-9.

[5]See the guidicious reflections of Paolo Landriani on the theatres of Marco Scauro and Caesare Curio.

[6]Luigi Piermarini, master architect of Teatro alla Scala.

While passing through the book, after you have passed through and examined the principle theatres of the ancients, and those which were constructed after them in Vicenza and Parma, you will come to a discussion of modern architects. One, a Galli from Bibiena, was the famous deviser of the theatre at Mantua and of another, even more praised, erected in Verona under the direction of the most erudite Scipione Maffei. You will find one Torelli of Fano, who designed the exalted theatre of Fano. Another, perhaps the oldest among the moderns, Cosimo Morelli, who raised the singular theatre of Imola. Then there is Count Teodoli, who profitting perhaps from the design of the already existing theatre of St. Benedict in Venice, erected in Rome the well-designed Argentine Theatre. And finally you will discover that the famous Selva was the architect of the grand and sumptuous Phoenix (La Fenice) in Venice. You will learn that the new theatre raised in Naples by the architect Domenico Antonio Vaccaro was exalted as a miracle of its kind, and that it has been newly reconstructed of a shape which equals that of our La Scala Theatre, becoming enlarged and embellished by the most illustrious architect and scenic artist, Nicolini. It is incontravertable proof of the valor and genius of our builders that these magnificent theatres have been erected and are luxurious competitors with those of the ancients. You will certainly understand this in reading the descriptions and in observing the designs of the now over-praised grand theatre of Milan, done by the esteemed Piermarini. It will be seen in the masterful new theatre of Parma erected on the design of the illustrious architect Prof. Bettoli. And particularly it will be seen in the Carlo Fenice Theatre, now raised in Genoa, the most vast of all, after Milan and Naples, and the most sumptuous in the external elements of its construction and first for the exquisiteness of its marble. It was designed by the most valiant Dr. Carlo Barabino, who built the internal of the (box circle) curve and the stage platform on the design proposed for that purpose by our (milanese) famous architect, Cavalieri Canonica. Canonica, you will recall, is the celebrated author of various most recently constructed theatres, and especially the Carcano Theatre in Milan and the civic theatres of Cremona, Brescia and Mantua.

Among these architects, who have left in theatre edifices luminous proof of their abilities, you will find as well some who with their scientific writings on theatre architecture have endeavored to raise theatre architecture to the highest plane of perfection. The Essay on Theatre Architecture, by the Frenchman, Patte, on the method of how to construct well a modern theatre, is perhaps the finest treatise on the subject which has been published up to the present. Thus I believe that I am making available a most pleasant source for the lovers of theatre architecture with

its inclusion herein.

The learned Patte in his Essay on Theatre Architecture studies which shape is the most adaptable to the modern theatre. He seeks to trace the method by which sound moves and the causes which effect its deadening and reinforcement. He examines all obstacles which are placed between the spectator and the stage and indicates a means of improving audience sightlines. Then the author passes to the particular applications of the elliptical shape to auditorium design, after having proposed it as the most advantageous shape for this kind of construction. In conclusion he goes on to discuss the disposition of the boxes, the platea (parterre), the orchestra pit, in short all of the parts which go to make up a modern theatre auditorium.

Our illustrious and famous architect and scenic designer Sig. Paolo Landriani, who, it should be said, is perhaps the founder of the most celebrated school of scenic art (the Brera Academy of Milan) and who contributes still to the enrichment of the scenic art with the eruditeness of his writing, has prepared (translated) for publication the Patte Essay. Landriani has in various places submitted some of his own critical and sensitive notes. Also published herein are his own not insufficient observations, which submit his reasons for his oppositions to Patte's principles. This has been done for the sole reason of perfecting even more the art of theatre architecture. His observations are particularly derived from the Imperial Royal Teatro alla Scala in Milan.

If, from what I have unfolded with succinct words so far, you can form an idea of the valor of modern theatre architects and of the sumptuousness of their buildings, which will be described even more copiously in the following history, then I will not omit making a nod here at the state in which modern scenic art will be found. This will be done intentionally to contrast scenic art as it now is with that of the ancients, and not only to liberate the beautiful works of our notable scenic painters from the bad fault, which against all reason has become their buckler, but to attempt to bring it under a single point of view which will form the argument of this part of the book.

Next the question will be discussed of whether the ancients possessed the true rules of perspective and if they were as knowledgable in that art, to the point of perfection, as our own most noted painters. This will be accomplished with the inclusion of reports of different opinions of the literati and artists, who will pass along to give a history of perspective and scenic painting, beginning with its

resurgence in Italy and up to our own days.[7] It is not strange, when speaking of this art to happen to mention Italy, specifically, since, ". . . speaking of Italy is to present the same thing as speaking of all Europe, especially since the art in its worst condition is found in foreign places, and that the true masters are to be found in Italy."[8] It is probably opinion that true perspective had its origin in Bologna since among the first architects found enumerated are: one Serlio, the famous Ferdinando, Francesco and Antonio Galli, all from Bologna (actually from Bibiena, near Bologna). The Galli had also painted scenery for the old Milanese Imperial Royal Court Theatre. It was in this theatre where for some years the most valiant Galleari had operated as scenic painters, who when younger were directed in this art by a certain Milanese' Medici. The Galleari had also painted with a certain Barbieri, likewise Milanese, in the aforementioned theatre, wherein one Ricardi was also a renowned master of scenic perspective. Ricardi's son, Carlo, a painter of lively and marvelous coloration, had worked in the Teatro alla Scala with the excellent Cacianiga, in whose manner he painted.

In Milan, meanwhile, one Clemente Isacci and the Florentine Chelli had distinguished themselves in scenic perspective. There had risen the quasi-luminous star, the Venetian Pietro Gonzaga, a student of the Galleari, who made the day and the sun splendid in the colorfulness of his scenery, but who had not come to the point of intentionally correcting the corrupting gusto which he had absorbed from his masters. It was reserved for one of his disciples, for our illustrious and famous compatriot, Paolo Landriani, who attained to a style most just and severe, but who perhaps did not come to perfectly join the art of the masters with the ultimate precepts of the school, to correct the sins of his masters, with which union he would have obtained the maximum of effectiveness. Under his excellent tutilage Perego and Sanquirico have been formed and work at the present time in Milan. Also working at the present time in the theatres of Milan are Fontanesi of Reggio and the two Milanese: Canna and Foentes; the first (Fontanesi) of the bold and rich fantasy; Canna the second admirably works

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[7]See the observations of the aforepraised Sig. Landriani. In particular, on the scenery of the ancients and the moderns, p. 314, on the beginnings and progress of true perspective as applied to scenery, p. 323, and on the perspective of the ancients, p. 345.

[8]Ferrario does not footnote the source. It is presumed that this was a common nationalistic saying or sentiment.

especially in stylized things (cose di maniera); and the third, Foentes, works in architectural scenes much more in the style of Landriani's master, Gonzaga, then in the style of Landriani from whom he learned his style. Here we should make honorable mention of Giovani Pedroni and Baldessare Bevagna, both of Milan, who worked famously with the aforementioned artists.

I will pass on now to speak of the two most famous students of Landriani, Giovanni Perego and his valorous comrade-in-arms Alessandro Sanquirico. Perego was the finest pure grand perspective, imaginative in its architecture, and following the example of his master, he subjugated the scenery to the more rigorous rule of the customs of the locale being represented. The famous Sanquirico coupled with a most beautiful and almost magic colorfulness the purity of architectural style and the sublime qualities of Perego, performing with such mastery that it deceived the observation of every spectator in an astonishing manner. All that which reawakens our admiration is the incomprehensibility of his quickness of being able to imagine and execute his designs without separation from a consummate exactness and precision.

Here, we will close the brief discussion of the scenic artists with the hope that not one of the Italians will take offense, if we have remained especially within the region of the Milanese theatre, since it is by now a thing well-known by all in our homeland that the most excellent school of art has been formed here, and that those who leave it are nearly all the most valiant artists of their kind.

The scientific dissertation of Sig. Paolo Landriani, Observations on the Essay by M. Patte,[9] which forms the continuation of this material, will revolve singularly around many subjects, including, the scenery and perspective of the ancients, the origin of the form of modern theatres, and the beginning and true progress of true perspective as applied to scenery. Landriani's principle object was to prove that the ancients did not know perspective of the same quality as has been developed afterwards by the moderns. This is the distinction he makes when he demonstrates the distinction between natural perspective and artificial perspective, when an exact definition between the one and the other is needed. He continues with a passing examination of the painting of the ancients to which the established principles of the perfect science of perspective will be applied. His final

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[9]See Landriani's part of the Appendix.

conclusion is that without knowing those rules which are the soul of natural perspective, the ancients could not have painted in a manner to deceive perfectly, since deception is only obtainable by modern painters from the true theories of artificial perspective.

The book closes with other observations which regard theatre in general, including, a parallel between ancient and modern theatres, another parallel between French and Italian theatres, and finally with a confrontation between the perspective art of painters of the "loose and awkward" (barocca, or Baroque) manner and those of the pure style, generally handled as our own style. It would seem that the opinion of the severest judge would be inclined to favor the first. This comes out in fact in the many examples of the heights of the majesty of their perspective paintings, although the paintings are of things of the most strange and bizarre combination, and also many proofs can be brought of the surprising illusions which they have produced, which today's painters, to tell the truth, would not think to begin to execute even if they had the desire to do them.

Landriani would prove with his argument the falsity of the assertions of those who are afraid to publish that today's perspective is developed to the highest degree of perfection. Our austere critic makes this the sole basis for freeing the ingeniousness of young painters. Landriani believes that the Baroquists are masters without knowing the difficulty of their art and that this will always be evident in their work. He therefore argues that young painters should not study the perspective of the Baroquists but should realize that the height of their art is in the execution of the most difficult things in perspective with many strange and capriciously moving lines.

If it is permissible in this controversy to profer my own sentiment, I would say that the attempt to represent the highest and most difficult objects with any effectiveness is a proof of the worth of the effort and also the worth of those who undertook the design in perspective. But this does not prove that contemporary perspective, considered under all its conditions (i.e. not being allowed to reach the highest degree of perfection for the reason that it is generally woven of single straight lines; and since the majestic simplicity of our beautifully dominating architecture is being called upon) is asked merely for the easiest of operations in the exercise of its art. Who could ever reasonably assert that a book could be more deserving of praise than if it requested major thought and demanded more difficulty in the execution of what it proposed?

The Baroquists, therefore, who with considerable knowledge designed excellent perspective caprices, do not receive a certain great amount of praise from those who think, 'less makes better,' nor of those who know better, since of those who know, all is necessary for the representation of the lines and beauty of architecture with sufficient perspective truth.

I will finally conclude that the perspective of the Baroque was more difficult to execute than that of the moderns, although that of the more ease of execution had surpassed the other in the beauty of its style of architecture and in the magic coloration made known by its bizarre painters.

I will terminate by recommending the letter of this last precept; not only to the artists who covetly cultivate theatre architecture, turning it into one of the fine arts, an object most important and of universal luxuriousness, but also to the young painters who are formed at our most famous school of scenic art and leave it, perhaps first having been taught the art to perfection, to take it and execute it in theatres especially in Italy, where its emulation is called for and most seriously desired.

To this book, devoted solely to the theatre, will be added the following, some of my own observations, without outside comment, for the correction, or at least the attempt, at the betterment of the spectacles presented in theatres, and especially the pantomimic dance (ballet). Though, ballet merits being cultivated with great study, for it has, among the fine arts, the advantage of producing an equal sensation in all places and all nations, it has been fatally thrust aside from that sublime point to which it had been raised by the genius of Vigano, beyond which I doubt if others on the rise will transcend, and which no one certainly has approached in our time. My purpose will be to bring back, if possible, the imperious composers to that golden simplicity of argument (plot) which is necessary for the unity of action, according to the true rules of drama, to the clear language which can be seen, to the music which not only deceives the ear but which takes the place of the eloquent and energetic word, to those graceful groupings displayed with picturesque and various movements, and to those most mysterious of pictures imagined and composed by the most valiant of painters, to that dance which with complete magesty is conducted according to the customs of every nation, and in summation, to that imitation of truth and of nature without which it can not be represented as worthy of praise, and to which has come disgrace sustained by all of the incorrigibles as well as the more ignorant of: composers, Romantics (romantic arguers), entanglers, obscurers, producing a

uniformity of expression form and character, passions which are expressed with the continual stomping of feet and with inverasimilar movements done with full acknowledgement of the authors, whose contortions are executed at the same tempo and all in the same way making as much decoration as automotons (automi) with groups of arms and legs raised with exact symetry on raked stages with no feeling for perspective, a music which says nothing, if it is not even opposed entirely to the expression of the movements, a thunderous roar from the orchestra of the dissonance frequently of the military band, an always homely dance in whatever part of the world the action is found, troupings of cavalry and infantry executed almost always in the same manner, at last, the arrangement of the scenes is by now reduced to ever representing successively these scenes: triumphal squares, chambers for secret intrigues, royal ballrooms, remote places for conspiracies where everything is always reconciled, and finally, naval battles, volcanoes, fire and snow and Olympuses gleaming with that perpetual Fire of Bengal (either Lacrapodium powder or phosphorescent paint), things which do not arrouse, nor even by surprise, the most ignorant of spectators.

My forceful diatribe can only try to better the most appreciated entertainment of the public, contributing in some manner to rendering it more pleasing, instructive and perfect.

end of preface.

APPENDIX B

FERRARIO

INTRODUCTION

HISTORY AND DESCRIPTION OF PRINCIPAL THEATRES

INTRODUCTION

There are many memories which we have concerning the ancient dramatic poets, and also concerning the variations and improvements which were made in theatrical performances. Thus one would not find it tiring to draw a regular and continuous pathway through their history. This would not be the case for one who would intend to do the same concerning the material construction of the places or theatres where these same performances were given. Since in the area of drama it is sufficient to consult the literary writers, and since their works exist, one can have desire satisfied and can ejoy their works as an intelligent and descrete lover of literature. But for those who are interested in theatres and their shape, and naught or very little else, it would not be enough to go through the plays and to find incidental discussion of the subject. Nor, for the most part, is it easy to find out about the skills of the art of theatre architecture. There has not been much left of the names or biographies of them on whose designs the theatres were built. Others, who have written treatises on the subject, have not dictated rules nor indicated this or that in particular without extending themselves to speak of theatres which were most notible in their own times.[1] A work more expedient for perusal for those who love to have notices of the progresses made in the art of building theatres would be the, Critical History of Ancient and Modern Theatres, by the most erudite Sig. Pietro Napoli-Signorelli.[2] Outside of having to search through its eleven volumes for one to find word of a particular theatre, the book is defective in omitting some theatres, and is totally lacking in engravings, which more than words aid the intellect to conceive the true construction of those same theatres. This lack will certainly be filled by the timely, for it cannot be said of other works, Essay on

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[1]See: Vitruvius, Architecture. Galluccio, Tragedy and Comedy. Calliachio, Scenic Amusements. Mazzocchio, The Campanian Amphitheatre and Theatre. Bulengero, Concerning Theatre, in the Dictionary of the Pitisco, Quadrio, vol. VI. Cavaliere Fontana, The Flavian Amphitheatre. Boidin, Dissertation, inserted in vol. I of the Memoirs of the Academy of Writing and of Fine Literature of Paris.

[2]Napoli-Signorelli, Pietro, Critical History of Ancient and Modern Theatres.

Theatrical Architecture, etc. . . . ., of M. Patte,[3] and the as yet to be released, l'Architectonografie des theatres de Paris, etc. . . . ., by Alexis Donet,[4] which is not yet available and when it will be, nobody knows (it was not released until after 1840). Both of these writers have undertaken the task of reuniting materials which have been dispersed among many authors and of reducing it into a single body, or to say it with modern phrase, of composing it into 'an easily usable collection for the science and practice of the architect'.

There is a similar vacuum today concerning the place wherein the flower of the most select society may convene to find an honest recreation away from the tedium of daily cares. It would seem that they do not really deserve to go neglected and this suggests the thought of complementing them by giving a brief historical survey of theatres from their origins up to the present day.

The present work, then, is aimed at researching which among the variations of shape and form would be the most proper to be given to the auditorium of a theatre. It has been considered opportune to admit into a single book both the Essay on Theatrical Architecture of the most celebrated M. Pierre Patte and the judicious and most sensitive Observations of the most clear architect and ingenious scenic artist Sig. Paolo Landriani, who both have carefully examined this particular point. A complex book of many parts such as this, accompanied by many relative engravings, would seem to demand to be acclaimed by the public as a unique work of its type.

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[3]Patte, Pierre, Essay on Theatrical Architecture, or Concerning the Most Advantageous Construction for a Theatrical Hall Relative to the Principles of Optics and to the Science of Music (Acoustics), with an Examination of the Principal Theatres of Europe and an Analysis of the Most Important Authors on this Material, Paris, 1782.

[4]Donet, Alexis, l'Architectonografie des Theatres de Paris.

APPENDIX C

PREFACE BY THE MOST CLEAR ARCHITECT AND SCENIC ARTIST--SIG. PAOLO LANDRIANI

PREFACE BY LANDRIANI

The book by M. Patte on theatrical architecture, or on the best method of arranging or designing an auditorium, as he called it and as he regarded his book, is one of the very few, I believe, which fully satisfies its intended scope. For this reason I set about making a translation of it, because it will be thus read by a larger number of persons, because it is rare to have a book in the idiom of the author (i.e. in direct translation) and also because the book is very difficult to find. Thus we will have at least copies for use among ourselves in Italian.

I will now present a succinct idea of the scope of the work. Patte begins by researching which shape would be the most favorable for a modern theatre auditorium. He goes on to how sound would act within it, particularly the voice, and the causes which increase or decrease its effectiveness. Then he writes of the causes which place obstacles in the sightlines of spectators and of the means of improving sightlines in an auditorium. Speaking of the shape he then says that the ellipse alone among all the other curves is that one which brings together all the advantages which could possibly be desired. He passes to examine then some of the principal theatres, beginning with the Greeks and Romans. He moves then to those which were built to resemble the theatres of the ancients, such as that at Vicenza and the Farnese at Parma. Then he comes to the better theatres of the moderns, as are those of Naples (Teatro San Carlo), Turin (Le Fenice), Milan (Teatro alla Scala), Rome (Teatro dell'Argentina), Bologna (Teatro Civico), Manheim (Alter Statsöper), Berlin, (Alter Statsoper), Paris (the old opera) and finally the theatre of Bordeaux (Theatre Civile).

After this point he passes to make an analysis of the major books which have been published on the best methods of designing a modern theatre. He contraverts their reasoning where he finds them to be in opposition to his own principles and selects the best in them to corroborate his own reasoning.

Then he comes to talk of the particular application of the elliptic shape to theatre auditoriums, because it is the most advantageous shape to have for a theatre auditorium and for its construction.

From this point he discusses the location of the boxes, of the orchestra floor (<u>platea</u> or <u>parterre</u>), of the orchestra pit (<u>orchestra</u>), of the ceiling and the wooden

arch of the proscenium, of the stage (palco scenico), of the method of lighting the stage and stage settings, and finally of all the accessories and accompaniments of an auditorium, i.e. all the ancilary constructions which comprise a theatre building and its surroundings.

He ends with a description of the attached plates, analyzing the shape of each auditorium and comparing each with his principles for a new theatre. He always maintains that the elliptic shape is, as has been mentioned, the most favorable for obtaining all of that which is desired from such an establishment. I found that M. Patte in his examination of the principle modern theatres, at least in those of ours of which he spoke, did not use those which now exist but others which had burned in 1775, and thus, as is only natural, he has made a more unfavorable description of their extravagant shapes, without checking to ascertain whether these theatres are now actually in existence.[1] Thus to remedy this mistake of M. Patte, I believe I have set his work correct by inserting in his work a description of our new Teatro alla Scala, erected from the foundations in 1776 and opened in 1778. I have also presented its plans and a description of all of its measurements, in the method which he used for all the other theatres.

I have spared you from notes in the course of the translation and have developed these observations which I have judged the most opportune to enlighten theatre architecture, presenting at the same time some designs of more recent theatres. Neither have I omitted to openly manifest my own sentiments in the observations, where it was perhaps more just or where my reason gave direction to the decision. You must understand from all of this that the 'gusto' of the Italian in the theatre genera is somewhat different than that of the Frenchman.

APPENDIX D

PATTE

INTRODUCTION

ESSAY ON THEATRICAL ARCHITECTURE

CONCERNING THE MOST ADVANTAGEOUS SHAPE FOR A MODERN THEATRE

INTRODUCTION

There does not seem to be any other question upon which there is so little agreement as that concerning the arrangement of the interior of an auditorium or theatrical hall. Some maintain that the circular or semicircular shape is the most advantageous, others demand that it be oval or semi-oval, others, and by far the greatest number, believe that they should be free to adopt indifferently every sort of shape or curve, be it of a bell, of a racquet, of a horse-shoe, of an octagon, of a quadrilateral figure or of a parallelogram, etc., etc., and each finds facts with which to support his arguments.

The ancients thought very differently, or so it would seem. They adopted the semi-circular shape for their theatres. They employed no other shape. It has been proved that they were proud of the idea of that shape, due to the motive that it afforded the largest advantage for their productions. For this reason, why haven't the moderns adopted the shape from them? Or, at least, decided to imitate the constant rules of the ancients for the construction of the above mentioned structures? Why have they allowed themselves to be lured by their felicitous successes into proceeding arbitrarily in this regard?

On the other hand, if you would reflect a little, it does not seem at all difficult to discover what the rules of the ancients were, because of necessity they had to have been based on the manner which would best generate the good will which was produced by dramatic or lyric performances when performed there. We will look into them and see what these things were. Is not its scope that which produced a movement of the heart to the excitement of terror and pity, or the recreation of the spirit with ridicule by the designs of chastisement in the costumes? Is not this the place where one develops for a time the enchantment of the eyes and ears with the pomp of the production, with the majesty of the settings, with the truth of the theatrical actions, with the gestures of the actors, with the spirit of the voices, with the power of the dance, and with the accompaniments of the choruses? Is not this the place, in a word, destined to put into action the spring most apt to salve the soul, to make illusion for the senses, and to enchant the spectators? Can it not be seen from what has been expressed, certainly it is not in this manner that the distribution of a theatre ought to be decided?

The eyes and ears are destined to be the agents of pleasure, from which it should be obvious that a theatre must be arranged in such a manner that it satisfies essentially the twin objects of good sight and good hearing. Its shape must be a composite of shapes, optical and acoustical, the most appropriate to favor those organs. Everything must have rapport with these fundamental considerations. Other advantages which might be achieved for it with a nice arrangement and a delectible architectural ornamentation must be subordinate to them. Beyond that, one could not think that there would be any doubt.

But this point has never been answered. Which shape is needed to attain them? Are all shapes equally capable of satisfying the desired purpose, or is there at least some uncertainty which exists around this determination? An uncertainty to which we can attribute those small, but happy, successes of almost all auditoriums? This is the argument which we propose to examine in this work.

In that it is the eyes and ears which are the immediate organs of the divertisement gained from performances, in order to better favor them, they must evidently be the basis for the search to discover which must be the most advantageous shape for a theatrical hall. Consequently, we will begin with an exploration of the manner in which sound acts, particularly the sound of the voice; how it is propagated, what can alter it, and what can give it more strength. After this we will pass to an examination of how one assists one's view of the stage, and how it may be favored or prejudiced. From the results of these examinations, we will deduce, naturally, which should be the shape of which we will speak.

Having established these principles, we will begin to look at principal theatres which demonstrate them, to the extent that they are observable in those same theatres. Then, we will pass on to see what has already been said of importance on the subject in already published works. We will finish this work with the application of the discovered shape to an auditorium for plays or operas, not without adding our observations on all of its accessories, similarly based on the same reasoning, from which will result that sort of satisfaction which is achieved with direct attendance to an effective execution of a project.

APPENDIX E

PATTÉ, ESSAY, CHAPTER I

CONSIDERATIONS INTRINSIC TO HEARING AND SEEING WHICH DETERMINE THE TRUE DESIGN OF A MODERN THEATRE

THE WAY IN WHICH SOUND, AND ABOVE ALL VOCAL SOUND, ACTS AND THE CAUSES WHICH ARE CAPABLE OF ALTERING AND AUGMENTING ITS EFFECTIVENESS

CHAPTER I

Sound is a species of invisible transmission which is formed in the air by the movement of a resonating body. Thus air being the means by which sound is transmitted, it is necessary that it be set in motion because it is with this motion that sound is propagated. Sound can be heard in every direction, as it exits from the resonating body by means of rays of this fluid. The rays become enlarged without interruption (as they flow outward) and are weakened proportionally to the increase in distance from the resonating center. If the sound when it arrives at the ear has been wounded on the way, which can rapidly happen, it will be without melody and will have a certain dryness (or thinness). But it is not the same thing, when the rays of air being in movement from sound encounter an obstacle to their natural extension or reverberate against some body. Now, more than their direct force, the sound also picks up a return force, and becomes susceptible to diverse effects and a variety of modifications. These modifications can be more or less advantageous. It is this theory of sound which constitutes the principles of the science called Acoustics, also called the Science of Music. Following will be a summary of the principle modifications produced in sound by reverberations. These may be verified from all of the experience of Physics.

The material of the body against which the sound hits, can at one time change it, at another blunt it, and at still another to make it fly even more. Hard substances such as marble, glass, and iron, etc. reflect sound in general dryly, but without delight and with a variety of crudeness. Soft substances on the contrary, such as sand, oil, water, wood, wool, etc., when sound hits them are prejudicial to it. These substances are recognized as being active in the exhaustion, absorption, and the making of obstacles to the reflection of sound. Wood is the only one among all these substances which is believed to be the most favorable to harmony; as a result the major number of musical instruments are fabricated of it. It is at the same time resonant, sonorous and elastic, reflecting sound delectibly. Sound's occasional encounter with wood makes the lightest vibrations which augment the force and duration of the sound without the least prejudice against its cleanness.

When sound reflections occur closely together, the direct force and that of the return become mixed with each other; but when the reflections occur at a certain distance, that is if the sound reflected encounters different obstacles

and is reflected from each and must go a further distance than that which goes directly to the ear, thus arriving a little later than the other, it repeats the first impression, and thus produces that repetition of the voice which we call the Echo. The more obstacles which multiply and postpone the force of the return of the sound from one to another lengthening the trip, thus the more times the echo repeats the same sound, and sometimes it has been heard to repeat up to twelve and fifteen times.[1]

For this reason it does not hold that you would have echos in a flat area, but only in an area with rocks, or frequently in forests, or in the mountains. If the area around the sound (source) is found to be circumscribed or sustained by a group of bodies placed circularly around it, and they are such that they reflect more than they diminish the sound, their effect would seem to be to give a very sensitive augmentation to the sound. Thus it is possible to observe that it is not the voice which is modified but its force, being stronger in a room than in the country and more so in a street than on a smooth plane or on top of a mountain.

It should be noted from experience that the forms most expected to fortify and harmonize sound are concave. Concave forms assemble the return sound through common points where it is concentrated. Consequently, the caused movement of the air is held back a little longer at the mercy of the resonating body. Selecting a shape because it is merely concave is not the best; because a number of things are concave, for example, a number of overhead semicircular vaultings, which do not ordinarily augment the effect or noise of the sound sent into their cleanness and spaciousness but produce echoes and with the resultant redundancy often generate cacaphonies. Though it is that vaults are advantageous for harmony, they only need to have less concavity, without which the sound would reflect many times inside the curve before arriving at the ears of the auditors. With the decrease in concavity, the curve should be located in such a way to return the sound waves directly toward the ears of the auditors. For a completely opposite reason, convex forms are less favorable to sound. Sound is harmed by the hardness

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[1] You will find a short distance from Milan a farm house in the country called La Simonetta, where a pistol shot, or a loud clap, would be repeated up to thirty or forty times; and the most singular thing about this echo is that it is heard best only if you stand at a certain window and not at the other windows of the house. This appears to be Landriani's note, not Patte's.

of the shape, or at least it is exhausted or prejudiced in being reflected from convex shapes. The sound rays are rendered more divergent by the convex shape and are impeded in their movement against the walls of the shape due to their counter-concert or bowing-in.

We must return to the art of making sound travel considerable distances. For this reason, one must clearly understand that the rays of sound, put into movement by a resonating body, being made to pass through a long, straight channel, which is bent many times, to look like a trombone, and is returned, to look like a French hunting horn, become dilated at their exiting from the resonating body, and when they arrive at length at the ear they transmit the impressions which they have received. Who is there who has not heard of the sweet success at London of Cavalier Morland with a type of horn, called the Marine Horn, with the aid of which he has developed and will publish shortly a law (of sound).

Finally we arrive at the degree sound is modified. An intellectual of the last century, (Musurgia universalis par le Pere Kirker, Tom. II., p. 228.) has already tried to demonstrate the possibility of arranging a space (room) such that it was capable of decomposing sounds through the different reverberations and reflectings of the sounds, to the degree that something different is heard from that which is first said. Asking, for example, in a place arranged in a certain way and with a representative shape, "Quod tibi nomen?" (What is your name?) An examination of reverberations produced by the distribution of the circumferential bodies could distinctly reply from this predetermined space, "Constantinus!" (Constantine! Both French and Italian texts read in Latin.) Obviously no one can report any analogy between the consonants of the question and the reply. If he is correct, as there is not reason to doubt, then the reverberations, due to the shape of the bodies which reflected them, were susceptible to a change in the articulation of the sound. Which brings forth the need for all to take regard of the shape in the design and distribution of a theatrical hall. This design must tend to favor the reverberations of sound as a result the shape of the hall must not be arrived at arbitrarily.

There is evidently and principally need to reinspect the manner of the agitation and reagitation of air, being the agent or vehicle with the help of which sound is propagated, for explanation of the reasons for its modifications and variations. It has been proven that sound is a composition of contiguous molecules, which because of its extension, divisibility, resistance and elasticity is a material thing (Ledons de Phisiq. experimentale, par M. l'Ab.

Nollet.), which can receive and transmit movement and which, in a word, has the principle attributes which characterize bodies. That being so, sound comes under the same laws as bodies when they encounter an object in motion. It can be demonstrated in Mechanics that the angle of reflection of a body which touches the surface of a body which resists it, or which stops it, is always equal to the angle of incidence. (For the following discussion see fig. .) Surface F being resistant, in fig. , thus body B moving according to the line BA comes to touch at the point A forming the angle CAD, the body B will be reflected toward G, in such a manner that the angle of reflection FAE will be equal to the angle of incidence CAD. This will always be true, whatever the resistance surface is, against which the reflections are made.[1] As a result, rays of air set in movement by sound merely follow this determination common to their collision with a body, because that point does not absorb the sound rays.

Everyone knows that the undulations of sound rays exist circularly, that they become measurably weaker the further they are from the center of their movement, and that they would collide at the forward edge of their outward spread and thus lose their force. This same collision against bodies produces other undulations (waves) which encounter the first, seeming to fortify them, and making their movement difficult. But it has been recognized that this is not the only effect, if there were space when the sound went out vertically as in an unknown country, or if on the contrary the sound is directly found to be going out obliquely, similarly, for example, to that of the human voice, then it would move differently. It would be directed against the surrounding bodies and the molecules of the contiguous air would be compressed and made to move due to their elasticity or divisibility, being penetrated as do the rays of a lantern, being snuffed or flared up as would happen from the action of the wind.

Ultimately whatever the manner in which sound agitates the surrounding air, the effects which result are always constant. Rays or lines of molecules of agitated air are returned in every case, according to the general rule of angle of incidence and reflection, from obstacles which they encounter during their extension. In this manner it is possible to distinguish the shape most favorable to sound and most appropriate to concentrate it. It is not a question of

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[1]It can be seen in all physics books that the reflections of rays of light are equally submissive to this law.

drawing attention to the method in which the reverberations of sound should operate.[1]

It is a constant rule that nothing is produced in nature at a right angle, and that everything that seems to move by itself, turning or gravitation, does so circularly or elliptically or according to certain internal curves with their centers. It is said that God did not intend to geometricize in the creation of the universe: sound consequently must be placed under one of these determinations. Thus, sound produced by a bell suspended in a free space or which is directed vertically like the report from a small mortar loaded with powder, supposing it is not aimed against the wind or at surrounding objects, would produce sound waves reflected circularly from all parts, as it would follow like the undulations in a basin of still water. The reflected force returns against the center of its movement for the reason that the rays of a circle are always perpendicular to its circumference. The case is not the same if sound is sent obliquely from a cannon or by the human voice. It must necessarily embrace, because it will extend freely into all of the air, a completely different mass of air, rather "oblongue" than "Barlongue," i.e. rather elliptic than circular, seeming to be of the shape of a melon or of an elongated spheroid. This mass of air is equally a little inclined from low to high according to the direction of the vessel from which it has come, and from which the resonating body, the position of which is at the center, as in the first case, seems at the other end from that of the focal point of the spheroid.

The proof that the mass of air moved is now somewhat like a type of elongated spheroid proceeds from the sound being like that of the voice or of a cannon which is all at once heard in the distance in still air. It can be heard at more distance, in the sense of the direction of the channel in which it is fired, or, the same sound which returns, more in the sense of its force before than afterwards, and now longer at the sides, than not being opposed against that where it is spent. Another no less palpable proof, that the axis of this spheroid of air which has been set into motion is oblique and a little inclined from lower toward higher in the sense of its direction, can be deduced from the fact that the voice, for example, can always be better understood in the higher parts of the audience hall

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[1]It is the reverberations from one to the other of the different encircling bodies which produces <u>echoes</u>; thus to explain their effects, there is no more need than to observe their respective locations.

or from up on an edifice, than from below. There is no person who has not been carried to make this observation.

From all of these considerations, it can be concluded due to the nature of sound obliquely sent out, as it is in the case of the human voice, and due to the manner of agitation of sound; and due to the mass of air and how it acts in a quiet place; that one must make the elliptic shape, which is not a section of an elongated spheroid according to its larger diameter, the most natural for containing and reflecting the voice ahead of its being exhausted. Consequently it is the most apt shape for determining the true form of a hall for auditors or spectators, because the tempramment is found to be in rapport with the contents and the reflections of the vocal rays against its internal walls are more uniformly made than against all of the other possible curves. The other curves which do not have a point of reflection with the mass of air wet in motion, which would be found more of a necessity in concert, that is more of the uniformity of the reflections.

But, if the elliptic form does not apparently seem to be the most natural for the soaring of the voice, it merits preference because it has the precious advantage of bringing concentration fully to all of the auditors. It can be demonstrated geometrically that one of the properties of the elliptic shape is that if you draw as many rays through one focus and then against the circumference, these rays due to the reason of the equality of angles of incidence and reflection against the curve, will all be returned or reflected through the other focus. To make this more intelligible, we will reduce that which we have said to one fact of which everyone will be in a state of exactly rendered reason: suppose we had a Billiard table of true elliptic shape, such as fig. , and that there is a nail driven into the table at one of the <u>foci</u>, G, now, a ball located at the other foci, F, being sent against a point, say K, L, M, or N, on one of the cushions of the billiard table, will always return to strike the nail at G for the <u>mattonella</u> or point.

Consequently, the same thing would occur in an auditorium where the entire interior is made like an ellipse. If you located the stage at one foci, F, would not the reflections or reactions of the voice against the encircling walls at K, L, M, and N, be found to give equal repercussion or reverberation to all the area around the other focus, G, where communally you will find the major part of the auditors. The convergence of all of these reverberations will form with their union at G a sound column, equally sustained for the entire height of the hall, which will maintain longer the movement of the air, giving a body to the voice, which gains an even more grand effect, which is spread in

unison throughout the hall. That is once the voice achieves its body, it would be spread to the rest of the hall maintaining that body, to the point that one is led to believe that the voice becomes the same even in locations in the hall most distant from the stage equal to that as most near.[1]

When we speak of the Ellipse, it is important that one not confuse it with the shape of the oval, as is commonly done. Whatever these two shapes have in common, their differences are many. The ellipse is an oblique section of a cone. It has, to begin with, a shape as perfect and regular as a circle with its small diameter. The elliptic curve is described uniformly between two centers, called foci, singular focus, which should not be supposed to be common with other smaller or larger ellipses. It can be divided in two parts equally in all of its diameters, which pass through its center point. On the contrary the Oval is an idealized shape, the basis of which is an irregular curve. It is not divisible into two equal parts by means of a single diameter. It is drawn with four variable centers, from which it is equally possible to delineate other concentric ovals. It does not have any of the properties of the ellipse for sound reflection.[2]

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[1]The whole trick of that phenomena called the "secret room" consists in the arrangement of the room in an elliptic shape. If one person stands at one focus and speaks softly, a person at the other focus can hear them, anyone not at the foci cannot hear a thing. (See the Encyclopedia, no ref.)

[2]Observe how one makes an ellipse. After having determined the larger and smaller diameters, AB and CD in fig. , and having drawn them on lines at right angles, in a manner which cuts each reciprocally into two parts, you will come to the fixing of the foci, F and G. Carry half of the large diameter, AE, less the smaller diameter, CD, in from the ends of the larger diameter, AE. The points of intersection or of reincounter, F and G, will be marked on the large diameter as the location of the foci. One can delineate an ellipse in a moment, raising perpendicular lines from the large diameter, on which you determine, with lines of average proportion between the large and small diameters, the points through which the curve will pass. But, if this operation seems long, it is possible to limit the thing to the practicality of locating the foci, F and G, with a "couple of shovels" to which you attach the ends of a piece of string equal in length to the length of the last diameter, AB. Then swing a curve with this string held uniformly. With the help of a point you will describe the curve, ARKOLDMNBCPA,

It would be vain to try to find the same advantages in any other curve. Would it be in the semicircular shape?, as in fig. ? As the rays, AB, AC, and AE, are always perpendicular to its curve, suppose the voice were in the center, A, and what would result from it? It would always be returned toward the actors and not sent out into the midst of the auditors as with the ellipse.

Might it not be the circular shape? Suppose the actor was against one of the sides, at A. If you draw lines from there to all of the parts of the circumference, AB, AC, AD, you will observe that due to the equality of the angles of incidence and reflection, the ray AB, will be reflected to E; Ac to F, AD to G. These reflections cannot in any way be called advantageous, understanding that they agitate one against the other and without unanimity. The same thing occurs after a little while, if instead of placing the actor at the edge of the circle, you think to place him in its interior, for example, at H, inside of the edge by a quarter of the diameter. To judge the effect which results, if one were to draw from this point, H, the lines, HL and HK, against the circumference, at L and M; one would perceive from the angles of incidence and reflection that the voice in particular would agitate without concentration or without being able to fortify itself from its reverberations.

The parabola, fig. , would not be able to converge sound any better, because, due to its known properties, all the actions, AC and AD, which would be exercised leaving from focus A, would be reflected due to their angles of incidence and reflection against the curve and come out parallel to the axis, AB. It is needless to repeat that CF and De and reciprocally all the actions which would be exercised according to the lines ED and FC, parallelly to the axis AB, and against its curve, would reflect the convergence upon the focus, A. These reverberations, which would be favorable to a fog horn (marine trumpet) or a trombone, or to the sound which comes from a narrow channel whose mouth is found at the mentioned focus, could not produce equal convergence in the voice for a hall. In the first place, the object is to compress the rays of air which have been set into motion in such a way as to form with them a type of bundle which due to their strength are able to carry the sound a long distance with the aid of their directed force. In the second

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where all of the points are found to be consequently and without interruption equally distant from the foci, F and G, by the length, AB. This manner of making an ellipse is vulgarly called the Gardiner's oval, to distinguish it from the oval described with four centers.

place, and on the contrary, it is found that in the collection of the force of the returning sounds that the force is weakened, and in distributing it the surrounding bodies in consequence give it fortifications and values which are completely different.

One could also allow to pass in review all the other shapes and you would see that due to their edges, or their centers, or due to the point within for the voice, that none could be found to be as favorable to the reverberations as that shape of which we have spoken, the ellipse.

The ellipse being the most advantageous shape for the hearing of the auditors, it should not occur otherwise than to determine what would be the maximum extreme (distance) which would allow one to say so. It is known that the projection of the voice is not a well illuminated point, and that beyond a certain distance it degenerates successively into a vague matter, become confused, and finally it is not possible to distinguish the articulations. Thus it is more important to reduce the amount of distance which the voice must be projected to a certain limit, in the end to again obtain the advantage of the reverberations of the voice ahead of their being refinished, than it is that it be fortified and given value. It is possible from daily experience to determine this distance. One observes that at more than 72 feet an ordinary voice must strain to make itself heard and to be distinguishable in its articulations in a closed and covered place. Without shouting or being forced, it could not be long continued. It is necessary that the surroundings of the place where the voice is projected be arranged in such a way as to be most favorable. On a plane, such as in the open countryside, the voice is hardly distinguishable for two-thirds of the distance (72 feet) already discussed. That being the case, it would seem that it would not be advisable (possible) to surpass a certain limit; not allowing seats in a recital hall or theatre at a distance of more than 72 feet from the stage or from where the orators or actors must speak. With this means the rays of sound will not be exhausted when they arrive at the furthest seats. They would gain also the advantage of the reverberations and above all the sound convergence of the elliptic shape. Although this approximation cannot be determined with geometric precision it does have the merit to be respected.

From all of that which we have expostulated, it becomes constantly apparent that the elliptic curve has certainly above all the other shapes a notable superiority for making worthwhile the return of the voice and that it does not require more to obtain all the effect possible than turning one's attention to two things: The first is to line the inner surface of the hall with materials which are

sonorous or elastic, which would be wood, conforming to the observations of Physics. The second would be to avoid everything which would hinder the free reflection and reverberation of the voice which would strike it.

APPENDIX F

PATTE, ESSAY, CHAPTER II

CONSIDERATIONS INTRINSIC TO HEARING AND SEEING WHICH DETERMINE THE TRUE DESIGN OF A MODERN THEATRE

THE CAUSES OF OBSTACLES INTERRUPTING THE AUDIENCE'S SIGHT AND THE MEANS OF IMPROVING SIGHT IN A THEATRICAL HALL

CHAPTER II

The best, and at the same time the most natural manner of seeing an object, without being obliged to get up, or duck down, or twist your head, is done in such a way that the visual rays fall perpendicularly into the eye. This sort of thing is not very practical in a spacious theatre, such as would be required for the divertisement of a large city. Wherein, due to the need for a multiplicity of places and seats, it would not be enough to cover just the floor with seats, but one would also need to distribute seats along all the height of the walls. Thus due to the necessity for this diversity of seating locations, it is not possible for <u>all</u> of the spectators equally to see a view of the scenery or all of the theatrical action. Necessarily some of them see the stage with difficulty. Those who are on the sides and in the lateral boxes cannot see as well as those who face directly onto the stage or are in the 'parterre'.

The same thing is to be said of being able to see the scenery. Not more than a few of the spectators who look at the scenery get the full effect. For those few of the spectators who pay attention, it can be observed that for them there is not a single point of view which would be exactly true for relating to the perspective of the scenery.

The place from where the perspective ordinarily works corresponds to the middle box in the first row balcony opposite the stage, or at the center of that which we in France call the 'anfitheatre.' It is toward this place that the designer voluntarily directs the principal effects of the design of the scenery. Those who see the scenery from all other places in the auditorium are in some way in a forced relation to it, either too high, too low, or too much to the side. This is the great superiority which real or artificial three-dimensional relief will always have over that which is only painted.

The first, three-dimensional reliefs, have a multitude of points of view and seem fully natural. Flat painted relief has one point of view, as a picture, a theatrical decoration, or a perspective drawing, and does not have truly more than one single side or one single place from which it has a reasonable effect. Outside of that place one cannot look at it except in a defective manner. The art of scenic design will never be able to rectify this disadvantage nor overcome this habit, nor, even less, be able to lose those considerations which make the habit senseless.

We will now depart from these speculations which interest the scenic designer more than the architect, it will be enough to note them to give them the necessary importance, for they regard the manner of seeing the scenic objects, and they are limited to three considerations, all concerning the distribution of the seats in a theatrical hall.

The first consideration consists of not placing the spectator at too great a distance from the stage; so that they can discern the actions, gestures, and expressions on the faces of the actors, which make a part of the pleasure received from a dramatic presentation, and as a consequence from the illusions which they produce. There are mute scenes in drama using the kind of pantomime which would be lost to the public if given in an auditorium of too great depth. Ballet and dance would also lose effect. How would one distinguish the precision of the pas, the design and the grace of the dances from an excessive distance?

If there are limits to the vision of the spectators for recognition, then these limits require some discrete attention. There is not a person who has not noticed that he ordinarily suffers some loss in ability to discern movements and facial expressions at a distance greater than 60 to 72 feet. It is needless to point out that this is the same distance that the ordinary voice carries. In this manner one can readily understand that the major depth of an auditorium must be limited naturally in respect to both hearing and vision. There must not be more than 72 feet from the place of the scenery to the most distant seat.

The second consideration consists of not elevating, by more than certain limits, the height of seats in an auditorium. Thus the vision will not be fatigued by rendering it too intent, nor by impeding it due to angles formed by the visual rays from too great a height. As a result the extreme subtlety of the scenic objects will not be disfigured. It has been recognized in Physics that objects seen at more than or outside of an angle of 30° seem to be deformed because of their distortions or foreshortening. They no longer compare sufficiently with the actual objects for us to receive pleasure in seeing them.

If the seats in the face of the theatre, i.e. the seats in the boxes in the back of the theatre which directly face onto the stage, are not inconvenienced by this distortion, those on the sides and higher are, on the contrary, very much the subject. Does this not suggest an obvious means for correction? It is to proportion the height of the auditorium to the width of the opening of the stage, i.e. more height if the auditorium will be wide, and less if the

hall will be tall. Thus, in all circumstances, if one draws the visual rays from the high side seats, placing those seats so that one can see the objects on the stage within an angle of not more than 30°, you will once again make it possible to gain some pleasure from looking at the scenic objects from all of the seats in the hall.

The third consideration, and no less essential due to precedence, is that of seeking to give the interior of the hall a shape which does not disturb the viewing of the stage in any manner. Naturally, its curve must be one which does not present the least obstacle, so that the eye of the spectator can completely embrace all of the stage opening and can equally extend his visual rays to the deepest flat, without the interposition of any opaque object.

In the parterre facing the stage one can discover everything easily, but it is amongst the side seats and boxes nearer the stage where one always encounters some obstacles. To remedy this effectively it would be necessary to have as the base of a cone the largest width of the hall, the point of which would be found at half of the depth of the stage. The sides of the cone should not be interrupted, under any pretense, whether by proscenium, by its aperture, or by some other intervening body.

Manifestly resulting from these observations, on the distribution of those seats usually regarded as the least advantageous at a performance, is the fact that they can be freed from such inconveniences by meeting certain stabilizing constant relationships, between: the length and width of the hall; between the size of the opening and the maximum height of the spectators; and the combination of these considerations in such a way that they do not prejudice themselves in any way.

APPENDIX G

PATTE, ESSAY, CHAPTER III

CONSIDERATIONS INTRINSIC TO HEARING AND SEEING WHICH DETERMINE THE TRUE DESIGN OF A MODERN THEATRE

ONLY THE ELLIPSE BRINGS TOGETHER ALL THE ADVANTAGES DESIRABLE FOR AN AUDITORIUM

CHAPTER III

If you attentively examine the elliptic shape, fig. , demonstrated to be the most favorable for the reverberation of sound, you will note that it is also susceptible to being modified in its dimensions to be the most favorable for seeing. We will show that these modifications can be determined exactly, to leave no doubt and so that there will be no question.

Assume that you are given an ellipse with a large diameter, AB, which is regulated by the rules for carrying the voice and vision. Its small diameter should have a length, CD, being of a relationship of 3 to 4 with the large diameter. This proportion will be recognized for being pleasing in its execution. After having fixed the foci, G and F, according to the method given above, and having designed its elliptic curve, you are free to determine the sponda or parapet (the apron edge) of the stage, with the line, PHO, parallel to CD, which will cut the diameter, AB, of the ellipse, AB, at the A end, at one quarter of the AB length. If you then draw from the ends, C and C, of the small diameter, the lines, CI and DI, towards the fondo (rear wall of the stage), I, the intersection of these lines with the ellipse at the points, Q and R, not only will give the opening of the stage, QR, but also the depth of the proscenium arch, PQ and RO. The results of these determinations will be several. (1.) The ellipse will be cut across at one quarter of its length, at PO, by the edge of the stage, or sponda, HD, which will be equal to CD. Thus the hall may appropriately be said to be as long as it is wide. Thus, also, it will be certainly favorable to the sight as well as to the voice. (2.) The largest width of the ellipse, or its small diameter, CD, must be considered as the base of a triangle, the sides of which, when lengthened to the back wall of the stage, I, serve to determine the stage opening, QR. Evidently, one would be able to see from seats at C and D, reputed to be the most dis-advantageous, to the back wall, I, or to the back wall of the scenery without any obstacle. (3.) The opening of the stage, QR, is in about the middle of the large diameter, AB, and at about two-thirds of the smaller diameter, CD. (4.) The depth, PQ and RO, is half of AH, the part of the ellipse cut from the edge of the stage, PO. (5.) And last. The proscenium, then, does not interrupt the elliptic curve at any point, and also one of the foci, F, naturally will be found to be situated in the middle of the proscenium. If all of these relationships are established, the theatre will not be wanting of a favorable agreement with the needs and desires of the ears and eyes.

How much should the angle of view of the side seats be elevated? You do not have to search to determine this angle. It is given in the relationship between the width of the hall and the height of these seats. Suppose a rectangular parallelogram, ABCD, see fig. , the length of which is equal to the width, CD, of the hall, and its height, AC and BD, equal to two-thirds of C or QR, fig. . The opening of the stage would be the same. If you divide this parallelogram equally in half with a perpendicular, EF, which represents the middle of the stage, draw from point A to the most elevated side seat the visual ray, AF. It is easy to judge that because of the relationship of the lines the angle, FAC, will be about 30°. Thus one should not elevate the side seats higher in relation to the stage than the width of its opening, or beyond two-thirds of the width of the hall. As a result, anyone can be persuaded that the scenic objects need not always be disfigured by too much foreshortening when seen from the high side seats.

From the relationships of all these different elements it is obvious that in a theatrical hall one should be able to find a mixture of optical and acoustical shapes most appropriate to favor the organs of our pleasure. Pleasure, then, results from the combination of being able to see and hear equally well all of the aspects of that which is happening or is being said on the stage.

It would be vain for a person without direction to design a theatre without regard for the observations of Physics reported herein. Neither will they obtain the desired effects if the different parts of the theatre do not evolve in concert. Nor will the flight of sounds agree without having a concentrated point of unity for reverberations and free circulation.

The ceiling (<u>soffitta</u>) of the hall, a space which offers a superficies plain or with affectations of ornament in relief, must be but a portion of the completely united elliptic curve. If it were not it would reflect the reverberations of sound by chance due to angles of incidence and reflection. This would be an error because the essential thing, as we have proved, is to concentrate the reverberations to make them circulate and fortify themselves.

It is necessary, then, to cover all the surfaces of a hall with sonorous and elastic materials, which is the function of wood. It should be noted that harder bodies do not give sufficient reverberations; they do reflect sound, but dryly and without harmony. Softer bodies absorb and tire sound.

It follows then, from what we have said concerning the impressions of the voice received back from the encircling bodies, that if you allow for the visual angles in the distribution and design of a hall, that openings or points which are pushed out in front from their surroundings, tend to absorb almost all sound. If you have many openings or points pushed out, the most grand disorder results in the reverberations from this license taken in the design. As a result a multiplicity of new angles of reflection are introduced. Once again, you will not obtain a good presentation of the stage voice unless you give pre-eminent attention to all of these considerations. If you do, you will succeed in composing a theatre wherein the scope of your desired expectations will be found to have been exactly fulfilled.

Then, if you join these advantages with an architectural decoration of good taste and beautiful distribution, you will be able to say with Horace, "Omne tulit punctum, qui miscuit utile dulci!" But you object perhaps that a theatre cannot be done in any other than one manner. That one only needs to seek an example of one of the ancient's theatres to make one in a completely similar shape. Why not? It would be a great error to attempt to render a theatre like those of the ancients, adapting it to our own ends, i.e. changing it for better sight and acoustics. Everything must be subordinated to the two essential considerations of sight and acoustics in the execution of a theatre edifice.

When you are certain of the success of your intent, we do not see for what reason you would have to be free to affirm at all times the advantages which would redound to the public. We are bold to suggest that if you made a hall according to the rules which we have prescribed, a difference would be found which would make it stand out from other halls, above all for the carriage and sustenance of the voice, for the pleasure which would be received from the uniformity of the reverberations, and from the harmony which would result from the performances, whether it be an arrietta or an important piece of music. To the extent that this will be found to be true, you will shortly see halls with other than these conditions being abandoned.

The organ of the voice can be considered as both a stringed and a wind instrument, on which the wind has the function of the bow. But as has been said of the violin you cannot play it merely with a whim. If you want to modify its shape, however you would do it, whether to a box or a cube or triangularly, you will lose the pleasure of its sound due to the different shape. Likewise, you must believe that to make the voice soar you have need of a privileged shape, by means of which you might produce the best effect or

find the best harmony. So then to us it seems completely agreeable to prove that only from the elliptic shape can you find the hoped-for advantages discussed above.

To apply the general rules, therefore, and to give merit to any theatrical or lyric hall, it is necessary to follow this procedure: (First.) Imagine the hall in plan, and at its greatest width imagine the visual rays going to the middle of the back wall of the stage. This done, one must then judge if there are any obstacles found due to the extension of these visual rays. If the seats are conveniently placed, which will be the most favorable? Which the most inconvenient? How many fewer will the inconvenient seats be? How many more if the distribution of the theatre is brought closer to internal perfection at this point?

(Second.) It is necessary with regard to the auditor to imagine, similarly, lines from the middle of the stage which go out variously and encounter the extremities or walls of the hall or its ceiling. Paying attention to the angles of incidence and reflection of these rays it will be possible to discover the manner in which the voice will be found to reflect: (1.) If the reverberations of the voice seem forced, being made against solid bodies which do not have sufficient elasticity or being made against soft bodies, or being made against something which is not sonorous. (2.) If the reverberations are without consonance or are not reciprocally sustained. (3.) If the sound escapes from the stage opening. (4.) If it becomes absorbed in the depths of the boxes. (5.) If we see it striking any supports or ornaments in relief. (or 6.) If it becomes multiplied. Then, you should conclude with complete frankness that the voice moves in disorder, that the sharpness of its articulations and its harmonies will suffer, that it will seem hollow and exhausted from having lost its sustenance, that there will be as a result a number of spectators who will lose a part of that which will be said on the stage, and who, in a word, not that it was intended, will be seen to have lost some of the benefit which was to be desired.

Following these observations on improving design, during a performance, move yourself successively to many different seats in a hall, from each of which you should pretend to not have any knowledge of acoustics and you will notice above all the singular diversities of the manner of the functioning of sound. We say during a performance, because all that we have said theoretically about sound is altered when you have spectators in the hall, in that they absorb a part of the reverberations of the voice. In one seat, you will hear the voice distinctly, due to the nearness of the stage and due to the voice's direct force. Somewhere else, you will hear deafly, for the reason that nearby there is some opening

which swallows the voice, or it is because the absorbant mass of the spectators will not always be evenly or to best advantage distributed. Too far away, the voice will seem thin and overly extended, from not being agreeably sustained from its origination to its reinforcement. You may well be obliged to guess in part what the actors have said. If it is a question of song, for those who have a delicate ear, the vibrations of the sound will seem dry, diminished, incoherent, without the intimate union necessary for forming melodious accords, and its harmony leaves something to be desired. After a while it becomes evident that what is happening is similar to what happens due to a mediocre instrument even though it is played by an able artist.

Similarly one encounters many of the effects on seeing noticible only from many different seats in the hall. The first seats of the side boxes will have a view of the theatrical action, further back it will be necessary to stand up to see. When you are at the highest seats, the seats nearest the proscenium wall, the scenic objects become relatively disfigured due to the extreme acuteness of your angle of view. The expressions of the actor's faces seem to be convulsions and contortions of the mouth, also due to too much foreshortening.

It is only thus that you will become convinced that you would be led to expect an empty success in the execution of a similar work, if you went outside of the observance of our rules.

APPENDIX H

PATTE, ESSAY

CHAPTER VIII, PART 1

ANALYSIS OF THE MAJOR WORKS PUBLISHED ON THE CONSTRUCTION OF MODERN THEATRES

CHAPTER VIII, PART 1

For a long time the public has been aware that there have been this or that defect in our theatrical halls. One has only to begin to study this to find evidence of it for the past twenty-five years or so. Count Algarotti was among the first to have spoken of it in his Saggio sopra l'Opera in Musica, (Essay on Opera). Wherein, after having advocated invariable principles and rules of good taste with which one could perfect operas, he passed on to expound his own sentiments on the most fitting construction of a theatre.

He believes that architects, those who are in charge of undertaking the construction of theatres, have not paid enough attention to the uses to which the buildings must be put, nor to the materials with which they are to be constructed. Therefore, he discourses on the materials with which one should fuild a theatre, on the theatre's size and shape, on the location of the boxes, and on their decoration, also on what his suggestions are concerning the different points proposed.

Based on his given principles, Algarotti commends architects who wall the vaults of corridors, stairs, and every wall outside of the interior of the auditorium with brick or stone. These materials act half to render the walls durable and half to defend people from fire. But he then reproves those who insist on using the same materials to construct the boxes and all of the interior parts of the auditorium. His reason is that to do so would be to get away from the given rule, the main objective in the construction of a theatrical hall, which is to make it sonorous and to do so in such a way as to make the voice produce its best possible effect, without having to suffer before reaching the ears of the bystanders or lose its force or lose delight, which it can cause. "It can be demonstrated from everyday experience," he says, "that in a room, 'where the walls are bare, the reflections of the voice will be small and come crudely to the ear. They will be absorbed by the tapestries, with which the room is dressed. But, when the room is lined with boards or paneled, the voice rebounds softly, sweetly, and returns fully developed to the ear. From which, it would seem, experience would teach that for the interior of a theatrical or lyric hall it would be preferred to use wood. The material that is of which one makes musical instruments, as it is wood which is more apt than any other material, when it is vibrated by sound, to create that sort of reverberation, which is best suited to our organs of hearing."

Speaking of the size of a theatre, Count Algarotti says, judiciously, that before designing a theatre it is best to know how far the voice can travel. Thus it would be rdiculous to make a theatre of such a size that it is difficult to hear what is said or sung. Given the opportunity, he states, many have laughed at architects who, "have thought to have a theatre larger than the maximum size, and have as a result made it un-easy to hear." The correct method to be used is this, Algarotti proceeds, "the platform on which the actors stand, if made to thrust outward for many feet in front of the stage, thus placing the actors almost in the middle of the audience, will not endanger their being heard marvelously by everyone." But this manner can only please those who are easily pleased. And who is there who does not see that it is a turning upside down of all good order and every rule?

The actors must necessarily be inside the mouth of the theatre, within the scene, far from the eye of the spectators, and must assume their part of the sweet deception wherein everything is ordered in the scenic representation. It is here that there is direct contravention of the intentions of the presentation. If this effect is not cut away, the actors will be disengaged from the remainder of the scenery, and will be transported from the midst of the scenery to the midst of the parterre. This must not be done. The actors must not be shown from the side. They must not either turn their backs to a good part of the audience. Neither must this be done, or many other inconveniences may follow and thus cause a great disgrace, which might be seen but not paid for.

Based on the example of the ancients, M. Algarotti advises the semicircular shape to be the most convenient for a theatre auditorium. The reasoning on which he founds his preference is that the circle has greater qualities of space than all other shapes of the same perimeter, and that spectators located within the semicircular shape are all turned toward the stage. Hence they would see all. All are found to be an equal distance from the center. Therefore all would equally see and hear from whatever their location. Not daring to conceal that the above mentioned shape carries with it the inevitable defect of giving to the stage a wide and absorbant expanse, he proposes as correction of this problem, the conversion of the semicircle to the semielliptic shape. The semiellipse being the shape more accommodated to obtaining not only a stage more controlled in width but also a hall more proportioned in length.

Concerning the ceiling the same writer recommends that it should always be composed of a sonorous material, diligently put together in panels, not unlike the panels of a

ship. Guarding that they be of small thickness and concave, rather than flattened, so that they gather the vibrations of the air. Moreover, that the paneling be continuous up to its joining with the proscenium, so as to better reflect the voice toward the parterre.

The feelings of the writer are particularly detailed concerning the location and arrangement of the boxes. He would favor an arrangement most favorable to the public. However, he counsels conformity with what was done in the Theatre at Mannheim and in many of the theatres of Italy. That arrangement consists of placing the boxes in rows, starting at the stage, raised from the floor of the hall, with each row of boxes separated by pilasters or small columns, which support the next higher level, and which due to their partitions for separation, always transform the boxes into a sort of grating. It is not to be denied that this arrangement, as has been said above, was developed to facilitate the viewing of the performance. Such an arrangement has the misfortune of presenting most disgusting sight-line problems. In addition the quantity of projecting walls and partititions obliges the sound to make its reflections in a manner which prejudices its circulation.

For those who look around at the surrounding and decoration of a hall and its parterre, Algarotti says that there has to be in the interior of the hall an elegant and sophisticated air. Nothing should appear heavy or trivial. The spectators should be fully comfortable and they should be able to compose themselves for the performance. He feels that they should be located at a point with a favorable view of the stage, somewhat like being on the bookshelves in the stacks of a Library. He would absolutely exclude the multiplicity of ornaments in relief, concluding that they tend to interrupt the effect of the voices of the actors.

He would abandon the architectural orders of the friezes above the boxes for the reason that they cannot be given the needed height, thus appearing to be mean and things of bad taste and crammed into needed space. Instead of the mentioned ornaments, he would tolerate ornaments, though it would seem strange, if they pretended to imitate the grotesqueries used in ancient paintings or those sculptures made by the Gothics, which they very much resemble. In conformity with this, the ornaments could be worked with a gentleness which would crown the boxes, carrying little weight and lightening the supports.

In substance the reasoning of M. Count Algarotti does not in general include any research into what is necessary for rendering a hall sonorous, i.e. good acoustically, except for indicating certain principles with which to

proceed in the construction of a hall. On the other hand, it seems that he has had his eye only on theatres in Italy, where due to the graces of etiquette, the boxes in the theatres have become obligatory for the reception of visitors, for entertainments, and for conversation.

APPENDIX I

PATTE, *ESSAY*

CHAPTER VIII, PART 2

DE CHAUMONT: *VERITABLE CONSTRUCTION D'UN THEATRE D'OPERA A L'USAGE DE LA FRANCE, SUIVANT LES PRINCIPES DES CONSTRUCTEURS ITALIENS*

CHAPTER VIII, PART 2

The Theatre d'Opera burned in 1763 in Paris, a short time thereafter a pamphlet came out entitled, Veritable Construction d'un Theatre d'Opera a l'usage de la France, suivant les Principes des Constructeurs Italiens, (True construction of an Opera Theatre for the use of the French, according to the Principles of Italian Builders), by M. Cavalier de Chaumont. This book has made some little impression, although its material is badly organized, but it in no way corresponds to its title. Nonetheless it does contain some useful observations which we believe worth repeating.

From the start this author avers that to come to a good arrangement for the interior of a theatrical hall, there is need for it to be designed as a physical unity. As we have explained in the Essay, we are of the opinion that all the world will agree. Seemingly we are in accord that little good can be expected of a theatrical hall until it is built. To tell the truth, it can be charged all to an ignorance of the principles of optics and acoustics of singing in those who take it upon themselves to present designs. Naturally M. De Chaumont allowed these observations to take the place of thought and consequently should have presented some principles for the establishment of what would be the true and just shape for a modern theatre, at least. But on this point he speaks precisely not one word, though making haste to insert a passage on some of the defects of older theatrical halls, in particular those which have been lost as prey to the flames.

According to his ideas a completely inappropriate shape has dominated for too long in our theatres, and even now. A shape which is completely contrary to the propagation of sound. This shape consists of two parallel lines (wide-walls) which come to an end at corners opposite from the stage, then, either as a line or as a portion of a curve, they join at the rear of the hall. Leaving out a drawing of this envisioned arrangement, a practice against which all are advised, De Chaumont recounts various causes for sound becoming lost in the parterre. They are (1.) the large walls which often stretch below the first row of boxes and the enclosed corridors at the sides of the parterre, which absorb sound without any chance for return. To obviate this he would build a wall or wooden panelled partition on the parterre below and plumb with the box railings. (2.) The habit of locating entrance doors to the parterre opposite from the stage, concerns him. He counsels that they should be placed

always against the flanks of the hall to enter from the side and from the end of the hall nearest the orchestra pit, with the precaution of an inner door to impede the enclosed air from carrying the voices from the outer hall toward the stage. (3.) He advises against using supports between the boxes, for their full height. The author proposes that the balconies be open and continuous, without pilasters or pillars, with the condition that the balconies not be held up by poles or bars of iron, as slim pillars, as he judges these would be the object of inconveniences, but that they should be framed with small beams within the walls during construction, which would give the boxes more solidity. (4.) Finally, the opening which is left by custom in the ceiling of a theatrical hall is very damaging to the voice. The aforementioned M. De Chaumont makes a statement which would have us regard the ceiling as an important agent, the precise duty of which is to return the voice everywhere. Concerning the construction of the ceiling, conforming to the customs of the Italians, he would have it covered like a tamborine. He explains that it needs to be made concave and of paneling connected like the tablets of a pavement, more narrow than two feet at its upper joining, and that these panels should be attached to the above superstructure by the use of rings and small chains.

Having made these observations, the author proposes a sketch for a theatrical hall. He prefers the shape of an arc 'in the third point' with walls angled and receding toward the stage, offering itself up in the midst of the stage. Indeed, the idea has true strangeness, which other than being without example, jostles one to be interested to see how it might work.

APPENDIX J

PATTE, ESSAY

CHAPTER XIII, PART 3

MONSIEUR M. COCHIN, LE PROJECT D'UNE SALLE DE SPECTACLES, POUR UN THEATRE DE COMEDIE

CHAPTER XIII, PART 3

A little before or after the De Chaumont pamphlet just examined, there was published another by Monsieur Cochin, engraver to the King. The mentioned pamphlet carried the title, Le Projet d'une Salle de Spectacles, pour un Theatre de Comedie, (Proposal for a performance hall for a Comic Theatre), and coming with this pamphlet were some relevant notations. Cochin recommended the shape of the Theatre of Vicenza to our uses due to the scope of its application. The reason he gives as justification for his choice is that our halls, in general, appear to be too long. As a result the boxes at the rear, being more favored for seeing the performance and for judging the effectiveness of the scenery, are for the most part too distant because it is not possible to hear distinctly from them.

Nevertheless it is not the semioval shape which he proposes as our model, but Monsieur Cochin, with his design, suggests that one use a completely oval shape. The large diameter of which would be about 72 feet in length and the small of 54 feet. According to custom the seats would be scattered or spread out and it would have an orchestra pit, a stage, a parterre--spacious enough to have nine hundred persons on foot, an amphitheatre (a banked section of seats between the parterre and the first row of boxes, completely surrounding the parterre, with two rows of seats, and above that three tiers of boxes.

In order that everyone might be persuaded of the usefulness of this shape, Monsieur Cochin, contrasts it with the shape of the old hall of the Comedie Francese. He demonstrates that the auditors located at the rear of the hall, which he had idealized, would be twenty paces closer to the stage, and those located in the side boxes, being there at their own choice, would find themselves closer than they might have been in the boxes at the rear of any other theatre.

The author points out that the above mentioned arrangement involves the great inconvenience of giving an immoderate largeness to the stage. He would remedy this with a permanent scene, of triple division, giving to the middle division fourteen feet and ten to those of the two sides. He would give an architectural ornamentation to all of the interior of this scene. He proposes this scene on condition that the divisions, in crossing, would leave sight of all the sceneries. Here in this manner, like his novelty, he studies to justify it.

Thus dividing the scenery he says would give a more magnificent performance without increasing the day to day cost. The spectators on the sides would be better able to see the working of the scenery than at ordinary performances. The small side stages could be used and seen corresponding to their particular scenery. In other words, the triple scenery could indicate three different locations, conceived to sustain the law of unity, i.e. that place where according to the rules the action must occur would be marked by the completeness of the whole stage, but would be subdivided especially when the scene must show more than one building, such as a temple, and a palace, and a tomb, etc. After all, in many tragedies and comedies, the actors must depart without being seen by those who must take their places. Therefore, a recitation could appear to one side and thus appear more verisimilar and more natural.

How valuable it would be to know the reasons adopted and the authority for the theatre at Vicenza. Thus to end an argument about whether or not the proposed oblong shape would come out happily if actually done. If for no other reason than that it is directly opposed to the mass of air which is emitted by the voice at the exit which it makes from the mouth of the actor. On the other hand, with the subdivision of the stage into three permanent parts, with openings as narrow as those on the sides are idealized to be, could agreement ever be made then with the extreme width of the hall? With the interruptions of the scenery, how much would the illusion be marred?

On the merits of the advantages discussed in favor of the recitations on the side stages does not Cochin realize that from time to time either the designer or the theatrical machinist has not sufficient control of the arrangement of his movable scenery in such a way as to favor a tripartite stage, by having to feign either a crossroads or some place or another which is divided into more streets than the stage has?

Finally, carrying the apron of the stage more than twenty feet out into the middle of the hall necessarily would find the actors too isolated in the midst of the spectators and too far from the scenery. As a result the illusion would disappear and the action of the play would appear poor and without effect.

From the mentioned conception another particularity has originated. That particular is the raising, as much as necessary, of the first row or tier of boxes. To answer this necessity it is suggested that at the back of the boxes posts of wood be made which would descend and overlap the joints of the paneling, in the manner used with the windows of a carriage, such that the panels might be removed,

exposing the corridors behind the boxes. Then, with the filling of the evening opening night performance with a throng, it would be possible to ease the crowding, by removing the panels, giving the addition of two rows of seats in the corridors. The suggestion would certainly make for a most opportune increase in the number of seats. But while one gains in one way, one loses in another, because sound would suffer considerably from being engulfed and lost in the extraordinary depth of the boxes.

APPENDIX K

PATTE, ESSAY

CHAPTER XIII, PART 4

MONSIEUR "M. M.", EXPOSITION DES PRINCIPES QUE L'ON SUIVRE DANS L'ORDONANCE DES THEATRES MODERNES

CHAPTER XIII, PART 4

Among many authors on theatres, one, from many years ago, who had seen the light, wrote a particularly distinguished work, entitled, Exposition des principes que l'on suivre dans l'ordonance des theatres modernes, by "M. M." (initials only, no name).

In general this book abounds in judicious reflections on the abuses which come from overly common construction in theatrical halls. Therefore, much of good grade can be pulled from this discourse, in which the author seems to have studied and come to the same conclusions as we. As a consequence, it will be of some moment to see if he has given the truth, or if not, how he has gotten away from it.

Monsieur "M. M." begins by declaring what must be the basis for the structure of a theatrical hall. For the reason that the spectators must hear the voices of the actors distinctly, he requests that the stage be visible in full light, that it all be exhibited together with the permanent part of the stage, and that the seats be distributed according to the customs and conveniences of the climate and place.

Then, descending to an examination of particular points, he attempts first to explain the manner with which, according to his ideas, sound must operate, corresponding to the qualities of the parts of the hall which it touches as it circulates.

Augmenting force can be given to sound, he says, only with the means of the hall's interior, produced with the reaction of its rays, so it is said, with their return over themselves. The return of the rays over themselves, over their own mass effects repercussions, reflections, and circulations. In this manner the method is found in which the return of the rays of sound happens. The secret, to obtain the maximum effect from the rays of sound, is in dressing its enclosure in a hard and sonorous body arranged in its totality in such a way that the enclosure is also rendered sonorous.

Two different species of force can be distinguished in sound, direct force and return force. Direct force not only consists of the emission of the direct rays which are carried to the ears; but above all depends on the union of those same rays, which are here aided and sustained by their cohesions.

Parenthetical to the present discussion, we will observe here that it is an error to believe that the rays of sound always return over themselves, as the above author thought, because the rays can be just as equally divergently or convergently reflected, due to that which has already been demonstrated by us according to the principle that reflections are determined by the disposition of the bodies which surround the sound source.

Concerning scenic objects, Monsieur "M. M." likes those which can be distinctly recognized and seen, those that, from where the spectators see them, appear through what resembles a large frame, wherein the eye discerns all of its parts at one and the same time. Not drawing for containment of the scene four lines from the point of view to the flat at the rear of the stage of which one passes below the feet, another above the heads of the actors, and the other two represent the edges of the opening of the stage. All four lines are more or less elongated toward the parterre, they enclose or contain all of the visual rays of the spectators; and it is not possible to consider the thing otherwise.

After having established that the perfection of a theatrical hall can be reduced to the premise that we should be able to see and hear well, Monsieur "M. M." passes on to explain what his thoughts are concerning the shape of the hall. A hall, he writes very suitably, necessarily should be determined relative to sound and to the size of its stage. Few are the shapes which are not adaptable for the small hall, provided that they are not too restricted. Since in small halls the spectators are so close to the actors, it is enough that they can hear the rays of the voice directly. But in the construction of large halls, there is need to select the shape, if you intend to get the advantages of both the sound and sight. To this end it is required that those shapes be absolutely banished which are composed of two almost parallel lines, even if at their beginning they should expand and then restrict themselves again, and toward the rear take the rounded shape. The result is that the sounds are more quickly absorbed, more so as they become more distant from where they are made, because they go into a void in their circulation. Sight suffers no less, except in the space directly in front of the stage, because sight is intercepted for those who are in the second row of boxes, and even higher. The reason is that those boxes nearer to the stage present opaque bodies between the point of viewing and the rear of the stage. It is not that the visual rays of the spectator cannot reach the stage; it is that the cited opaque bodies are produced by the first row of people in the boxes, or by the presence and mass of the supports of the boxes. In summation, such a hall, due to its bad arrangement, obliges some

spectators to rise to their feet to see. They must then support themselves, be disquieted, inconvenience those nearer, and make heads to be twisted so as to see the stage. That such an arrangement is not the most felicitous is confirmed by the proof of having been done to the old halls of the 'commedia' more in the French than the Italian.

The author's proper rule, of which he speaks, is that: As much as you make a hall larger the more essential it will become that it's curve come closer to a circular line to give better quality to the rays of the voice and to facilitate seeing. To the detriment of his counsel, Monsieur "M. M." reputes all shapes as indifferent. He leaves the choice to that which pleases most. Suggestion: Use either the circle or the ellipse, the large diameter of which extends across the hall, as it is in the Theatre of Vicenza (Teatro Ollimpico), of the semicircle, which was like that of the old theatre, either of the semi-ellipse elongated, or of the shape of the ceiling or of a pear without a stem, as is that of the Teatro Argentina at Rome and the Teatro San Carlo at Naples. Nothing limits the choice other than that the diameter not fall precisely on the opening of the stage, but that it be transported two tesa (from fingertip to fingertip equals one tesa), further toward the hall. The result is that from one side and the other of the proscenium, either real or feigned, remains a plane surface to where the circular part of the wall begins, which is clear of spectators. This sacrifice of seats seems to the above mentioned author to be essential to facilitate the reflections of sound and to direct them toward the parterre.

In this manner all of the investigations with the inclusion of those of Monsieur "M. M." have been studied for the establishment of some rules for the arrangement and distribution of the parts of a theatre; coming internally to an end while leaving the beginnings uncertain, from which as it has been demonstrated, we should have been freed in the first place. Thus the investigation was born from having believed in the authority of Cartesio, who said that rays of sound operate only in their circulation, or when they return over themselves--an effect which is completely dependent upon the voice being at the center or it will not have space whether it is in a circle or a semi-circle; in such a way that the rays being always perpendicular to their circumference, they must be returned of necessity against the source from which they are issued. This cannot be verified if based on one particular case, from which the author has formed a general rule. Carry the voice to any other place, for example, to the edge of the circle, or to any point inside the same circle, fig. , table , and its reflections against the inside of the circle will form a type of polygon, conforming to the accepted law of the

equality of the angles of incidence and reflection. If Monsieur "M. M." had announced that the rays of air set in motion by sound must be equally the subject to the same determinations, we would not doubt that all shapes react indifferently to reflections. We have in the course of this treatise by now debated and redebated this point which would make it superfluous to turn it over again.

How very strongly Monsieur "M. M." disapproves of locating the boxes stacked vertically one above the other in rows. This "heap", so he advises, denies a hall its free surfaces the action to reflect sound. Nor will the hall react other if it has curves introduced into it, or absorbent bodies which expend sound, or obstacles which reduce the force of returning sound. He finds that with the proper arrangement of the boxes one can both hear and see, and cannot judge whether one or the other is more beneficial. He suggests that whichever shape you select as better for the circuit of a hall, that shape should always be repeated in the upper levels. Finally, he maintains that the general decoration of a hall suffers from little multiplied perpendicular planes, and due to the mass of spectators being united, its internal appearance suggests its being fractured into small equal parts, similar to the divisions between one and the other which are left between the nests of a pidgeon coop.

After this somewhat exaggerated criticism attacking the rows of boxes placed vertically one over the other, he attacks on principle those boxes with separate interiors, or semi-separate, one next to the other. Between these two, he prefers the semi-separated interior, citing for proof the new theatre of Bologna, yet on the contrary the rows of boxes in that theatre, fig. , table , supercede one over the other perpendicularly. To the end of favoring his new division of the balconies, the author suggests eliminating the partitions between the boxes and substituting for them simple barriers or railings for separation. With this expedient it is possible to have the walls of the boxes of a lesser height than usual. In his judgment, in a more eminent part of the hall, it would be possible to restore a more advantageous surface for decorations, for sight, and for the reflections of sound. In proof of the good effect of this arrangement, he proposes as example a model of a theatre drawn by Monsieur Damun, of whom we will speak in the next section, part 5, Chapter XIII, which follows.

A similar compartmenting of the spectators in seats banked, like in an amphitheatre, would in truth present to the eye a more impressive togetherness than that which is ordinarily seen in our boxes. Thus, seemingly, leaving the walls, near to the proscenium and towards the whole, nude

and smooth, which would really be advantageous to the reflections of the sound. But with a shape which has already been noted discordant with the ancient theatre and equally so with our modern customs, could our customs then combine well with the amphitheatral shape? Would it not be more pleasant, if instead of the commodiousness procured from the boxes, to make these seats not be isolated, so that no one would become confused in the crowd, and so that women could perhaps be represented a little more? Instead of the interest which moves men to build men being for the few, he suggests, who it is who would desire to tolerate all of those blind spaces on the heights and sides. Then he says that those who want distant and incommodious seats should not be ignored by those who would tolerate them, and that is enough.

(Less suitable than somewhere else would be the singular arrangement of the seats as in an Italian amphitheatre, because the way in which they dressed would often unknowingly interrupt the performances. For those who would take leave of the play, the boxes serve as a place for visiting, and when this occurs, they could also close them with mobile shutters.)

But more than that they show another important consideration, and it is that whichever the shape of the hall and the arrangement of the boxes, retreating one behind the other, from the stage would require, necessarily, an exorbitant width of stage without any way to change its height. As a result, excess width cuts its grace, which properly exists from giving it an aperture somewhat squared. Otherwise, it would obligate augmenting the expense of the scenery. Above all, the voice proceeds to be lost, in part, in the first set of wings. Supposing, for example, that the four rows of boxes of our old Theatre d'Opera in Paris would have been arranged as a suite one after the other with separations to support them, it would be clear to the eye that there would have to be thirty feet more to the opening of the stage, if it is desired that the spectators located on the sides be in a position to see the stage completely and the rear of the scenery, without which a great multitude would have to be in seats completely outrageous, inconvenient, and useless. It is not completely outside of doubt, that Monsieur "M. M." had foreseen this inconvenience, and that, thus, he could have more truthfully written by uniting to his work some designs, which at a glance of the eye wouuld have made clear the illustration of his new compartmentation of the boxes and as a consequence of his principles.

APPENDIX L

PATTE, ESSAY

CHAPTER XIII, PART 5

MONSIEUR M. DAMUN, PROSPECTICE ANNOUNCING A WORK WITH THE TITLE: NOVEAU THEATRE TRACE SUR LES PRINCIPES DES GRECS ET DE ROMAINS

CHAPTER XIII, PART 5

It is now seven or eight years since Monsieur Damun, the architect, sent out a Prospectice which announced a work entitled, Noveau Theatre trace sur les principes des Grecs et Romains, (New Theatre Based on the Principles of the Greeks and Romans), however, the bad luck of his death has impeded for this artist the publication of the idea of his work. We believe that it would be thought of good grade if we would look closely at that aspect which the author examined in his Prospectice.

This architect demonstrated with well directed argument that the shape, the proportions, and the distribution of modern theatrical halls do not have need of being researched in the various orders of architecture, but only in the principles of sight and hearing; that all of the properties necessary for a theatre must not be determined geometrically; that both among the ancients and the moderns the theatre had to be a complex optic and acoustic shape conceived for the best manner of seeing and hearing all that which was concerned with the presentation of the dramatic action. Consider the general shape of the Greek and Roman theatres, he said, which are almost completely the same. That shape seems to have been derived from the sublime and simple idea, undertaken from the manner in which plays were augmented and done naturally within the angles of and in the streets of the city. There have always been some crude dramas given by men who had permission to give entertainment to the indolent part of the population. It can be seen that these men managed to carry on their backs their portable theatre-stage to a wall of a small square. From the moment that they began to unfold their equipment the populous spontaneously came to stand in a semicircular form around that instant scene or stage. The spectators who found themselves in back raised themselves on their toes so that they could better see like those who were in front of them. Here, according to his thoughts, was the source from whence the ancient architects, without having studied anything else, seemed to have attained the general shape for the design of a theatre, and here is the shape which he proposes to be embraced for our modern hall.

In fact, according to his thoughts, the plan of his projected theatre had a half-circle with a mass of banked seats topped with a colonaded portico. The banked seats conjoined with the scena, the sides of which it went to expand. Supposedly in this arrangement he found some advantages which it seems we do not have in our modern halls,

due to their narrow, long shape. He argues that the shape of the modern halls distresses the gestures of the actors, restricts the depth of the picture, destroys the sound of the hall, and shuts off from many spectators a view of the stage. They are constrained one behind the other to be in locations painful and at a height where the objects seen from above no longer have the appearance of their ordinary shapes.

The same architect finds no less reprehensible the complete separation of the parterre from the stage by a large immobile frontispiece with columned architecture, because it impedes the decorator by enlarging the flanks of the proscenium, because they have come too near to the first painted flats, and because many times they have nothing on them analogous to the rest of the view. He condemns, above all, the habit of using a great number of narrow wings planted at little distances from one to the next. Thus according to his advice, they impede the movements of the actors, double the manual labor, render the machinery complicated, multiply the lights, constrict the painter to mutilate the tracery of his designs with the division of the masses onto many separate flats, and finally casts into the composition of the theatrical decorations a studied monotony, which, almost all of the time, destroys the truth of the planes. As a consequence, he intends to substitute for ordinary flats in the wings other flats made in the form of triangular prisms (periaktoi) according to the example of the ancients and conforming to the idea of Count Galiani, expressed in his Italian translation of Vitruvious. Similar flats, he believes, which because of their different optical positions and their mobility, would be enough to produce every manner of change--simply, judiciously, and economically. You can see, under the letter , fig. , plate , the distribution of these triangular flats on the sides of the ancient scena.

These are more or less the objects which Monsieur Damun proposed to exhaust in his Prospectice, to say more would have need to have under one's eye his projected book. That not being the case, we will limit ourselves to observe that with whatever sort of distribution of the seats and however large the stage is widened, it would be truthfully subject to the same inconveniences as those of Monsieur "M. M.", which have already been discussed, which Damun had for a model.

APPENDIX M

PATTE, ESSAY

CHAPTER XIII, PART 6

BLONDEL AND PATTE, COURS D'ARCHITECTURE

ROUBO, TRAITE DE LA CONSTRUCTION DES THEATRES ET DES MACHINES THEATRALES

NOVERRE, OBSERVATIONS SU LA CONSTRUCTION D'UNE NOUVELLE SALLE D'OPERA

CHAPTER XIII, PART 6

There are other authors who, without entering into any particulars, have in general explained their feelings concerning the construction of theatres.

BLONDEL:[1]

Monsieur Blondel in his Cours d'Architecture thinks that the interior of a hall should have a circular or elliptical shape, and, of course, not be oblong, according to the custom of the era in which he was writing. He feels the ceiling must always be a squashed curve, because it would more sweetly reflect the sound of the instruments and the voice. He also advised that it would be useful to remove the boxes and to supply, instead, continous galleries, which are raised one above the other. And last, he would want the conversion of the brick floor, where one stands on foot, into a planked floor with benches for seating oneself. Finally he would agree that it should be better to split the orchestra in two, locating the two parts above the balconies on one side and the other, because it would leave the hall entire between the stage and the parterre. This architect, however, did not give any reasons for his changes, and neither founded them on principles, nor formed his judgments on available designs. Thus, we will dispense with examining his feelings, being contented to note that the division of the orchestra, which for him is greatly to be desired, would make it very difficult to conduct.

ROUBO:

Monsieur Roubo, having published a Traite de la construction des Theatres et des machines theatrales, attached to it a plan for a model, and we, without agreeing with all the details of its arrangement, and following our customary style, will pay attention only to the arrangement of the interior which he had imagined. The shape of the interior which prevails is that of a semicircle of 54 feet radiating

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[1]Textual footnote: "for sale at chez la veuve Desaint, Libraire rue du Foin. Patte added two volumes of text to Blondel's, Cours d'Architecture, vols. V and VI, and a volume of plates, Vol. III.

from the apron of the stage up to the rear of the hall. The semicircle enlarges the curve of the proscenium. All of the seats are distributed on banks and they, as in the theatres of the ancients, are finished with columns with sufficient space for boxes between one column and the next. The parterre is crowned at the ceiling with a band of basketwork, which mounts the columns and ascends to eighteen feet. About forty-five feet of the opening are given to the stage, and seem to have little relation to the exuberant width of 108 feet which is required for the hall. To temper which, he has carried the edge of the stage thirty feet out in front of the scenery, in such a manner that the actors seem isolated in the middle of the spectators, such that there is grave dispute with the illusion.

Only casting a glance at his plan, one could rest convinced of the justness of the observations which have been made concerning the shape in general of ancient theatres with their banked seats or boxes retreating from the stage the one next to the other. The thoughts of Monsieur Roubo do not seem to be those of a mere application, because they are quite apart from the reasons that the above mentioned curve is less favorable to the reflectance of the sound in the midst of the auditors. We have said and repeated that those boxes rising behind the parterre one after the other and distributed along the curve as in the ancient theatre would demand of a necessity a size, or would give it an incident width to the opening of the stage, or would leave near it a gross number of incommodious seats. In fact, if on his plan you draw from the middle of the rear flat some lines toward the hall, and pass them past the extremes of the aperture of the stage, you will comprehend that the rear wall of the scenery will be lost from sight to almost one-third of the spectators.

Giving a glance at this, you will see with equal clarity how damaging the columns are to the reflections of the voice and to the sight of those who have to be seated behind these double boxes. A cross-section of the same hall will show that, in proportion to the extreme concavity given to the ceiling, the rays of sound would not be directed straight toward the spectators according to the angles of incidence, but would form diverse reflections which would give birth to untimely echoes and redondances.

NOVERRE:

We believe it would be appropriate to examine the lectures, Observations sur la construction d'une nouvelle salle d'Opera, which Monsieur Noverre has presented but has not yet brought to light in print. (He did the following year.)

His principle point is an explanation of the defects of the burned Theatre d'Opera, and a demonstration of how difficult it was to gain a good effect from the scenery due to the restrictions of the place where it had to be built. They did not have the freedom, he assured us, of being able to avail themselves of the space in the wings of the stage next to the courtyard of the fountain of the royal palace. The chorus and the corps de'ballet could not come out and return except on the right side of the stage, and on the left they always needed to follow major events, which produced a disgusting and tiresome monotony for the public. Other than that, it did not leave the way open for the imagination and inventive genius of the artists.

He then compares these defects with those being done in the new Theatre d'Opera, as yet to be built. He similarly stressed the arrangement in accessory space for handy water reservoirs and water hoses, so that in the unfortuitous event of fire they could be quickly and easily carried to put it out.

Concerning the structure of the interior of the hall, its decoration, and the location of the seats, Monsieur Noverre scarcely said a word. All of his other sayings were resolved in some general advisements. After having said that between all the theatres he had seen he had not found one in which the defects did not surpass the beauties, he passed on to recommend to architects that they should not ornament a hall to the sacrifice of that for which the hall was intended, and as a result covering the beautiful sorcery of the performance. He intended that the most essential thing to which the architects had to refer themselves was to make the hall a place wherein the spectators could find that they could both see and hear well. He also maintained that the actors should be established as though at the center of a semi-circle, which in its shape was described by the form of the encircling boxes. It is not good, he continued, that the spectators be either too near or too far from the stage, because the scene must be regarded as one would a grand picture, of which one cannot get the best effect unless it is at a certain distance, which is the way it is, by the way, with those who inhabit the boxes. He went on that the best ornamentation should be reserved for the gentlemen of the boxes, in the same manner that the decoration of the scenery must be well done for the actors and for the scene. Finally, he maintains, that the construction of the hall should be done in such a way that the spectators are never permitted to see what goes on behind the scenery and in the wings. Monsieur Noverre did not let the opportunity pass to demonstrate the ridiculousness of the common habit of wanting boxes at the sides of the proscenium. He blamed the locating of boxes there either on the attraction or love of profits,

or on the ignorance of the architect, or on the perverse feelings of those who build theatres.

"The proscenium," he said, "must be considered as a large frame, able to receive alternatively the various pictures which the arts can offer. The frame must be mobile in its shape and simple in its ornaments, because if it is encased in gold, if the diversity of its marbles is too resolute, the decorations which compose the picture, and the actors who are its figures, become suppressed by the ornaments and their richness. From this even the scenic vestments will be very much lost, and from the clash of colors and magnificance one cannot expect to gain a harmonious whole."

Certainly these sentiments merit applause. They are founded on the truth, on good faith, and on good criteria. We will return to this material, a little bit from now, when we make a purposeful word concerning the arrangement of the stage, or space appropriately of the actors, for on this point Monsieur Noverre spoke as a master and his feelings are of great value, relying upon forty years of experience during which time he always had room to exercise universal acceptance of his ingenuity in almost all of the theatres of Europe.

APPENDIX N

PATTE, ESSAY

CHAPTER XIV, PART 1

DETAILED APPLICATION OF THE ELLIPTIC CURVE TO A THEATRICAL HALL

CHAPTER XIV, PART 1

One can learn from a careful and diligent examination of major theatres, i.e. those whose interiors have some resemblance to perfection, that which is lost in translating plan into actuality, unless a firm attempt is made to insure that the implicit good of the theory is made to come forth in the construction. Theatres have had in the past every variety of indifferent shape, without the consideration having been made of whether this or that one would be the best or most privileged. With regard to those theatres which cost the most money to build, in the end they came out as magnificent halls for conversation but not as true theatrical halls.

The variations between halls are not proved, perhaps, with equal clarity. As a result and up til now, not one has been built which does not grope toward the true principles which it must use as the foundation for the design of such a building. If the principles were recognized and adopted, they have not had the necessary attention paid to them. Vainly these theatres are giving multiplication to false notions, vainly science continues to make still greater progresses, but it is the scientists who have never deigned to give an overview to the results of their writing and who give slight to the applications. Without this torch, which would give reason for marvelling to whoever would go for some time, groping, and ending up in the middle of the darkness, without such help, experience will never be opened up, so that, except for the fortunate accident, who would have the time to follow the intent?

Consulting those authors who have written about the design of theatres, you will find that either they are not in accord, or they sound unanimous. Yet for all their force, they are unable to leave the subject in certainty. The few who have been content to compose some of their thoughts into rules, managing to strengthen them either with the design of the ancient theatres or with particular examples, and the one among them who risks to stabilize principles or precepts, have come finally to the conclusion that all shapes, indifferently, for a theatre are more or less the same.

It must be confessed that in the midst of all these tentative practices, which now and for some time have been followed, it would be a relief to know which would be the <u>true given order</u> for the interior of a theatrical hall, or at least that which would permit us the minimum of inconvenience. In many of the more recently built theatres, the

oval shape has been selected, which has been cut at one end for the stage. But, at the same time, it seems that all now agree, without having investigated the reasons, that it is settled, that among all the other curves (i.e. rachet, horse-shoe, bell, circle, semi-circle, or semi-oval, either cut along the large or short diameter), there seems to be little difference.

To tell the truth, it is the nearness to the ellipse of the oval shape which gives it its preference and some of the major advantages which are found, if there is no interruption in the continuity of the curve ending at the place of the stage, or if the desire is avoided to change it or open it at its part closest to the stage, as was the case in the theatres of Torino, Paris, and Versailles, or if, finally, in their circumference there would not be tolerated any license contrary to good principles, except if it is noted by us a number of times.

We will return, now, to that which has been proved by the principles of this Essay. The elliptic shape is agreed to be the one above all others hoped to give, if possible, a success analogous to the one desired. As we have already said, and here allow ourselves to repeat--it does not carry with it any inconveniences of the other curves. It does not obligate giving too much opening to the stage. It offers ease for seeing the scenery and all which occurs on the stage from the seats usually and communally stigmatized as uncomfortable and the most unfavorable. Without there being any mystery about enlarging or altering its curve, it will not have anything lost due to its major width except too much sensitivity. The ellipse also includes the already mentioned advantages in our case inestimably in that locating the stage at one focus assures that the rays of the voice will always be reflected from the walls of the hall against the other focus. At the second focus of the ellipse there is formed a sound column due to the encounter of all of the reflections. The sound column very favorably fortifies the voice, gives it value, and increases the grace, cleanness, and harmony of anything which is either declaimed or sung.

It may be named either one or the other, Theatre Comique or Theatre d'Opera, but no one has given any thought to what the differences must be between a hall for one or the other, one for comedies or plays and one for dramas in music, the differences in shape and capacity. Neither song nor words modify the voice. Both equally exert a certain agreement to the reflections, augmenting force and agreement, softness, impeding without seeming hollow or diminished or exhausted or altered by echoes. Thus, that which gives advantages to one modification must necessarily give them also to the other. Some say that more of the words are

extended in length in singing, while one can reply that at those times they tend to be lost in French music, because the singers believe that they must force themselves beyond the measure of their voices. But it is not for us to return to the simple and the natural, being possible as it is for everyone to have the true music not deafeningly in the ear but on the contrary as the basis for good singing comes from the knowledge of how to modify the voice, to sustain it, and to manage it with imperceptible gradations, that is, so that it is easier to listen to than to explain. Thus it is that a hall for drama in music does not have to be more spacious than a hall for comedies.

Would you believe that if you could find a hall designed according to our principles you would not find in it any of those displeasing things against which one hears laments every day. Other than: that from every seat one can see well, not only the scenery but the dramatic action and without the actors having to make forced movements; one can equally hear well the voices, and find them sustained on all sides, returning to the ear every time light and sonorous, and without overdoing the limits of ordinary conversational tones not even a particle being lost; and the listeners would not have to have their attention suffer from time to time guessing at a portion of the speech.

Construct a theatrical hall to our way of seeing and those lovers of columns and they who are given to believing that without their accompaniment one has not designed well the grandiose fabric of the architecture of the hall, and in vain they will cry to relieve the wound to the eye one should adorn the interior of the circuit of the curve. To which we respond, nevertheless, that columns in this case would do nothing more than damage. It can be related that an 'ancient' had a very well-tuned lyre. If one of the strings was to break and the player wanted to replace it with a string of gold, then the sound of the lyre would not have been the same. The effect which will or will not be produced by indiscriminant magnification is not dissimilar when admitted into a place wherein everything conspires to favor harmony. When appearance and pleasure are lavishly desired, through the use of architectonic richness in the ornaments of the salons, the galleries, the ballrooms or conversational saloons, when it is adopted in the porticos, the foyers, and the lobbies and in places accessory to the theatrical hall, that is well and good, but they would be badly spent in a room wherein they would be if you were to try to hear the singers and actors. The columns, capitols, the pedestal with its ornamentations, the matting, draperies, reliefs, carpets, figures, and the ornaments in relief, all these things are not suitable for other than rendering hollowness, diminishing sound, constricting its free circulation,

spoiling its clearness, and causing dissonances always damaging to its cleanness.

Once again, at the expense of being accused of repeating ourselves, a theatre, relative to the end which we never wish to lose from sight, is a complete composite of optic and acoustic shapes, the most suited to favor our eyes and ears. Everything which goes against this must be proscribed in its construction.

Fresco wall painting is the only type of embellishment which should be allowed to adorn the walls of the theatrical hall. In the hands of an artist of taste and with a sense of fantasy this profession is fully able to give a work which can seduce the eye and be at the same time peaceful. Having the hall ornamented differently would be to lose the reflections toward which these principles are constituted.

For a moment we will examine whether it is true that columns, when imagined, give beauty to the interior of a theatrical hall. Either the columns are well suited to give particular order to the different levels of the boxes or they must be distributed about the interior such that they have to occupy the complete height of the hall, as is the case at Bordeaux. In the first case, their diameters must be shrunk, which having been done, they no longer have some of their grace and present nothing more than a poor substitute for decoration. In the case as at Bordeaux, the columns are located with rows of boxes jutting out in the intervals between. It becomes evident that the columns, or at least some of them, destroy sightlines for the seats in the depths of the boxes nearest the stage. The projection of the boxes in other places, outside of those which are in the central part of the hall, makes for the mutilation of the major number of the columns or cuts them into pieces. Thus they are in no way pleasing to the eye, essential beauty consisting of one column which is never interrupted in all of its height. Although in reality they are not this way in this supposed case, it is enough that we have the appearance because the spectators do not receive all the dissatisfactions which could be directed from the expectation. The one place in a theatrical hall where columns can be located with manifest success is at the opening of the stage. For there it is conceded that they can be looked at without being obstacles, beautiful and whole.

It is given as known that the elliptic curve includes the essential conditions for the construction of a modern theatre. To conserve these advantages assigning constant relationships between the dimensions of the hall, and its length, width, height, opening of its stage, and the position of its proscenium, does not need to be done. But, not to rest

upon generalizations, like the beautiful study which we have just finished, we will now pass on to the particulars for determining the relationships and will show their application to plates 7, 8, and 9, which represent the plan and profile section of the interior of an auditorium of major size, which can be adapted equally to musical drama as well as to comedy.

AB and CD, plate 7, are the two diameters of an ellipse of the relationship of 4 to 3, (this relationship is the same as the length and width of the parterre of the Theatre of Torino and that of the older Theatre d'Opera in Paris), the first being 72 feet, important both to sight and sound, the second as a consequence will be 52 feet. After having the two diameters intersect at right angles, use the given method of cutting them reciprocally into two equal parts. The foci are determined customarily, taking a compass the length AE, half of the line AB, which will be carried between C and D, the ends of the small diameter, from one part and the other of line AB, and their intersections give F and G, the locations of the foci.

Then describe the ellipse. By hand raise sufficient perpendicular lines for your needs on the large diameter. On these perpendiculars determine, with half-proportionals between the large and small diameters, determine the points through which the elliptic curve will pass. Draw the curve with a continuous movement by means of a cord or string equal in length to AB but attached at the foci, taking care to make it uniform.

That done, to find the part anterior to the stage or of the proscenium, there is no other need than to truncate the ellipse on one end at one quarter of its large diameter, or to divide EB in two with the line MN. With this operation the edge of the stage MN will be 18 feet from the end of B, and AQ will be found to be equal to CD, needless to say this gives us 54 feet. Thus it follows that the hall, in particular, will have the same length as its width.

With regard to the opening of the stage, and to the size of the proscenium, both the one and the other must be regulated by the major or minor depth of that same stage, and in such a way that it would be easy to perceive the rear flat of the stage scenery.

Let us suppose the middle, I, of this rear flat to be at a distance of 60 feet from the line MN, the edge of the stage. To take advantage of this takes nothing more than drawing from the extremes C and D of the major width of the hall some lines, CI and DI. Their intersections O and P with the elliptic curve will give the opening of the stage, that

is its width and height, which will be given around 36 feet or half of the large diameter, and also the size (depth), of the proscenium, MONP, which will be about 8 feet on the large diameter.

Take care that, according to all of these relationships, the focus F is found, completely naturally, to be located in the middle of the proscenium, and that as a consequence all of the rays of air, FR, FH, FT, and FK, set into motion by the voice would be necessarily reflected through the other focus, G, or to the middle of the parterre.

Since the disposition of the boxes, of the parterre, of the orchestra and orchestra pit, of the ceiling, of the proscenium, and of the stage require particular considerations for arriving at and arranging a completely reasoned design, based upon the elliptic shape, rather than proscribing the description of our shape we will first make an examination of some of these different parts of a hall.

APPENDIX O

PATTE, ESSAY

CHAPTER XIV, PART 2

THE DISPOSITION OF THE BOXES

CHAPTER XIV, PART 2

Among the principle difficulties encountered in the organization of modern theatres, one is the successful distribution of the seating in a charming and comfortable manner: although, other than the seats on the parterre, with the desire for the multiplication of the seating, the need will arise ultimately to cover all the walls with seats or boxes. The ancients had the imagination to make their theatres with gradations like an amphitheatre; but this distribution, as we have already observed, is completely contrary to our sense of etiquette, to our customs, and to our costumes. We are now habituated to boxes from long habit. It is accepted as true that the boxes facilitate the presentation of the production to a person, according to his grade or his authority, and one finds in the boxes as a result similar levels of company or society. The woman of considerable elegance, accustomed to being the principal ornament for our divertisement in a box, would find that she did not make the same impression in the seating of an amphitheatre. In a box she is isolated and demure; the propriety of her sort of dress would be annulled in the amphitheatral sort of seating distribution. Besides this, the annual rent of the boxes procures the most secure income for the stabile theatre in the largest cities, without which subsidy it would be difficult perhaps to sustain the theatrical enterprise. We believe that there are many considerations which would be sufficient to make it vain to attempt to exclude boxes from theatres. Thereby rests a point for consideration from which we will obtain major advantages.

The lines of boxes which face on the parterre are arranged separately one above the other, conforming to the advice given in a work which we have already analyzed, leaving passageways between the different levels, and 12 feet of empty side wall on each flank of the stage. There would also be empty wall, which rests in the middle between the highest boxes and the ceiling in a complete ring around the hall. This arrangement would to a certain extent assist the auditor but it would offend also our sense of visual etiquette.

Would it be better, perhaps, for the lines of the boxes to be plumb one with the other, with pilasters on the railings, and with partitions for separation for their entire height? But this does not give us anything better than a multitude of little cells, in which sound would be repressed, giving the impression of being engulfed and which is contrary to sight as well as to hearing. If this is not a problem for the Italians because they are used to it, there is no

particular reason for us to have to allow it in France.

Does there not seem to be any other remedy than to cut away the partitions separating the boxes, leaving only small pilasters for support of the boxes, as was the habit in the older halls in France and in the Theatre Comique Italien in Paris? It is true that the inconvenience would be only minor. But the sightlines would not be accommodated by the small pilastered columns. But left out would be that which would either alter or interrupt the reactions of the sound.

Having made all of these reflections, it would seem that every aspect of better conditions and the common desire would be more satisfied by raising in a plumb line the different rows of galleries one on top of the next, without columns or pilasters appearing at their fronts, and by organizing the interior of the hall like a continuous open gallery, as it was in the old Theatre d'Opera in Paris. Whatever arguments you would want to cite against this arrangement should turn for evidence to plates and . Any inconveniences would always be less than those bourne by any of the other possible arrangements of theatres. Yet it cannot be negated that in general it does not inspire us with its nobility, nor its grace, that it does not offer a beauty of unity, that it is not the most joyous way to mirror the presentation, and that moreover with the aid of the elliptic shape the enclosures of this open gallery, because of the force of their isolation, are not equally appropriate to reflect the voice to the middle of the hall, as would the walls to which this has been entrusted. But to obtain from these enclosures their complete effect would require that they always be made united and plumb, that is to say without convexity and without railings, not cloth, nor ornaments in relief, nor with anything which might diminish sound or ruin the agreement of the reflected sounds.

There are those who disapprove of the different levels of boxes founding their argument on the reason that the various levels divide the sound due to the height of the hall. This concept they verify according to the method which is usually used for the arrangement of the seats. It is claimed that at the rear of the boxes they absorb the sound or its reflections as the case may be. But this difficulty never seems to happen when the ceilings of the boxes are vaulted, presenting an aspect of the spheroidal curve of the inside of the entire hall. From this method it is found that the acoustical shape used in the enclosure of the open gallery, i.e. joining the back wall and the ceiling of the gallery, will reflect completely the voice toward the sound column or the middle of the hall. To remove any doubt from this one is requested to search your thoughts for a method

which would be more effective with the reflections.

Using this arrangement of boxes, if one then adds to all the walls of the hall an entablature or paneling of thin wood, well joined together as is done with the body of a musical instrument, then one can heighten the reflectivity of the walls. Instead of sticking the panelling directly to the walls, it should be placed an oncia (about an inch) from them. The sound, then, being sustained by the entrapped air will be found to be favored to a major degree, as it reverberates against the sonorous material of the panels. Along with these items, everything else should be done to obtain the maximum effect, which should be inevitable from the visual angles, the panelling, and the stage opening.

Observe that the two different ellipses, which form the curve of the gallery railings and the curve of the walls of the hall, are not concentric, like a pair of ovals. The ellipse with which the gallery railings is formed should have its foci somewhat closer than those which form the curve of the walls of the hall. Thus, the reflections against the walls and vaulted ceilings of the galleries, against the railings, and against the ceiling do not run exactly to the same point. This does not carry large consequences in that nature is never so pin-point precise in her operations on account of a little more or less of a sensible difference.

It cannot be presumed that the actors will always be in the middle of the stage, at the onstage focus, and that otherwise being the case, their being further back or to the side would naturally make for variations in the directions of the reflections of their voices. The voice would be found to be variously reflected from the enclosure of the open gallery, and from the ceilings, and from the walls, all of which encloses it, but it will never be found due to the nature of the elliptic curve to be given alterations and falsifications. By anticipating this phenomenon it will be found that the sound column will encompass a large area, which will not redound unfavorable to the auditors.

In view of the fact that theatres are frequent involuntary objects of fires, it should be said that there should be exits to safety, always. In the past twenty years, circa 1760-1780, theatres in the following towns have fallen prey to flames: Vienna, Milan, Stockholm, Venice, Bologna, Lyons, Paris, Mantua, Amsterdam, and Saragozza (Spain), and in the last two towns this occurred during a presentation. As a result an unknown number of citizens became unfortunate and unnecessary victims. Available in Amsterdam, Vienna, and Paris are various experimental types of plasters and paints by means of which wood and the flats of theatrical scenery

can presumably be made incombustible. But the experiments have not produced anything from which the stuccoes could be made, which adorn ceilings and the vaulted halls of large palaces, which would suspend the activity of fire, for even a few minutes.

It is of significance for us to note that two theatres have been raised, one in Florence and the other in Bologna, wherein the boxes and ceilings are built either of stone or brick, toward the end of preserving them from fire. These theatres are laid out in a shape already discussed by us. What could be better than to use their construction as a model; seeing that they do protect the public security. However, these materials would not be the most advantageous for all construction, due to the fact that stone and brick have neither the elasticity nor the properties of wood for strengthening sound, for building melody, and for rendering the voice sonorous and harmonious. One must observe, on the other hand, that the two halls under discussion, are hallow, that their vauling produces a sort of redundance prejudicial to the lightness of sound, that, in general, voices project badly and are without grace. It would appear to be the case that the reaction of sound with the interior of stone or brick does not receive as much force as would be ordinarily received from construction in simple wood or paneled wood.

Reflect upon these reasons, on the one hand it is necessary to encircle the interior of the hall with a material both elastic and sonorous, and on the other hand it is necessary to secure the public, at least, from the dangers of fire which are accidentally manifest in times of production. To reconcile these two points we would advise that it would be prudent to make all of the corridors to be roofed with brick, as has been the practice in some theatres, and markedly those in Naples (San Carlo) and Turin. This can be easily obtained by undertaking to make the walls of brickwork, instead of partitions of wood, save as has been said before, that you draw the line at paneling the side of the wall toward the hall with wood, so as not to damage the harmony of the hall. Everybody wanting to exit from the balcony would be able to find themselves outside of danger. It would be best if all of the boxes were always open, that is that they could not be closed like a prison, so that at any moment the public would be free to get to the exits, and that the doors open into the exits whenever they wanted to open them. Exit from the boxes must be able to be made as a free escape into the corridors, in order to then descend the stairs, which for the same reasons must always be constructed of stone.

These walls will produce two additional advantages. First, they will impede ordinary noise which is made in the

corridors by those in them and who use them, which is heard in the boxes and disturbs those there. Second, with tie-rods of iron inserted into the separating walls of the boxes, the floors would be made to be firm and stable, like a drawbridge, and thus more safe in possible disaster.

APPENDIX P

PATTE, *ESSAY*

CHAPTER XIV, PART 3

CONCERNING THE *PARTERRE* OR THE *PLATEA*

CHAPTER XIV, PART 3

That place which is called the Parterre. The space contained between the circuit of the boxes and the orchestra pit carries the name: parterre. It is always furnished with benches whereon everyone is seated. But that was not the case in Paris or in the provinces, where the custom, above all in the major theatres, was of remaining on foot for four or five hours in sequence. We have said in major theatres, because in the little theatres of the "boondocks," during the festivities of San Germano and San Lorenzo this abuse is now reformed, and it is joyously to be hoped that it will be reformed successfully in all other theatres.

What kind of inconveniences result from the above-mentioned manner of attending operatic or dramatic theatres? As can be seen frequently spectators tread on one another as in a popular riot, a thing almost indecent, which many times interrupts the performance, due to quarrels, ease of robbery, on account of the cold or the pleurisy, with the result that one exits from such places all in a sweat, and often carries a tall cloud of powder which does not add to one's fastidiousness, and, finally, this place favors riots for and against new dramatists and plays.

In consequence of which, the design of a "parterre" and of an amphitheatre should be one continuous level from the orchestra pit to the back wall of the hall, encircling which, there should be a balcony, E, fig. , tiered as is shown in our designs. With this arrangement, you will obtain a view for the eye, better uniformity, and this elevating of the amphitheatre to above the parterre does not obscure the view of the confines of the hall from the first level of boxes.

Concerning the other point of the argument, that is whether to continue the custom of being on foot or not within the platea. It will always be more convenient to make entrance at the sides near to the orchestra pit, as at the old Paris Opera, not only for fear that the column of air would leak from the doors. If these doors were placed against the extreme sides in the face of the stage, it would do no damage to the voices of the actors, returning to the place of the stage. But, then again, because the spectators must stand on foot, which could not be accomplished with ease due to the crowd of people, waiting as they are; they might object to the slope of the platea.

We do not advise it to be a good idea to allow a row of boxes to face onto and be level with the floor. Mostly because they could not form the proper concavity for the reflections, although it would remove obstacles to effecting various exits. In case of an unfortunateness, they would give a quick and free vent for the people to the nearest corridors. We believe it to be more advantageous to make the first rows of boxes raised like an open gallery equipped with a railing of iron and with a single row of seats on its curve, except that they would be made toward the leading ends to go toward the orchestra pit, where there would be space for one more row of seats. These seats would be most distinguished for regarding the presentation, due to their location. No damage would be caused to the free circulation of the sound, nor to the sight of the first row of boxes, as can be easily seen from the profile shown in figs. and .

APPENDIX Q

PATTE, ESSAY

CHAPTER XIV, PART 4

CONCERNING THE ORCHESTRA PIT

CHAPTER XIV, PART 4

It is generally agreed that the orchestra should be located between the stage and the parterre. With the orchestra in this location the spectators gain some distance from the place of the scenery, and this distance contributes to the illusion, which always has need for a certain distance to produce its effect.

Among musicians some are of the opinion that the orchestra is rendered more sonorous if the floor of the pit is built in the form of a grating of wood, leaving under it a void of around four or five feet of depth. Describing among others the theatre of Torino, we have seen that below the orchestra pit there was made an upside down vault with a tube of wood at each end, which comes out at the ends of the proscenium, and to which a larger effect is attributed, particularly in some Italian orchestra pits.

Mr. Rousseau of Geneva in his Dictionary of Music, goes into greater detail, and allows that to make the orchestra more sonorous, one should take attention to make all the parts isolated, and that one should leave a large space in the middle with the assistance of which the pit is separated from the parterre. The railing around the pit should be made like the body of an instrument with its connected exactness, and that not one of the seats of the players should become touching it. We do not know if this is usually done, but we would believe that an orchestra arranged in this manner would operate to good effect. Even more so if the orchestra pit was developed using the already mentioned reverberation vault under it. If that same vault were made in thin panels of wood, it would have the advantage of helping to isolate the sound in its circuit and thus it would make a circuit of all the extreme parts of the hall simultaneously; see figs. and , letter L, for an indication of this arrangement.

APPENDIX R

PATTE, ESSAY

CHAPTER XIV, PART 5

CONCERNING THE CEILING

CHAPTER XIV, PART 5

No other thing contributes to the general success of the theatrical hall more than the shape and the construction of the main ceiling which covers it. The ceiling finishes the reverberation of the voice. Granted that one can hear the voice without some additional reverberation. Above all when the reflection of the sound is not well accomplished, as when the voice is divided and redivided into many little cells as happens in Italian celled ceilings. We have repeatedly observed that monoplane surfaces are not the most appropriate for reflecting the sound of the voice with harmony, and that the concave surface is the only type best suited to reflect sound. In view of which, it is necessary to determine the form for the ceiling which would be the best: to reflect the voice, to impede what might be lost, to fortify it and, in a word, to advantageously reflect the voice toward the auditors. Consulting the elliptic shape, which has already been recognized as the most favorable shape for a hall, one will understand that among the other shapes it would be the most favorable for reflections from a ceiling, and from it would be obtained the desired effect. The other shapes do not have a hope of succeeding except for the spheroidal which would throw the sound against the rear of the hall, where it would be adversely affected.

This arrangement of the ceiling, which becomes palpable from figs. and , is the best shown in the theatre of Torino, which enjoys a particular esteem. All of the possible difficulties are reduced by stabilizing the rise of the curve, because if it is made too concave it would be found to produce redundances or echoes. The rise of the ceiling discussed (at Torino) is about five feet, and if it is not done thus the advantages are lost.

But to obtain the effect which is desired from the ceiling depends upon giving certain rules concerning its general shape and some advice appropriate to regulating the work done upon it.

(First) It must be built in a manner to make it sonorous. Therefore it must be built with panels well put together, which are made of a sheet of wood enclosed in frames and isolated at the same time from the roof structure above, making that it to be suspended from the above with the help of small chains or metal rods. Make certain to leave a space of about a foot between the lower and upper ceilings. The panels should be exactly fitted all

the way around; in which way the effect of a drum is created, which reflects sound because the air is contained and cannot escape from any part; or like a tambourine which has two heads, if you push on one head you would expect to get some sort of sound from that head. The same is also true, if you make a space above a simple ceiling, because the void in the middle will assist the production of sound.

(Second) One must firmly enclose the ceiling in all of its constructions with a frame which ties it all together without cutting into any of the walls of the hall except in front of the stage. Its construction should be simple and with ornament painted rather than in relief. It does not seem to us that it is necessary to lengthen a ceiling more than the width of the opening of the stage, and to carry it further than above the proscenium. (In that all movements of the voice move out from the stage toward the rear of the hall, there is no need to continue the curve of the ceiling to above the head of the actors.)

(Third) Do not allow in the ceiling figures or ornaments in relief, or any other bodies. Their projections might cause or produce surfaces detrimental to the reflection of sound and to its free circulation. The grand ceiling of the Salle des Machines of the Tuilleries with its sculptures, its rosettes and its compartmentations and panelling cannot as a result be so grand after all because it does not appropriately favor sound.

(Fourth) The painting, the double arches, and the ornaments of the ceiling must be made directly up on the wood, and preferable a fresco instead of with oil paints, not only because the wood has considerable sonority, and would be less so under combined paints, but also because the canvas (for the oils) and the oil paint would force the muting of the sound, would impede the elasticity of the wood, and therefore would diminish the resonance which was the reason for insistance on the use of wood for the construction.

(Fifth) Finally, one must seek to avoid making boxes, or many holes, as has been done many times above the cornice which is the principal support of the ceiling, because these openings, due to their location, absorb sound without any chance of returning it, and prejudice the sensitivities of the reflections.

Another occurence, which many regard as very damaging is that of placing a large opening from custom in the middle of the ceiling. The love to leave it open for the duration of the performance on the pretext of refreshing the air in

the hall. An opening according to all of our assumptions should be a major prejudice against sound. It should be prevented, in particular because if its shape is like the walls and equally spaced from them it should be directly above the sound column. We do not intend by this to fully disapprove of this type of ventilator, its use being easily imaginable. It is our opinion that it should be kept closed, and opened only during intermissions between the acts and during the dances. These times should be sufficient for renovating the air and for tempering or diverting the column of heat which rises from the parterre and from the boxes.

APPENDIX S

PATTE, ESSAY

CHAPTER XIV, PART 6

CONCERNING THE PROSCENIUM

CHAPTER XIV, PART 6

The end for those who use the proscenium is uniquely that of preparing the opening to the stage. In some theatrical halls, such as those at Parma and Mannheim, the stage is not separated by more than a simple wall. Thus, when the actors speak they find it necessary to be in front of the first wings (prime quinte), which does not give great variety to the picture if they must always be on the forestage or apron of the stage. Their voice though is in danger of being lost if they move to the part of the stage behind the first 'flats' (telai) of the scenery. This defect has been remedied in some other halls, for example those of Naples, Milan, and Rome, where the stage is carried forward into the hall. This works, but tends to isolate too many of the actors in the middle of the spectators, and makes distortions in the theatrical illusion. To prevent these two inconvenient extremes it is necessary to think of a proscenium which is like a mixing place between the hall and the stage, destined to prepare the aperture of the stage.

The whole point is to design this proscenium in such a way as to prejudice neither the voice nor the effect of the scenery. For this reason it must supply a frame, and to be at the same time sufficiently arranged so that it will reflect the voice toward the audience, and to prevent it from being lost against the wings, (le quinte), on stage. It is best for this reason to construct it of wood, covering it with material equally resonant as that used for the inside of the hall, and composed of surfaces appropriate for the reflection of the voice.

Now comes the thrust of the intent of the planning of the boxes for the whole height on one side and the other of the proscenium. What are the things which contribute most to distorting the voice? From the first is it not found to be swallowed up in a gulf of its own making? Concerning which and also for maximum communication with the hall, would it not seem better to have a hall closed on its flanks? Is this an intolerable abuse, and does one need to expect that either sooner or later one's eyes would be opened to it and that the public would give wind to the cause in the public interest.

If you consider the position of the boxes on the other hand; relative to the production, the result is certain that under every one of the aspects here considered they are very badly located. Thus, from them either one can

see the walls of the backstage (i muri del fondo delle quinte) between the wings, or one is too near to the actors to judge their actions, or one hears the force of their breathings, or they are seen from the side or from the back, or one must get all bent out of shape to see the lines of their movement. Nor can one see well from the boxes the design of the dance, and from the boxes it is absolutely assured that one completely misses the illusion of the scenery. Finally, from these flanking boxes one cannot get the full effect of the instruments of the orchestra because they have not had time to expand sufficiently. Too much asperance travels to the ears, which makes them appear either too hard or not pleasing. After having pondered this exposition of all of the real, proved disadvantages of having boxes at the proscenium, should not one be more secure once persuaded of the great benefit to be derived from eliminating them completely.

It is not as bad now as it was in the past, when in the comic theatre rows of benches were tolerated on the edge of the stage, which was edged with a steel railing. During the evening of the season at the presentation of some new piece the affluence of the spectators was at times so grand that there was hardly sufficient space left for the actors to do their parts. This was an abuse which lasted for too long in many provincial theatres and was necessarily cause for some difficulty to a large theatrical action, and changed our dramatic compositions into long conversations of five acts. As a consequence of this, we do not have the courage for adventurous magnificent spectacles, or mysterious and terrible catastrophies, which when well written re-establish the principal beauty of tragedies, produced, as Voltaire said in the Preface to Simiramis, "How do you produce on stage the bloody body of Caesar? How do you make the crazed Queen descend into the tomb of her husband, and how do you get her from there, dying at the hand of her son, to the middle of a crowd which cuts her from view and from the tomb and the son and the mother, and which exhausts with the contrast of ridicule the terror of the spectacle?"

It is well for us that destiny has wings which close our eyes against too much abuse! The reform which is herein suggested would augment the pleasure to be received from presenting dramatic compositions. At the same time that it has presented its major verisimilitude, it is able to join the magnificent scenery necessary for a terrible action with the force of sentiments, emotions, and thought.

APPENDIX T

PATTE, ESSAY

CHAPTER XIV, PART 7

CONCERNING THE STAGE (PALCO SCENICO)

Though the stage, or the space appropriately of the actors, is built by itself as a separate part from the construction of a theatrical hall and does not have any other relation to it save for the opening between, we do not believe however that this should effect our thoughts about their relationship.

The major and minor dimensions of a stage must per force depend on the type of plays for which it is destined. The size of a hall for works in music has indubitably to be larger than that of a theatre for plays, in order, that with the necessary apparatus, one can develop the actions of the play, locate a numerous chorus without confusion, arrange dance figures, order triumphal marches, and in a word present grand spectacles with machinery adequate to convert this place into a magic palace.

The distribution of the appurtenances of the stage seems to be more important to the machinist (T.D.) or to the scenic painter and designer than to the architect. For the stage it is enough that it is generally arranged in such a manner as to facilitate every sort of scenery change. The other details of the stage seem to be of less importance, that is whether it is possible to have a descent from above to below, or to ascent from below to above, or that it is possible to fly in the front (midstage) or from the sides, or that one might desire to imitate tempests, shipwrecks, fires, etc. In this area among others the Italians of the last century were preeminent; and now the French are those who above all others hold that honor. Even greater, seeing that the celebrated Servandoni has given with machines the marvelous spectacles at the Grand Theatre of the Tuileries, the "Discesa d'Enea agli Elisi," and the "Gerusalemme liberata," etc.

Since the scenery for a particular presentation in one place has to be determined by a certain action, convenience teaches that scenery should be analogous to or conform to the 'genus' of the people and to the dominant feeling of the century in which presumably the said action is to have taken place. The introduction, more or less, of Greek or Gothic architecture into the representation of a palace of China would be as absurd as introducing Chinese architecture into a palace of Imperial Rome. The essential point is to make the scenery in such a way that the spectators believe it enough that they feel transported to the

times and places wherein the action occurs and that all of it appears to the mind and the imagination as if the thing were real. Other than that the scenery must be particularized as to attire, arms, costumes, and the feelings of the different people and customs.

For all that is known, there are not any specific and positive rules concerning the depth of a stage. For our considerations the greatest distance to the last flats of the scenery should be limited in general to one and a half times the width of the stage opening, for fear of extending too far the point of view, columns in the scenery would not compare in size with the actors, providing from the rear of the house one could see all of the scenery.

Generally, the apex of the art consists in displaying all entrances, exits, and arrivals on the stage sufficiently that the actors never lose giving a certain proportion to the houses or architectural members which surround them. It is not enough that the scenery evidence a similarity to a sort of architectural labyrinth, with a mass of columns planned by chance, the surfaces of which are purely fantastic and do not have a verisimilar solidarity, because this would work at odds with the end proposition. Illusion must always have the appearance of reality as a basis; and a good result can never be missed if one produces the image of a certain massiveness. For this we are debted to the 'height grid' on which we, the Bibienas and the servandonis have all been raised.

Laments are now made that not enough people study the methods of mounting the magic of spectacular plays in music. Thus at the moment that one sees a divinity descent, as one hears the cry in a celebrated opera: the prestige begins; but as soon as the ceiling is cracked, and the chariot has appeared, the ropes appear and the illusion vanishes. To cover this disgrace, which could necessarily not be passed off or disguised for the spectators, these disgraceful ropes, which in ridiculous spectacles make the marvel more delectable, one is counselled to mask the ropes with a crown of clouds artificially located. True it is that sometimes they are used in this manner, and if used sometimes well. Then, one does not realize that that is the way that it is being done, because many other things are happening.

No less well founded is another reproof for something universally done in theatres; and it is that in the scenery there reigns monotony and uniformity, since many designers do not offer to the eye other than nice streets, galleries, leafy glades, and flights of columns. M. Noverre,

in his excellent Observations on the Reconstruction of the Operatic Theatre attributes this defect to the insufficient width of the wings (ali) of the stage. He also attributes it to the obligation of having to make the wings of scenery thus restricted (narrower) and of having to multiply them for the ease of handling.

M. Noverre, to cut the defects which he noted in his treatise, would leave to the right and left of the stage a free space of about four tese (measurement equal to the distance from fingertips to fingertips with arms outstretched) (singular: tesa) from the wall starting at the proscenium. With which there would be enough space for the changing of scenery, for the working of the stagehands (operaio, operai), for the entrances and exits of the actors, for the choruses, and for the corps de Ballet. Other than this he would like to see on each side of the stage a room three tesa in width and six tesa in length with three arches opening on the stage, (larger for a musical theatre). This room would serve for the storage of the scenery not necessary for the particular performance in progress, would serve for the storage of the mobile water trumpets (fire houses) always ready in case of a fire, and would serve for the storage of (carri) chariots and other accessories. In this room one could also disperse the choruses and the corps de ballet, thus they could be well ordered for an entrance onto the stage.

With the advantage of four tesa of depth on each side of the stage as suggested by Msr. Noverre, one would have to make the wings of the scenery wider, and could save in consequence on their number. One design for a back-shutter and three sets of wings could be more easily varied than one for sets of eight wings. There would be adequate space to feign depth, beautiful cutouts (sforo - sfori), points for angled perspective, which if used with all of the finesse of the art would make an enchanting and seducing effect for the eye. The machinist and the designers of the scenery would be accorded free reign to their imaginations, and thus proceeding hand in hand their prestige and their illusions would increase and develop. A very beautiful idea, but one which is very difficult to find verified, for usually the multitude of straight wings endures, almost touching one another, and as long as movement of them is difficult, embarrassment will rob the effectiveness of flights and the changing of ceilings.

APPENDIX U

PATTE, ESSAY

CHAPTER XIV, PART 8

CONCERNING THE METHOD OF LIGHTING PERFORMANCES

CHAPTER XIV, PART 8

Many of those who frequent theatres know how the placement of light carrying battens (porta-lumi) between the wings of scenery and between the flats (tele) or cloths suspended in the air to form ceilings or clouds gives rise to easy disordering of the proceedings due to their nearness to combustible materials. They know because their almost continuous movement often occasions some token of oil to fall on the cloths of the actors. Rarely a week passes that one does not hear that either this or that part of the scenery has caught fire. These accidents are believed to be of small or no moment. It is true they are remedied easily with the help of large sponges full of water, attached to long sticks, or with the help of long syringes (sprayers), as are used in Germany. But what reasonable authority permits levity at every instance of the carelessness of stagehand, which is saluted by the public? And what reason, if the thing is possible, deters the prevention of this almost daily accident by the placement at some length of these lighting carriers from the scenery? The major use of reflectors (riverberi) which can give the double advantage both of augmenting the volume of light and of making it directable in whatever direction one wants, makes it a marvel that they are neglected in their adoption for use in the illumination of theatrical scenery.[1] Thus, there is nothing more needed than to locate the reflector lamps, F, figs. and , at the right and left walls behind the wings, from where, by means of a vertical frame (telaio) carried on a pivot (perno), their light would be allowed to strike the scenery. Not only would there be the escape from the risk of fire, but they would be able to give the scenery a variety of life, which is often lost from them, even more unfortunate because the scenery is executed in perspective. How long will these reflector lamps not be used to augment the illusion?! The preference for light on certain parts of the scenery has caused the privation of other parts. Now the vivacity of the colors should be redeemed for producing a sweetness and an appropriate accord for deliciously alluring the eyes of the spectators. Now on the stage the light should be thrown (gettarsi) and there

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[1] In the first Mercurio di luglio of last year, that is of 1781, we published a part of these observations on the advantageous use of reflectors for the illumination of theatres.

those strong effects of chiaro-scuro (light and dark), carried on the scenery, those contrasts of light and shadow which enamour us of the views painted in the works of the grand masters. From the cold and monotonous manner, with which theatres are presently illuminated, one never obtains such contrasts. With these types of lighting instruments alone, one could be secure of developing and augmenting the prestige and pleasure which is given to the emotions by dramatic presentations.

Further, it is our belief that with this method of lighting with reflector lamps one should no longer have need to illuminate the scene with that line of lamps which comes from below up onto the stage. It has been noted how uneasy is the use of this type of lamp (footlights). In truth at times because of them the view of the spectators is hurt, who find themselves in the boxes, in the amphitheatre, and especially those in the gallery, for due to their position they blind the actors. The hall appears to be continuously engulfed in flames. Before long this not only tarnished the ornaments and the painting of the ceiling, but expends a sort of fog between the actors and the spectators. Besides as we have already noted it will not be a long time till. Is it not a thing completely false, this light which strikes the body from below upwards: it disfigures the actor, distorts all of his traits, and ruins the ordering of the lights and shadows. It disfigures all of the physiognomy and it deprives us from your natural look and from your expression: it is finally diametrically opposed to all the laws of nature.

A reform then in the illumination would also be very useful. Take a look at our distribution of these lighting instruments (figs. and) and you will see that it would not be very difficult to substitute the new for the old. It would not take more than mounting three reflector lamps, D, figs. and , next to the end of the boxes at the stage on one side and the other at the widest part of the hall, where the railing (recinto) begins of the second, third and fourth row of boxes. Thus the reflector lamps can advantageously direct their light, and embrace with their rays the totality of the width and height of the proscenium. With this method instead of finding the scenic objects ridiculously illuminated from below to above, they would be light from above toward below, as would the Sun. Thus they would appear to have a natural appearance.

It occurs also to note that, the position of the reflector lamps would be behind the ends of the railings of the ends of the boxes, thus they would not inconvenience the spectators in any way.

Scarcely being able to be found as they are; they would be noticed only because of the clearness of sight without seeing them. They would be lighted from the outer corridors, and no one would be startled when they were started from outside. Their fumes would not start above the ceiling of the hall because of an ordinary stove pipe of tin on each. Our design renders our intent completely evident, which saves us in trying to describe it from expending another word.

Finally, if you would please, one must also illuminate the hall without works of glass or crystals, which are as inconvenient as those footlights already mentioned. Here is that which is required to be made. You take a large reflector, X, fig. , placed in the middle of the ceiling below that opening destined to renew the air during the intermissions between one act and the next. It is intended that the reflector be made or fashioned of a large lid of copper or of some other metal, but well silvered, of about three feet in diameter, below which would be a bowl of glass of conic form. In the middle of the bowl would hang a lamp of large wicks. Thus the light bouncing on the smooth and polished surfaces of the cover will illuminate by reflection all of the hall. It would shed a sweet and soothing splendor, which would make a contrast with that of the stage which would be live and brilliant. We have no doubts in experimenting with this different manner of illuminating theatres with reflectors, also the economy of the manner will be found as a major advantage to whoever finally uses it.

APPENDIX V

PATTE, ESSAY

CHAPTER XIV, PART 9

CONCERNING ACCESSORIES AND ACCOMPANIMENTS FOR A THEATRICAL HALL

CHAPTER XIV, PART 9

It would go outside of the confines of our province if we assumed to give rules on the general distribution of all of the parts necessary to a modern theatre: on the style of its exterior embellishment, on the diverse accompaniments, antihalls and such for it does not take much for even the smallest architect to lay them out. It is already well known that before entering into the great hall there is need for a great vestibule which opens onto stairs to the boxes. A public hearth with few entrances but many exits, because going to a performance one arrives after the other, but at the moment that it is finished all crowd together to exit at one time. It is understood that rooms are required where the actors may dress themselves, arsenals or magazines for repairing or painting the sceneries, a coffee house (un caffe), a quarter for soldiers, if need be: a jail, business offices, a meeting room for the Directors, and finally do not ever forget those who are always here (provide restrooms), and include with them reservoirs full of water for impeding the bad effects of fire in case of a disaster.

Being beyond this work of a few moments the process of getting from the various designs of theatres (which we have adopted as paragons) an idea of the arrangement (relative in a grand part) of the above mentioned accessories. It does not take much to see that their distributions are not uniform, and that it depends more on the time and the situation then that the same architect is adopted to construct the theatre. However because the ordering and the lay-out of the hall are always in his hands, if it is determined that he erred, then he erred in orders coming from an ignorance of the various principles, which we have undertaken to develop in this Essay.

Before closing the present discourse we will turn to repeat that it is consummately desirable that buildings of this type always have in front of their face a square to facilitate access by carriage. The buildings should above all be isolated to escape from accidents of fire to which it is always subjected, which is to be expected because in its construction larger quantities of combustible material are used than in any other type of building. It should also be surrounded by a portico, where under cover one could dismount from a carriage or enter one during intemperate weather. Finally along adjacent streets there should be shelters or sidewalks for the safety of those persons who find themselves on foot either going to or returning from the performance.

APPENDIX W

PATTE, ESSAY

CHAPTER XIV, PART 10

THE FOLLOWING IS A DESCRIPTION OF FIGS. , , AND

CHAPTER XIV, PART 10

We take up the file again on the application of the ellipse to the construction of a theatrical hall, which we were obliged to interrupt due to our observations successively made regarding the improvement of the diverse parts which enter into and compliment the hall.

The elliptic curve was designed. The aperture to the stage was determined. The location of the proscenium was established by us according to the 'relationships'. We now pass to describe the surrounding of the boxes, fig. , in the manner of the continuous balcony with a new ellipse, about four feet further out than the first. To favor the seats at the rear of the side boxes, we have directed that they be separated by one of their heights from the stage, more or less according to the practice used in the theatre of Rurino, fig. , with portions of the concentric circle AC, fig. , the center of which A is found in the middle of the stage. Due to this separation of its encounter with the curve of the boxes at B and with the wall at A as prejudicial to the sound, by also cutting from point A the lines AA and AB we have converted the acute angles to right angles.

Looking at figs. and which represent two cross sections of a hall, the one longitudinal and the other latitudinal, one will perceive that we have limited the lines of boxes at four. We feel that they should not pass that number, not only in order that you would not have to look too far down if you were high in the last row near the stage, but also in order to not have to raise the grand ceiling which saves it principally near the wall of the hall to the advantage of the reflections in all of their fullness.

Conformibly to our designs the first line of boxes has an elevation of ten feet precisely above the plane of the floor at its mid-point. It is supposed according to our intent that on the face of the balcony will be placed a small balcony, E, with iron bars. The other rows of boxes would each have a height of eight and a half feet. Thus, the total height would be forty-three feet from the pavement going up to the edge which forms the entabulated cornice of the ceiling.

The ceilings of the boxes would proceed to finish an elliptic curve, such as to make the rays of the voice, FZ, fig. , due to their encounter, at Z, to be reflected by angles of incidence and reflection to P and O against the column of sonority GG.

Supposing that the spectators are seated in one of the balconies, according to our dimensions at least three feet would then remain void above the heads of those in the rear. Taking this three feet and uniting it with the height of the curvature of its ceiling and the curve of the ceiling would offer approximately nine feet of surface appropriate for reflecting sound. Thus the absorbent mass of auditors lodged in the boxes does not occupy much more than a quarter of the height of the hall; and as our arranging of the ceilings of the boxes is to put them in order with the acoustic form entrusted to the recesses and the walls, evidently it will be manifested that this arrangement is good enough as a rule for the rise of the sound, and thus it concurs with the structure of the hall and will augment its harmoniousness.

All of the inside walls of the boxes have to be constructed of good materials, because behind them are appended the brick vaults of the corridors under which those who occupy the boxes must pass in the event of fire. The walls, then, of the internal part of the boxes must have (about an inch out from them) a covering made of light well-made paneling, toward the end of augmenting the effect of the sound with the space between the paneling and the actual wall.

For the orchestra pit, L, one must have a width of seven feet. Its floor is put together or fashioned with panels over upside down vaults below them for all of its length. This same vault, constructed of wood and insulated and rounded at its ends, has from each end a wooden tube, the opening of which, U, gives onto the proscenium. Figs. and , one the plan and the other the longitudinal cross section, demonstrate the already discussed design, which is based on many Italian theatres. Instead of making the prompters box as is the custom at the edge of the proscenium apron, which because of its location is in the way of the actors and in the way of the stage, we suggest that it would be better to place it at location, Q, in the orchestra pit.

Everyone should be able to be seated in the platea, and the entrance should be from two opposite doors, L, fig. , which open toward the outside and are near the orchestra pit. Flanking them there should be another door, M, to make for an easy exit at the end of the performance from a place so long frequented.

The ceiling, figs. and , is 48 feet in elevation above the level of the ground plane, and ends at the proscenium in an ornamented cornice which serves as frame. It should be worked in light paneling of wood and about one foot distant from the support structure above, in a manner

to leave a void between them. It should be built that both are closed at all their edges with the exactness used to close a drum. Its shape should resemble a spheroidal skullcap from the wall of the hall to the column of sonority, GG. From that place to the proscenium it should resemble a portion of an elliptic curve raised five feet, the principle center of which is more or less in the same place as that of the platea. The rays of sound, F and N, directed against a portion of the spheroidal skullcap, and those which encounter it in the middle of the elliptic curve, should be reflected in concert against the column of sonority at different heights, Q, E, S, T, due to the equality of the angles of incidence and of reflection. Respecting the other reflections from one part or the other pf the elliptic curve, they will approach their origin, and those which are not reflected directly against GG, nonetheless because of the obliquity of their incidence, would be reflected toward the walls of the hall, or against the diameter line, which cuts the hall through all of its length. A not different arrangement, conforming as it does to that which we have indicated, is that of the ceiling of the parterre of the Theatre of Turino. It produces an equally good success, even with that massiveness which you have for not having any boxes, box dividing walls, or protrusions which make for distortions of the harmony or to the sustaining of the voice.

Now comes the time to verify whether the statements, which we have made concerning the opening of the stage and the width of the hall and the major height of the boxes, make the viewing of the scenic objects advantageous also from the upper seats nearest the stage with an angle of view which is diverting and pleasing. We have proclaimed thirty-six feet for the width of the opening of the stage, which is the width of the stage of the Opera Theatre of Paris; and with our upper boxes are raised above the level of the stage not exceeding this height, as a consequence of what we said in paragraph III, fig. , then in general we have been freed from the question. According to our dimensions the theatrical actions would be discernible from the highest seats, usually judged the least favorable for seeing a performance, would be below an angle of about forty degrees, that is located so as to not disfigure by distortions.

At the ends of the railing of the second, third, and fourth rows of boxes, D, figs. and , there has been left a small space, where with advantage could be attached the reflector lamps which would be substituted for that inconvenient line formed by lanterns which ordinarily come at the bottom of the apron of the stage. The said reflector lamps because of the divergence of their luminous rays could easily embrace the entire height and the width of all the proscenium back to the first wings on each side.

The other reflector lamps, F, made expressly to illuminate the scenery in place of the now used lantern carrying poles, would be hung on frames, revolvable on pivots, in order that their brightness could be turned at free will against the different objects of the scenery.

The great reflector lamp, X, hanging in the middle of the hall is destined to replace the lanterns or ordinary lights. Its place is, appropriate, below the ceiling opening, which serves to renew the air in the rest between one act and the next and during the time of the ballet.

Above the proscenium there has to be a brick wall, Y, fig. , high enough to touch the gables of the roof, and it should shut off every communication between the structures in wood of the hall and those of the stage. This precaution goes along with the vaulted corridors which would somewhat retard the progress of the fire, and give hope for enough time to leave the theatre, in case of catastrophy.

Now recapitulating the measurements produced from the statements which we have established in conformity with the ordinary carrying of the sight and of the voice, it is found that our hall is 58 feet wide and as much in length. Its height from the middle of the parterre amounts to 48 feet. The height of each plane of boxes is eight and a half feet. The ascent of the curve of the ceiling is not more than five feet. Thirty-six feet square is required for the opening of the stage and eight feet for the depth of the proscenium. The highest seats facing the stage should not be more distant than 65 feet. Finally, the highest side seats should not be more than 36 feet from the stage.

To allow the above mentioned measurements, and not to intend that the rest of the measurements are invariable, and that they cannot be changed in proportion corresponding to the length of the larger diameter of the ellipse which is given to the hall, it is then all the relationship within it which must always be adjusted with relation to its length which is its base.

It is to be remembered in the examples proposed that we have at last gratified the capacity of these organs at the mercy of which is the enjoyment of the theatrical performance. In this guise we have more or less determined which are the major dimensions to be given to this sort of building. It would rather be the hope to restrict these dimensions rather than to augment them in their execution

as we have talked of it.[1]

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[1]In contrast with the old Theatre d'Opera of Paris, our design, which except for the opening of the stage, is the same, would be from five to six feet more in length, width, and height.

APPENDIX X

PATTE, ESSAY

CONCLUSION

CONCLUSION

To those who have paid attention to the way in which we have proceeded with research into the well understood ordering and most advantageous structuring of a theatre, one which must be as clear and open as geometry. To the experience from physics, and the optic and acoustic principals used in the design, we are indebted for their determination; that we can depend on the elliptic curve, after having had demonstrated with infragible evidence the decided superiority before all the others in this case of favorability to the sight and hearing. One will have noted that it all depends on the association of certain constants after the large diameter of the hall (its length) has been established (width, height, opening of the stage, and the space of the proscenium). It should be given and also noted that we have not spared reference to the elliptic curve, also of maintaining in all parts the direction of the reverberations going toward the auditors, and that relative to these observations, considering that they could contribute to and strengthen the voice, we have not ceased to insist on the importance of covering the insides of the hall with sonorous materials, and to avoid in every case absorbent materials on the walls or the concavities, the panelings, the framings, and every other thing which might be presumed to make an obstacle for lightness, fullness, the harmony of that selfsame voice.

As a result a theatrical hall constructed according to our principals should have all the advantages which are desired. As the ancients gave certain rules for the construction of their theatres analogous to their customs and the vast size demanded, thus perhaps one will find other similarities between their lives and ours. We do not have any other object which was put back and now knocks to be let out. We hope to have satisfied our charge, and of having, together with these our reflections, contributed to the accomplishment of the common desire.

APPENDIX Y

LANDRIANI ON PATTE

OBSERVATION A

OBSERVATIONS BY THE ARCHITECT AND SCENIC PAINTER SIG. PAOLO LANDRIANI ON THE ROYAL IMPERIAL TEATRO DELLA SCALA IN MILAN AND ON SOME PARTS OF THE ESSAY OF M. PATTE

OBSERVATION A

Our Teatro della Scala is one of the most grand and agreeable theatres both for its design and for the uses for which it is destined. It has all of the conveniences which are desired in other modern theatres. Thus it can be said that on this point it has no peer. A look at the plan, see fig. , should be enough to convince you that after the lengthening of the stage, done recently and other recent added construction, it is a most complete theatre in all of its parts. A grandiose entrance hall proceeds from where you descend from the carriages under cover, which gives onto an equal vestibule, which gives entrance to the platea, and to the spacious double stairways on both sides which go to the corridors for the boxes. There are service rooms, waiting rooms, a large lobby with other halls attached for warming oneself, and another large vestibule annexed to that for servants. A place for pastery with many rooms, a caffe, and many other comfortable rooms both for offices and whatever else is needed in this sort of establishment.

The form of the auditorium is that of a semicircle with sides prolonged in a restricted curve, which is close to the form of the Teatro d'Argentina in Rome. The width of its major diameter is 37 Milanese braccia (about half a meter per braccia), the diameter where it is restricted at the mouth of the proscenium, 29 braccia, 8 oncia (an oncia is the twelfth part of a braccia). The complete length of the platea, 41 braccia, 9 oncia, similarly the length of the including the proscenium, 49 braccia, 6 oncia. Of the proscenium alone from wall to wall, 7 braccia, 3 oncia, 6 punti. The width of the proscenium from column to column, 27 braccia, 6 oncia, equally restricted toward the stage to 26 braccia. The complete width of the stage, to where it is divided by arches in the wings, 40 braccia, 2 oncia, 7 punti. The complete length of the structure of the theatre, 168 braccia, 3 oncia. The proscenium is decorated with two columns on each side, of the Corinthian order with architraved cornices, the projection of which is two-thirds of its diameter and is 1 braccia, 7 oncia thick. The height of the columns, 15 braccia, 8 oncia, 9 punti, and the architrave of the order, 2 braccia, 4 oncia, 7 punti. The complete height of the order, including the base of the column, 19 braccia, 5 oncia, 6 punti. The complete height of the proscenium ending in a large corbel in the form of an arch above the order of the columns, 25 braccia, 1 oncia, 5 punti, from the level of the stage. The complete height of the theatre from the platea up to the vaulted ceiling, 33 braccia, 7 oncia, 6 punti. It should be noted that the

height of the vault diminishes somewhat going toward the proscenium. Thus the largest height above a horizontal line at the cornice which crowns all of the theatre hall is, 6 braccia, 6 oncia but only 5 braccia, 7 oncia, where it terminates at the proscenium.

According to the ruminations of the author our large theatre does not have the elliptic shape, which is the most advantageous for the reflection of the voice. He has said that we should be able to hear less sound, because the boxes are closed by separations, and this forms, as he says, many little cells which must swallow the voice and what is more the supports of the boxes should also interrupt the reverberations of the voice. Our theatre must suffer from deafness! But even more it must be that in every box decorated in rich curtains, as noted, the people seated behind must be enveloped. All of which must be most unfavorable to the sonority of the theatre. I must say then that our theatre with all of these defects, which should have been noted by M. Patte, because they would make for a moderate silence, our theatre is thought to be one of the most sonorous and of the best acoustically.

At the rear of the platea and in whatever other part of the theatre one hears the articulation of the voices beautifully. The rental fees for the boxes have been doubled more for luxury then for convenience. No one has noticed that the theatre has lost any voices. Saying that the divisions into little cells of the boxes engulfs the voice cannot be admitted. The effect as heard proves against the opinion of the author. We will also say that it is not true that the placement of the boxes interrupts the reflections of the voice for it is not possible to damage the voice with the slender walls between the boxes which support and divide the boxes.

The reason then which renders our theatre sonorous, as much as that is possible in all of this grandness is that it has a curve in its vaulted ceiling favorable to the reflection of the voice. It was built of this form and this material by the excellent architect Piermarini with such a sense of security in its effectiveness that he gave all of his knowledge to this work, such that, if mistaken, nothing else could have been used not even all the prayers for a theatre, no matter the beauty of the theatre's form. It would have to be compared with a beautiful harpsichord which is feint or has a spoiled sounding board or harmonic table. With regard then to the ornaments in relief over the entire interior of the hall, which are proscribed not only by M. Patte, but also by some other architects who construct theatres, more for the reason of habit then from

experiment; I am of the opinion that for the voice of the harpsichord, which is completely ornamented in relief and which has been done for its beautification, it is necessary to smooth out the sounding board because it is that which reverberates with the sound. Thus also is the case with the partial ornamentation done in relief both on the front of the boxes and that other which serves to refine their supports. None of this can prejudice the sonority of the theatre, nor interrupt the reverberations of the voice, because the vaulted ceiling of the theatre is perfectly smooth and not much arched. It is made in paneled wood to look like a royal vaulted ceiling, as you can see in our ceiling at Teatro della Scala and also in the ceiling of the Teatro della Canobiana. Suffice to say, the single surface plane of the vaulted ceiling reflects the voice and expands it to a point into all of the theatre. Damage to the voice must never be caused by the looseness of the curtains of the boxes, nor the extending of the multiplicity and richness of their folds beyond the front of the balcony railing. One hears that it is the same when they are more simple and more within the box. Speaking of the ornamentation of the balcony railings which are painted or made in relief, sounds and sung voices do not revolve in their interior to be retained by those little reliefs which are there. If they should revolve, all would not be heard at one single point of either the voice or the sound for within the time it revolves it vanishes. If you would then consider that the balcony railing also reflects the voice. It should have, if made of wood and not panelled, or if having ornamentation in relief, the same function of smoothness for sound reflection. When under the pretense that all the component parts of the theatre, such as the lining of the boxes, must not make any obstacle to the reflections of the sound, one must voluntarily ask is all the parts of the theatre come into contact with the same sound at the same point in time because they are equally reflecting the voice to the same point. Such a thing can never happen, there must be some confusion in the reflections due to major and minor retardations caused by the different distances from which the voice must be reflected. Nothing then can succeed from this point. One needs to conclude that it is not the vaulted ceiling alone of all the parts of the platea which has the force to neglect the voice. Thus all the other parts either more or less contribute to making the voice fly, provided that all of the interior of the theatre is constructed of wood and provided that there are no openings wherein the voice will stop, as it would if all the doors to the boxes were left open onto the corridors. As for the rest, it would be true if all the things which we have noted up to now did really spoil the sonority of the theatre or would diminish it from more to less sensitivity.

The differences which are found are such that they would be no more questioned if one be more inclined to adopt more one thing than the other. But in the end I will say that it makes quite a difference either if this or that thing make some damage to the sonority of the theatre and to the reflections of the voice or would it not be easier to prove this with experiment?

The draperies should all be removed, I say, on a summer day and a single performance of an Opera or Ballet given. Then judge if the theatre has acquired more sonority or perhaps lost some due to one of those accidents for which there is no reason. Having made this proof, one then ornaments the balcony railings in relief with sketchy festoons of wood and other pieces, as you will, in place of ornaments, and you give a performance, as above. All will decide if the theatre be more silent or as they heard it at first. It would be ridiculous to leave it smooth for the reason that the reflections of the voice would be interfered with, if this were or were not the case. This proof would be the most convenient and the most useful because an architect having to construct the interior of a theatre must be able to assure the owners that for ornamentation of the theatre it is not necessary to do it completely in flat painting. The vaulted ceiling alone is that which should not be allowed the smallest relief, as relief is not allowed on the sounding board of the harpsichord. The rest of the theatre can have all of that ornament which is wanted in relief, provided that the relief is of wood or of a material which is equally from nature or has the same effect. Thus the theatre, ornamented mostly in relief, acquires more majesty, is better joined to the relief of the proscenium, and would be more durable. On the contrary painting on the box railings can never have the effect of relief, because a large part of that which is presented is always foreshortened. Due to the curve of the balcony railing its effect tends to be lost and we return quickly to seeing a smooth surface, on which it is never possible to obtain the painted effect of relief, other than the ease of dirtying them and of having to renew them every once in a while. What happens many times is that the original work is no longer recognizable, is not repeatable, it loses integrity, and is always altered in its parts.

APPENDIX Z

LANDRIANI ON PATTE

OBSERVATION B

ON THE ELLIPTIC SHAPE

OBSERVATION B

To assert that the elliptic shape is the one which is best for a theatrical hall as sustains M. Patte, because there are always in it advantages which can be claimed of sight, hearing, comfort, beauty, and others; it would be necessary to be able to see two theatres of the same size, one of the elliptic shape and the other like a horse-shoe, which is the shape now adopted most commonly as the most beautiful, to know the advantages of one over the defects of the other. I do not believe that there are those who will agree with regard to the major beauty of the ellipse over that of the other curves because the ellipse comes from a squeezed circle, and the other shape (horse-shoe) is from a perfect semicircle with two prolonged sides in a restricted curve. If nothing else the horse-shoe contains in its shape an almost perfect semicircle, and it approaches more the beautiful shape of the ancient theatre.

The reasoning by the author based on the reflection of the voice shows the advantage of the elliptic shape and appears to be theoretically demonstrated by him. But many are the differences between the voices which are found to come from so-called equal instruments. His reasons in the theory do not completely explain these differences. Thus it would seem to me that in two shapes somewhat similar, either the major effect claimed of the one over the other is not recognizable, or it could be said that the ellipse responds less than the other for one of those reasons which we do not know how to explain although we could not negate its effect. Therefore it appears that we have theatres sonorous enough of the non-elliptic shape. If with the changing of their shape they do not obtain that major effectiveness which is promised by M. Patte, then one could argue that the unpleasantness of sound does not result from a shape of any less beauty.

APPENDIX AA

LANDRIANI ON PATTE

OBSERVATION: MARKED "C"

ON THE BOXES CLOSED ON THE SIDES

OBSERVATION: MARKED "C"

M. Patte here condemns our habit of making the boxes closed on their sides instead of open like corridors, saying that the boxes one by one engulf the voice. If this were true that each of the boxes absorbed a portion of the voice our large Theatre which has hundreds of boxes must be the most deaf theatre of the world, but thanks to the skies we hear everything in it. Thus the reasoning of our author becomes contradicted by fact.

APPENDIX BB

LANDRIANI ON PATTE

OBSERVATION D

ON THE DIVISION OF THE BOXES

OBSERVATION D

It is not only the division of the boxes which the author proscribes but also the posts which serve to support the balconies, and he wants more than that their ceiling be covered from below with a somewhat curved plane. All, he says, of the dividing walls and supports with their thickness serve to interrupt the reactions of the sound and to impede the vision. We will not insist to question if the use of the corridors is better than the boxes, we will only make the observation that the person you find in a box is as in his own house, on the contrary, the one who you find in a corridor is as if in a public square. I would rather demand of M. Patte if he were alive, if it is possible to make a corridor look well without making it all visible, losing its apparent solidity, while carrying not less than three rows of persons one above the other, held up in the air like the statues on the Gothic buildings, carried up to that compressing ceiling so that they can see. If then the separations thus close the boxes and the supports damage the voices, and I do not know to say that they do, I will say instead that many people being amassed in the corridors, according to the principals of the author, would interrupt the reflections of the voices, and all of them as soft bodies must be unfavorable to the sound. There in the boxes are there not amassed many persons, and in this situation, would not the many interrupt the reflections of the voice. What would happen to those persons who were seated in a direction opposed to the direction of the rays of the voice, due to the oblique separation of the sides or according to the place at which they found themselves in the curve of the theatre? I would say that though the view is lost for some; how many more gain it from another part due to the same obliquity of the sides. It follows then that great numbers in the boxes make damage to the reflections of the voice because it is not being reverberated. How little becomes the interruption for the same voice, which could not succeed in a corridor fully open and full of people, all of whom would make a cushion to damage and absorb that same voice?

APPENDIX CC

LANDRIANI ON PATTE

OBSERVATION E

CONCERNING THE STAGE (PALCO SCENICO)

OBSERVATION E

M. Patte, being obliged here to discuss the arrangement of the stage, contented himself with speaking only of its use, and then coming suddenly to a definition said, "Its arrangement seems to be more the province or within the competence of the machinist and the scenic painter (designer) than of the architect." I will say of all architects generally if they make haste with this part due to not wanting to be embarrassed in a thing which, either they do not know or which they believed to be a less important part of their studies for the well-made theatre. But if they believe that it is more within the competence of the machinist or painter (designer) than of the architect, because they would design it first for space, large, compact, long or short, as they want or by accident, and then they want the machinist and the painter (designer) to vindicate the rest? Should not the machinist have the walls arranged for him, as they have already been ordered for the architect, to have the most convenient space for the movement of the scenery and the best arrangement of all of the machinery? Would not the painter enlarge the narrowness of the stage with perspective, if he is not given the means of enlarging the wings? But after the architects have thought out the beauty and most advantageous shape of the theatre, it seems to them that the main job is done, and the rest is always an additional thing which comes out in some way. But how often they are mistaken!!! And it will not be bad here to make a comparison with a sumptuous dinner made to be seen on a most simple table with another meal, shabby, but arranged on another table of the richest decor. The question is who would not prefer the better feast to the better appearance? It is not the richness of the table that is more desired, but the exquisite foods which are on it. Must the part of the theatre most apt to gain delection be left to the neglect of the architect? Though the theatre is of the most beautiful shape, of the richest of golds and ornaments, when it is not possible to do a grandiose performance on the stage, does it not become a shabby dinner prepared on a sumptuous table? Architects, then generally little versed in perspective (scenic design), cannot know the major and minor advantages which the painter (scenic designer) can get from a <u>braccio</u> more of space to make the scene more vast. Though the machinist little understands perspective (design), he knows how to favor the art of painting the scenery. He thinks, it is true, of the location of the machinery and of all the other ordering of the movement of the scenery, but then he does not reflect upon

what things would be in contradiction with the effect of the scenery. It is therefore only the painter who best knows that part to be communicated to the architect and the machinist, regarding the construction of the stage. It is the major part, however, practical. They who want to make their observations of value to the architects are either scorned or find the architects not interested, because they are not expressed according to the theories relative to validate them.

APPENDIX DD

LANDRIANI ON PATTE

OBSERVATION F

CONCERNING THE METHOD OF ILLUMINATING THE PERFORMANCES

OBSERVATION F

We do not doubt that experimenting with this different manner of illuminating theatres with reflector lamps will discover major advantages and also economy when they are finally available.

One of the most important things which regards illuminating theatres now is the lighting desired for their interiors. Thus we see introduced in our two Royal Imperial Theatres (Teatro della Scala and Teatro della Canobiana), in the middle of their ceilings immense lighting fixtures of brilliant crystals which carry light to the entire platea and also into the boxes. A lighting fellow, of a little time before us, adopted the idea that it was believed to be damaging to the scenery, not because too much light was obnoxious to him, but because the brightness vibrated from one of the resplendant lighting fixtures, introducing light rays between the sight of the spectators and the performance, impeding, dazzling, and making the objects on the stage appear distant by those same rays. More, the lighting fixture being completely formed of brilliant crystals, worked in thousands of facets, and for the most part hanging loosely, all the transparent and lucid materials of which it was made, came to reflect the light rays receiving the various colors of all of the theatre, and to spread the rays equally tinted by them; that is the coloration was lightened for all who watched, enervating the vivacity of whatever it effected.

To better explain I will say, the rays of a lighting fixture make an effect due to the sun which we see in a closed place. When sunlight enters through some aperture its rays all come out in dimmed streaks, which, instead of clarifying the objects from which they are reflected, confound the eyes because they are no longer distinguishable either in shape or color. It is thought that this is due to dust in the air which when illuminated in space appears to be an opaque body which prevents one from seeing. According to the density and agitation of the dust, the objects which are touched by those streams of sunlight are but a little accented. There is no place where dust is in less continuous agitation than in a theatre, creates so dense a veil, or is less illuminated by the rays lighting fixtures, which an effect on the appearance and the coloration of every object. As a matter of fact there is nothing which does more to stop the wandering eye; neither the painting nor the decorations of the theatre, all splendor is concentrated in the lighting fixture and all of the rest in the hall adds to the shabbiness of the scenery (whatever its beauty might be) or to an

indifference of consideration. When the glimmering of the lighting fixture is more bright the eye turns more to regard it. It should neither want nor be the thing most attractive in a brilliant vista, as a thing appearing the more resplendant because of the light it is in which due to its nature, even though it is placed in the center or is contoured with the most exquisite work in gold, always stands alone, and is lost, or makes the value of the rest much less. The same, I must say, happens to the splendor of the brilliant crystals of the lighting fixture, which if they are not of the true diamond are their equal for effect, for their glimmer reflects the flame of the light which makes it vehemently splendid. For this reason one cannot look at it for a long time without damage to the sight.

All these good and sound reasons, are or should be true. In spite of this, everyone prefers to see the hall illuminated, because in this manner they will always be joyous, and the boredom will diminish when the performance either does not interest or becomes repetitious to the point of yawning. The middle of the theatre is then surrounded with illumination, either in one way or another least offensive to the effectiveness of the scene, to the painting, and to the decoration of all of the theatre, thus all of the spectators will always have need for some light in the platea.

This objection forces a confession, that when one wants or believes indispensable the illumination of all of the theatre during the performance, one does not have any other expedient than the employment of an immense lighting fixture, hanging from the center of the vault or ceiling which as we have seen at our two Royal Imperial Theatres, is an example to all of the leading theatres of all nations. But I cannot ever say that one must have an extremely bright lighting fixture, completely formed of brilliant crystals, the splendor of which, as we have already seen, is damaging to the scenery and to all the decorations of the theatre, with the diminuition of all of the force of its natural coloration, and thus rendering all of the decorations of the hall to a monotone value, in spite of the variety and distinctiveness of its detailed working.

To find, then, a lighting fixture which makes the least damage possible to the effect of the scenery and to the other objects already indicated, it would seem to be necessary that its construction would have to be of a material neither lucid nor transparent, such I would say to be silver worked in white. The back of the lighting fixture should not be transparent, nor be pierced, but completely

opaque and ornamented with a strong and raised relief, able to receive a chiaroscuro for a piquant effect, such as grotesque figures grouped to circle the edge of the lighting fixture feigning to hold it up. It should be suspended from a single chain attached to the center of the lighting fixture, not with various other chains around the edge like a common lamp, in order that they do not send their shadows over the vaulted ceiling. Multiple shadows spot and contradict the effect of a ceiling painting, as we see on the ceiling of the Teatro della Canobiana. Its fixture is ornamented with eight chains and it expands many streaked shadows upon the painting.

APPENDIX EE

LANDRIANI

THE PARALLEL BETWEEN FRENCH AND ITALIAN THEATRES

THE PARALLEL BETWEEN FRENCH AND ITALIAN THEATRES

The theatre in France is used only for performances and not for other events. Thus for Balls there are separate halls. In Italy theatres serve for one and the other use. As a result the spectators are obliged to be seated on a plane of very little inclination, and they find it hard to see one over the other; a defect which renders the conditions of those who are in the platea inconvenient. The French Theatre has the platea or parterre made in a low series of steps over which the seats are placed. Persons seated on these risers do not have their view impeded by those in front of them. The defect in this is that almost all of the first row of boxes does not have any view because it is blocked for the most part by the height of the people seated on the risers. On the contrary our own theatres do not have even one row of boxes lost, there is space for moving around on the platea, and it becomes very spacious when the seats are removed and one can be on foot. In the French theatres they do not have a straight passage to go directly to the seats because the seats are none other than a variety of adorned bench, and there is no space for anyone to stand.

The parterre of the French Theatre is always raised to the level of the first floor (for us the second floor), hence causing the inconvenience of having to climb stairs on the way of a height not well proportioned to the display of the person. It is also inconvenient at the end of the performance, because of the competing of the multitude with those from the boxes. On the contrary, the platea of our own theatre is at the level of the street (ground floor). The wave of the spectators, having finished the performance, do not become completely restricted due to the stairs as the French do; but their exit is made much more freely, and very quickly each one finds himself outside in the open.

Having in the French Theatre the parterre located above, as has been said, has the advantage of having the below stage area at the level of the street. Hence it is more ventilated, more clear, more healthy, of a height much more than the Italian stage, and more convenient for the repair of the machinery and things for transformations. Finally it is a point to note that the materials are not drenched or altered by humidity. On the contrary our stage built completely underground, like cellars and will always have the defect of humidity, which not only dampens the materials, but always renders them subject to warping or altering. They always have a sepulcral air due to lack of

ventilation. One must add that, other than lavatories, there are rooms there where the fats and oils are rendered for immense illuminating fixtures of the theatre, a thing which must be done in a place apart from the theatre itself.

The platea of theatres constructed like the French always have the disadvantage, which might occur during a performance due to a sinister accident. The exit of the people will be more impeded by the long and tight exits down the stairs, with an ease of falling and piling up of those above the others. Therefore to have the platea on the level of the street is always to be preferred to minimize the fear of danger, and this overcomes any advantages of having a theatre built above the ground level.

The French Theatre, regarding the movement of the scenery, is better served than ours. Their chariot never becomes overloaded, as do ours, with large quantity of flats (tele: refers both to the mot and the ferm, and interchangable term for both) which are appended from its arms above the stage. They, the French, attach only the flats of the scenery which must serve for the performance of that day and no others. Every performance which they do, varies from one to the next, and they get the scenery out of the way immediately once it is used, and substitute that which will be used only for the particular opera or ballet which will be given that day. In this manner every time the stage becomes cleared completely of all that will not be used for the performance of that evening. All of the necessary scenery becoming located at its proper place, and at those distances which give naturalness to the scene. The flats are not placed in that location more obligated by the narrowness of the space than by the needs of the performance, because the needed space is already occupied by other flats extraneous to the performance to be given, as happens in our theatre. Our tele (chariot) are at times loaded with the scenery of five or six performances; so that many times the space to locate a change of flats is lost. Thus a scene is night, or it is day, or it is always the same. Now in our theatre there is too much use of usual red cloth panels (red draped wings) for every scene of every character possible, because they are there all the time. They are great temptation to the scenic painter to cut short the difficulties which he must bear. So we find them in one part or another of a scene. They are an indispensable reprieve, when if at the place of the panel one cannot substitute another flat which would read better with the scene, one may always use the red wing.

The French Theatre has vast storehouses separate from the theatre, where all the materials of the scenery are

stored which serve all of those varied performances which must be prepared for certain given days. On the contrary our theatre does not have other than our stage to serve as storehouse, where the scenery for five or six performances is kept which are changed from time to time. Our stage is always found to be congested in all of its parts, causing many times difficulty in situating the scenery at those depths of stage which are required for the perspective of the scene.

APPENDIX FF

LANDRIANI

OTHER OBSERVATIONS WHICH REGARD THEATRE IN GENERAL

The best shape for a proscenium would seem to be square, because it would close the scene like a frame and happens to be the most beautifully proportioned shape other than the circle. We will not say that the arch would be the worst, because it presents a shape composed of a highly exact state and of a portion of a circle, but altogether it forms a disproportionate opening, and even worse would be semi-circular. Thus it seems that the preference would be for the square. Nor should one believe that the reflections of the voice would return better from the curved shape of the proscenium than from the plane or flat ceiling, because it is not the shape of the proscenium which agitates the voice, but the curve of the vaulted ceiling above the platea which reflects the sounds of the voices of the singers and the instruments of the orchestra. For the rest it is enough that its interior be made of wood, which may be or may not be ornamented in relief either on the balcony railings or on the wood of the supports between the boxes, this not being prejudicial to the sonority of the theatre.

In large theatres how high should the proscenium be? Too much height is defeating for the scenery because wings (tele or ferme) cannot be taller than 16 braccia (about 8 meters or 25' - 30'), otherwise they would not be portable by two persons. Hence from the height of the wings comes also the limit of all of the scenery, since the remains of the opening will be covered by the panels (teazers) which leave very little space above the wings. The opening or the proscenium, whichever is larger, becomes almost equal to that of a little theatre, because above the wings for the most part it is closed by a large stable panel (teazer) for a good third or more of the opening of the proscenium.

The stage must have enough width on its sides to be servicable for its scenery and for the grandiosity of the performances. It is not necessary that it have an equally corresponding depth, in that to have too much depth diminishes the scenery more than favoring it. When there are more than six sets of wings to a side, the wings force the stage to appear too deep. Instead of increasing beauty with the depth, it appears to always be a narrow street, and too little of the ampleness of the rear is left to be discovered. The rear wings are never illuminated enough due to their too great depth from the footlights. Hence we will say that the depth of the stage if it has six or

at most seven divisions of wings to a side should have behind these 10 braccia or a little more. Any more depth which you would want to give it should be for storage, or for a naval combat machine, or for locating practical mountains above which those who walk are of equal size as if on real mountains, all things which are always applauded by the less cultured spectator when they see them.

The carriages for carrying the wings located below the stage are generally adequate for only one wing or flat. When it is necessary for them to carry two at once, one is attached to the other by means of iron hooks pivoted in eyes fastened to the frames of the wings which are supported by the carriage. But the weight of the attached wing causes the other to lean over. Moreover it becomes difficult to move the carriage below the stage because half of the weight rests in front of its balance point. The attached wing has the inconvenience of having to be accompanied by hand or it will fly at an angle away from the other during the movement. The carriage might suddenly become bent in such a way that it would not allow passage of wings until very deep into the stage. To alleviate these difficulties it is necessary that the carriages be built in such a way that they can carry two joined wings, or only one if that is desired. The designer would profit from this benefit by being able to design a scene with less number of wings. The perspective of the scene would look better with these fewer flats. The distribution and the foreshortenings would seem more consistent in the same flat. As one cannot do over two divided flats because of the small surface which is left to be seen of the one behind the other due to its nearness. The designer would also have the advantage of twice the space between one wing and the next, such as one would not have with one simple wing. Light would play with more effect over the painting of the flats. It is better then to reflect that the carriage which must carry two wings of equal width must of necessity almost be double its ordinary dimensions, and must in moving cover twice the width of the two wings. The width of the cuts in the stage floor must be elongated on the flanks as much as the width of the wing added to that part. All then depends on the construction of the stage, that is: whether it can have the length of the cuts, whether the double wings which are covered will not be impeded when they are exposed, whether they will be seen from the platea, whether there is room to get around the offstage end of the wings, whether this causes those involved to run around the ends of the wings in order to act in the performance, and finally whether the changing of such wings would be too perplexing.

Concerning the width of the stage, as has been said, when it is larger, it is more apt to favor the size or

grandiosity of the scenery and of the whole performance. On the contrary too much depth will perhaps be more of a danger than an advantage both for the scenery and the presentation, because everything becomes channeled and becomes too diminished due to the repetition in depth of the wings, to the extent that the actors with their height do not hold the major part of the stage. There is also the obscurity which always remains due to the light of the footlights not being able to arrive at the flats or wings at that depth. Whatever lights then which are introduced from above, not having the distance to reflect in the proper direction and due to their light descending over all of the surface of the flats will always give but the smallest use. Nor would it do to add a second set of footlights, because it would be necessary to locate them at a little more than halfway deep on the stage. Other then the difficulty of covering their lamps their location there would make getting over them greatly perplexing to persons who had to come downstage from afar. Even though in our Teatro della Scala there was a second built-in set of footlights, it has never been used and has come to the point of being removed.

APPENDIX GG

ADDITION TO OBSERVATIONS ON THEATRES AND SCENERY

BY

PAOLO LANDRIANI, MEMBER OF THE IMPERIAL ROYAL
ACADEMY OF THE FINE ARTS OF MILAN, MILAN

FROM THE IMPERIAL ROYAL PRINTING HOUSE
MCCMXVIII (1818)

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Chapter I Concerning the advantage and method for enlarging those theatre boxes which look on the proscenium from the front over those which flank.

Chapter II Concerning Box Sets, their advantages and their defects. How they may be designed according to the proper rules of perspective.

Chapter III Concerning the method of introducing columns, pilasters, or doors with protruding headings (or three-dimensional moldings) and similar things into the Box Set.

Chapter IV Wherein it is either demonstrated theoretically how scenery can be designed so that it can be painted on many separate flats or on those pieces which the painters call cut drops.

Chapter V On the defect of indifferently moving the point of view beyond the middle of the scene with the same distance which should be fixed for situating it in the middle of the same scene, and that disconcerting effect produced in the foreshortening of the objects seen from such a point. (In effect: Why the artist's central vanishing point should be fixed in the middle of the stage picture, and a discussion of the distortions which arise if it is situated elsewhere.)

Chapter VI Concerning the Figure Painter. How to position your groups with diminuition or foreshortening carried over from perspective can be done with a more simple method and with the same rules of perspective. Note: The height of the horizon line is demonstrated to be the soul of perspective, which is strictly necessary for the young architect to know.

Chapter VII Concerning the major difficulties encountered by the Theatrical figurative artist.

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APPENDIX HH

LANDRIANI

INTRODUCTION

INTRODUCTION

I find myself, with my Observations on Theatres, now printed, perceiving, from too much love of brevity, of having omitted to speak of the method of designing the type of stage scenery called the box set (scena parapetati), nor of having given easy demonstrations of the rules of perspective for the decoration of many detached pieces, that I have called cut drops (rompimenti), and considering these subjects to be totally useful, and believing that they make good and agreeable subjects for young scenic designers, I add to the first book, this other, my Observations, not to replace the first book with something better but to set right a deficiency, though to always simplify for them, the young artists, the way to artistic enterprise.

I believe I have added something to the body of general intelligence by expostulating these new chapters. Presuming always that the new painter has by now studied Perspective, it is not my thought to develop that study from its elementals, but only to give demonstrations and examples as necessary.

Finally, I want to add a brief and easy method of perspective for young figure painters, which I want also to be an exercise in decorating the scenes to which they belong. They can be made with the support of the rules, this method though is not new, but taken from Trattato di Pittura of Leon Battista Alberti. (Landriani is mistaken on this point!) Returning then in suitable addition to this, my Observations on Theatres, one of my reflections which regards the major foundation wall which yields to the boxes, increasing little by little by degrees, their arrangement so that they come to present their fronts to the proscenium, without giving any disharmony either to the curve of the balcony of boxes or to the regularity of the plan of the layout of the boxes, I have believed best to give demonstration, which will be considered in the first chapter of this my new addition.

Perhaps the low level of my intentions will fail to make known, or will show without sufficient clearness how much is necessary for the exercise of theatrical painting. It is conceded for the one part the brevity which was predetermined for me and for the other at least the desire is relished that I have helped, not with new precepts, but with the practical application of the ancients for those who interpret this art so entertainingly and so honorably four our Italy.

APPENDIX II

LANDRIANI: OBSERVATIONS ON THEATRES AND SCENERY (1818)

CHAPTER I: CONCERNING THE ADVANTAGE AND METHOD FOR ENLARGING THESE BOXES WHICH LOOK ON THE PROSCENIUM FROM THE FRONT OVER THESE WHICH FLANK

CHAPTER I

Although it had been my thought to only talk of the defects produced in theatres from the bad construction of their stages, and of certain inadvertancies in the painting of the scenery, since the construction of theatres is by now reduced to perfection, whether for the form or for the visual conformity of the boxes, or for comfort, it would seem that one is not permitted more room so that few or perhaps no one has better comfort, however to run the risk in this case of observing that the boxes situated in front of the proscenium are of a background equal to those which flank, from those flanking boxes no one can see the proscenium except those few persons seated at the railing, or anyone else only with great difficulty, it comes to my thought that a theatre would have a pleasing compensation if the boxes of the flanks should have the same major architectural relationship to the stage as those which front onto the stage, thereby giving room for a larger number of comfortable spectators; but reflecting that such, as my casual and easy observations, would have been without first done by the many famous architects who have constructed theatres in Italy, and seeing that they had never deviated from the parallelism (radiality of the walls of older theatre boxes) described by the curve of the boxes, nor being able to decide their forgetfulness of this effect, I have decided to examine this effect to show that the reason on which it is founded is common practice, for I believe it is generally admitted that the best results for the sonority of the voice depend on the following principles.

From the form of the curve of the auditorium box wall, commonly adopted in modern theatres; from the same curve without any interruptions from the railings of the boxes being constructed of wood paneling; from the vaultings of the ceiling being of elliptical shape, as flattened as it can be and of hard plaster; from the mouth of the proscenium being somewhat more straight toward the stage space; and finally from there being a slight inclination of the ceiling of the proscenium toward the scene, thus the voice like a ray of light will expand more easily into all of the theatre hall.[1] It does not seem to me therefore that the divergence of the walls of the boxes could do anything but help the voice and not bring damage to it,[2] but neither can I believe

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[1&2]Because of the length of these two footnotes, they will appear at the end of this appendix.

that it could possibly bring defects to the appearance of the form of the hall. How difficult it would be for one to perceive from the platea the inequality of the arrangement of the walls of the boxes with relationship to the stage, which as we will see from the plan, fig. , succeeds gradually from the last box on the flanks which begins to take a more favorable view toward the proscenium, and becomes increased in proportion little by little in the galleries which have a view of the stage. Not having found therefore sufficient motive for excluding this my thought I take courage to communicate it. The internal plan of our Imperial Royal Teatro della Scala (La Scala Opera House) is designed toward this end, for example, as it is executed, fig. , and it is supposed that it should have given a major breakthrough from that one point in the arrangement of the boxes. Those at the rear of the house (i.e. those which front on the stage), those whose front directly views the proscenium, and they are actually increased two braccia more in width by actual measure. This transports the center of the curve of the back walls of the platea, X on fig. , which is made of a perfect semicircle, on the longitudinal center line of X at the middle of X two braccia toward the boxes. Thus the center of the semicircle of the rear walls of the facing boxes is actually at F. From this point, F, you draw a line parallel to that of the diameter, X, parallel to a transverse cross sectional line in plan drawn through X. It is made to center at F with the same radius as BX. Using BX at F you describe the new curve which determines the increase of the curve of the rear walls of the boxes, which is the thing sought after. For the space which remains between the two diameters, F and X, for the protracted curve of the wall, you continue that portion of the curve with the center of which we were served for describing the remainder of the same line that was used to establish the proscenium. One will draw the thickness of walls and the width of corridors (carritojo;corridio;corredors) parallel to the new curve. If you make in swinging the curve the same divisions for doors and partitions between the boxes, as there were at first, you will therefore observe the protracted curve of the rear wall of the boxes and will see that the subsequent enlargement of the space at the rear of the boxes is pleasantly born from the principle of the semicircle of the theatre. This is done without disconcertingly carrying the point to the extreme of largeness to everything which is built. It is observed that little by little the boxes present more of their fronts to the proscenium and stage. Therefore it will be a most difficult thing for the eye to perceive of any defect because of inequal depths of the rear walls of the boxes, since it is difficult to measure depths with the eye from one box to the next.

Footnotes:

[1]The generally adopted form of theatres is a curve composed of a semicircle, continued on the sides with two additional circles which have between their centers a length of two times the diameter of the first semicircle, positioned on the extended line of that same diameter. See fig. , for illustration. The complete length of the theatre generally is equal to the diameter of the circle of the inside depth of the platea and the mouth of the proscenium becomes determined from a line tangential to that same circle, parallel with the same diameter, where it becomes intersected with the two circular curves at the sides or when the length of the platea exceeds its diameter, as in our I. R. Teatro della Scala, I find that drawing a line from the center of the curve of the sides, tangent to the same internal circle of the platea and lengthened equally where it becomes intersected with the curves of the two sides (i.e. where it intersects the two side circles. The lengthening occurs between points X and F parallel to B-X-(?).), in this way the width of the proscenium is determined.

[2]When I allow myself to be moved to doubt if the diffusion of the voice and of sound in wide and closed places, due to the obscurity of the theory such that it is uncertain if the place is better for deadening sound or for reverberating with it, so that the dissonances of the voices and sounds do not arrive distinctly at the ears of the spectators, then I must demand, if when a voice is diffused through so much space, when not resulting from the increase in the angles of the walls of the boxes, and that space in distance differs from the front to the rear of each of the boxes, does this then result in one or the other above mentioned defects, or some other defect of the same genre. It should be said that the sound deadness of a theatre or on the contrary the sound liveness, or whatever the sonic ambience may be of the platea, does not depend always on the form nor on the material with which it is constructed. That this is true we may see from two semicircular theatres, one which is dead and the other which is resonant. The larger renders the voice more vibrant in the middle range. We see this happen in perfectly similar stringed instruments made by the same hand, for pretty often one has a more successful voice than the other for reasons which one could not begin to guess at. As a result I would rather not prognosticate if a theatre larger in the internal part of its boxes will be more dead or on the contrary more resonant. I will restrain myself therefore to the soul reason for this introduction, though there may be available given experience and reasons which I do not know.

Considering that the sound augmentation is reduced to the major space inside of the boxes only in the part which fronts on the tilted stage space as is seen in fig. , it seems to me that there is not sufficient basis to question that such an increase in the angle of the walls might carry confusion into the sonority of the voice and into all of the theatre nothing else is to be altered at all. The platea remains intact and the exterior of the boxes remains as before, since all is reduced to the sole protraction of the curve of the walls and rear walls of the boxes. But this now being equal to the way it was at first, for described with the same reason as you can perceive equally from the mentioned figure, I cannot see how there can be fear that the voice cannot make the same repercussions as before, with this modification however that it originates naturally from a major distance increase for those souls who find themselves in the rear of the boxes.

On with the point then, if it is given to the major voice space to expand into, and this space has diverse distances from the front to the rear of the boxes, being for the production either of minor resonances or major loss of the voice, it is possible to prove that the voice as in the curve of the platea or the curve of the line of boxes around it, as in that curve of the rear walls of the boxes, it acts equally for the general sonority of the voice in all of the theatre. But considering that vibrations have voice in the inside of the boxes, it is possible on the other hand to deduce from the construction of the boxes that this vibration-redundance is not presumable, because they are divided in such a way that the voices of the talkers when moderated in the boxes are not intended to be heard by those in the neighboring boxes, and as a consequence they are not disturbed. I must say that the voice is not intended to circulate within the enclosure of the box as it is intended to travel within the curve of the wall of boxes surrounding the platea. Neither will the voice be bounced back from the bas-relief figure which is placed on the end of each wall between the boxes. The voice certainly enters from the platea into the boxes, but the curve of their back wall does not reflect the voice, because, as was said, it is interrupted by the division of the walls which constructs the form of the box, and as a result these walls cut off the movement of that same voice. Thus it appears that the theatrical voice in the interior of the boxes does not have the influence that a voice making a turn of all the platea does. Reasonably it must not likewise seem to be doubted that the increased angle or increased curve of the rear wall and side walls of the boxes can bring damage to the sonority of the entire theatrical hall. Instead it solely produces this effect in hearing only the voices of the singers for

those souls who are found in the increased depth of the box, for the natural reason that distance diminishes the sonority of the voice. If then in spite of all these reflections the voice had managed hollowly to escape from the boxes into the theatre due to the increased depth of the rear wall of the boxes, for one of those reasons not now known to me, but mentioned before, I will allow that everyone gives to such doubts that value that they believe. I am content to have exposed my thinking for the sole pleasure that comes from stirring up this project, from which you may infer if it is or it is not of susceptible advantage to use in the theatre, toward which and nothing else these observations are aimed.

APPENDIX JJ

LANDRIANI: OBSERVATIONS ON THEATRES AND SCENERY (1818)

CHAPTER II: CONCERNING BOX SETS (SCENA PARAPETTATA), THEIR ADVANTAGES, AND THEIR DEFECTS. HOW THEY MUST BE DESIGNED ACCORDING TO THE RULES OF PERSPECTIVE

CHAPTER II: CONCERNING BOX SETS (SCENA PARAPETTATA)

Scena parapettata (box set) is the name given to that type of stage scenery which on the stage space is formed with individual flats joined in the form of walls, and placed in such a way that would comply with or follow the structure of the real plan of the same actual scene, but which is somewhat restricted, foreshortened, or being perceived in perspective, in which the space given is fixed by the designer, or must be fixed because of the needs of the performance. These scenes are created in order that the usual openings between one wing and the next are not seen; the openings staying completely closed, and they have their ceiling equally closed, the ceilings made of flats, horizontally above the others; so there is no need for the introduction of masking pieces, expressly to cover defects in the lines of sight of the spectators seated in the flanking boxes.

We now have the advantage with this type of scenery of being able to place on the flanks of the set doors and windows with much more truth and of such a size that they are better suited to need. There is not the embarrassment or the obligation of being seen in a small space, as between wings, as we have seen in the other type of scenery. It would seem that a stage setting covered in such a way on every side would give a better illusion of whatever it represented, not having the distraction of extraneous objects which ordinarily appear in the open flanks of the other type of scenery.

All of these advantages are but very little if you prefer the ease of movement and handling and the major effect which is attained from the other type of scenery, which is painted on single flats and uses a few wings. In the wing set all of the painting is seen by us in a horizontal line, it does not have the defect of having part of the set escape from view on the side walls, as is observed on the flanks of the box set. It presents to us everything painted on it obliquely, equally conveying to our eyes all of the painted relief, which, if painted as the front of objects, makes this part confused because we see it as though looking at a painting of a house from the side.

The idea of the box set must always be limited by the limitations of the stage space and by the height of the flats, which must not exceed a given measurement because of transportability, as we have already discussed

in the first part of these Observations (1815), and also for the easy changing of the scenery and an easy amount of time for that action. Thus due to the construction of the flats a flat ceiling is always called for. The 'striking' of the set is also restricted to a limited number of pieces of scenery. That scenery, however grand it may appear, must never in fact be grandiose, recalling that which we obtain with foreshortening and perspective in a small amount of space on the flats of the other type of scenery.

Equally the total height of the box set which can be most difficult comes back to the same reasoning, the flats. There is not complete agreement on the relationship of the height to the width of opening of the proscenium. The size of the opening being so much larger will be a major defect, requiring the restriction of that opening with the help of draperies. It will always be an unlaudible thing to have to do this, aggravating to all who cannot see the scenery because it is being engulfed by the proscenium.

Thus I will state in advance, it helps to examine the difficulties which will be encountered in the designing of the box set. Many people do not work with a plan; they produce many other things in perspective which do not satisfy, but they are not persuaded. They will only be persuaded in the designing of box sets if they use from experience the frankness of approximation. The young painter must guard well against a seducing facility by not erring in those defects which they do not yet know well. They must become accustomed to using the principles to seek the reason for how a thing works, always with the help of perspective. For they must be persuaded that it is possible to design correctly only with the frankness of practice. Know clearly then the theory of your art and you will find that you will be able to use easy expedients and tricks much more than you ever imagined.

The major difficulty then that you will encounter in the design of the box set is that of not being able to obtain, with the customary operation of perspective, all of the foreshortenings of the outlined frames (doors or windows), and the size of the jutting pieces on the single side walls of the scenery. This is due to the reason that forming the line of the sides, that of the edge, where there is the intersection of the visual lines, which we draw from the points of the geometric plan, and the function of the sections, <u>how</u> we draw in another line in the horizontal drawing (the front elevation), may produce shapelessness in all the objects because of the exaggerated measurements which result. This defect can be demonstrated in the principles of perspective with the diversely made section of a cylinder which loses its perfect circular shape because it

is cut obliquely. Thus comes to light the necessity of having the line of the section-cut be square with the center line of the visual pyramid. The reason is that you give to the section measurements suitable to the form of the object which we pretend to imagine in the design, and as we see them in nature. But this may be explained better with some analytical plates. I will make use of the same plate we will use to design the box set. (Note: Landriani from this point talks as though you are systematically drawing a copy of the plate he is referring to.)

Supposing that the plan, ABCD, fig. , is reduced in perspective to the form of construction which is needed for the box set, representing a saloon or room. We will have the shape, DEFC, of three sides, which should be the perspective plan of the scenery in place on the stage. Observe the three lines: DE, EF, FC, comprising the plan. We find them to be three lines of diverse kinds, where all the vanishing lines usually pass to the central vanishing point, these lines follow the point of intersection which we must take for the foreshortened measurement. All of the lines of the perspective operations converge on a single point of distance, X, but the side of the plan, EF, does not become horizontally cut. The other two, DE and FC, rest obliquely as the two lines of the diverse sides, which certainly gives them a just perspective division, when caused by coming from another line made over a straight line without any result and nothing else. Thus you must take the measurements arising from the foreshortened mass or whatever size as is that of the door post, I, which we will find exaggerated perhaps more than the double of its geometric measure, and it would be absurd to make use of it, producing an effect contrary to our needs. But if on the contrary we take the same measurement of the thickness of the door post in horizontal section made at the point of incidence (or intersection), M, of the oblique line, DE, we will find the measurement agreeable to what we seek. The measurement indicated then being impossible to obtain on the line of the oblique edge due to the effect of perspective in the box set, painters think to remedy this with the practice of giving the objects their true natural-size projection indicating their real size as we will see in the following demonstrations. First let these necessary explanations be made, then you will see that you can design the box set with all the possible obligations of that same perspective, and also answering all of the other demands of the nature of that same type of scenery.

You fix the width of the opening of the scenery, which we would suppose to be equal to that of the proscenium except for the advancement of the two flats of drapes with

which we have arbitrarily closed the width of the scene Having fixed the width of the scene, as above, you compose the distribution of the view of the same scene, that for now we will call 'the room', dividing it in a method which is well suited to the height of the flats, or as much as possible, and without prejudicing the ease of moving them. For one might be obliged to change the scenery during the time of the action or during the course of the play's performance. This change must happen at once, without being uneasy to move or causing a delay. Make then a plan, ABCD, as in table , fig. , of that part which we intend to be seen, composing the space of the stage as we have determined or which is carried over from the needs of the play. CD is the opening of the scenery and EF is the line of the limit of the same (the line of the rear wall of the set). From the opening of the set, CD, to the entrance door at the rear of the platea you fix a point of distance, X, (the location of the ideal eye), and from the points A and B of the corners of the real room you draw to the point, X, the lines, AE and BF, and these will establish the line, EF, between the points E and F, which determines the width of that wall of the scenery. From the point, D, to that of, E, you draw a line, DE, and from the point, C, to F, the line, CF, and in the three sides, DE, EF, FC, we will have the composed figure of the perspective plan of the scene which we seek. This plan you must then draw on the stage floor for the construction of the same scenery. To the point of distance, X, you draw all the visual lines which come from the objects seen in the geometric plan. These visual lines become intersected by the three lines, DE, EF, FC, and above each of them you have the perspective divisions for designing the single sides of the scene. For the measurement of the projections on the sides of the scene, such as the thickness of the door posts, you take the horizontal line, marked with the letter, M, in the method explained above.

You can design in elevation the geometric view of the scene, O, R, N, S, of fig. , as far as its ceiling line, R, S, and you can design the opening of the scene equally in elevation, as you can see in fig. , marking the middle with the letters, G, F. On the GB side of the sheet of drawings you will design the profile of all the component parts in the elevation of the view, O, R, N, S, and on the center line, F, you will mark the height of the point of view, X, which height will be, H. We want to use that height which was fixed for the other type of scenery because the drop curtain design is based on having the point of distance placed at the same location.

In the design of the side, SP, you will have to give to the underneath of the horizontal line, H, that

increase of height which becomes produced from the slope (or rake) of the stage. As you see indicated from R to S, that increase must be regulated according to the location of the side walls in depth on the stage floor. One must take into account with exactness the slope of the stage in order that the line of the horizontal point always remains perfectly level in all the component pieces of the scenery, and the flats are plumb with the inclined plane.

If you will place the width of the wall, E, F, fig. , on the middle of the elevation of the stage opening, fig. , at DS, and you elevate the perpendiculars, DC, and AS, from the profile, GB, you draw to the point of perspective, H, all of the converging lines which will terminate at the line of the corner, DC, and you will have designed the thickness of the cornices. If you sharply turn them into horizontal lines, as you can see designed as far as the other angle, A, you will have enough for designing all of the parts of the view of the scene. For continuation then with these views of the sides of the scene, you take their extensions, ED, fig. , over to the perspective plan, and you will unite them at the angle, AS, fig. , which will be SP, and at the point, P, you raise the perpendicular, PQ, and above you mark the total height equal to GB of the stage opening. Then from the extreme point, L, of the line, AS, at the height, Q, you draw the line QL, and you will have composed the figure, LSPQ, of all the sides of the scene. On the perpendicular, PQ, you transport (carry over) all of the divisions of the line now cutting on the side of the profile, GB, to the perspective point, H, with which the same intersections are carried to the same point. The lines are now all determined in the line of the corner, AS, from the points at the corner, to those points marked on PQ you draw all the transverse lines necessary. Pay attention to show the thicknesses of the cornice at the corner in a manner which must necessarily unite the flats with a completely straight line. The spacing of the cornice must not be defective. It is designed, as you can see in fig. , across the angle of the union, OG. Reflect moreover on the thickness of the cornice at the corner of a box set, which here is demonstrated, fig. , in larger size. The cornice must remain outlined in the corner, P, over the flat of the rear, OF, and thus the little piece of the cornice must be turned, but designed as a surface seen from the front. To do this one is obliged to draw the line to the point of perspective, H, as far as the edge of the corner, OG, and from the section you continue the line with that inclination which like the diagonal lines we have deduced from the two heights, SL and PQ, in order that the folding or the turn of the corner will not carry any defect to our view. The elevation of

the line, PO, from O, produces then the thickness, P, of the cornice. This should be of contrast to the favor of the horizontal line of the support which is needed for the ceiling of the scenery. This becomes remedied with the increase of all the heights which balances the product in O with the drawing of the line OF. We will consider the height, FX, as the pediment above the cornice.

For designing the ceiling of the box set you must take your dimensions above the sides of the support (i.e. above the fake pedimental part of the ceiling on the rear flat), and its distribution, when being obliged to those of the scenery, will now be easy to design from the complex lines of the walls, as can be seen from fig. . Regarding the perspective inclination of the lines, which becomes considered at the middle point, it is thus naturally determined and from the length of the side wall and from the fixed stage opening of the stage set, from which the supports are made in both the same proportion and if you draw the line you will have the true inclination which you seek. The side walls of the ornamental recessed panels of the ceiling are designed with their natural geometric height. The point of perspective will always be the soul by which we will be served for the rest of the scenery. You must then make other divisions of the ceiling, not tied to those of the walls. They should be designed in plan, and from this you will draw the divisions equally as we have done for obtaining in perspective the other parts of the box set.

APPENDIX KK

LANDRIANI: OBSERVATIONS ON THEATRES AND SCENERY (1818)

CHAPTER III: CONCERNING THE METHOD OF INTRODUCING COLUMNS, PILASTERS, OR DOORS WITH PROTRUDING HEADERS (OR THREE-DIMENSIONAL MOLDINGS) AND SIMILAR THINGS INTO THE BOX SET

CHAPTER III

In the preceding chapter we have seen the difficulty of obtaining the thicknesses and the reliefs on the sides of the box set by means of the usual operations of perspective. It would not be difficult then to introduce in this genre of scenery columns, pilasters and other bodies, making them like cut drops, as will be comprehended from the following demonstration. Imagine a room with isolated columns, ornate doors with exact projections, and corbels as part of the door frames, and being of the plan, ABCD, fig. . If this is reduced in perspective in the same manner which we used for the preceding room, plate , without any relief (thickness), then we would have made the perspective plan, DFGC. For designing the thick part of the columns which must be made like breaks in the walls, you will observe on the line which parts from the angle, O, of the pilaster against the wall, O, becomes intersected by the line of the oblique edge, DF, at R, from the point, R, you will draw the line, RS, parallel to the line of view, FG, and this will be the line of the edge of the break in the wall of the columns. This is where you will take the measurement of the thickness of the same break in the wall, and it is the precise location where the pieces of scenery will be inserted.

To design the elevation of the scene you will make the geometric elevation, GH, fig. , and the profile, DD, fig. , of all of the parts, as was done in the preceding. You will do the same perspective operations for designing both sides, PACB, of the same scene, and the ceiling, RM. To then design the break in the wall (or cut drop), OPQR, fig. , of the isolated columns with their pilasters, which is designed expressly to have at the corner a line directly necessary for the joining of the flats. It has been said above that if you must take the measurement above the line of the edge, RS, fig. , and for the height we will do the same operation we did for the preceding, as you can clearly deduce from fig. , that is drawn out from the line of insertion, CH, fig. , in the method which we have used for designing the lines of the view, PAS. All of the material for the design of the scenery will be arranged in the manner which we see united in fig. .

To design the door with its lintel supported by corbels, you must draw in plan the space of its cornice and corbels so as to have the thickness of the dimensions of its front on the same line as the oblique edge. The lines

of their flanks must be taken from the horizon line, in the method which you have already been told. For increased understanding I have designed, in a larger scale, the plan of the door and its lintel with corbels, fig. . We have said that the size and thickness cannot be taken from above the line of the oblique edge, AB, because of the inconveniences already demonstrated, and that the line of the edge is also oblique giving but the true divisions perspective and proportional thicknesses, when they are derived from divisions made above a continued straight line. All of this we find combined in our plan, CB, in the points, marked from number 1 to number 8, which are all the widths occupied on the wall of the door posts, corbels, and thicknesses of the cornice of the lintel. These divisions when drawn to the point of distance will all be proportional in the line of the oblique edge, AB, which is carried as is seen in the elevation, DF, marked with the same numbers from 1 to 8. This done we will have all of the points at hand sufficient for drawing the thickness of the cornice and of the corbels, as you can see mentioned in CV, OR. Be it understood that the thicknesses must be drawn also of those things from the plan in the suggested method, that is drawing from the points to the point of distance and taking the measurement seen for crossing the horizon line, as seen in the expressly drawn line of the edge, DG, and all of the others drawn fragmentarily for better explanation.

But what is the good of designing box sets. They will always have the observed defect of their side walls never exactly corresponding to perspective. One will always be able to see objects designed as if of a natural largeness with their flanks visible, yet naturally it is not possible to see these sides. The objects are all foreshortened in one way or another. But this has always been given to the art for the necessity of making the depth and width of the stage visible from the platea. Really in life you might not see these same objects if they were constructed as from life. A final point, you can never see the scene sufficiently lighted from the sides, the light of the footlights escapes. The lighting is particularly bad when there are no jutting (masking) pieces to hide a break for the hanging of suitable lights.