A Historical Critique on 'Photo-fake' Digital Representation in Landscape Architectural Drawing

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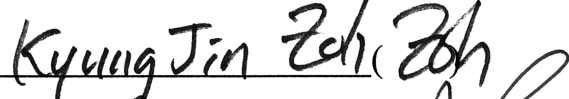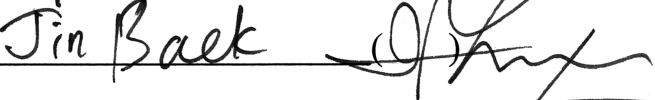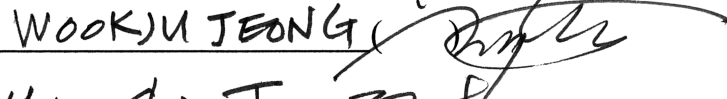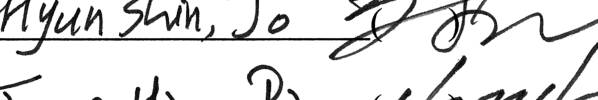
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for my parents, brothers, and old friends

Abstract

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This dissertation explores historical landscape architectural visualization techniques and ways of using computer technology and then offers a critique of the pervasive trend towards realism in the recent digital landscape representation. Specifically, it examines historical representational techniques in landscape design from manual drawings to recent computerized visuals; it also explores the role of computer technology in landscape representation during media transition from hand to computer and critically analyses the trends of realistic pictorial depiction in recent digital landscape visualization.

Firstly, examining the history of manual drawings, this research provides a comprehensive understanding of the characteristics and functions of landscape representation and historical changes regarding specific techniques. Landscape architectural drawing has double functions, namely, illustration of not-yet-actualized landscapes (i.e. instrumentality) and generation of creative ideas (i.e. imagination), which are relative, interchangeable, and transformable. These characteristics have been embodied in the forms of particular types of drawing, projections, perspective views, and diagrams, whose characteristics are not so much clearly distinguishable as rather mutually complementary and hybridized in such a way that pictorial views of plants frequently are hybridized to projection drawings. Of course, particular drawing types or techniques have often emerged as suitable and thereby dominant forms, depending on particular historical styles of landscape design. Sixteenth-century Italian Renaissance gardens and seventeenth-century French formal gardens were generally visualized in the form of projections. Eighteenth-

century and early nineteenth-century English landscape gardens were frequently represented in pictorial perspective view. In nineteenth-century America, the professional identity of landscape architecture started to be established and different drawing types were specialized depending on their respective functions. Furthermore, the map overlay method for site analysis emerged. Twentieth-century American modernists began to explore the diagram to deploy design strategies. However, such drawing types and methods have coexisted after their emergence; instrumentality and imagination have been frequently hybridized for the visualization of future landscapes.

Secondly, this work discusses the early history of the initial uses of major computer software to shed light on the major roles of such technologies in landscape visualization in the period of transition from conventional drawing tools. Computer technologies generally functioned as mechanical tools to imitate previous manual techniques and translate physical media into computer files. In the 1970s to 1980s, the medium of the map overlay analysis of Ian McHarg, namely, layer cake, changed from manual to computerized. In the transition of technologies, the computerized Geographic Information System served as a mechanical tool substituting the hand in that the GIS efficiently used methods similar to manual procedures, including inventory, evaluation, and visualization. Since the 1980s, Kathryn Gustafson and George Hargreaves have used physical modelling, such as sand and clay models, for landform study. In realizing such models on site, the CAD software generally functioned to translate three-dimensional (3D) models to two-dimensional (2D) construction documents, i.e. projection drawings. In the next two decades, landscape architects, including Yves Brunier, Adriaan Geuze, and James Corner, deployed the collage and montage using mixed media and photographic materials. Since the late-1990s, manual techniques have been increasingly produced using graphic editing software, such as Adobe Photoshop, which generally functioned as a tool to perform processes similar to those of manual techniques. In *Lifescape*, the winning proposal in the Fresh Kills Park competition in 2001, as an exception, Corner fully exploited the potential of graphic software to explore creative visualization techniques, including plan collage, which was used to develop the design idea in the design process.

Thirdly, this research offers a critique of the dominant trend towards realism in recent digital landscape representations. Since 2000, in landscape design, presentation drawings adopting a realistic depiction have gained increasing importance in communication with the public. Landscape architects, historically, have frequently used pictorial depictions of the appearance of landscapes as a dominant representational technique; advanced graphic editing software, including Photoshop, make it possible to achieve this desire for realism effectively. This trend is epitomized by perspective views using the composite photographic technique. In representations, discernible traces of cutting and assembling are removed, and visual effects are applied to create illusions via various commands and filters in the software. Thus, the complete representations are

perceived as if they were a copy of an actual landscape. To refer to such representations, this dissertation coined the term 'photo-fake', whose several conditions (invisible frame and viewer's position, illusions, landscape as theatre and human figures as spectators, and digital aura) were analysed by scrutinizing the visuals of recent international design competitions. These techniques often imitate previous manual methods, which historically date back to at least the eighteenth-century picturesque aesthetics and seventeenth-century historical landscape paintings.

Whereas the photo-fake image can easily capture the public's eye, it is difficult for the static visuals to achieve full embodiment of all of the multisensory characteristics of a landscape. Thus, photo-fake techniques need to be exploited to deploy a designer's specific vision of the not-yet-actualized designed landscape. Furthermore, digital modelling of landscape performance and various hybridized techniques with different drawing types and technologies provide the opportunity to explore various aspects of landscape and stimulate design ideas during the design process. If a designer's vision of a future landscape cannot be immediately realized on the actual site, then such visions inevitably need to be visualized in other forms. Thus, visualization techniques, both to generate creative idea and exploit the potential of digital technology, need to continue to be simultaneously explored in landscape theory and practice.

Contents

I. Introduction

1.1. Research Purpose

At present, landscape architectural drawings are generally produced using computer technologies, particularly digital software. Landscape architects, in design studio and professional firms, produce computer-generated images for communication with others, including their clients and colleagues, and the public (Figure 1). Although such images are produced in other disciplines related to built environments, landscape architecture presumably is the most picturesque compared with visuals in other disciplines. The concept of 'landscape' has historically derived from 'prior images', particularly landscape painting. In other words, visual representation such as landscape painting has affected the perception of landscape significantly. [1] John Dixon Hunt, a prominent historian of landscape architecture, uses the term 'computeresque' to refer to the picturesque computer-generated representation, in which 'the very qualities that also characterized the original picturesque' [2] are epitomized evidently.

The computer-generated visuals generally have been understood in terms of digital technology. In a strict sense, the designers produce the visuals through specific digital software programmes, including AutoCAD, Adobe Photoshop, and Adobe Illustrator, which provide a number of specific commands, than the use of algorisms of the digital technology (Figure 2). This process poses several questions. What are the different characteristics, if any, of images generated by software programmes and of those produced using physical mediums (e.g. pencil, paints, magic marker, and analogue photographs)? How did the first computer software programmes produce landscape architectural drawings? Did these programmes merely simulate or substitute the functions and effects of the previous physical mediums? If not, was the potential of computer technologies to achieve effects that would be impossible through manual methods fully facilitated? In other words, what are the specific roles of computer software programmes in the landscape design process?

To answer these questions, the drawing conventions with which landscape architects visualize particular aspects of the designed landscape should be laid out. Design

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[1] On this topic, see Gina Crandell, *Nature Pictorialized: 'The View' in Landscape History*, Baltimore and London: Johns Hopkins University Press, 1993; John Dixon Hunt, *Greater Perfections: The Practice of Garden Theory*, Philadelphia: University of Pennsylvania Press, 2000; Régis Debray, *Vie et Mort de L'image: Une Histoire du Regard en Occident*, Paris: Gallimard, 1992.

[2] John Dixon Hunt, 'Picturesque & the America of William Birch: "The Singular Excellence of Britain for Picture Scenes"', *Studies in the History of Gardens and Designed Landscape* 32(1), 2012, p. 3.

1. West8 and Iroje et al., *Healing: The Future Park*, International Competition for the Master Plan of Yongsan Park, 2012.
   (Korean Ministry of Land, Infrastructure and Transport)
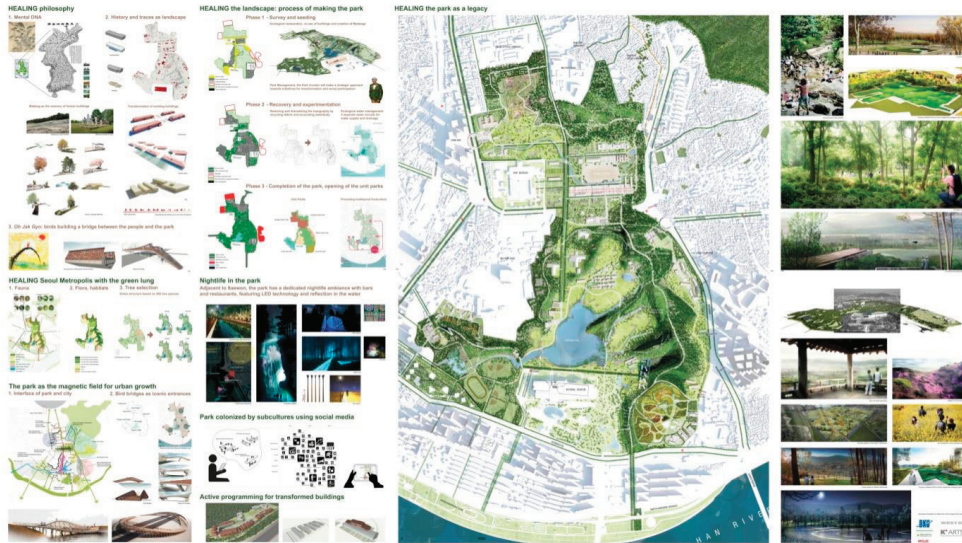
2. *Photoshop CC interface*, Adobe Systems Incorporated.
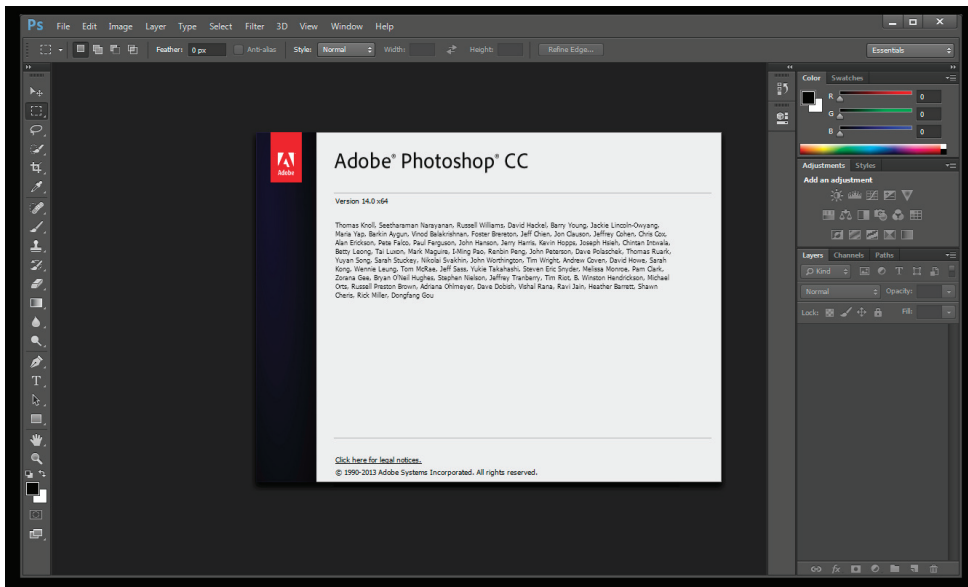
panel generally consists of the particular drawing forms, such as diagram, elevation/section, plan, and perspective view. Frequently, drawing types are requirements of design competition. In the education of landscape architecture, students undergo training for production of the conventions. For example, recent books pertaining to digital landscape representation generally discuss the digital drawings according to drawing types.[3]

Indeed, drawing types are important established conventions and, thus, used for landscape visualization. To trace fully the origins of each drawing type, the histories of not only built environments, including landscape architecture, architecture, and civil engineering, but also visual culture, including fine art and visual media, need to be closely scrutinized. In the history of landscape architectural drawing, drawing conventions emerged in the mid-nineteenth century when, as is well known, the professional identity of the discipline began to be established. For example, Figure 3 rearranges the manual drawings contained in the well-known winning proposal *Greensward Plan* for Central Park competition in 1858, by Frederick Law Olmsted (1822–1903) and architect Calvert Vaux (1824–1895), and the annual reports by the Board of Commissioners of the Central Park in that period. Compared with Figure 1, there is no diagram in Figure 3. Save for the diagrams, most conventions, such as plan, perspective view and section drawings, were already used to visualize the park's vision. In other words, either drawing types have remained continuously or a new type has emerged. How have the specific drawing types been used to visualize particular aspects of designed landscape? What are the different characteristics between the drawing types of recent landscape representation and previous historical conventions?

When landscape architects visualize a designed landscape using digital software and different drawing types, such diverse drawings tend to be finalized in the format of a flat image, namely, a design panel. Specifically, although designers produce drawings using different software, including AutoCAD, Rhino, 3ds Max, SketchUp, Google Earth, and Geographic Information System (GIS), the different formats are generally reassembled in a digital canvas of graphic editing software, such as Adobe Photoshop and Illustrator.

Digital landscape drawings that tend to emphasize pictorial representation are criticized, as picture-like visuals, such as 'visual biophilia', are produced merely to win design competitions.[4] Moreover, a number of scholars remark that landscape architecture has embraced digital technology sluggishly, compared with other disciplines, including

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[3] Bradley Cantrell and Wes Michaels, *Digital Drawing for Landscape Architecture: Contemporary Techniques and Tools for Digital Representation in Site Design*, Hoboken: John Wiley & Sons, 2015; Nadia Amoroso, ed., *Representing Landscapes: Digital*, London and New York: Routledge, 2015.

[4] Andrés Duany and Emily Talen, 'Reminiscences: Looking Backward: Notes on a Cultural Episode', in *Landscape Urbanism and its Discontents: Dissimulating the Sustainable City*, eds. Andrés Duany and Emily Talen, Gabriola Island: New Society Publishers, 2013, pp. 11–12.

architecture and civil engineering. Indeed, landscape architecture relatively lacked explorations in form generation using digital technology, compared with architecture that have maximized the potentials of digital technology to generate new architectural structures. In fact, these uses of technique and technologies reflect the specificity of a landscape architecture. As architectural historian Antoine Picon stated, when computer-aided design (CAD) in architecture was in its infancy in the 1960s, the early computerized GIS software, which was a more necessary and suitable technology in landscape design, was developed.[5] Moreover, the techniques of picturesque drawings and their characteristics were derived from the tradition of landscape architecture, or the original picturesque, which was established in the eighteenth century. Thus, graphic software, such as Adobe Photoshop and Illustrator, has been appropriate to visualize the picturesque qualities of landscape. At this point, the important discussion concerns how the historical picturesque aesthetics have affected the present digital landscape representation, and what do software-produced picturesque digital images suggest about the contemporary landscape architecture.

3. *Drawings for Central Park*, 1850–60s.
  (Morrison H. Hecksher, *Creating Central Park*, pp. 18, 26–27, 29–35, 40.)

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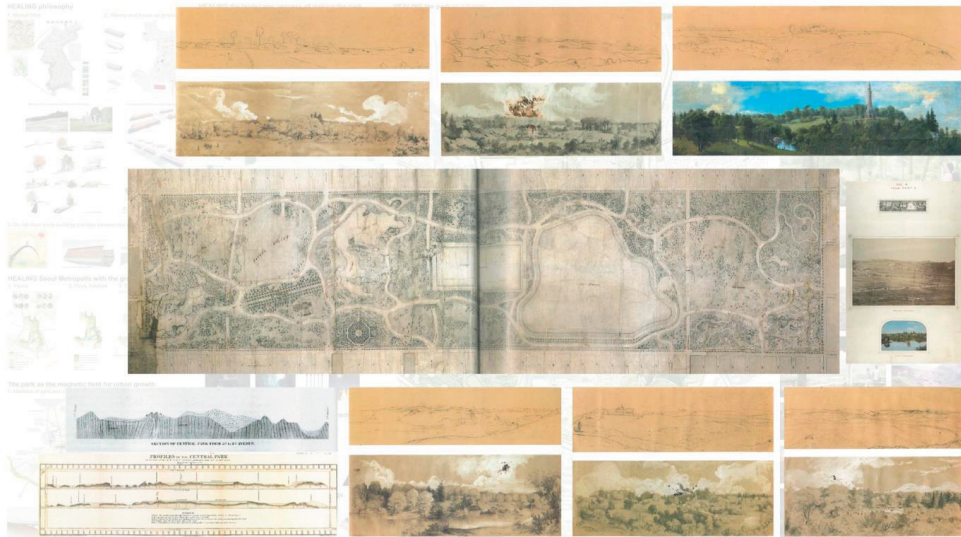
[5] Antoine Picon, 'Substance and Structure II: The Digital Culture of Landscape Architecture', *Harvard Design Magazine* 36, 2013, p. 124.

1.2. Research Objectives and Theoretical Perspective

To answer the aforesaid questions, this dissertation aims to, first, explore the historical visualization techniques and computer technology in landscape architectural drawings, and, second, offer a critique of the pervasive trend towards realism in the recent digital landscape representation.

First, this study examines the history of landscape architectural drawings. It assumes that techniques and characteristics of present digital landscape representation tend to borrow the conventions of previous drawings that used physical mediums. In other words, it needs to rethink the historical manual techniques and their roles and functions to understand the present conditions of digital representation fully. Next, this study explores the early history of uses of major computer software programmes that have performed important visualization techniques of landscape design, thereby understanding how transitions in technology have affected the specific process of the techniques as well as the roles and functions in design process. Thus, in this study, the histories of landscape drawings are examined critically to rethink the present digital landscape representation.

After the review of historical drawings, this study offers a critique of the dominant trend towards realism in recent digital landscape representations. This pervasive trend is derived from historical manual methods, which date back to at least the eighteenth century picturesque aesthetics. In addition, this study assumes that present digital drawings not only imitate the previous techniques but also transforms them through technology to a certain degree. By comparing the present digital representations with the previous methods, this study identifies the specific roles and functions of technology in the production of visuals during design process.

In this sense, this study fundamentally pursues *history as a critical theory*, which is one of the three roles of theory in landscape architecture described by Simon Swaffield, a landscape architecture scholar. In particular, this study 'resists and challenges taken-for-granted ways of thinking, and puts forward alternatives'.[6] The history of landscape architectural drawings is examined to critically rethink the present digital landscape representation, thereby find alternatives to proceed in landscape architectural representations.

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[6] Swaffield describes the three roles of theory in the discipline as the instrumental, critical, and interpretive. The instrumental theory can 'generalize and codify knowledge, as a basis for practical action', whereas the interpretive 'helps us better understand a situation'. See Simon Swaffield, 'Introduction', in *Theory in Landscape Architecture: A Reader*, ed. Simon Swaffield, Philadelphia: University of Pennsylvania Press, 2002, p. 1.

1.3. Literature Review

This study traverses theoretical discourses on drawing and pictorial representation in various disciplines, including the theory and history of built environments of landscape architecture and architecture, media studies, and art history.

Recently, scholars of landscape architecture have focused on the limitations of realistic techniques in digital landscape representation. For example, Karen M'Closkey, in her essay 'Structuring Relations: From Montage to Model in Composite Imaging', argued that the recent function of a photorealistic digital landscape representation during design process is merely a demonstrative 'project depiction' rather than a generative 'project ideation'. [7] Moreover, other scholars have described the limitations of the present photorealistic depiction and suggested alternatives to proceed in realms of pedagogy and practice in landscape architecture.[8] The focus of this study corresponds to the issue that these studies raise. However, all of these explanations account for the trend in realism that mainly derives from digital culture, particularly in terms of education and practice. What distinguishes this study from previous works is its specific focus on close relationship between the techniques of realism and those of historical landscape representation. This study examines the origins of the techniques for landscape architectural drawings and their transformations. Additionally, this work addresses the ontology of photography to describe fully the desire of realism in recent representation; thereby, it accounts for how the computer-generated images can be experienced as an equivalent of the not-yet-actualized landscapes that they represent.

In discussing the relationship between the present and past conventions, this study assumes that the present techniques tend to imitate those of previous mediums. Scholars have addressed the variations in the conventions. For example, architectural historian James S. Ackerman, in his recent essay 'The Photographic Picturesque', noted that when the photography was initially invented, techniques using the medium borrowed previous manual methods, including work of arts and drawings that embodied the picturesque aesthetics. [9] In addition, Timothy Davis, in his article 'The Bronx River

[7] Karen M'Closkey, 'Structuring Relations: From Montage to Model in Composite Imaging', in *Composite Landscapes: Photomontage and Landscape Architecture*, eds. Charles Waldheim and Andrea Hansen, Ostfildern: Hatje Cantz Verlag, 2014, pp. 116–131.
[8] Katie Kingery-Page and Howard Hahn, 'The Aesthetics of Digital Representation: Realism, Abstraction and Kitsch', *Journal of Landscape Architecture* 7(2), 2012, pp. 68–75; Blake Belanger and Ellen Urton, 'Situating Eidetic Photomontage in Contemporary Landscape Architecture', *Landscape Journal* 33(2), 2014, pp. 109–126; Karl Kullmann, 'Hyper-realism and Loose-reality: The Limitations of Digital Realism and Alternative Principles in Landscape Design Visualization', *Journal of Landscape Architecture* 9(3), 2014, pp. 20–31.
[9] James S. Ackerman, 'The Photographic Picturesque', in *Composite Landscapes: Photomontage and*

Parkway and Photography as an Instrument of Landscape Reform', noted that the famous technique of juxtaposition of before and after view by landscape gardener Humphry Repton (1752–1818) continued, albeit slightly varying, in the twentieth-century landscape visualization.[10] Similarly, in the digital era, this study traces historical changes of the various techniques that are still used frequently in the present landscape architecture.

This study is also guided by prior studies that provide a description of the history of established drawing conventions, that is, drawing types in landscape architecture.[11] In discussing pictorial representation of past and present landscape architectural drawings, John Dixon Hunt provides theoretical descriptions of historically significant influence of visual culture, including landscape paintings, on landscape design and its representation particularly in the era of the eighteenth-century English landscape garden.[12] André Rogger's recent book, *Landscapes of Taste: The Art of Humphry Repton's Red Books*, assists in understanding the aesthetic characteristics of Repton's visualization techniques;[13] this book describes pictorial representations of 'Red Books' drawings executed by Repton in terms of art history. In addition, numerous prior histories are used to understand landscape visualization techniques.

James Corner's pioneering works in theory and practice of landscape representation is greatly employed in organizing this study, complementing and building on his theoretical writings pertaining to visual representation. This study describes the fundamental double characteristics of landscape architectural drawings as a demonstration of designed landscape (i.e. instrumental) and a generation of creative idea (i.e. imaginative); in discussing the role and function of computer technology for landscape representation, this study distinguishes between technology (i.e. drawing mediums) and techniques (i.e. particular representation modes, including drawing types).[14] These fundamental understanding of drawings borrow those of Corner, whose theory of representation will be prominently discussed in this study.[15]

Landscape Architecture, pp. 36–53.

[10] Timothy Davis, 'The Bronx River Parkway and Photography as an Instrument of Landscape Reform', *Studies in the History of Gardens & Designed Landscapes* 27(2), 2007, pp. 113–141.

[11] James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', *Word & Image: A Journal of Verbal/Visual Enquiry* 8(3), 1992, pp. 243–275; Erik de Jong, 'Landscapes of the Imagination', in *Landscapes of the Imagination: Designing the European Tradition of Garden and Landscape Architecture 1600–2000*, eds. Erik de Jong, Michel Lafaille, and Christian Bertram, Rotterdam: NAi Publishers, 2008, pp. 8–25.

[12] John Dixon Hunt, *Gardens and the Picturesque: Studies in the History of Landscape Architecture*, Cambridge, MA: MIT Press, 1992.

[13] André Rogger, *Landscapes of Taste: The Art of Humphry Repton's Red Books*, London and New York: Routledge, 2007.

[14] M'Closkey also explained the distinction between the two aspects in her aforementioned essay, which is presumably derived from the writings of Corner. See Karen M'Closkey, 'Structuring Relations: From Montage to Model in Composite Imaging'.

[15] Most recently, Corner's writings are collected and published in the form of volume. See James

In addition, this study addresses not only historical manual drawings but also, and more importantly, digital landscape representations. In discussing the latter's present conditions, this study is assisted by recent literature related to digital drawings. The advantages and limitations of the uses of computer technologies as drawing mediums have been discussed in the discipline. Scholars, including Marc Treib, view manual methods as superior to computer drawing.[16] Other scholars, including M'Closkey, consider digital representations to have remarkable capacities that would not be possible in manual drawings.[17] In addition, the recent works that discuss present digital technologies not only for representation but also during construction process assist in suggesting alternatives to proceed in digital technologies in landscape design.[18]

To understand Korean digital landscape representations, this study considers Korean-language studies on Korean landscape architectural drawings as well as Western landscape architecture and its representations.[19]

In architecture, several studies have examined the various drawing types and their properties and historical origins. For example, Ackerman's book, the *Origins, Imitation, Conventions: Representation in the Visual Arts*, explores the historical origins of conventions in visual arts, including architectural drawings, tracing them back to the Renaissance period, Middle Ages, and Ancient Rome.[20] Moreover, in discussing the characteristics of drawings, architectural historians have focused on the close relationship

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Corner and Alison Bick Hirsch, eds. *The Landscape Imagination: Collected Essays of James Corner 1990–2010*, New York: Princeton Architectural Press, 2014.

[16] Marc Treib, 'Introduction', in *Representing Landscape Architecture*, ed. Marc Treib, London and New York: Taylor & Francis, 2008, pp. xviii–xxi; Marc Treib, 'Introduction', in *Drawing/Thinking: Confronting an Electronic Age*, ed. Marc Treib, London and New York: Routledge, 2008, pp. viii–xi; Marc Treib, 'Paper or Plastic?: Five Thoughts on the Subject of Drawing', in *Drawing/Thinking: Confronting an Electronic Age*, ed. Marc Treib, London and New York: Routledge, 2008, pp. 12–27.

[17] Karen M'Closkey, 'Structuring Relations: From Montage to Model in Composite Imaging'; Nadia Amoroso, ed., *Representing Landscapes: Digital*; Bradley Cantrell and Wes Michaels, *Digital Drawing for Landscape Architecture: Contemporary Techniques and Tools for Digital Representation in Site Design*.

[18] Jillian Walliss, Zeneta Hong, Heike Rahmann and Jorg Sieweke, 'Pedagogical Foundations: Deploying Digital Techniques in Design/Research Practice', *Journal of Landscape Architecture* 9(3), 2014, pp.72–83; Jillian Walliss and Heike Rahmann, *Landscape Architecture and Digital Technologies: Re-conceptualising Design and Making*, London and New York: Routledge, 2016.

[19] Kyungjin Zoh, '조경드로잉의 변천과 의미에 관한 연구 [A Study on the Transformation and Meaning of Landscape Architectural Drawing]', 한국조경학회지 [*Journal of the Korean Institute of Landscape Architecture*] 27(2), 1999, pp. 140–151; Jeonghann Pae, '현대 조경설계의 전략적 매체로서 다이어그램에 관한 연구 [A Study on the Diagram as Strategic Media in Contemporary Landscape Architectural Design]', 한국조경학회지 [*Journal of the Korean Institute of Landscape Architecture*] 34(2), 2006, pp. 99–112; Kyungjin Zoh, '환경설계방법으로서의 맵핑에 관한 연구 [A Study on the Mapping as a Environmental Design Method]', 공공디자인학연구 [*Journal of Korean Society of Public Design*] 1(2), 2006, pp. 72–84.

[20] James S. Ackerman, *Origins, Imitation, Conventions: Representation in the Visual Arts*, Cambridge, MA: MIT Press, 2002.

between the recent digital drawings and historical manual methods. For example, in their seminal volume *Architectural Representation and the Perspective Hinge*, Alberto Pérez-Gómez and Louise Pelletier described a historical change in the epistemology of the perspective in architectural drawings, extending the visual regime embodied in the manual methods to that of digital drawings.[21] In his recent work, *The Alphabet and the Algorithm*, Mario Carpo discussed the potential of digital drawings with the use of algorithms. However, similar to the manual methods, the fundamental nature of digital representation is still the manipulation of point, line, and planes using the interface of the computer screen.[22] Focusing on the early history of a specific software, namely, CAD, in his most recent work, *Builders of the Vision: Software and the Imagination of Design*, Daniel Cardoso Llach examined the functions of initial CAD software in architectural design after the Second World War in terms of social and political aspects.[23] In his study, Llach argued that the software borrowed and slightly transformed the principles of historical perspective using data processing. Thus, in the history of architectural drawings, the attention has been mainly focused on the CAD software, and its potential to generate new architectural form has been enabled in architectural design.

Media studies enable this study to rethink the historical representation techniques and characteristics of digital software. The recent digital representation tends to be produced using the composite technique of images through graphic editing software. To understand the principles of the techniques, this study uses the double logic of hybridization of media (i.e. immediacy and hypermediacy), which is described by Jay David Bolter and Richard Grusin in their book *Remediation: Understanding New Media*.[24] Moreover, this study addresses the history of and current software programmes for landscape visualization, which are informed by theoretical perspective of Lev Manovich. In his most recent work *Software Takes Command*, Manovich argued that the particular properties of digital media are derived from software programmes, including Adobe Photoshop and After Effects.[25] Similarly, this study discusses the properties of software programmes in discussing roles and functions of digital technologies during design process. In addition, among the pioneering works that have explored the characteristics of synthetic photographs using computer technology is William J. Mitchell's *The Reconfigured Eye: Visual Truth in the Post-photographic Era*, which was used in this study in discussing characteristics of the

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[21] Alberto Pérez-Gómez and Louise Pelletier, *Architectural Representation and the Perspective Hinge*, Cambridge, MA: MIT Press, 1997.
[22] Mario Carpo, *The Alphabet and the Algorithm*, Cambridge, MA: MIT Press, 2011.
[23] Daniel Cardoso Llach, *Builders of the Vision: Software and the Imagination of Design*, New York: Routledge, 2015.
[24] Jay David Bolter and Richard Grusin, *Remediation: Understanding New Media*, Cambridge, MA: MIT Press, 1999.
[25] Lev Manovich, *Software Takes Command*, New York and London: Bloomsbury Academic, 2013. See also Lev Manovich, *The Language of New Media*, Cambridge, MA: MIT Press, 2001.

recent digital landscape representation.[26]

   In this study, art historians provide a theoretical perspective on the pictorial representation. For example, in Ernst H. Gombrich's seminal book *Art and Illusion: A Study in the Psychology of Pictorial Representation*, he described the conditions of illusions in pictorial representation by discussing the theories of the historical techniques, including perspective, light, texture, and human expression.[27] These techniques appear in landscape representation. To further understand the visual experience of synthetic photographs in recent digital representation, this study borrows the theoretical discourses on ontology of photographic image.[28]

   Prior histories of landscape architecture and substantial literature on practical works and design philosophies of landscape architects are also employed in this study to re-establish and, thereby, rethink the long history of landscape architectural representation.

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[26] William J. Mitchell, *The Reconfigured Eye: Visual Truth in the Post-Photographic Era*, Cambridge, MA: MIT Press, 1992.

[27] Ernst H. Gombrich, *Art and Illusion: A Study in the Psychology of Pictorial Representation*, New York: Princeton University Press, 1969.

[28] Charles Sanders Peirce, *Collected Papers of Charles Sanders Peirce Vols. I–II*, eds. Charles Hartshorne and Paul Weiss, Cambridge, MA: The Belknap Press of Harvard University Press, 1960; Susan Sontag, *On Photography*, New York: Picador, 1977; Rosalind Krauss, 'The Photographic Conditions of Surrealism', *October* 19, 1981, pp. 3–34; Roland Barthes, *Camera Lucida: Reflections on Photography*, trans. R. Howard, New York: Hill and Wang, 1981.

1.4. Structure

This study consists of main three chapters, which are closely related. In Chapter II, historical manual drawings are examined widely to understand the forms of and changes in aesthetic characteristics and functions from the sixteenth century to the mid-twentieth century. Chapter III extends the representations using computer technology, and discusses initial uses and major functions of computer software that perform frequently used visualization techniques in the mid- to late twentieth century. Chapter IV reviews critically the present pervasive trend that has aimed to achieve the realism of pictorial representation of digital presentation drawings since 2000.

Chapter II addresses historical manual methods before the use of computer technology. First, it describes the fundamental characteristics of landscape architectural drawings as double functions, namely, an illustration of the not-yet-actualized landscape (i.e. instrumentality) and a generation of creative ideas (i.e. imagination). These functions have been embodied in established drawing conventions, including plan, elevation/section, perspective view, and diagram. After briefly examining the characteristics and functions of drawing types, this chapter rethinks the conventions in terms of hybridization. Specifically, the seemingly established conventions has been frequently hybridized each other in such a way that pictorial views of plants are hybridized to orthogonal projections.

In the sections that follow, this study rethinks the history of manual drawings based on drawing conventions and their hybridization. Specifically, this study recreates the seminal historical events, including drawing types and historical styles of designed landscape, related to their emergence and fashions, dividing the wide range of history into four parts. The first part consists of projection drawings in the Italian Renaissance gardens in the sixteenth century and the French formal gardens by André Le Nôtre in the seventeenth-century. The second part comprises the pictorial representation in the format of perspective view and the English landscape gardens by William Kent, Lancelot 'Capability' Brown, and Humphry Repton in the eighteenth century. The third one concerns the diverse specialization of drawings of Frederick Law Olmsted in the mid-nineteenth century. Lastly, the fourth one covers the emergence of diagram in American Modernism in the early and the mid-twentieth century. These drawing conventions have generally coexisted after their emergence. More importantly, instrumentality and imagination of the drawings have been hybridized mutually to complement each other in visualizing designed landscape.

Chapter III discusses the emergence of computer technology and its initial roles and functions in the production of landscape architectural drawings. First, the discourse on manual drawing and computer-generated visuals by landscape architects and scholars are examined. Through this examination, this study contends that the properties of hand or

computer drawings hardly depend on drawing mediums (i.e. technologies) but more visualization methods (i.e. techniques).

Chapter III also examines the transition of technology from manual method to computer, in terms of three important visualization techniques of landscape design, to understand the early specific functions of various technologies. The first one is the transition of mediums of the map overlay analysis by Ian McHarg, namely, the layer cake, from manual to computerized GIS in the 1970s to the 1980s. The second transition concerns the physical modelling by Kathryn Gustafson and George Hargreaves and the CAD software's initial role and function during the realization process of the models in the 1980s to the 1990s. The third involves the transition of technology in collage and montage techniques by Yves Brunier, Adriaan Geuze, and James Corner from the physical materials to graphic editing software programmes, such as Adobe Photoshop and Illustrator, beginning in the late 1990s. Through examining the histories, this study argues that computer technologies initially served as mechanical tools to merely imitate previous manual techniques. This section also discusses in detail the theory and practice of Corner, who attempts to exploit the full potential of scientific technologies, including graphic software, to explore creative visualization techniques.

Chapter IV offers a critique of the dominant trend in recent digital landscape representation that attempts to achieve the desire towards realism. At present, presentation drawings have gained an increasing importance in terms of communication to the public, whose eye can be grasped easily by realistic representation. This chapter, first, describes the trends as a specificity of landscape representation; in other words, the phenomenon derives from the tradition of historical landscape representation, which can be traced back to the eighteenth-century picturesque aesthetics embodied in English landscape gardens and drawings. This chapter then reviews critically the composite photographic techniques in the form of perspective views using graphic editing software, which epitomizes the desire of realism. In recent digital landscape representations, visible traces of assemblage are eliminated through numerous commands and filters of the software, thereby the complete representations are perceived as if they were a copy of an actual landscape. To refer to the visuals, this study coins the term 'photo-fake', and then discusses this term's specific conditions, such as invisibility of frame and viewer's position, creation of illusions, landscape serving as theatre and human figures as spectators, and digital aura. In the process, this study scrutinizes the visuals of recent international design competitions. These techniques often imitate previous manual methods, which can be traced back to at least the eighteenth-century picturesque aesthetics and seventeenth-century historical landscape paintings, and then transform them through technology to a certain degree. After the analysis, this study discusses the opportunities and limitations of photo-fake, as well as several cases of Korean landscape architecture.

In the sections that follow, this study suggests two alternative ways to overcome the limitations of photo-fake. First, it presents digital modelling to visualize landscape performance to overcome the limitations inherent in the visualization of only the appearance of designed landscape. Second, it argues that the hybridization techniques, from drawing types to drawing mediums, need to be explored fully to overcome the limitations that come from the desire of realistic depiction.

II. Rethinking the History of Manual Drawing

2.1. Hybridization of Instrumentality and Imagination

2.1.1. Instrumentality and Imagination

(1) Ruler and palette

Various visualization methods are used to conceive and illustrate designed landscape. For example, in the early stage of design process, landscape architects use mapmaking technique to analyse physical and social information of the site; in exploring ideas in the initial design process, a manual sketch and a diagram using pen and marker are prepared; and for clients and the public, a computerized representation is produced to depict future designed landscape elaborately. These visualization techniques refer to a professional identity of landscape architecture. At the heart of the discourse on the identity of the discipline is dualism that polarizes art and science, and planning and design, to which various visualization methods of landscape design refers.[1] For example, the mapmaking technique of ecological information of the site using geographic information systems (GIS) generally refers to scientific visualization (i.e. the instrumentality), whereas the pictorial representation of appearance of designed landscape via Adobe Photoshop and Illustrator refers to artistic visualization (i.e. imagination) (Figures 1, 2).

The tension between instrumentality and imagination of the discipline can be traced back to sketches executed by Humphry Repton (1752–1818), who is often considered as the first landscape gardener (Figure 3). In Figure 3, which was carried in one of his so-called Red Books in the late eighteenth century, Repton represents an English landscape garden in the form of panorama in which two parallel couples of men under a high tree are depicted on the right side in the foreground of the picture plane. Specifically, on the left side of the tree, a man and his assistant conduct a scientific survey of the topography; on the opposite side, another man and his assistant sit on the ground and draw an artistic representation. In other words, Repton defines himself as both a land surveyor and a landscape painter. As an art historian and a landscape architecture, André Rogger observed that the 'conjunction of the profession of land surveying with the pastime of drawing was the essence of Repton's early self-representation as a landscape gardener'.[2]

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[1] For more description of the two aspects of the identity of landscape architecture, see Elizabeth K. Meyer, 'The Post-Earth Day Conundrum: Translating Environmental Values into Landscape Design', in *Environmentalism in Landscape Architecture*, ed. Michel Conan, Washington, DC: Dumbarton Oaks Research Library and Collection, 2000, pp. 187–244.

[2] André Rogger, *Landscapes of Taste: The Art of Humphry Repton's Red Books*, London and New York: Routledge, 2007, p. 104. More specifically, Figure 3 indicates a transition in the perception of

1. *ArcMap 10.1.*, Esri.
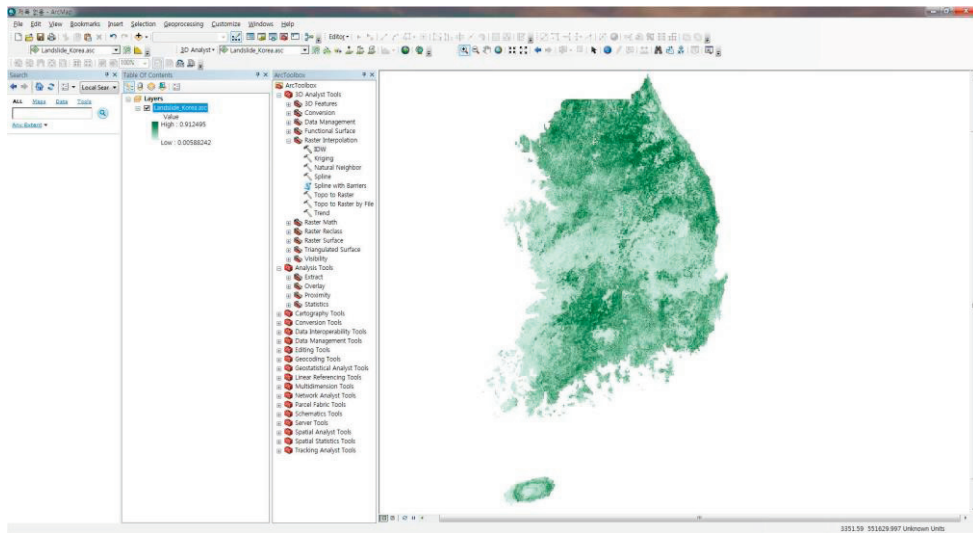
2. *Photoshop CC*, Adobe Systems Incorporated.
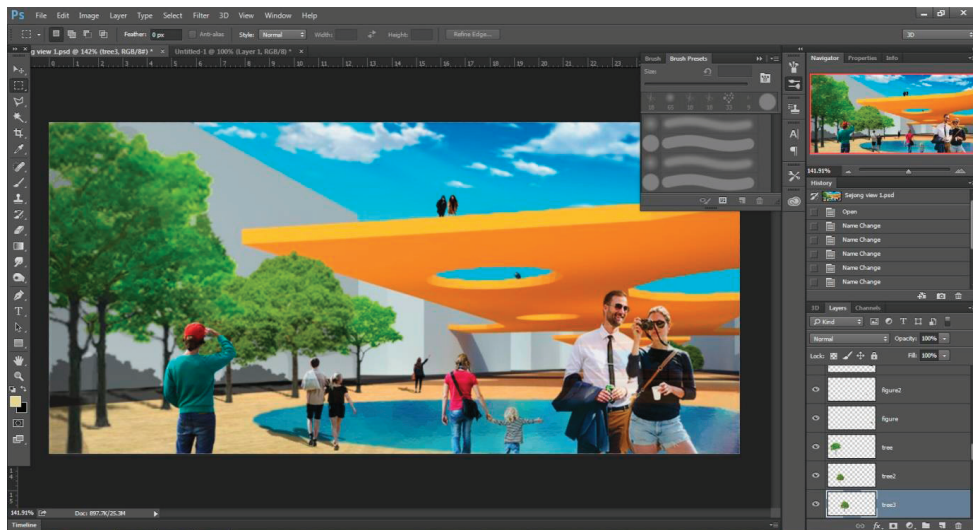
the profession (i.e. from being a surveyor to an artist). As Rogger observes, Repton only represented himself as a surveyor in his business card and sketch around the 1790s before the time of Figure 3, and then as an artist with a pen and sketch-book in his sketches in the 1800s after the time of Figure 3. *Ibid*., pp. 103–104.

1 5

3. Humphry Repton, *View of the Welbeck Estate*, 1794.
   (http://digital.library.wisc.edu/1711.dl/DLDecArts.ReptonSketches)

4. Jacques Delille, *Frontispiece* in *Les Jardins, Ou L'art D'embellir Les Paysages*, 1782.
   (Erik de Jong, 'Landscapes of the Imagination', p. 9.)

Similarly, another representation in the form of engraving reveals the tension by establishing an analogy between drawing media and styles of garden (Figure 4). This representation was made earlier than Repton's self-representation and carried in a poem by French Jacques Delille (1738–1813) in the late eighteenth century. On the foreground of Figure 4 were two females: the right-side woman places a ruler, a compass, and a set square on her side, whereas the left-side one holds a brush and leaves a palette on her side. As a historian of landscape architecture, Erik de Jong notes that in the representation, two dominant styles of garden are personified as the two women and their drawing mediums. The right-side woman and her drawing mediums, including the ruler, refer to 'architectural style', whereas the left-side woman and her mediums, including the palette, refer to 'landscape style'.[3] In other words, in the late eighteenth-century Europe, the French formal and English landscape gardens existed as dominant styles of landscape design, and the two personifications shown in Figure 4 illustrate the tension between the two methods of garden design.

In the two aforementioned representations, visualization mediums appeared notably as crucial symbols in describing professional identity of landscape gardening and its styles. French formal gardens, such as *Gardens of Versailles*, are generally designed through precise measurements of the sites using a ruler, a compass, and a set square. Landscape gardens, such as *Stourhead*, are designed by representing the sites artistically with a palette and brush. Thus, in terms of garden style and visualization, the former belongs to scientific instrumentality, whereas the latter falls under artistic imagination.

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[3] Erik de Jong, 'Landscapes of the Imagination', in *Landscapes of the Imagination: Designing the European Tradition of Garden and Landscape Architecture 1600–2000*, eds. Erik de Jong, Michel Lafaille and Christian Bertram, Rotterdam: NAi Publishers, 2008, p. 17.

(2) Drawing types

The two types of drawing mediums refer to specific established conventions in landscape design (i.e. drawing types). One type involves rulers and compasses that are generally used to produce plans, elevations, and sections through which a site is measured and visualized precisely (i.e. instrumentality of visualization). A second type concerns palettes and brushes that are used to produce a perspective view; in a strict sense, it is an image adopting loosely the principle of perspective through which a landscape is conceived and represented artistically (i.e. imagination of visualization). The first one was used frequently to design historical styles, such as the sixteenth-century Italian and the seventeenth-century French formal gardens, whereas the second was a major representational convention for designing the eighteenth-century English landscape gardens.

The drawing types have been classified by scholars of landscape architecture. For example, prominent landscape architect and scholar James Corner (1961–), in his 1992 essay 'Representation and Landscape: Drawing and Making in the Landscape Medium', divided landscape architectural drawings into three distinct and separate types, namely, projection, notation, and representation.[4] Projection concerns '*direct analogies* between drawing and construction, and includes the plan, the elevation, the section, the axonometric, and in a lesser way, the perspective'.[5] A sort of projection, notation seeks to 'identify the parts of a schema, enabling them to be reproduced, enacted or performed. They include itinerary schedules, piano scores, and dance notations'.[6] Corner explained the notation systems in landscape architectural drawings, including landscape architect Lawrence Halprin's (1916–2009) notational score for fountain displays that visualize the experience of motion and its disposition along a particular sequence, and Bernard Tschumi (1944–)'s cinematic path notations for Parc de la Villette that visualizes a variety of programmatic and spatial experiences (Figure 5).[7] Representation is situated as the most important drawing type, which aims to '*re-present* a given landscape or building, seeking to elicit the same experiential effects but in a different medium[, that is,] to give the same effects again'.[8] For example, a pictorial perspective is representational as 'it depicts the depth and spatiality of a scene at eye level from a certain vantage point'.[9] However, according to Corner, this realism of direct imitation has limitations in landscape architectural drawing, and therefore creative techniques that *re-present* or conceive future designed landscape need to be

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[4] James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', *Word & Image: A Journal of Verbal/Visual Enquiry* 8(3), 1992, pp. 243–275.
[5] *Ibid*., p. 251.
[6] *Ibid*., p. 255.
[7] *Ibid*., pp. 256–257.
[8] *Ibid*., pp. 257–258.
[9] *Ibid*., p. 258

explored.[10]

The classification of recent digital representations through digital technologies, particularly software, are generally similar to but slightly different from the drawing types described by Corner based on manual techniques. Recent books for practice and pedagogy related to digital landscape representation generally discuss digital drawings for landscape design based on three types of drawings, namely, diagram, plan and section, and perspective. For example, Bradley Cantrell's and Wes Michaels's *Digital Drawing for Landscape Architecture: Contemporary Techniques and Tools for Digital Representation in Site Design*, which was published in 2015, introduces the overall process of digital drawing production in five parts.[11] Parts 1 and 2 describe an overview and workflows of the process, and then parts 3, 4, and 5 introduce in detail the productions of three types of digital drawing, namely, design diagrams, plan/section renderings, and perspectives. Similarly, *Representing Landscapes: Digital*, which was edited by Nadia Amoroso and published in 2015, is a collection of essays and visuals in an attempt to discuss digital landscape representation based on specific drawing types, namely, diagrams and mapping drawings, presentation plans, axonometric drawings, section elevations, perspectives, digital modelling, and fabrication.[12]

Landscape architectural conventions can be loosely divided into three drawing types when both the historical and present as well as manual and digital techniques are considered comprehensively. These are orthogonal projections, including plan and elevation/section; perspective view using pictorial representation; and diagrams for visualization of invisible characteristics of landscape or design strategies.

First, projections, including plan and elevation/section, generally aim at the realization of projections as literal representations of an actual site, and they thus require precision of spatial measurement. This drawing type is often considered as architectural projections, which affected landscape architectural representation in the sixteenth-century Renaissance.[13] According to architectural historian James S. Ackerman, plan as a drawing type dates back at least to the technique of ancient Rome, and section drawing can be traced

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[10] *Ibid*., p. 259. For more discussion of Corner's theory and practice of representation, see Chapter Ⅲ. Moreover, de Jong builds on Corner's description of landscape architectural drawing to discuss the historical and contemporary European landscape representation. See Erik de Jong, 'Landscapes of the Imagination', pp. 8–25.

[11] Bradley Cantrell and Wes Michaels, *Digital Drawing for Landscape Architecture: Contemporary Techniques and Tools for Digital Representation in Site Design*, Hoboken: John Wiley & Sons, 2015.

[12] Nadia Amoroso, ed., *Representing Landscapes: Digital*, London and New York: Routledge, 2015. For specific description of the drawing types and the structure of the book, see Nadia Amoroso, 'Representations of the Landscapes via the Digital: Drawing Types', in *Representing Landscapes: Digital*, pp. 3–25.

[13] Erik de Jong, 'Landscapes of the Imagination', p. 22.

5. Bernard Tschumi, *Cinematic Path Notation*, 1983.
   (Frédéric Migayrou, ed. *Bernard Tschumi: Concept and Notation*, p. 112.)
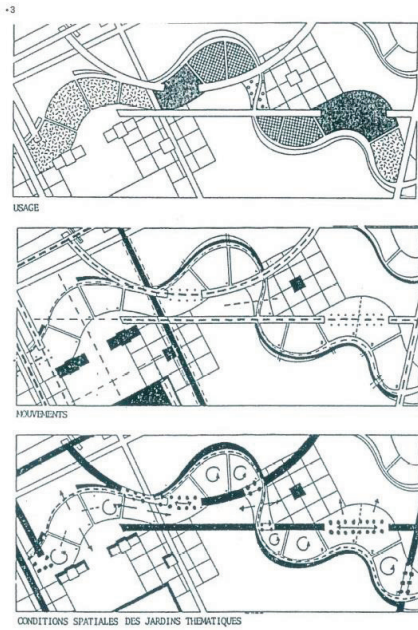
6. James Corner and Stan Allen, *Diagram, Emergent Ecologies*, Downsview Park International
   Design Competition, 1999. (Julia Czerniak, ed. *CASE: Downsview Park Toronto*, p. 59.)
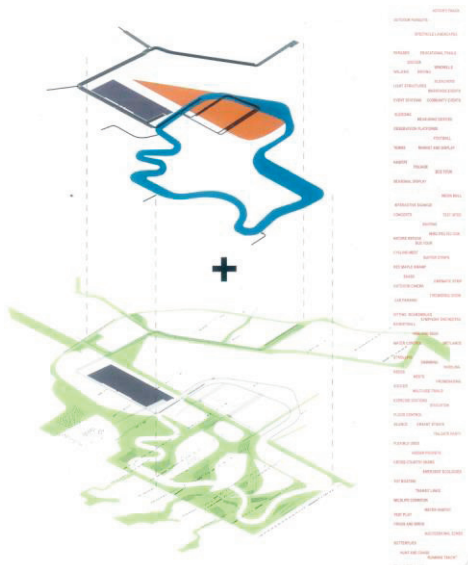
back to the thirteenth-century architectural convention.[14] Thus, projections are suitable to visualize architectural structures. At present, orthogonal projections are produced using AutoCAD, which provides the capabilities to visualize a designed form accurately by inputting precise physical dimensions and various lines.

Second, perspective view is generally used to represent pictorially the appearance of designed landscape.[15] This drawing type is used rarely to construct actual landscape and often to communicate with clients and the public, whose attention can be captured easily by the similar form in landscape painting. Thus, this type adopts representational techniques to create realistic illusions and is an important method in competition drawing. At present, advanced graphic editing software, including Adobe Photoshop and Illustrator, are used to perform such representations. These programmes enable landscape architects to create various visual effects so that the complete representations are perceived as if it were a photograph capturing the existing landscape. (The process of creating these representations will be discussed in Chapter IV). Such representational techniques are more dominant and important in landscape architecture than in other built environments. As the term and perception of landscape are derived historically from the genre of landscape painting, as discussed in the Introduction, the similar form of the genre has been an appropriate drawing type to visualize landscape. The type with a technique that adopted loosely the principle of linear perspective, among others, was used frequently in the eighteenth-century English landscape garden design.

Third, diagram generally aims to visualize invisible or complex characteristics of landscape and design strategies. Unlike the above two types, diagram does not depict appearance of landscape in terms of resemblance or likeness, and conveys relations, functions, structures, circulations, and design ideas. The diagrammatic techniques began to appear in the design of built environment in the early twentieth century. With advanced digital graphic software and postmodern culture, it has been a dominant drawing technique since the late twentieth century. Unlike projections and perspective view, diagram has no strict and standard rules and, therefore, can be produced and transformed in various ways (Figure 6).

Although the three drawing types are classified in terms of convention or style,

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[14] James S. Ackerman, 'The Conventions and Rhetoric of Architectural Drawing', in *Origins, Imitation, Conventions: Representation in the Visual Arts*, ed. James S. Ackerman, Cambridge, MA: MIT Press, 2002, pp. 296, 298.
[15] In a strict sense, perspective view, which adopts completely the convention of linear perspective, is considered to belong to projections. However, as various examples will be discussed throughout this dissertation, perspective view of landscape representation frequently applies loosely the technique to carry the phenomenological atmosphere of landscape, or is transformed in several ways, such as collage and montage, to *re-present* landscape. Thus, this dissertation uses the term perspective view to refer to not only principles of linear perspective but also, more frequently, various representation techniques of landscape appearance in the form of perspective view.

the drawings can be divided in terms of specific design process or stage. First, in the initial design process, landscape architects make relatively freely rough sketches to explore initial design idea and analyse or study site conditions with a pen and a marker or stylus pen (Figure 7). Second, the initial concept and spatial structures are revised and developed to become presentation drawings using hand or, more frequently, graphic editing software for communication with clients and the public. Historically, presentation drawings have played an important role in landscape representation, as shown in Repton's beautiful and vivid sketches for his clients in Red Books (Figure 3). At present, such presentation drawings are produced using digital software, which provides a number of commands to perform visual effects and videos so that these drawings can capture a client's attention (Figure 2). The aforementioned perspective views are important in presentation drawings. Third, landscape design is completed in the realization of actual site for which construction documents must be produced. Such construction drawings require standardized and legible languages, such as formats and symbols, which can be understood easily and readily by construction workers. Thus, in producing construction drawings, orthogonal projections, such as plan and elevation/section, are mainly used as formats. Sectional drawing is particularly a suitable type to understand topography and its construction (Figure 8).

However, such seemingly different established conventions are, in fact, difficult to distinguish clearly, as various drawing types can be deployed in different ways through hybridization and transformation. In this sense, instrumentality and imagination as characteristics of visualization are relative, interchangeable, and transformable because a drawing type has a function of either instrumentality, imagination, or both, depending on a specific way of representation, particularly hybridization. [16] For example, plan as a projection is generally considered as a drawing type of instrumentality that can visualize spatial measurement in a precise way. The instrumental function of the plan can be transformed into diagrammatic function epitomized in the plan collage technique explored by James Corner. (This topic will be discussed in Chapter III). Although perspective view as a drawing type is generally considered as artistic and imaginative convention compared with projections, the representation can be used as an instrumental visualization technique to depict a realistic appearance of landscape, or functioned as a generative and imaginative technique, such as montage and collage, during the design process. Such divergent ways of representation that hybridized instrumentality and imagination will be fully and often discussed critically throughout this dissertation.

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[16] To describe the double function of instrumentality and imagination in landscape representation, this dissertation builds on Corner's theory of landscape representation, which will be discussed in detail in Chapter III. For a brief examination of Corner's polarization of instrumentality and imagination, see Richard Weller, 'Afterword: Wordscape: the Writings of James Corner in theory and practice', in *The Landscape Imagination: Collected Essays of James Corner 1990–2010*, eds. James Corner and Alison Bick Hirsch, New York: Princeton Architectural Press, 2014, pp. 351–361.

7. Lawrence Halprin, *Creek Sketch*, 1964.
   (Margot Lystra, 'McHarg's Entropy, Halprin's Chance', p. 72.)
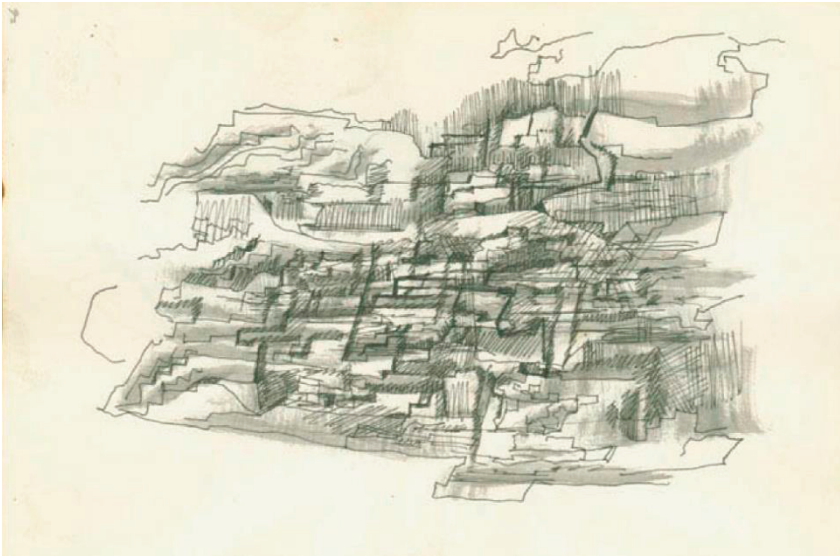
8. Frederick Law Olmsted, Calvert Vaux, and W. H. Grant, *Profiles of the Central Park*, 1860.
   (https://archive.org/stream/annualreportofbo00newy_9#page/n73/mode/2up)
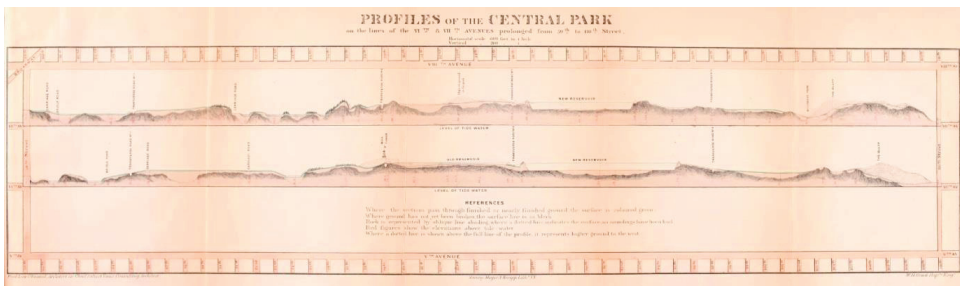
2.1.2. Hybridization

(1) Time and tense

The three drawing types of landscape architectural conventions are based considerably on not virtual but actual reality. In particular, projections and perspective view are related directly to actual reality, which the drawings generally tend to visualize in terms of resemblance. When considering drawing types as signs, the correlation between drawing types of images and real-world objects can be understood in terms of typology of signs (i.e. icons, indexes, and symbols)[17] by philosopher and logician Charles S. Peirce (1839–1914). An icon is a sign based on its degree of likeness to an object. Thus, projections, such as plan and elevation/section, which were intended to project literally onto actual ground, can be interpreted as icon; in addition, perspective view that generally represents appearance of landscape in terms of likeness is likewise considered as icon. An index denotes its object, having an actual connection with the object, without whose existence the sign is unable to be interpreted as an index. Projections have characteristics of the icon, but they can also be considered as index because projections directly indicate the landscape. Moreover, the photographic image, including both the analogue and digital, which will be discussed in detail in Chapter IV, can be considered as an index by virtue of its sense of presentness, making the photographic image similar to the sighted subject. A symbol is based on a conventional rule and depends rarely on the likeness or actual connection to the denoted object. Any of the three drawing types is interpreted as a symbol when it conveys a conventional meaning. For example, a pictogram is icon based on appearance of real-world object to a certain degree, but it is also symbol as it is intended to convey a particular conventional meaning. Thus, a specific drawing type can have various characteristics of signs simultaneously.[18]

The understanding of landscape architectural drawing types becomes more complex when considering time and tense of drawing. In a strict sense, the world that the drawing visualizes is generally not yet actualized and is, thus, a future landscape. A site for design exists in present, but an altered or a designed landscape in a designer's mind is virtual that will be realized in the future. In other words, a drawing visualizes the future

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[17] Charles Sanders Peirce, *Collected Papers of Charles Sanders Peirce Vols. I–II*, eds. Charles Hartshorne and Paul Weiss, Cambridge, MA: The Belknap Press of Harvard University Press, 1960.
[18] Myeongjun Lee and Jeonghann Pae, 'Condition of Photo-fake: Rethinking Photomontage in Contemporary Landscape Design', *Peer Reviewed Proceedings of European Council of Landscape Architecture Schools Conference 2014; Landscape: A Place of Cultivation*, eds. Isabel Martinho da Silva, Teresa Portela Marques, and Gonçalo Andrade, Porto: University of Porto, 2014, pp. 409–412. For a Korean-language essay, see Myeongjun Lee, '포토페이크의 조건 [Conditions of Photo-fake]', *환경과 조경* [*Environment & Landscape Architecture*] 303, 2013, pp. 82–87.

time in the present tense. Thus, drawings of built environmental design are different ontologically from other fine arts, such as landscape painting and photograph in which the present or frequently past time of real world is represented in the present tense. Corner builds on the account for time and tense of architectural drawings from architectural historian Rovin Evans (1944–1993) to extend to that of landscape architecture.[19] In 'Representation and Landscape', Corner stated:

> Robin Evans has described how architectural design drawing differs from other pictorial arts in that it is not done after the subject, but prior to it, that is, prior to building and construction. Landscape architectural drawing is not so much an outcome of reflection on a pre-existing reality, as it is productive of a reality that will later emerge. The built landscape must be determined in advance, and will exist after the drawing, not before it.[20]

Not all of represented world of landscape architectural drawing belongs strictly to the future time. In the representation, future designed landscape is added frequently in present ones. Hence, a drawing is hybridization of various times of landscape. In similar context, a drawing is hybridization of index and pseudo-index; the existing part of the representation is considered as index of actual site; the altered or designed part is understood as pseudo-index of virtual landscape in a designer's mind.

In the history of landscape architectural drawings, the desire to visualize landscape of different times in one image has been expressed frequently in various ways and still remains even in digital representation. For example, Repton's sketches in Red Books illustrate a technique to display before and after views using flaps, which will be discussed later in this chapter. This technique hybridized different times in one view by covering improved views with representations of existing landscapes on the flap. Moreover, landscape architect Ian L. McHarg (1920–2001) used map overlay analysis for ecological planning, namely layer cake, in which various maps were superimposed in chronological sequence so as to finalize in a complete suitability map. (McHarg's technique will be discussed in Chapter III.) Corner's phasing plan and plan collage using mapping technique, which will be also discussed in Chapter III, attempts fundamentally to visualize flow and changing evolution in landscape.

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[19] Robin Evans, 'Translations from Drawing to Building', *AA Files* 12, 1986, pp. 3–18.
[20] James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', p. 245.

(2) Hybridization of drawing types

The three different drawing types are also hybridized. Recently, advanced digital software enables landscape architects to transform a drawing type freely and easily into another convention or new technique. For example, Corner's plan collage deployed in *Lifescape*, a winning proposal of Fresh Kills Park competition in 2001, transforms a master plan creatively into a new hybridized diagram, which was used to generate the form of the site (see Chapter III). More frequently, another drawing type is hybridized within a convention, or different drawing types are juxtaposed within the same picture plane (Figure 9).

The composite techniques of drawing types appeared already in historical manual drawings. For example, eighteenth-century Swedish landscape architect Fredrik Magus Piper (1746–1824), who introduced English landscape garden style in Sweden, executed a beautiful presentation plan in which plan and elevation/section are juxtaposed in a general plan (Figure 10).[21] Specifically, topography of the site is represented in the form of plan, which Piper executed; other smaller architectural elements are visualized in the form of section/elevation entrusted to French theatre architect Jean Desprez.[22] Notably, different desires of visualization are hybridized within the drawing types. Projections, such as plan and elevation/section, as major drawing types of the representation include the beautifully coloured decorated topography and plants that generally take the form not significantly of projections but more of loose perspective view. Such projections are seemingly intended to generate depth in the flat two-dimensional (2D) projection drawings. Similarly, hybridization technique appeared in the late nineteenth-century architectural presentation drawing executed by Constant-Désiré Despradelle (1862–1912), a French-born architect and professor of Massachusetts Institute of Technology (MIT). In the representation (Figure 11), within the overall perspective view, elevation and section of architectural structures are integrated without disrupting the unity of the representation. As architectural historian Hyungmin Pai noted, 'The drawing is thus a collage of divergent modes of representation: of the pictorial and the orthogonal, of the ideally hypothetical and the immediately projective'.[23] Thus, although the aforementioned different drawing types have been established historically, the seemingly distinct and distinguishable drawing types have hybridized each other to a certain degree.

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[21] For more description of the drawing, see Erik de Jong, 'Landscapes of the Imagination', pp. 71–72; for Piper's landscape design, see John Dixon Hunt, *The Picturesque Garden in Europe*, New York: Thames & Hudson, 2002, pp. 142–148.

[22] Thorbjörn Andersson, 'From Paper to Park', in *Representing Landscape Architecture*, ed. Marc Treib, London and New York: Taylor & Francis, 2008, pp. 81, 95.

[23] Hyungmin Pai, *The Portfolio and the Diagram: Architecture, Discourse, and Modernity in America*, Cambridge, MA: The MIT Press, 2002, pp. 263–264.

9. Megan Esopenko, *Site plan and a perspective*.
   (Nadia Amoroso, ed. *Representing Landscapes: Digital*, p. 25.)

10. Fredrik Magnus Piper, *General plan for the park at Haga*, 1781.
   (http://www.sfv.se)

The principles of hybridization between drawing types can be understood through the 'double logic of remediation' argued by Jay David Bolter and Richard Grusin who are prominent scholars of media theory. In their book *Remediation: Understanding New Media*, Bolter and Grusin addressed two contradictory composite techniques, namely, immediacy and hypermediacy.[24] The former refers to a technique that intends 'to erase all traces of mediation' towards 'transparency [...] so that the user is no longer aware of confronting a medium'. In contrast, the latter requires 'to multiply its media' towards 'multiplicity [...] that] acknowledges multiple acts of representation and makes them visible'.[25] For example, according to them, historical linear perspective and recent virtual reality are considered as remediation techniques with a desire of immediacy, whereas the twentieth-century modernists' collage and recent websites, using different interfaces and are divided into several sections, are understood as media following the logic of hypermediacy.

The double logic can be used to understand the composite techniques of landscape architectural drawings. When different drawing types are hybridized with visible traces of assemblage, the representation follows the logic of hypermediacy. For example, Piper's and Despradelle's hybridization techniques demonstrates fundamentally the principle of hypermediacy. In Piper's presentation plan, all the different composite parts, which are the centred large plan, surrounding small elevation/sections of architectural structures, and the top-left side descriptive explanation are distinct and visible. In comparison, distinguishing the different drawing types in Despradelle's perspective view is slightly more difficult and, thus, the representation still follows the logic of hypermediacy by multiplying the drawing types and making them visible in the entire representation. Moreover, Corner has deployed the techniques of collage and montage construction frequently towards the desire of hypermediacy. For example, in Corner's *Windmill Topography* (Figure 12), 'the de-territorialized map is framed as an egg-like ellipse (the shape of both a turbine gear and a wine-shadow) and combined with a topographical section that depicts the mountain range, air-pressure and wind velocity charts'.[26] In producing the representation, Corner intended to make the traces of assemblage clearly visible to array 'the various shaping forces and conditions that undergird the genesis of this still evolving landscape'.[27]

In contrast, when different drawing types are hybridized without visible traces of assemblage, the representation follows the logic of immediacy. For example, Repton's technique achieves the desire of transparency by erasing the visible traces of assemblage of

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[24] Jay David Bolter and Richard Grusin, *Remediation: Understanding New Media*, Cambridge, MA and London: The MIT Press, 1999.
[25] *Ibid*., pp. 5, 23–24, 33–34.
[26] James Corner, 'The Agency of Mapping: Speculation, Critique and Invention', in *Mappings*, ed. Denis Cosgrove, London: Reaktion Books, 1999, pp. 247–249.
27 *Ibid*., p. 249.

11. Désiré Despradelle and Stephan Codman, *Composite view of grand auditorium building,* Phoebe
    Hearst Competition, University of California, Berkeley, 1899.
    (Hyungmin Pai, *The Portfolio and the Diagram*, p. 265.)
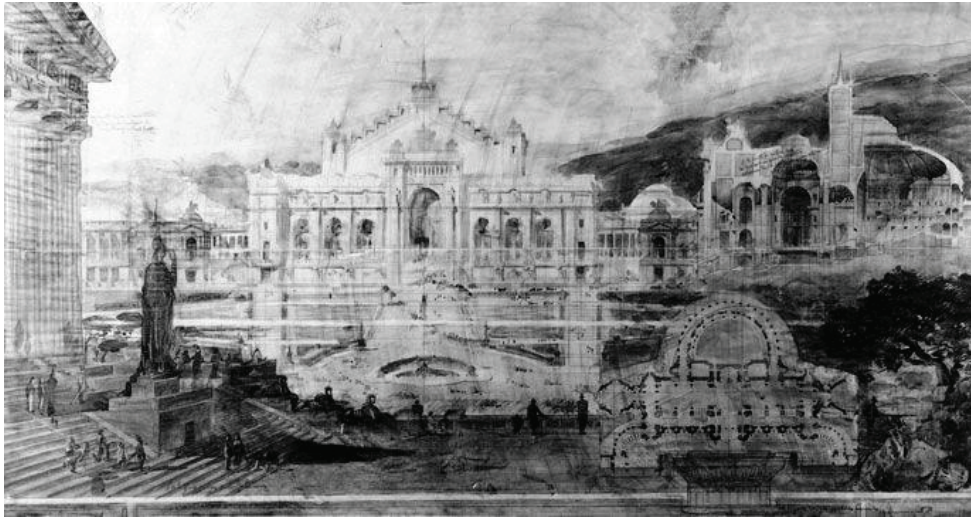
12. James Corner, *Windmill Topography*, 1996.
    (James Corner and Alex S. MacLean, *Taking Measures Across the American Landscape*, p. 83.)
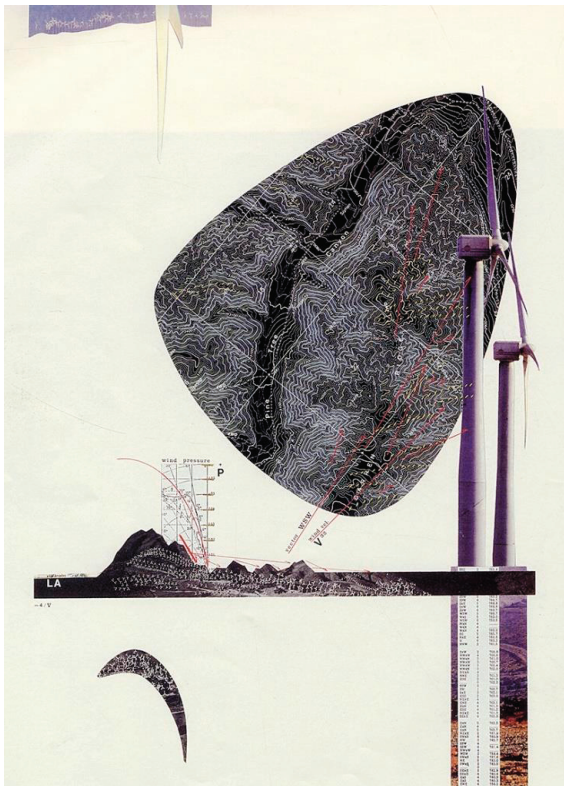
flaps that depict before/after views realistically. In McHarg's layer cake, the traces of overlay of maps that visualize different landscape elements are eliminated in the complete suitability map.

Consequently, although transparency of immediacy is involved in the technique of realistic depiction of landscape appearance and scientific visualization of landscape information (instrumentality of visualization), multiplicity of hypermediacy tends to be exploited to resist the instrumentality and *re-present* landscape in imaginative and creative ways (imagination of visualization). The double logic of hybridization will be discussed again in Chapter IV to understand critically the composite technique using photographs of recent digital landscape representation.

(3) Plant and topography

When different drawing types were hybridized, plants and topography were represented frequently as objects of pictorial depiction in the form of perspective view. For example, in Piper's aforementioned representation (Figure 10), architectural structures are visualized in the form of orthogonal projections plan and elevation/section; however, plants and topography are represented artistically in the form of loose perspective view to generate depth in the picture plane.

Among the main reasons for using such technique is probably that the perspective view, among different drawing types, has been a suitable type for landscape representation. As the term and perception of landscape were derived from landscape painting, the type was established as a dominant convention for landscape representation. Thus, English landscape gardens, which will be discussed in section 2.2.2, were visualized frequently in the form of perspective view.

The drawing type had been a suitable convention for the representation of plant as a composite part of landscape. As will be shown in section 2.2, the hybridization technique of orthogonal projection and artistic perspective view appeared already in the drawings for design of the seventeenth-century formal gardens. The loose perspective views of plants resisting the principle of projection, as shown in Piper's drawing, are represented beautifully within the orthogonal plan. In other words, plants are represented in the observable form of human eye within the plan that visualized from above.

To a certain degree, another possible reason for using the technique was that the established visualization technique for orthogonal projection of plants had not yet appeared. The technique, which projects precise orthogonal appearance of plants from the air as a top view of the plants, probably first appeared in the nineteenth-century landscape architectural drawings, and then spread in the twentieth century (Figures 13, 16). Thus, before the emergence of the technique, plants were represented artistically as objects of visual pleasure. Compared with architectural structures, this process was fairly immune from the strict reductive principle of projection.

Moreover, the pictorial representation of plants functioned to decorate elaborately the flat picture plane of projection drawings. Historically, thus, such beautiful landscape architectural drawings, which are collected by clients or the public, have been appreciated as an autonomous work of art. The beautiful appearance of plants in such drawings was represented artistically and elaborately in the observable form of perspective view.

The hybridization technique, namely, double projection, which represents 'a view of objects such as architecture, trees, and other plants on the flat map-like topography of the

13. Gustav Meyer, *Hypothetical plan of ancient Roman garden*, 1860.
(Matteo Vercelloni, Virgilio Vercelloni and Paola Gallo, *Inventing the Garden*, p. 151.)
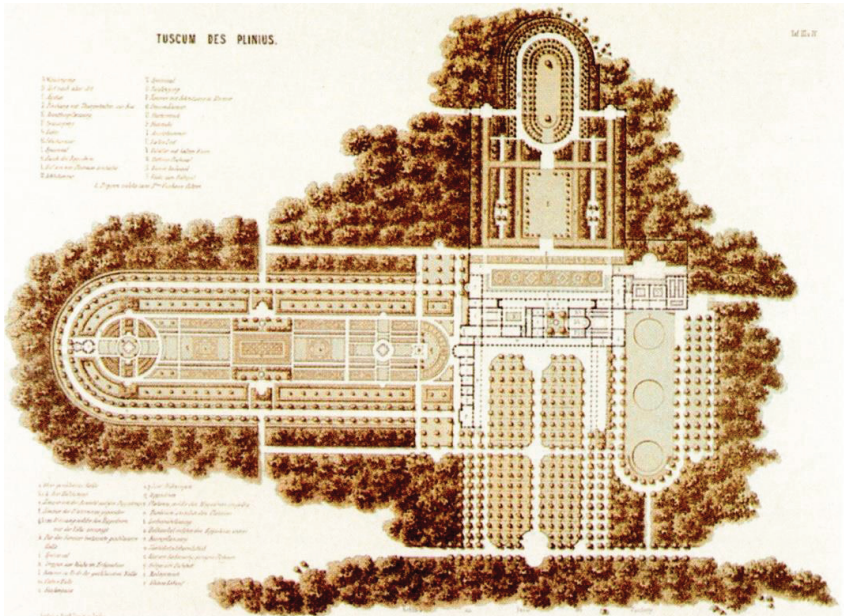
14. Ippolito Rosellini, Egyptian Garden, copy of fresco from tomb, plate LXIX from Monuments of
Egypt and Nubia, 1832. (https://artdone.wordpress.com/2016/08/02/gardens-of-the-world/)
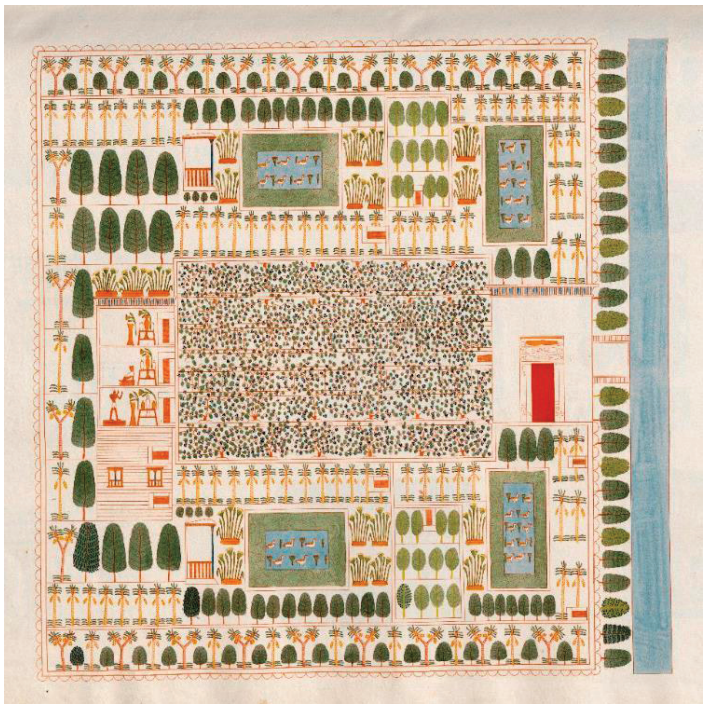
landscape', is called 'planometric'.[28] According to Corner, the origin of the technique can be traced back to an ancient Egyptians' method (Figure 14) in which 'the vertical elements of a building or garden are "laid down", as in elevation, over the plan'.[29] As Corner noted, the planometric is 'more peculiar to landscape and garden'.[30] Corner explained:

> This "double" projection embodies both the map-like topography of landscape terrain, as seen from above, and the frontal, or elevational, composition as seen by the standing subject, and it demonstrates to the gardener the layout and distribution of the various plant forms as well as the relationships between the parts. Unlike buildings, which are raised volumetrically as floors, walls and roofs, the constructing of a landscape is much akin to the workings of the planometric, emphasizing both the ground plane and the frontal identities simultaneously.[31]

In addition, German landscape architect and scholar Elke Mertens discussed the planometric technique in exploring historical landscape architectural visualizations. According to Mertens, the technique makes it possible to 'provide information about the tress which would not be possible in a top view, such as their species […] and their different sizes [… it] conveys a lucid and precise impression of the garden'.[32]

The difference between actual construction of architectural structure and landscape is found in not only representations using planometric but also sectional drawings. Although section drawing in architecture tends to display the vertical structures and their relationships, that in landscape architecture generally draws surface outlines of topography and illustrates plants and activities over the topography (Figure 15).

By the twentieth century, drawing types were standardized; thereby, appearances of plants also began to be reduced to formal signs or symbols (Figure 16). As shown in Figure 16, in the drawings of American modernists, plants were no longer represented artistically in the forms of perspective view or frontal identities, but, rather, in the similar way of visualizing architectural structure, namely, reduced to the forms of flat symbols of circle.[33] At present, advanced digital software, particularly computer-aided design (CAD)

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[28] Erik de Jong, 'Landscapes of the Imagination', p. 22; James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', pp. 253, 255.
[29] James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', p. 253.
[30] *Ibid*., p. 253.
[31] *Ibid*., pp. 253, 255.
[32] Elke Mertens, *Visualizing Landscape Architecture*, Basel: Birkhäuser, 2010, pp. 10–11.
[33] Indeed, French modernists, including Paul Vera, still used the planometric technique to visualize their designed landscape.

15. James Corner and Stan Allen, *Section-elevations, Emergent Ecologies*, Downsview Park
    International Design Competition, 1999. (Julia Czerniak, ed. *CASE: Downsview Park Toronto*, p. 65.)
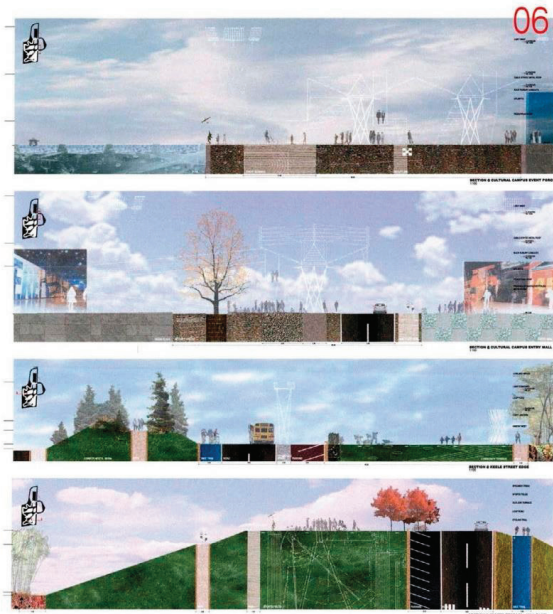
16. Garrett Eckbo, *Plan for Contempoville*, 1938.
    (Marc Treib and Dorothée Imbert, *Garrett Eckbo: Modern Landscapes for Living*, p. 37.)
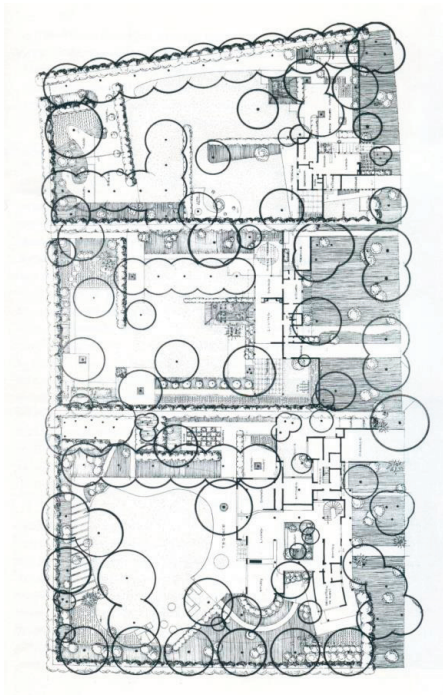
ones, which is used generally in producing projection drawings, provides such various symbols of plants.

However, planometric often reappears in recent landscape architectural visualization to explore innovative representational techniques. For example, Anuradha Mathur, a prominent landscape architect of visualization, produces creative images (Figure 17) to 'try to embody as much of the symbolic ideas and intentions as it does the instrumental'.[34]

Topography has also been a major object of landscape representation. As shown in Figure 10, undulations of terrain could be represented through shading technique to generate depth in flat picture plane of drawings. When contour line emerged, landscape architects could achieve a precise visualizing height of topography. In the mid-nineteenth-century France, the new convention, which visualizes lines that do not exist in reality, began to be used widely in producing drawings of built environments (Figure 18).[35] Before the emergence of the technique, sectional drawings had been used to convey instructions for construction of topography, and such instructions were often hybridized in another drawing type. For example, a study drawing for a park at Claremont by William Kent took the form of loose perspective view in which lines for alteration of complex undulating terrain were drawn in the same way as those of sectional drawing (Figure 19).[36]

17. Anu Mathur, *Ecological Garden*, 1990.
(James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', p. 273.)
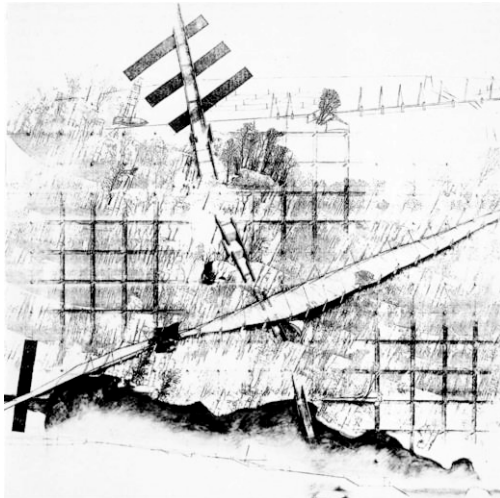
[34] James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', p. 273.
[35] Laurie Olin, 'Drawing at Work: Working Drawings, Construction Documents', in *Representing Landscape Architecture*, pp. 146, 148.
[36] *Ibid*., p. 144.

18. Adolphe Alphand, *Plan of Parc des Buttes Chaumont*, 1867–1873.
    (https://commons.wikimedia.org/wiki/File:Alphand_Buttes_Chaumont_Courbes_de_niveau.jpg)

19. William Kent, *Sketch for landscape adjustments, Claremont, Surrey, England*, c. 1746.
    (Laurie Olin, 'Drawing at Work: Working Drawings, Construction Documents', p. 145.)

2.2. Manual Drawings in History

2.2.1. Projection: The Italian Renaissance and French Formal Gardens

Landscape architectural drawing has a long history, dating back to the Italian Renaissance garden in the sixteenth century, in which projections requiring precision of spatial measurement were used. Among the surviving earliest garden drawings is the detail plan for the garden at *Medici Villa, Castello* near Florence (Figure 20). The drawing for the garden design is attributed to Niccolò Pericoli (1500–1550), who was also called Il Tribolo, from 1520 to 1536. Pericoli was a prominent Italian sculptor and painter in the Renaissance era.[37]

The orthogonal projection visualizes formal order and symmetry of the garden, which embodies Albertian principle that was generally adopted for the design of Italian Renaissance garden. The plan for the Medici Villa's garden draws precise outlines of the site, firmly dividing it into formal spatial units; following the delineated lines, the site is expected to be constructed. The garden was illustrated in one of the famous lunettes of the Medici gardens near Florence executed by Flemish painter Giusto Utens in about 1599 (–1609) (Figure 21). This painting demonstrates the typical design principles and aesthetic characteristics of the Italian Renaissance gardens. At both sides of the centre longitudinal axis of the picture plane are symmetrically separated gardens; the gardens took the form of a terrace laid out on the slope of the site; alley and paths are designed in a grid; in the intersections or along them, garden structures, such as fountains, pergolas, sculptures, are arranged.[38] Thus, in conceiving and constructing the order and symmetry of the formal gardens, projection was a suitable type of drawing.[39]

Giorgio Vasari (1511–1574), a prominent Italian art historian, painter, and architect in the Renaissance era, elaborated his experience of the garden at *Castello* in his *Lives of the Most Eminent Painters, Sculptors & Architects*. Vasari stated:

> In the middle of this garden is a forest of very tall and thickly planted cypresses, laurels, and myrtles, which, laid out in a circular shape, have the form of a labyrinth, all surrounded by box-hedges two braccia and half in height [1.4575 m;

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[37] For more evidence of this assumption and other scholars' views, see Raffaella Fabiani Giannetto, *Medici Gardens: From Making to Design*, Philadelphia: University of Pennsylvania Press, 2008, pp. 257–258.

[38] For a general description of the garden, see D. R. Edward Wright, 'Some Medici Gardens of the Florentine Renaissance: An Essay in Post-Aesthetic Interpretation', in *The Italian Garden: Art, Design and Culture*, ed. John Dixon Hunt, Cambridge: Cambridge University Press, 1996, pp. 34–59.

[39] Moreover, drawings were used to satisfy the demands of the Medici family, their patrons, by displaying them. Raffaella Fabiani Giannetto, *Medici Gardens: From Making to Design*, p. 150.

20. Tribolo (attributed), *Drawing of a Garden Detail at Castello*, c. 1520–1536.
    (Raffaella Fabiani Giannetto, *Medici Gardens: From Making to Design*, p. 151.)
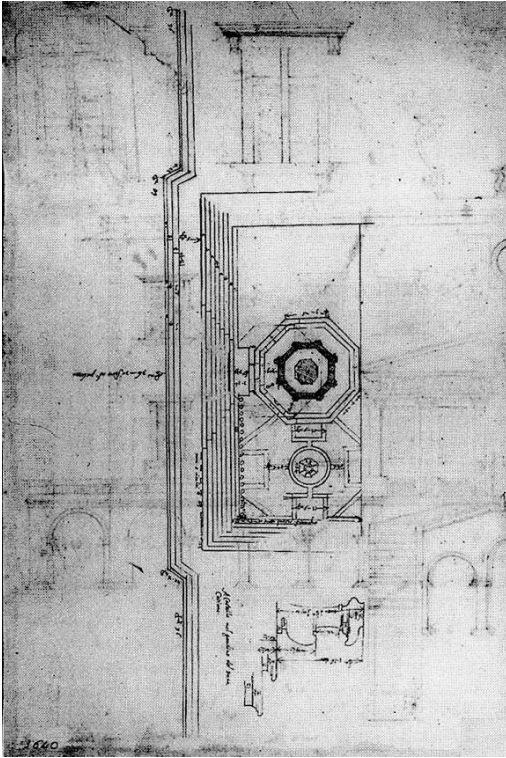
21. Giusto Utens, *Villa Medicea di Castello*, 1599.
    (Accademia Della Crusca, http://www.accademiadellacrusca.it/en/pagina-d-entrata)
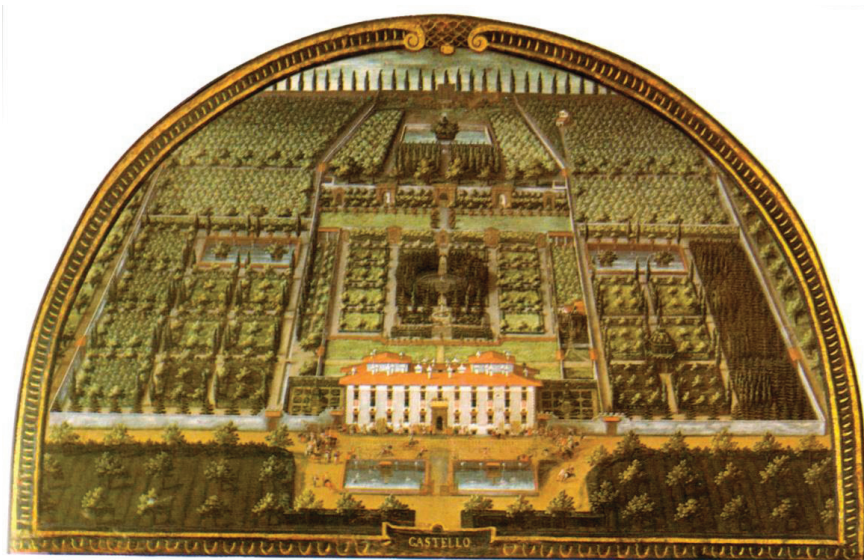
1 braccio equals 0.583 m], so even and grown with such beautiful order that they have the appearance of a painting done with the brush.[40]

According to Raffaella Fabiani Giannetto, a historian of Medici gardens, Vasari's description above indicates that 'gardens are compared for the first time to a product of artistic craftsmanship—painting in this case—which results from a number of sequential operations, such as drawing and the application of pigments'.[41] Moreover, the emergence of drawings for garden design implies that the perception of garden is in transition, as 'garden is no longer considered a microcosm reflecting the beauty of the entire universe created by God; rather, the perfection of the labyrinth reveals the presence of man as the artificer, whose skills allow him to manipulate nature according to his own wishes […, and] drawings allow the artificer to exercise a greater control over his work and thus better reveal his virtuosity for the appreciation of the beholder'.[42]

The drawing conventions of projection were also used frequently in designing the seventeenth-century French formal gardens. For example, a beautiful elaborate presentation plan of the gardens of the *Grand Trianon* at *Versailles*, which is attributed to André Le Nôtre (1613–1700) in 1694 upon the request of Swedish architect Nicodemus Tessin (1654–1728), epitomizes the design principle and aesthetics of a French formal garden (Figure 22).[43] The plan depicts elaborately the *Trianon* and its gardens, which are oriented towards *Versailles*. The plan's design principles are formal in style and similar to those of *Versailles*. The centre axis divides the entire site into formal gardens in which the outlines of the elements of gardens, including vegetation, fountains, parterres, and paths and alleys, are arranged symmetrically so that the perfect visual order of the site is accentuated.[44] The

[40] Giorgio Vasari, 'Niccolò, Called Tribolo', in *Lives of the Most Eminent Painters, Sculptors & Architects: Volume VII, Tribolo to Il Sodoma*, trans. Gaston du C. De Vere, London: Philip Lee Warner, Publisher to the Medici Society, 1914, p. 17.

[41] Raffaella Fabiani Giannetto, *Medici Gardens: From Making to Design*, p. 148.

[42] *Ibid*., p. 149. A verbal description was used to communicate with the clients or patrons to whom designers wrote letter to explain their vision of the garden and its details, including the structure of the garden and distribution of plants. In other words, before the emergence of the diagram, such texts had been used to describe the design strategy. *Ibid*., pp. 147–148, 150–152.

[43] The plan is attributed to Le Nôtre or his young nephew and follower, Claude Desgots (c. 1658–1732). Although Erik de Jong and Christian Bertram argued that the plan is attributed to Le Nôtre, F. Hamilton Hazlehurst noted that the drawing is similar to the style of Desgots. Nevertheless, the drawing reveals the design principles of French formal gardens, including the gardens of *Trianon* designed by Le Nôtre. For more evidences of these assumptions, see Erik de Jong, Michel Lafaille and Christian Bertram, *Landscapes of the Imagination: Designing the European Tradition of Garden and Landscape Architecture 1600–2000*, p. 50; F. Hamilton Hazlehurst, *Gardens of Illusion: The Genius of André Le Nostre*, Nashville: Vanderbilt University Press, 1980, pp. 158, 166. For more description of the drawings of Le Nôtre, see the Appendix, *Ibid*., pp. 375–394.

[44] For the realization of the geometrical principles of the formal gardens, technology of the period, including measuring and levelling devices, play an important role. For a description of the

22. André Le Nôtre, *Plan of the Grand Trianon and Description of the gardens of the Grand Trianon*, 1694. (http://collection.nationalmuseum.se)
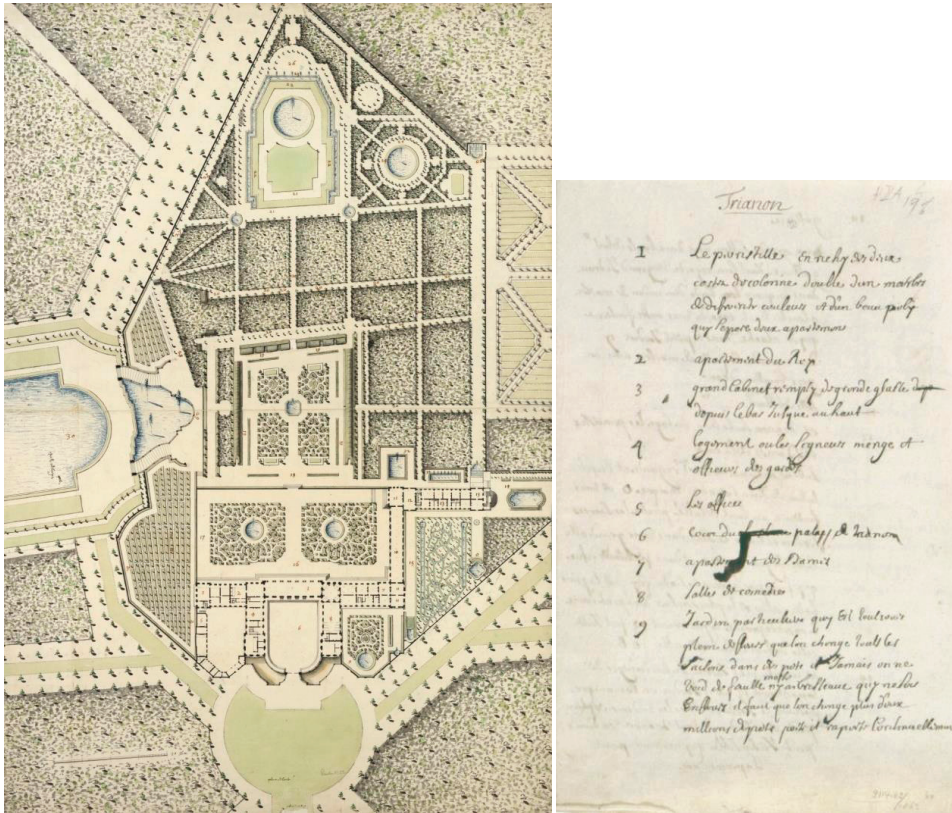
beautiful plan was accompanied by a descriptive explanation of the garden written by Le Nôtre to be sent to Tessin. Erik de Jong and Christian Bertram described the great precision embodied in the geometrical plan and the description as:

> The order that we see in the drawing, the attention paid to the very precise reproduction of architectural lines and spaces, the indication of water, vegetation, the planting of avenues (with shadow), the details of parterres, fountains and pergolas, with everything precisely arranged, numbered and explained in detail in the notes, all point to the concept of order and perfection which defined Le Nôtre's

fundamental attitude to his work.[45]

The garden plans executed by Le Nôtre and his supporters were often collected by their contemporaries, including Tessin, whose collection in Stockholm still contains French original designs, such as the plan and the other works of art. Thus, the above plan has been considered as a first and foremost example, revealing that landscape architectural drawings were appreciated as an autonomous works of art.[46]

Similarly, the plan of *Vaux-le-Vicomte* executed by Le Nôtre, which preceded the gardens of *Trianon* and has been acknowledged as the great masterpiece that embodies his early design principle, epitomizes the geometrical order and symmetry of French formal gardens (Figure 23). According to F. Hamilton Hazlehurst, a prominent historian of Le Nôtre's gardens, 'an aerial view of the site as it appears today confirms the accuracy of the drawing'.[47] Hazlehurst stated that Le Nôtre must have drawn elevation/section drawings for his formal gardens to be precisely constructed; however, many of them must have discarded or deteriorated during the construction of the gardens.[48] In other words, the projection drawing types, such as plan and elevation/section, were suitable to design and precisely visualize the geometrical orders of French formal gardens. As a scholar of landscape architecture, Marc Treib remarked: 'Other gardens, such as *Vaux le Vicomte*, are well served by their presentation plans. In them we sense the presence of geometry in both the drawing and on the ground; the plan embodies the idea of the garden and the garden is a drawing rendered large and volumetric'.[49]

Notably, the aforementioned hybridization of drawing types is found in the Le Nôtre's presentation drawings. Within the plan, which is one of projection drawing types, the plants with their shadows are visualized beautifully and decoratively in the form of loose perspective view or isometric; the drawing is performed with the planometric technique. In the picture plane of the drawing, the elements of the garden, including plants

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[45] Erik de Jong, Michel Lafaille and Christian Bertram, *Landscapes of the Imagination: Designing the European Tradition of Garden and Landscape Architecture 1600–2000*, p. 50. For more description of the garden design of the *Trianon*, see F. Hamilton Hazlehurst, *Gardens of Illusion: The Genius of André Le Nostre*, pp. 153–166.

[46] Erik de Jong, Michel Lafaille and Christian Bertram, *Landscapes of the Imagination: Designing the European Tradition of Garden and Landscape Architecture 1600–2000*, p. 50. Tessin was interested considerably in the French formal gardens, which he introduced into his country, Sweden. In 1687, before he asked the plan of the *Trianon*, he had already visited the *Versailles* several times. Among which, Le Nôtre accompanied him twice. For a description of the visits in 1687, see Thomas Hedin, 'Tessin in the Gardens of Versailles in 1687', *Konsthistorisk tidskrift/Journal of Art History* 71(1–2), 2003, pp. 47–60.

[47] F. Hamilton Hazlehurst, *Gardens of Illusion: The Genius of André Le Nostre*, p. 19.

[48] *Ibid*., p. 377.

[49] Marc Treib, 'On Plans', in *Representing Landscape Archite*cture, p. 114.

23. André Le Nôtre, *Plan of Vaux-le-Vicomte,* 1660.
    (Bibliothèque de l'Institut de France, http://www.bibliotheque-institutdefrance.fr/)
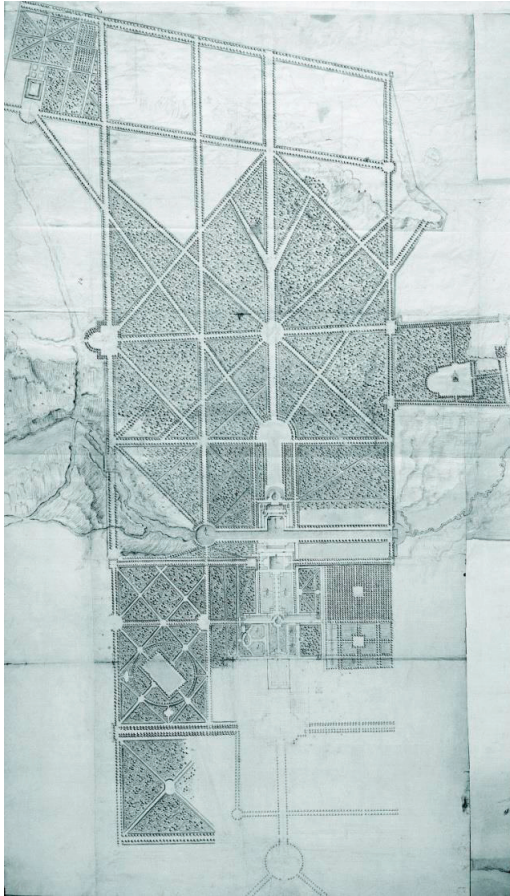
24. André Le Nôtre, *Detail of Plan of Vaux-le-Vicomte*, 1660.
    (F. Hamilton Hazlehurst, *Gardens of Illusion The Genius of André Le Nôtre*, p. 391.)
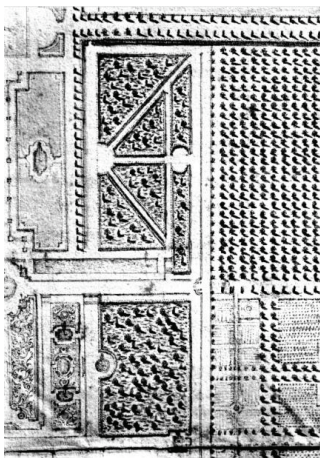
and structures, are represented within eye level, although the ground is visualized from the above. Allen S. Weiss, a scholar of the seventeenth-century French formal gardens, considered the composite technique of two viewpoints in Le Nôtre's plans as the baroque instability in the neoclassic proportion and perfection; in other words, the technique embodies an anamorphic distortion by inserting the perspective views in the orthogonal projection.[50] As Weiss described:

> The very conception of the formal garden rests upon the ambiguity between baroque and neoclassic modalities of spatiality. Consider the fact that André Le Nôtre drew the plans for his gardens in mixed perspective, combining in the same drawings both ground plan *and* perspectival projection. The topography of the landscape corresponds to the ground plan, while objects (such as building and trees, accentuated by shadows) are drawn in isometric relief, also known as 'parallel perspective', that is, a projection in which all parallel lines remain parallel, a representation without vanishing point and without horizon. Thus there is an apparent conflation of two- and three-dimensionality in the same representation.[51]

Although Weiss considered the hybridization technique by Le Nôtre as the baroque effect in terms of metaphysics, the double projection from a practical perspective, as Corner noted, reveals the characteristic of construction of landscape that emphasizes 'both the ground plane and the frontal identities simultaneously'.[52] For example, as shown in the detail of the plan of *Vaux-le-Vicomte* (Figure 24), the frontal appearances of the trees in rows, which are planted along the outlines of the paths or arranged in geometrically regular order, evoke a visual experience as if viewers, standing in front of the garden, enjoy the scenery within eye level. Moreover, the trees and their shadows, represented as if they are copied accurately, create illusions of invisible lines, which arouse or associate the acts of planting of trees in rows on the actual site. Thus, the composite technique enables the drawing to carry not only factual information of the garden in an instrumental way but also various visual experiences that would not be possible in the orthogonal plan in an imaginative way. Within one picture plane, plan and perspective view are hybridized following the logic of hypermediacy, although the traces of assemblage are not obviously visible.

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[50] Allen S. Weiss, 'Dematerialization and Iconoclasm: Baroque Azure', in *Unnatural Horizons: Paradox & Contradiction in Landscape Architecture*, ed. Allen S. Weiss, New York: Princeton Architectural Press, 1998, pp. 44–63; Allen S. Weiss, *Mirrors of Infinity: The French Formal Garden and 17th-Century Metaphysics*, New York: Princeton Architectural Press, 1995, pp. 32–51.
[51] Allen S. Weiss, 'Dematerialization and Iconoclasm: Baroque Azure', pp. 48–49.
[52] James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', p. 255.

2.2.2. Pictorial Representation: The English Landscape Gardens

In eighteenth-century England, the loose perspective view began to emerge in the conception and design of English landscape gardens, which reflect picturesque aesthetic as if the garden imitates a landscape painting.[53] Indeed, the perspective view had been used frequently in the seventeenth century, when the bird's-eye view was in fashion, to delineate French formal gardens.[54] However, the main viewpoint of such representations was changed from the air to the eye level, reflecting new attitudes towards the natural worlds, that is, designs on the ground.[55] In the perspective view of the eighteenth-century English landscape gardens, the principles of the linear perspective were ignored frequently, and the appearance and atmosphere of the new style of garden were more represented freely.

Such technique of representation was closely related to the forms of the garden. Although the French formal gardens had generally been designed using visual orders following the principle of linear perspective, the landscape gardens adopted the serpentine line as the major design principle, which made analogy to nature.[56] The visitors were guided to walk, following the free curves of the paths in the gardens, thereby experiencing the sequences of the picture-like gardens, which continuously hide and redisplay various elements of structures and plants. The picture-like gardens often literally borrowed the design principle from the fine arts, including the seventeenth-century historical landscape paintings. For example, the *Stourhead*, which has been acknowledged as the great masterpiece, creates the similar view of French painter Claude Lorrain's (1600–1682) *Landscape with Aeneas at Delos* of 1672. Thus, the loose perspective view with eye level was a suitable drawing convention to visualize the new garden style that imitates the principles of landscape painting.

The drawing executed by William Kent (1685–1748) for the design of the park at

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[53] Historically, perspective had been regarded as a drawing type that was inferior to projection drawings until the seventeenth century. Although the former was considered as an illusionary drawing that conveys expression, the latter was regarded as an ontological drawing that represents ideas. On this topic, see James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', p. 255; Alberto Pérez-Gómez, 'Architecture as Drawing', *Journal of Architectural Education* 36(2), 1982, pp. 2–7.

[54] For more description of visualization technique including bird's-eye view and the panoramic in cartography from the Renaissance period to the nineteenth century, see Lucia Nuti, 'Mapping Places: Chorography and Vision in the Renaissance', in *Mappings*, pp. 90–108.

[55] John Dixon Hunt, *Greater Perfections: The Practice of Garden Theory*, Philadelphia: University of Pennsylvania Press, 2000, p. 42. This change of viewpoint is found in the paintings of contemporary artists. John Dixon Hunt, *The Figure in the Landscape: Poetry, Painting, and Gardening during the Eighteenth Century*, Baltimore and London: The Johns Hopkins University Press, 1989, pp. 201–204.

[56] For the description of aesthetic characteristics of serpentine line in the eighteenth century, see William Hogarth, *The Analysis of Beauty*, ed. Ronald Paulson, New Haven and London: Yale University Press, 1997.

25. William Kent, *Proposal for landscape with lake and cascade house at Claremont*, 1729–1738. (John Harris, 'Garden Buildings', p. 397.)

26. Lancelot Brown, *Design for the lakes and northern extension of the park at Wimpole*, *Cambridgeshire*, 1767. (http://www.nationaltrustimages.org.uk/image/781546)
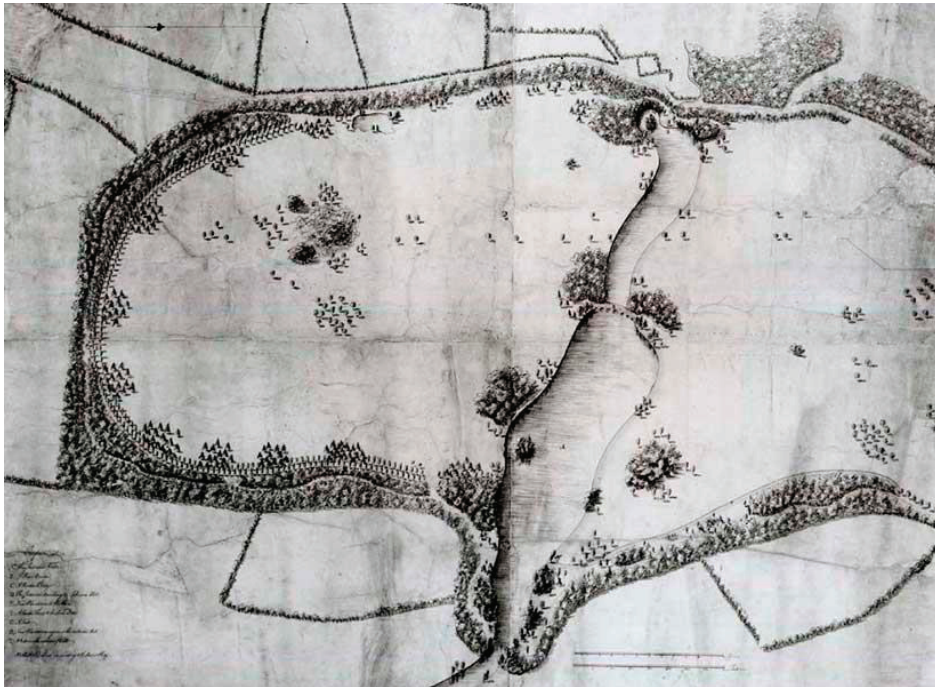
Claremont from 1729 to 1738 epitomizes the picturesque conventions (Figure 25). The sketch represents the landscape with a lake and a cascade house in the form of loose eye-level perspective view. Kent was not only a landscape but also a stage designer, architect, and painter. He was proficient in various drawing types, including projections and pictorial depiction. Interestingly, in designing landscape, he mainly used perspective view among drawing types; such view is similar to that of landscape painting. The construction of the drawing derives from that of the seventeenth-century historical landscape paintings, which generally consist of foreground, middle-distance, and background. John Dixon Hunt, a prominent historian of landscape architecture, noted that in Kent's drawings, human figures are represented frequently as actors and spectators, and landscapes are expressed as theatres.[57] As shown in Figure 25, the human figures are generally placed in the foreground and scenery or main structures are represented in the middle and background of the picture plane. Thus, this construction reflects his carrier as a stage designer; as de Jong and Bertram stated, the structure of the drawing functions as 'a three-dimensional translation of stage wings'.[58] Additionally, the construction similar to that of landscape painting still appears in recent digital landscape representation, which will be discussed in Chapter IV.

In the representation as if it was underdrawings for a landscape painting, Kent uses the hybridization technique of drawing types. Specifically, within the loose perspective view (i.e. imagination of visualization), the architectural structure is depicted in the form of elevation, an orthogonal projection (i.e. instrumentality of visualization), although the elevation seems not to have drawn based on precise spatial measurement. In other words, Kent hybridized the two drawing types, the overall view and the small elevation following the logic of hypermediacy, although traces of assemblage are almost invisible.

The reason that Kent mainly used the loose perspective view is probably that it is difficult to visualize the dramatically curved and winding topography of the landscape garden in projection drawings. In other words, for the visualization of English landscape garden that imitates landscape painting, the form of the perspective view that the painting takes is more suitable than the projection drawing such as plan and elevation/section.

The plan as a type of projections had been used to delineate synoptic vision of the landscape garden. For example, Lancelot 'Capability' Brown (1716–1783), whose byname was based on his often remark to clients that their pieces of land had potential qualities (capability), executed a presentation plan for the improvement of English meadow landscape in Wimpole Hall, Cambridgeshire in 1767 (Figure 26). The plan also shows the composite technique of the planometric; within the overall site plan, the frontal identities of

[57] John Dixon Hunt, *Gardens and the Picturesque: Studies in the History of Landscape Architecture*, Cambridge, MA: MIT Press, 1992, p. 42.
[58] Erik de Jong, Michel Lafaille and Christian Bertram, *Landscapes of the Imagination: Designing the European Tradition of Garden and Landscape Architecture 1600–2000*, p. 66.

landscape elements, such as plants and bridge with shadows, are hybridized. Thereby, the representation conveys information on way of planting and their visual characteristics, including species and sizes. The group planting, as if they are natural, contrasts sharply with the orderly planting of the French formal gardens as shown in the drawings by Le Nôtre.[59]

A number of scholars have viewed the picturesque principles of English landscape gardens with scepticism, as the style following the construction of landscape painting tends to reduce the multisensory landscape into static pictorialized object.[60] However, the gardens were not completely appreciated compared with static landscape painting in certain fixed viewpoints, as the latter provides multisensory experiences with movement in an actual garden. The contemporary advocators of English landscape gardens fully understood the difference between paintings and the picture-like gardens. For example, Christian Cay Lorenz Hirschfeld (1742–1792), who was a prominent scholar of English landscape garden and introduced the style into his country Germany, argued that the landscape garden surpassed all other art including painting. He accounted for such superiority in his seminal book *Theory of Garden Art* published in 1779–1785; 'Painting is restricted to the mere illusion of movement […] a well-designed garden is like a medley of the pictorial arts […] Garden art touches all the senses'.[61]

The experience with movement of the landscape garden was evident in the representation of the gardens, the contemporary cartography. For example, an engraving of the plan of *Chiswick*, Middlesex, executed by a cartographer John Rocque (c. 1709–1762) in 1736, includes the sequence of several illustrations that represent a motion experience of the garden (Figure 27). Giuliana Bruno, a scholar of visual arts, described such format of the eighteenth-century maps with illustrations as 'mobile mappings: views in flux', and the visualization technique of picturesque gardens is similar to that of filmmaking.[62]

Among the most notable landscape architects who greatly facilitated the potential

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[59] *Ibid*., p. 68.

[60] Gina Crandell, *Nature Pictorialized: 'The View' in Landscape History*, Baltimore and London: The Johns Hopkins University Press, 1993; Kyungjin Zoh, *Reinventing Gardens: A Study in Garden Theory*, Unpublished Ph.D. Dissertation, University of Pennsylvania, 1994; Julia Czerniak, 'Challenging the Pictorial: Recent Landscape Practice', *Assemblage* 34, 1998, pp. 110–120.

[61] Linda Parshall, 'Motion and Emotion in C. C. L. Hirschfeld's Theory of Garden Art', in *Landscape Design and the Experience of Motion*, ed. Michel Conan, Washington, D.C.: Dumbarton Oaks Research Library and Collection, 2003, p. 46. For more description of the comparison of garden art with other genres of arts, see Linda Parshall, 'Introduction', in *Theory of Garden Art*, ed. and trans. Linda Parshall, Philadelphia: University of Pennsylvania Press, 2001, pp. 1–54. For a Korean-language study of the theory of garden art by Hirschfeld, see Kyungjin Zoh, '*히르시펠트 정원예술론의 의미와 가치의 현대적 해석* [Interpretation of C.C.L. Hirschfeld's Theory of Garden Art in Contemporary Meaning and its Significance]', *한국전통조경학회지* [*Journal of Korean Institute of Traditional Landscape Architecture*] 32(3), pp. 58–68.

[62] Giuliana Bruno, *Atlas of Emotion: Journeys in Art, Architecture, and Film*, New York: Verso, 2002, pp. 180, 194.

27. John Rocque, *Engraved plan and views of Chiswick, Middlesex*, 1736.
   (http://gallica.bnf.fr/ark:/12148/btv1b59732911)
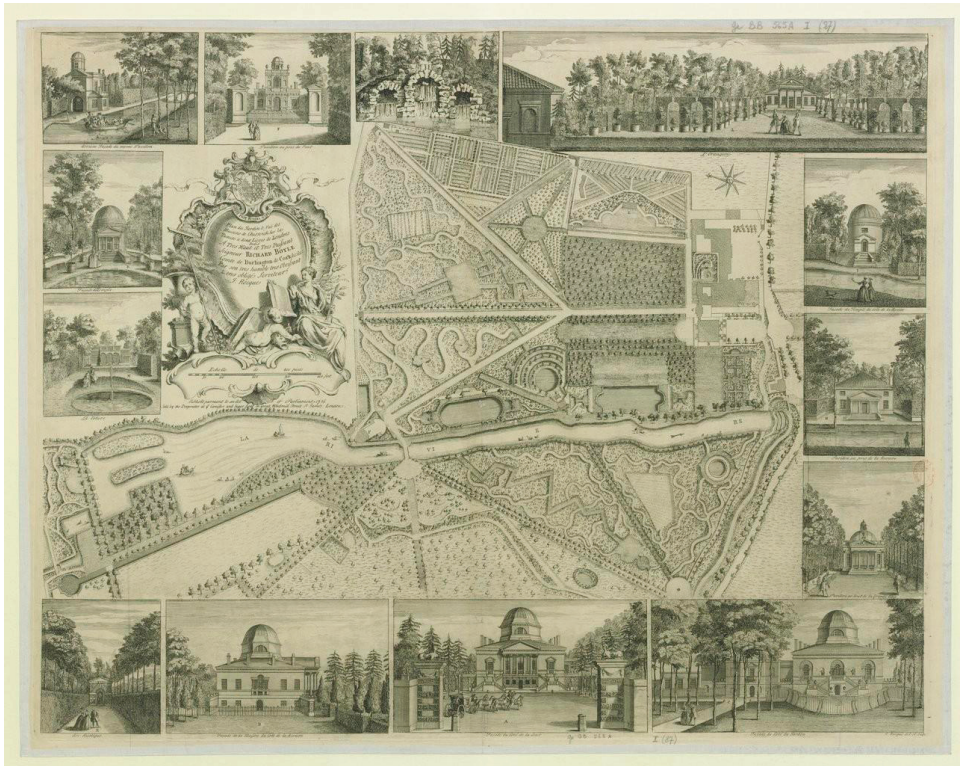
28. Humphry Repton, *Sketches for Attingham in Shropshire*, 1798.
   (André Rogger, *Landscapes of Taste: The Art of Humphry Repton's Red Books*, p. 162.)
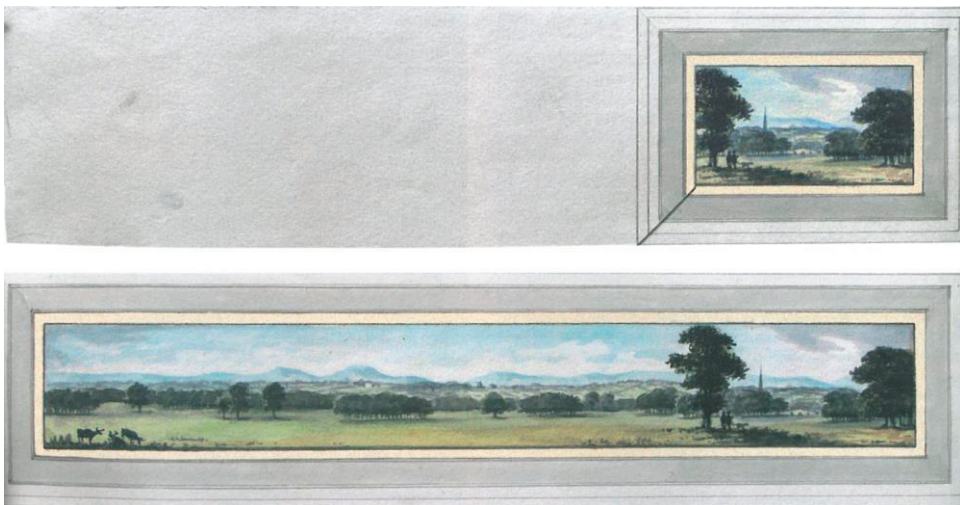
of visual representation, including moving images in landscape design, was Humphry Repton. First, he used visual representations frequently to persuade his clients, particular in his well-known Red Books, which included such elaborate sketches and descriptions of his proposal of improvement. In the Red Books, he invented a unique technique to display his sketches in sequence, which covers improved view (i.e. after view) with the illustration of existing landscape (i.e. before view) represented on the flap. The composite technique of representations of different times was conducted following the logic of immediacy, which hides the existence of the traces of the assemblage, the flap. Thereby, viewers are guided to appreciate the before and after views as individual complete scenes without any visible disturbance. Unlike Kent and Brown, he attempted to adopt the principle of perspective as a scientific visualization method.[63]

Another visualization technique of Repton reveals that visual experience of the actual landscape differs from that of visual representation. For example, in the Red Book for Attingham in Shropshire in 1798, he described Claude Lorrain's painting, *Landscape with Psyche Saved from Drowning* in 1666, which had been collected in his client at the time, and included it in his sketch that similarly represented the painting of Lorrain (Figure 28). His entire sketch takes the form of panorama, three fourths of which is covered with the flap; thereby, it is appreciated as if it were a painting similar to that of Lorrain within the constricted frame, illustrating the view from his client's breakfast room and seen from the window. Rogger, a prominent scholar of the Red Books, noted that Repton attempted to demonstrate that 'why and in what manner the spheres of art and nature separate and should remain so'.[64] In other words, although the landscape painting is appreciated within the rectangular small frame, landscape is experienced through wide human visual field similar to the format of the panorama.

Moreover, Repton used the potential of moving images frequently to visualize the experience of actual landscape. For example, he displayed the several illustrations that represent visual experience with movement as a sequence, which is similar to the technique of the aforementioned map by Rocque to a certain degree. As Rogger stated, the presentation technique resembles 'characteristics of cinematography' in such a way that the elaborate illustrations function to 'stills' that constructs a film of the visit of the garden.[65] Specifically, the views that represent the properties at a distance serve as the established shot of the film, and the specific views that illustrate the gardens at a close distance functions as the full, medium, and close up shots.

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[63] André Rogger, *Landscapes of Taste: The Art of Humphry Repton's Red Books*, pp. 111–113.

[64] *Ibid*., pp. 161–163.

[65] *Ibid*., p. 82. For a Korean-language study of Repton's visualization, see Myeongjun Lee and Jeonghan Pae, Myeongjun Lee and Jeonghan Pae, '18–19세기 정원 예술에서 현대적 시각성의 등장과 반영: 픽처레스크 미학과 험프리 렙턴의 시각 매체를 중심으로 [Modern Vision in the 18–19th Century Garden Arts: The Picturesque Aesthetics and Humphry Repton's Visual Representation]', 한국조경학회지 [*Journal of the Korean Institute of Landscape Architecture*] 43(2), 2015, pp. 30–39..

Although Repton generally used the format of vivid perspective views for communication with his clients, for scientific terrain study of the sites, he often used the sectional drawings (Figure 29). In Repton's drawingson, it is hard to find the hybridization technique: sketches for Red Books accentuated the realistic depiction so as to merely demonstrate visual appearances of the existing and potential gardens; in his plans, plants were often visualized in the format of top view, which is unlike those of Kent and Brown that used the double projection. Thus, Repton intended to achieve the desire of transparency of visualization.

29. Humphry Repton, *Sections of a garden near Oporto*, 1816.
   (https://archive.org/details/mobot31753002820014)
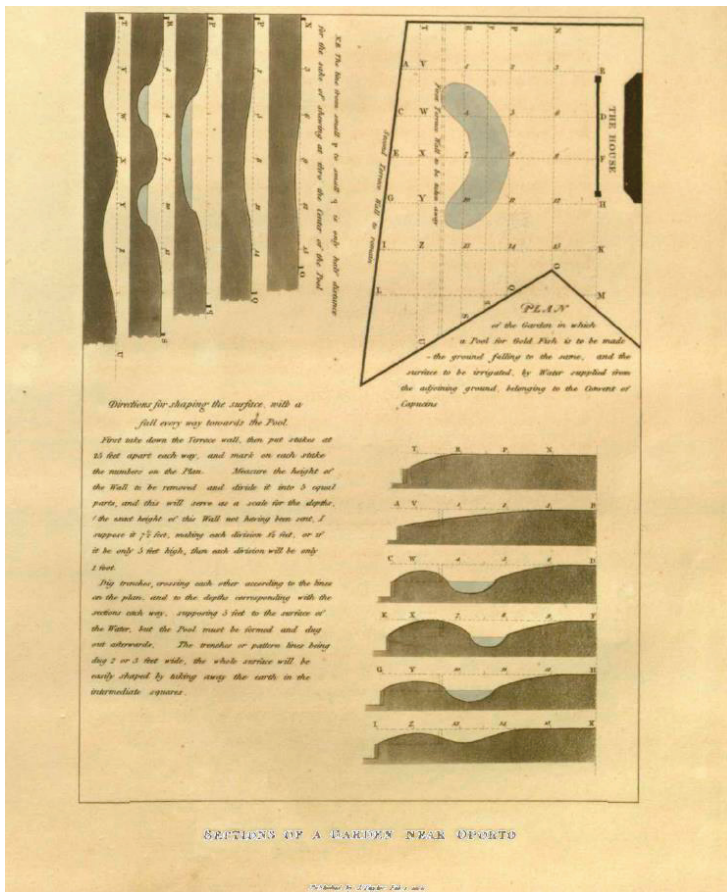
2.2.3. Diverse Specialization of Drawing: The 19th-century America and Frederick Law Olmsted

In the mid-nineteenth century in America, the professional identity of landscape architecture was established. Although the pictorial representation had been continuously used in landscape design, different drawing types were specialized according to their respective functions. In producing presentation drawings for competition, the technique of elaborate representation in the form of perspective view was frequently used to communicate to the public, whereas orthogonal projections, including plan and elevation/section, were used for precise construction of designed landscape. Moreover, the map overlay method for site analysis emerged during this period.

The diverse specialization of drawing was particularly evident in the representations of Frederick Law Olmsted (1822–1903). First, Olmsted's and architect Calvert Vaux's (1824–1895) winning *Greensward Plan* for Central Park competition in 1858 applied techniques of pictorial representation. The original *Greensward Plan* consists of a large-scale master plan and 12 illustrative boards that mostly take in the format of perspective view similar to paintings and the printed text; among the 12, eleven survived.[66] As shown in the elaborate master plan and illustrations, the design principles of the Central Park was affected by the style of English landscape gardens; the overall pastoral scenery consists of the winding paths and literally green-ward meadows, which are intended to be contemplated in systemically situated viewpoints (Figure 30).

In a strict sense, the design principle that attempted to embody wild characteristics of roughness, sudden variation, and irregularity in designed landscape reflected the picturesque aesthetic, which emerged in English landscape aesthetics in the late eighteenth century and early nineteenth century, advocated by William Gilpin (1724–1804), Uvedale Price (1747–1829), Richard Payne Knight (1750–1824). The English aesthetics, somewhat transformed, was introduced into the American landscape, the wilderness.[67] Such American picturesque aesthetics of wilderness was evidently represented in the contemporary landscape paintings of Hudson River School, including

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[66] Morrison H. Heckscher, *Creating Central Park*, New York: The Metropolitan Museum of Art, 2008, p. 26. The report on description of the *Greensward* plan is included in the following book. See, Charles E. Beveridge and David Schuyler, eds. *The Papers of Frederick Law Olmsted: Volume III, Creating Central Park 1857–1861*, Baltimore and London: The Johns Hopkins University Press, 1983, pp. 117–187.

[67] For a Korean-language study of the English picturesque aesthetic and its introduction into American landscape architecture, see Myeongjun Lee and Jeonghann Pae, '숭고의 개념에 기초한 포스트 인더스트리얼 공원의 미학적 해석 [An Aesthetic Interpretation of Post-industrial Parks with a Perspective of the Sublime]', *한국조경학회지* [*Journal of the Korean Institute of Landscape Architecture*] 40(4), 2012, pp. 78–89.

30. Frederick Law Olmsted and Calvert Vaux, *The Greensward Plan of Central Park*, 1858.
    (Morrison H. Hecksher, *Creating Central Park*, p. 34.)

31. Frederick Law Olmsted and Calvert Vaux, *The Greensward Plan of Central Park*, 1858.
    (Morrison H. Hecksher, *Creating Central Park*, p. 32.)

Thomas Cole (1801–1848). Embodied in the *Greensward* plan was the very American picturesque aesthetics.[68] In other words, Central Park of *Greensward Plan* included not only pastoral scenery but also steep and rocky areas resembling the untouched wilderness.

Whereas most of the drawings were finished with India ink and sepia, as no brighter colours were permitted, among the nine pairs of before and after views, three after views are beautifully and vividly represented in a way similar to landscape painting, particularly those of Hudson River School.[69] Moreover, most illustrations of the surviving *Greensward* presentation boards takes the format of perspective view; exceptionally, two projection drawings, namely, the elevation of a garden arcade building and detail plan of a formal flower garden, are included, per the competition requirement.[70]

Composite techniques are not easily observed in the representations of the *Greensward* submission: in the master plan, plants are visualized in the format of top view, although they are elaborately and artistically represented with shadows; in illustrations of before and after views, although beautiful and vividly colourful, the principle of realistic depiction is applied for demonstration, that is, instrumental function.

Notably, one of the initial uses of the new technology of photography in landscape design is found in the illustration boards of *Greensward Plan*. Among the before and after views, two images that depict the existing condition of the site are produced using a mechanical device, the camera. The photographs have been attributed to Mathew Brady (1822–1896), a prominent American pioneering photographer.[71] Considered as an index of actual objects, the photographic images provide the viewer with a sense of presentness. The very characteristic of the medium was mainly used in landscape design in the era; particularly, the capability of realistic depiction of the camera was suitable for surveying the existing condition of a site. For example, one of the boards carries three images (Figure 31): at the top is a miniature-engraved master plan; in the middle is the photographic image that realistically captures the existing site, occupying more than one-third of the picture plane; and at the bottom is the vivid coloured oil sketch of the effects proposed, the future

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[68] The aesthetics of Central Park was greatly affected by those of Hudson River School paintings. For example, Jervis McEntee (1828–1891), a painter of the School and Vaux's brother-in-law, was enlisted to paint the before and after views of the *Greensward Plan*. Moreover, Olmsted and Vaux knew Frederic Edwin Church (1826–1900), a central figure in Hudson River School, who was, in 1871, appointed to the commission overseeing construction of Central Park. Mark R. Stoll, *Inherit the Holy Mountain: Religion and the Rise of American Environmentalism*, New York: Oxford University Press, 2015, p. 98.

[69] For description of the competition entries including the *Greensward Plan*, see Charles E. Beveridge and Paul Rocheleau, *Frederick Law Olmsted: Designing the American Landscape*, New York: Rizzoli International Publications, 1995, pp. 54–55; Sara Cedar Miller, *Central Park, an American Masterpiece: A comprehensive History of the Nation's First Urban Park*, New York: Abrams, 2003, pp. 81–88; Morrison H. Heckscher, *Creating Central Park*, pp. 20–24.

[70] Morrison H. Heckscher, *Creating Central Park*, p. 54.

[71] *Ibid*., pp. 32–33.

designed landscape. The latter two images take the form of perspective views, intended to satisfy the desire for transparency in visualization so that the viewer can directly appreciate the representation without any disturbance. Particularly, the rectangular photographic image, with a frame decorated similarly as a painting, achieves the realism of the site,[72] which is an instrumental function of visualization.

Interestingly, this juxtaposition of the two images 'present outlines' and 'effect proposed' is remarkably similar to the aforementioned work of Repton for Red Books. Whereas Repton produced both before and after views using the same medium, Olmsted and Vaux created a subtle variation on Repton's technique by substituting a mechanical image produced by a camera for the before manual representation. The photographic image itself functions to display realistically the status of the site. When juxtaposed with the vivid coloured representation of a future appearance of the site on one picture plane, the photograph functions to accentuate the after view, which represents the design proposal. The viewer's eyes are easily captured by the large photograph, presumably taking the limited format and size of photographs in the era, which captures a seemingly abandoned site. Then, the viewer's gaze moves to the beautiful after view below that resembles paintings of Hudson River School, which represents the ideal vision of the site.[73]

After the *Greensward Plan*, Olmsted continued to use the photographic image as a mechanical tool to capture realistically the present condition of an existing site. For example, in 1859, after winning the competition, Olmsted, as an architect-in-chief and superintendent of Central Park, visited the parks of Europe. In the journey, Olmsted obtained photographs, as well as plans, drawings, and other documents of Europe's parks.[74] He hired Roger Fenton (1819–1869), who was a pioneering British photographer, to take pictures of *Regent's Park* in London, and Fenton then provided Olmsted with 48 photographs of the park (Figure 32).[75] Moreover, photographic images that captured the construction of the park began to replace lithographic illustrations in the annual reports issued by the Board of Commissioners of the Central Park in 1860s.[76] Thus, the initial photography in landscape design functioned to imitate manual drawings, particularly the perspective view.

The capability of photography to record reality was frequently used not only in

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

[73] The juxtaposition of before and after views continued in twentieth-century landscape visualization. Such juxtaposition functioned as an instrument of landscape reform, as epitomized in the photographs of the creation of the Bronx River Parkway in the 1910s to the 1920s. Timothy Davis, 'The Bronx River Parkway and Photography as an Instrument of Landscape Reform', *Studies in the History of Gardens & Designed Landscapes* 27(2), 2007, pp. 113–141.

[74] Charles E. Beveridge and David Schuyler, eds. *The Papers of Frederick Law Olmsted: Volume III, Creating Central Park 1857–1861*, pp. 235, 239.

[75] *Ibid*., p. 242.

[76] Morrison H. Heckscher, *Creating Central Park*, p. 39.

landscape design but in architecture as well. As Hyungmin Pai observed, the initial widespread use of photography in architecture emerged in the late-1880s, when 'it was used less to explore its own qualities than to emulate architectural drawing [...] the measured drawing'.[77] Thus, in both landscape and architectural design, early photography played the mechanical role of imitating the manual method to achieve preciseness of visualization.

Interestingly, the first photographers including Fenton borrowed the composition and expression of previous naturalistic landscape paintings by William Turner (1775–1851) and John Constable (1776–1837), and the formula of picturesque composition suggested by Gilpin, who published popular guidebooks for landscape tourists in the late eighteenth century.[78] Indeed, when the new mechanical device was invented, the medium borrowed previous manual methods including work of arts or drawings that had been established as conventions.

Whereas Olmsted and Vaux mainly used pictorial representation in the form of perspective view in producing presentation drawings for effective communication with their client and the public, they used the conventions of orthogonal projections such as plan and elevation/section, for realization or construction. For example, the second annual report of the Board of Commissioners of the Central Park in 1859 carried the map of the park, which precisely records the original topography of the site, including the roads and walk under construction (Figure 33). The plan includes red contour lines, at ten-foot intervals, which represented a new convention in the precise visualization of the height of topography; the dotted lines indicated not-yet-built roads.[79] The commissioners' third report in 1860 included longitudinal sectional drawings that recorded the dramatically varied terrain of the site and its alteration under construction (Figure 8).

By the late nineteenth century, the initial use of map overlay method, named layer cake by Ian McHarg in the 1960s, emerged in landscape architecture. The technique was used in Olmsted's office, Olmsted, Olmsted and Eliot, in which landscape architects, including Charles Eliot (1859–1897) and Warren Manning (1869–1938), used map overlays in ecological surveys.[80] The first description of the technique is included in *Charles Eliot, Landscape Architect* in 1902, written by Eliot's father, Charles William Elliot (1834–

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[77] Hyungmin Pai, *The Portfolio and the Diagram: Architecture, Discourse, and Modernity in America*, p. 30.

[78] James S. Ackerman, 'The Photographic Picturesque', in *Composite Landscapes: Photomontage and Landscape Architecture*, eds. Charles Waldheim and Andrea Hansen, Ostfildern: Hatje Cantz Verlag, 2014, pp. 36–53. The formula by Gilpin was affected by seventeenth-century painters Lorrain and Salvator Rosa (1615–1673). *Ibid*., p. 42.

[79] Morrison H. Heckscher, *Creating Central Park*, pp. 39–40.

[80] Frederick Steiner, 'Revealing the Genius of the Place: Methods and Techniques for Ecological Planning', in *To Heal the Earth: Selected Writings of Ian L. McHarg*, eds. Ian L. McHarg and Frederick Steiner, Washington, DC: Island Press, 1998, pp. 203–204.

1926).[81] Specifically, the staffs of the office used the map overlay technique, through sun prints produced on the office windows, to survey the geology, topography, and vegetation of the region within the Boston Metropolitan Park.[82] Thus, Olmsted appropriately facilitated the respective functions of various drawing conventions.

32. Roger Fenton, *Zoological gardens, Regent's Park*, 1859.
   (National Media Museum, http://www.nationalmediamuseum.org.uk)

33. Frederick Law Olmsted, Calvert Vaux, and W. H. Grant, *Map Showing the Original Topography of the Site of the Central Park with a Diagram of the Roads and Walks now under construction*, 1859. (https://archive.org/stream/annualreportofbo00newy_10#page/n87/mode/2up)

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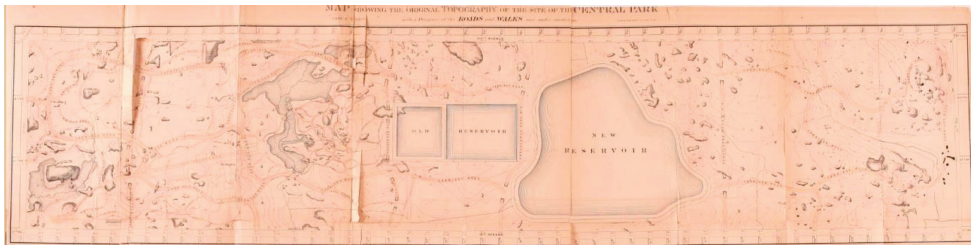
[81] Charles William Eliot, *Charles Eliot, Landscape Architect*, Boston: Houghton Mifflin, 1902.

[82] At present, historians of landscape architecture argue that the original identity of the discipline, established in mid-nineteenth century America, was that of large-scale city planning. For surveys of large sites, the map overlay was presumably suitable visualization technique as it provides the capability to collect and analyse comprehensive information of the site. For recent descriptions of the origin and identity of landscape architecture, see Charles Waldheim, 'Landscape as Architecture', *Studies in the History of Gardens & Designed Landscapes* 34(3), 2014, pp. 187–191; Joseph Disponzio, 'Landscape Architecture/ure: A Brief Account of Origins', *Studies in the History of Gardens & Designed Landscapes* 34(3), 2014, pp. 192–200.

2.2.4. Emergence of Diagram: Modernism in America

The diagram, as a drawing type, has divergent formats compared with those of the projection and perspective views. At present, advanced digital software programmes easily enable landscape architects to produce various forms of diagrams by hybridizing other types such as projection and perspective view. Thereby, the term diagram is often interchangeably used with mapping and datascape.[83] The diagram as a drawing type needs to be approached not so much in terms of the fixed convention as in terms of variously transformable format. The projection and perspective view generally illustrate the designed landscape in terms of resemblance of appearance, thereby closely relating to its realization or construction. Meanwhile, the diagram, in not depicting the landscape in terms of likeness, conveys invisible and complex aspects of the landscape, including relations, functions, and other design ideas or strategies.[84]

The diagram has a relatively short history, compared with the projection and perspective views, which trace back to the early and middle twentieth-century American modernists including Garrett Eckbo (1910–2000), James C. Rose (1913–1991), and Dan Kiley (1912–2004).[85] They frequently used the convention to visualize the appearance,

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[83] For Nadia Amoroso, landscape architect and scholar, the diagram and mapping, including datascape, fall within a category. See, 'Representations of the Landscapes via the Digital: Drawing Types', in *Representing Landscapes: Digital*, pp. 4–5. Similarly, Andrea Hansen discussed that the diagram, mapping, and datascape fall within a broad category. Specifically, Hansen stated that the term 'map' is a synonym for diagram in the broadest sense, as 'both maps and diagrams have two things in common: the abstraction or simplification of complexity with the intent of fostering clarity, and the selection of an appropriate visualization method'. Moreover, datascape is included in hybrid diagrams. See, Andrea Hansen, 'Datascapes: Maps and diagrams as landscape agents', in *Representing Landscapes: Digital*, p. 29. Prominent Korean scholars of landscape architecture Jeonghann Pae and Kyungjun Zoh described the diagram as a drawing type that needs to be understood in a broader sense by considering it with mapping and datascape. See, 'Jeonghann Pae, '현대 조경설계의 전략적 매체로서 다이어그램에 관한 연구 [A Study on the Diagram as Strategic Media in Contemporary Landscape Architectural Design]', 한국조경학회지 [*Journal of the Korean Institute of Landscape Architecture*] 34(2), 2006, p. 102; Kyungjin Zoh, '환경설계방법으로서의 맵핑에 관한 연구 [A Study on the Mapping as a Environmental Design Method]', 공공디자인학연구 [*Journal of Korean Society of Public Design*] 1(2), 2006, pp. 77–78.

[84] Andrea Hansen defined the diagram as 'a symbolic representation of information of the purpose of communication'. See, Andrea Hansen, 'Datascapes: Maps and Diagrams as Landscape Agents', p. 29. Corner tended to prefer such specific terms as eidetic drawing and mapping to refer to landscape architectural diagram. The theory of representation by Corner will be specifically discussed in Chapter III. Stan Allen stated that 'Unlike classical theories based on imitation, diagrams do not map or represent already existing objects or systems but anticipate new organizations and specify yet to be realized relationships'. See, Stan Allen, 'Diagrams Matter', *Any 23*, New York: Anyone Corporation, 1998, p. 16. For a description of the early history of architectural diagram, see Hyungmin Pai, *The Portfolio and the Diagram: Architecture, Discourse, and Modernity in America*.

[85] For a most recent description of the characteristics of Modernism in Landscape architecture and its sub-categories, see Marc Treib, 'Landscapes Transitional, Modern, Modernistic, Modernist', *Journal of Landscape Architecture* 8(1), 2013, pp. 6–15.

34. Garrett Eckbo, *Tree Diagram*, *Community Homes, Reseda, San Fernando Valley*, 1948.
   (UC Berkeley, Environmental Design Archives Garrett Eckbo Collection, 1933–1990,
   http://www.oac.cdlib.org/findaid/ark:/13030/tf4290044c/?&brand=calisphere)
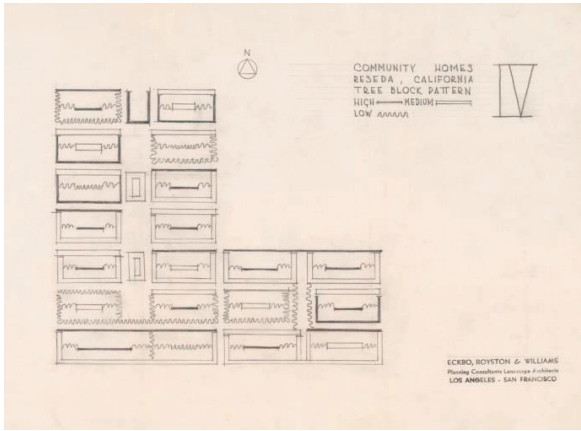
35. Garrett Eckbo, *Small Gardens in the City-Plan and Isometric View*, 1937.
   (UC Berkeley, Environmental Design Archives Garrett Eckbo Collection, 1933–1990,
   http://www.oac.cdlib.org/findaid/ark:/13030/tf4290044c/?&brand=calisphere)
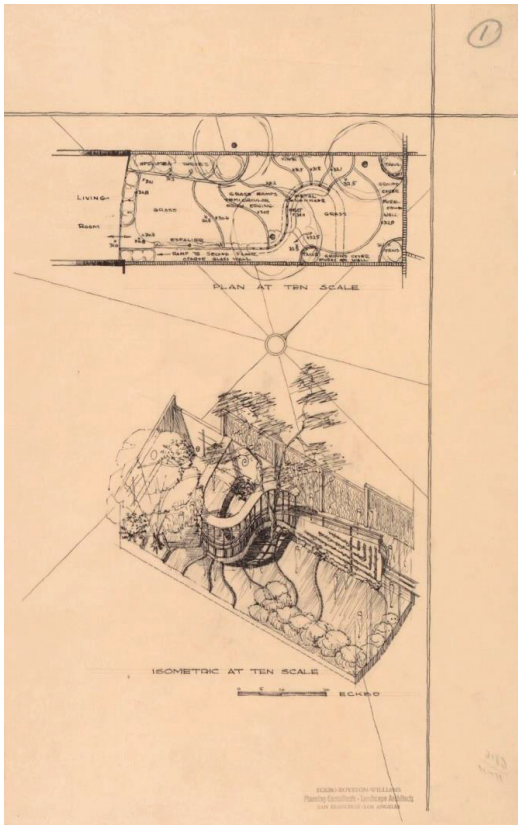
function, and zoning of designed landscape. For example, Eckbo often produced planting diagrams (Figure 34), in which visual information of trees is reduced to signs that conveyed their species, sizes, and arrangement. The abstraction of complex information functions to demonstrate the planting strategies. In other words, it had an instrumental function similar to that of the projections.[86] In American modernists' drawings in the plan format, including Figure 34, appearances of plants are no longer hybridized in the form of perspective view by visualizing in the orthogonal format of top view.[87]

Notably, modernists frequently deployed the technique of parallel projection such as axonometric and isometric projections, for visualizing design strategies.[88] The techniques, of course, can be considered as a sort of perspective view, although the aim and function are not so much the realistic representation of landscape appearance as diagrammatic visualization of design strategies. At present, parallel projection remains useful in the production of design diagrams. In other words, the origin of the technique can be traced to back at least the era of twentieth-century American modernists.[89]

For example, Eckbo is known as one of the modernist landscape architects who frequently used axonometric views in his garden design (Figure 35). The technique can accurately, equally, and three-dimensionally visualize a space including landscapes and buildings, on a two-dimensional plane, thereby escaping the optical distortion of the linear perspective using vanishing point. Eckbo facilitated the capacity of the technique to visualize accurately the arrangement of garden components as if it is viewed through a penetrating glance. Moreover, as noted by Dorothée Imbert, a prominent historian of modernism in landscape architecture, Eckbo's axonometric composition also represented the phenomenological, such as sun and shadow, and people and textures.[90]

The drawings of Rose clearly reveal that the parallel projection by modernists influenced recent digital software diagrams (Figure 36). In Figure 36, the skewed garden

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[86] Dorothée Imbert, 'The Art of Social Landscape Design', in *Garrett Eckbo: Modern Landscapes for Living*, Marc Treib and Dorothée Imbert, Berkeley and Los Angeles: University of California Press, 1997, pp. 152–154.

[87] Of course, French Modernists in the early twentieth century, including Paul Vera and Gabriel Guevrekian (1892–1970), affected by Cubism, continued to use the hybrid technique of visualizing the frontal appearance of plants in garden plans. For a description of French Modernism in landscape architecture, see Dorothée Imbert, *The Modernist Garden in France*, New Haven and London: Yale University Press, 1993.

[88] For a brief description of the origin of parallel projection, see Dorothée Imbert, 'Skewed Realities: The Garden and the Axonometric Drawing', in *Representing Landscape Architecture*, pp. 124–139.

[89] Landscape architect and scholar Christopher Marcinkoski coined the term 'landscape chunk' to refer to variation In the parallel projection in recent digital landscape representation. The landscape chunk has been frequently used to visualize design strategies, as it provides 'a uniquely legible means of describing complex interrelated systems operating in time'. See, Christopher Marcinkoski, 'Chunking Landscapes', in *Representing Landscapes: Digital*, pp. 109–111.

[90] Dorothée Imbert, 'Skewed Realities: The Garden and the Axonometric Drawing', pp. 135–136.

36. James Roes, *Pool Garden for the Ladies Home Journal*, 1946.
   (Dorothée Imbert, 'Skewed Realities: The Garden and the Axonometric Drawing', p. 137.)
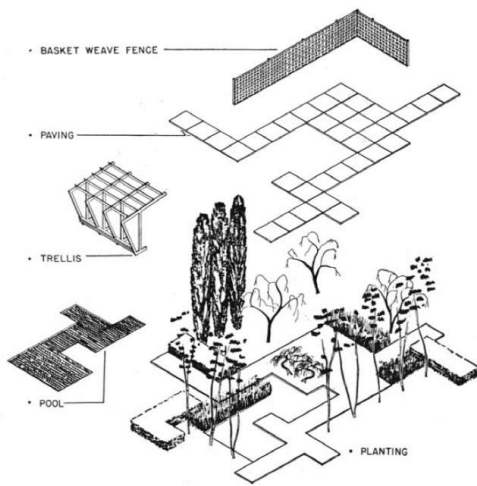
37. Lawrence Halprin, *Plan for a 45 Minute Environment*, 1962.
   (Margot Lystra, 'McHarg's Entropy, Halprin's Chance', p. 78.)
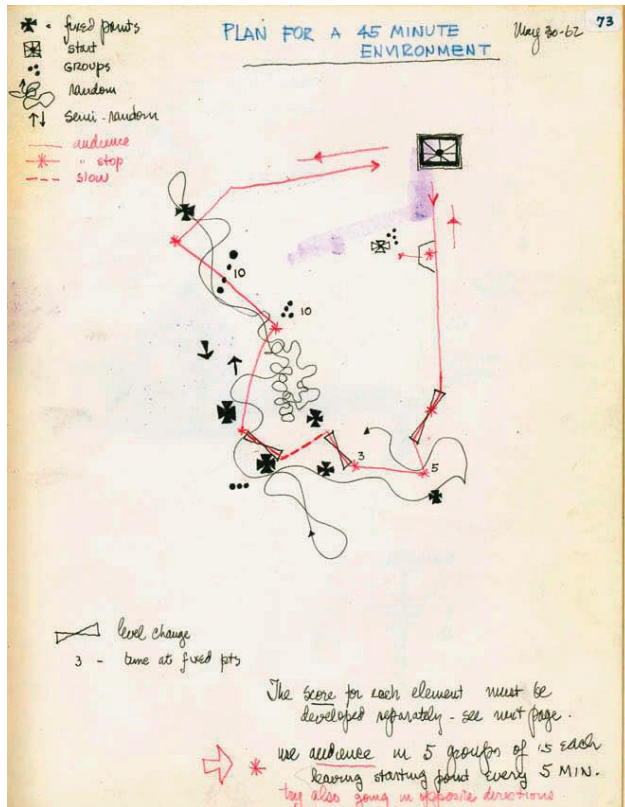
space consists of separate layers of components including paving, pool, planting and others. This technique continues to appear in recent digital landscape representation, epitomized in mappings by James Corner that visualize the construction of an ecological system (Figures III-3, 33). As Imbert noted, the drawing by Rose shows the flexibility of a modular system for the garden; 'Using the medium [axonometric projection] as a tool by which to study proportions and complicated volumetric relationships—rather than as a rendering or advertising techniques—they often produced diagrams of design concepts that were less than clear'.[91]

Another frequently used technique pertaining to diagrammatic strategies is the notation. Corner, as discussed earlier, presented the technique as a distinct drawing type from projection and representation.[92] At present, the convention is frequently used to produce various diagrams including circulation or flow of ecological and human components.

Lawrence Halprin (1916–2009) explored the technique to visualize the sequence of movement of performer and audience in actual landscape since the mid-twentieth century. For example, *Plan for a 45 Minute Environment* epitomizes his original technique—with his wife choreographer Anna Halprin (1920–)—named motation, portmanteau of 'movement' and 'notation' (Figure 37).[93] The notational score delineates the trajectory or route of the performer and audience in the environment for an outdoor performance event. Specifically, the black line directs the performer 'when and where to move in groups and in random or semi-random ways', and red lines directs audience members 'when and where to move slowly and to stop'.[94] Thus, the drawing aims to project literally the movement of the performer and audience onto the actual landscape.[95]

However, the projection, to a certain degree, allows the participants to move freely. As noted by Margot Lystra, a historian of architecture and urban development, the drawing reveals 'the open score's embrace of uncertainty', which derives from 'the ambiguity of its instruction', such that 'the score is indeed a form of 'chance plus choice'.[96]

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[91] *Ibid*., p. 137.
[92] James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', p. 251.
[93] For a description of Halprin's design principle, see Lawrence Halprin, *The RSVP Cycles: Creative Processes in the Human Environment*, New York: George Braziller, 1970.
[94] Margot Lystra, 'McHarg's Entropy, Halprin's Chance: Representations of Cybernetic Change in 1960s Landscape Architecture', *Studies in the History of Gardens & Designed Landscapes* 34(1), 2014, p. 78.
[95] For an account for this limitation of the scoring technique by Halprin, see Alison B. Hirsch, 'Scoring the Participatory City: Lawrence (& Anna) Halprin's Take Part Process', *Journal of Architectural Education* 64(2), 2011, p. 139.
[96] Margot Lystra, 'McHarg's Entropy, Halprin's Chance: Representations of Cybernetic Change in 1960s Landscape Architecture', p. 78.

Additionally, as Corner described, Halprin's scoring 'enabled group [participation] in decision making and planning. The complicated, but highly active, score itself becomes a performed piece as the creative process is graphically played out'.[97] In other words, the score is both notational (i.e. instrumental) and open (i.e. imaginative).

Thus, Halprin's notational technique can be considered a diagrammatic strategy. It reduces complex movements to simple signs and supports the design strategy simultaneously. Moreover, the technique fundamentally embodies the desires of designers to visualize changes in landscape experience over time. As landscape architect and scholar Andrea Hansen described, Halprin's motation can be understood as a diagram, 'the space-time datascape', in which 'relationships between space and time have married [...] to harness a greater understanding of landscape's value and use'.[98]

These diagrammatic strategies, as will be discussed later, have been deployed, with certain variations, in landscape architectural representation. At present, the techniques can be flexibly transformed using advanced digital software by hybridizing with other drawing conventions, thereby enabling function as creative tools for design development.

[97] James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', p. 256.
[98] Andrea Hansen, 'Datascapes: Maps and Diagrams as Landscape Agents', p. 30.

III. Technological Transition

3.1. Hand and Computer Drawings

Since the mid-twentieth century, hand drawing mediums, such as pencil, magic marker, and paint, have been substituted by GIS, AutoCAD, Photoshop, Illustrator, Rhino, and SketchUp. At present, map overlay analysis of environmental data to identify suitable sites is generally carried out using GIS; landform modelling is rendered increasingly using three-dimensional (3D) modelling software, such as SketchUp, Rhino, and 3D CAD; presentation and construction documents are drawn using graphic editing software, such as Photoshop and Illustrator, and drafting ones, such as AutoCAD. What are the influences of the transition of drawing mediums on drawing techniques? Is there any difference in appearance, specifically, between products using hand medium and computer technology? Does computer technology change specific drawing process? Does computer technology function as a substitute tool for hand drawing? Alternatively, is the potential of computer explored and deployed in the transition?

To answer these questions, the landscape architectural discourse on manual and computer drawing first needs to be scrutinized. Landscape architectural scholar Marc Treib argued that manual methods are superior to digital representation. Two volumes edited by Treib in 2008 were collections of essays, including his writings that explain the limitations of computer drawing and the superiority of hand drawing. For example, Treib's introduction for *Representing Landscape Architecture*, stated the following:

> The advent of software programs such as Photoshop has granted an enormous power to designers in terms of realism and accuracy, but these may be achieved at the expense of a sense of life and a confusion of detail for [design] idea. Because it is easy to generate numerous computer images once the data have been entered, we encounter floods of pictures rather than one or a handful that might convey the gist of the idea in a more lucid form. […] Too much imagery today[,] at least in my view[,] is produced primarily because we can produce it, and often at the expense of the design idea, the qualities and experience envisioned, and the recipient's ability to decipher the information.[1]

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[1] Marc Treib, 'Introduction', in *Representing Landscape Architecture*, ed. Marc Treib, London and New York: Taylor & Francis, 2008, p. xix.

Moreover, in the same year when Treib's edited book was published, in *Drawing/Thinking: Confronting an Electronic Age*, Treib remarked that 'electronic media tend to distance us from our location. [...] Drawing, in contrast, requires time, attention, and a focused acknowledgement of the particular place'.[2] Treib continued to take a critical look at landscape representation using graphic editing software, as follows:

> The Photoshop depictions of human beings which I find so offensive are admittedly accurate in terms of proportions and details, based as they are on photographs. But the superimposition of the figure upon the rendered space confesses quite directly the attitude of the designer towards the human being in that environment. People and their actions are secondary; they are added; they inhabit a world formed for them, not by them. [...] [Such Photoshop depiction] illustrates this reduction of sensitivity and understanding of line, [...].[3]

Similarly, landscape architect Laurie Olin accounted for superiority of hand drawing:

> I honestly don't see how anyone, while typing on a keyboard or wriggling a mouse, can ever really develop a spatial sensibility or a feeling for form, materials, structure, and weight[,] whether that of a landscape, a building, plants, or other life forms. These are things that drawing can do well, and has done for me.[4]

Advocators of superiority of hand drawing, such as Treib and Olin, assumed that hand drawing is unmediated, unlike the way that computer representation is mediated by machine; thereby, it can express directly a designer's idea in mind (Figure 1). As Olin stated:

> As soon as one puts several marks down on the page the brain reacts to them, from a life time of visual associations, feelings about composition, balance, and movements, unexpected thoughts occur about where or how to make the next ones. Drawings often develop a "life of their own," we say.[5]

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[2] Marc Treib, 'Introduction', in *Drawing/Thinking: Confronting an Electronic Age*, ed. Marc Treib, London and New York: Routledge, 2008, p. x.

[3] Marc Treib, 'Paper or Plastic?: Five Thoughts on the Subject of Drawing', in *Drawing/Thinking: Confronting an Electronic Age*, p. 20.

[4] Laurie Olin, 'More than Wriggling Your Wrist (or Your Mouse): Thinking, Seeing, and Drawing' in *Drawing/Thinking: Confronting an Electronic Age*, p. 97.

[5] *Ibid.*, p. 85.

1. Laurie Olin, *Sketch for Stata Center, MIT,* Cambridge, Massachusetts, 1999.
   (Laurie Olin, 'More than Wriggling Your Wrist (or Your Mouse): Thinking, Seeing, and Drawing', p. 96.)
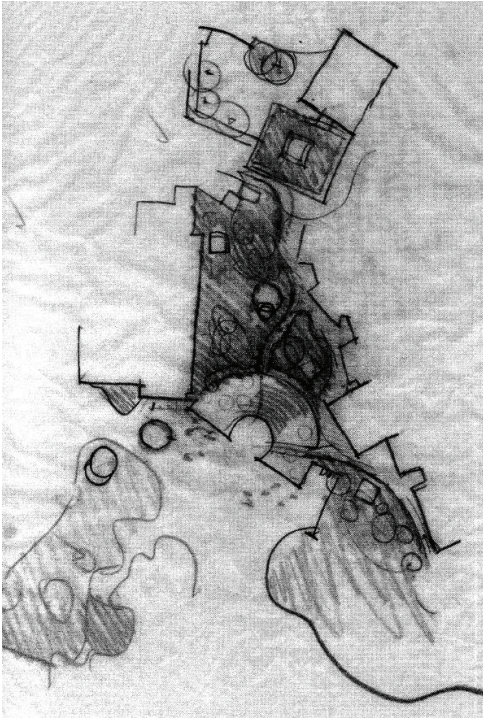
2. Martina Gonzalez, *Alternative creek, Site plan from Puerto Rico: South Coast studio*, 2015.
   (Roberto Rovira, 'The Site Plan is Dead: Long Live the Site Plan', p. 102.)

This claim that manual techniques are superior to computer representation in terms of creativity or personal expression can be traced back to the early stage of computer usage in landscape architecture. For example, *Landscape Architecture* in 1985 contained one essay titled 'On Drawing' in which Warren T. Byrd Jr. and Susan S. Nelson observed:

> The [hand drawing's] value of personal observation is especially significant today as the relationship between observer and object is diminished by our dependency on "less personal" devices for seeing. The camera or computer, for example, expands our perception and understanding in limitless ways, but we no longer have to be in direct physical proximity to the subject of study. The joy of learning through our *own* sense may be missed. Drawing can be the provocative and enduring language of our personal experience. By its nature it demands of our senses a keen awareness.[6]

By the early 2000s, this prejudice in favour of manual methods to embody creativity had continued. In 2003, Lolly Tai assessed the impact of computer usage on landscape architecture based on a survey conducted by the American Society of Landscape Architects (ASLA) in 2000. Tai's study concluded that the use of computers improved drawing quality and efficiency, but made no significant impact on artistic or creative aspects of design process. As Tai explained:

> The use of computers has had an overall positive effect on the design process. The perception among practitioners was that the quality of drawings was better, work was done more efficiently and new technologies enabled innovative and complex tasks to be accomplished more easily. There was, however, no statistically significant relationship found between practitioners' use of computers and their perception of computers' impact on artistic and creative activity. The predominant response was that computers were not intuitive and design is intuitive.[7]

In other words, a computer has been considered not significantly as an imaginative or a creative vehicle but more as a mechanical and an efficient tool for instrumentality until relatively recently. In contrast, computer drawing, at the same time,

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[6] Warren T. Byrd Jr. and Susan S. Nelson, 'On Drawing', *Landscape Architecture* 75(4), 1985, p. 54.
[7] Lolly Tai, 'Assessing the Impact of Computer Use on Landscape Architecture Professional Practice: Efficiency, Effectiveness, and Design Creativity', *Landscape Journal* 22(2), 2003, p. 121.

has often been considered as a tool that can provide favourable opportunities related to creativity for landscape architects. In *Landscape Architecture* in 1985, for example, Arthur J. Kulak described that there were no considerable differences between manual and computer drawing. As Kulak stated:

> Computers are often thought of as a way to reduce human effort, but quite the opposite is true: they actually *increase* human effort because we can produce more with them than without them. […] [D]esigning with a computer[,] more specifically, computer-aided design and drafting (CADD)[,] differs little from conventional methods except that graphic information is no longer manipulated manually. […] Many designers may argue in favour of the subtle variations or "natural quality" that freehand drawing lends to graphics, but CADD provides for that also. Every CADD product is essentially hand-drawn, because any symbols are more sophisticated than simple perfect shapes[,] such as circles[,] have to be drawn by the designer when they are first entered into the computer. It is CADD's ability to allow the designer to replicate, edit, and alter the scale and proportions of these "freehand" drawing symbols that makes it so powerful. […] The difference is the designer doesn't have to draw the same thing over and over.[8]

Similarly, in 1988, the journal *Landscape Architecture* addressed computer technology as a special theme of its July/August issue, in which Bruce G. Sharky stated that 'computers do not stifle creativity; instead they offer an amazing range of choices for achieving a creative excellence'.[9]

At present, creativity inherent in landscape representation using digital technology has gained increasing attention. For example, *Representing Landscapes: Digital*, which Amoroso edited in 2015, is a collection of many essays related to most recent digital landscape representations in which limitations of conventional manual drawing taking the static flat form are overcome by exploiting the potential of digital technology. As Roberto Rovira accounted for creative aspects of digital representation for site plan, as follows (Figure 2):

> While the site plan has historically served to communicate ideas about the landscape in a relatively static format, digital representation provides many opportunities to exploit the medium and grant it greater complexity and nuance.

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[8] Arthur J. Kulak, 'Prospect: The Case for CADD', *Landscape Architecture* 75(4), 1985, p. 144.
[9] Bruce G. Sarky, 'Confessions of a Computer Convert', *Landscape Architecture* 78(5), 1988, p. 74.

The ability to convey dynamic processes within a [static] site plan may not be immediately possible or even desirable, but the multiple ways in which digital technology can facilitate a better understanding of site by virtue of techniques like repetition, scaling, layering, filtering, duplication, and other digital methods remain essential and powerful.[10]

Another essay in the book addresses sections and elevations using digital software in which Daniel H. Ortenga and Jonathon R. Anderson argued that digital tools have rather ambiguous and free characteristics, which can be exploited to explore and experiment drawing.[11]

The aforementioned discourses on drawing media reveal that properties of any drawing depend on not particularly medium (i.e. technology) but a specific way of representation (i.e. technique). In other words, creativity or instrumentality of any drawing comes from how technology (either hand or computer) is exploited, that is, techniques (drawing types or particular methods). For example, as Treib argued, if a computer drawing would distance people from actual landscape and reduces sensibility, this is only when a computer technology, such as Photoshop, would be used as a mechanical tool for instrumentality that depicts future designed landscape realistically. Landscape architect and scholar Karen M'Closkey argued:

Some claim that, compared to manual methods, digital representation results in the loss of a drawing's qualitative aspects. Such an outlook conflates technology (i.e., pencil and computer) and technique (i.e., drawing type and image construction). If digital media are believed to be deficient, this is only because they are used to replicate hand-drawn techniques, rather than explored for the medium's inherent capabilities.[12]

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[10] Roberto Rovira, 'The Site Plan is Dead: Long Live the Site Plan', in *Representing Landscape: Digital*, ed. Nadia Amoroso, London and New York: Routledge, 2015, p. 99.

[11] Daniel H. Ortega and Jonathon R. Anderson, 'Vertical Plane Typologies: Examining Sections and Elevations', in *Representing Landscape: Digital*, pp. 129–130.

[12] Karen M'Closkey, 'Structuring Relations: From Montage to Model in Composite Imaging', in *Composite Landscapes: Photomontage and Landscape Architecture*, eds. Charles Waldheim and Andrea Hansen, Ostfildern: Hatje Cantz Verlag, 2014, p. 125. M'Closkey elsewhere characterizes between technique and technology. The former refers to 'a *particular* construction or method', whereas the latter refers to 'a *system* of such means'. Karen M'Closkey, 'Techniques', in *Unearthed: The Landscapes of Hargreaves Associates*, Philadelphia: University of Pennsylvania Press, 2013, p. 91. This distinction was already deployed in James Corner's theory of *re-presentation*, which will be discussed in detail later.

In this sense, the conclusion from ASLA's survey conducted in 2000 that 'computers were not intuitive and design is intuitive' is only valid when a particular technology, in this case CAD software, was mainly used to produce construction documents (i.e. orthogonal projection) that depict mechanically the appearance of designed landscape. In contrast, digital technology functions as a creative and an imaginative tool when it is exploited to represent dynamic process, complexity, and nuance of landscape, as aforementioned advocators of digital representation argued (Figure 3).

In similar ways, on one hand, Olin argued that hand drawing can be used as an imaginative tool that generates unexpected feelings and thoughts about the site; on the other hand, if pencils or paints were used to produce projections mechanically, the mediums are not used as a creative tool. Thus, any particular medium (i.e. technology) can function as both creativity and instrumentality according to different particular ways of visualization (i.e. techniques).

Indeed, it could be argued that computer drawing is generally more mechanical and accurate than the manual methods, and the latter is freer and expressional than the former. Korean landscape architect and scholar Wookju Jeong stated that '[manual methods] have capability that can directly and quickly commune with oneself […] initial design idea can be easily explored with tracing paper and pen rather than computer'.[13] For example, Korean landscape architect Soohag Lee used a term *Chobeolgeurim* to refer to initial sketch in which abstract ideas are explored, developed, and visualized (Figure 4). In conceiving initial design concept, free hand rendering is an appropriate medium to express and visualize impression of the site.[14] However, one medium is not superior to another in representing landscape. Different mediums merely have different characteristics. As M'Closkey argued:

> Claims that tools other than pencil or paint hinder our ability to capture the reality of a place or, on the contrary, that mediating machines such as cameras offer images closer to an appearance of reality than offered by pencil or paint are equally fallacious if those who make such claims assume that one mode of visualization is more "authentic" than another. […] When a mode becomes so common that it is adopted as convention, it is naturalized to a point where it can no longer be seen.[15]

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[13] Wookju Jeong, '*설계 도구: 자유 혹은 구속* [Design Tool: Freedom or Restriction?]', *환경과 조경* [*Environment & Landscape Architecture*] 262, 2010, p. 173.
[14] Soohag Lee, *태도: 조경, 행위, 반성, 시작* [*Attitude: Landscape Architecture, Act, Reflection, and Start*], Seoul: Noksaeknamu, 2002, p. 69.
[15] Karen M'Closkey, Structuring Relations: From Montage to Model in Composite Imaging', p. 126.

3. Field Operations, *Diagram Showing Systems of Threads, Islands, and Mats, Lifescape,* Fresh Kills
   Landfill Park Competition, 2001. (Julia Czerniak and George Hargreaves, eds. *Large Parks*, p. 100.)

4. Soohag Lee, 전남도청 건축현상설계 조경계획 [*Landscape Plan, Architecture Competition for
   Jeonnamdocheong*], 2000. (Soohag Lee, 태도: 조경, 행위, 반성, 시작 [*Attitude: Landscape Architecture, Act,
   Reflection, and Start*], p. 117.)
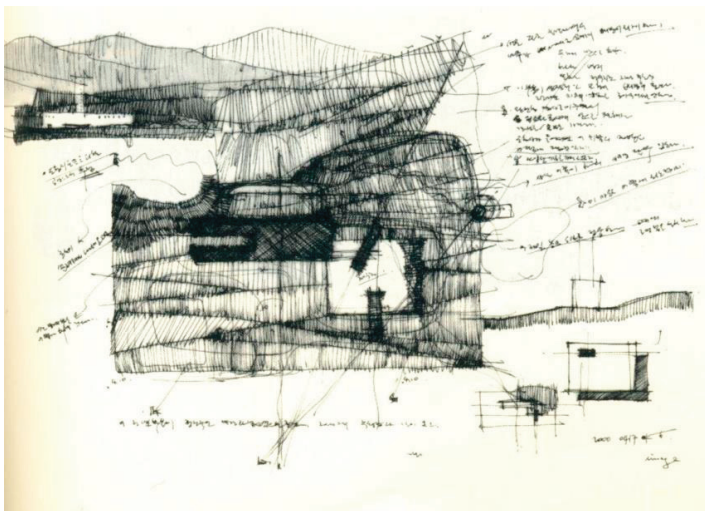
Thus, in examining the transition of drawing technologies, consideration must be given to how such computer technologies have functioned. Specifically, is the computer technology used as a tool to substitute for hand drawing, that is, a tool that imitates technique of previous mediums? Alternatively, have such technology's capabilities and the potential that unlikely expressed by manual drawing been explored? The next section answers these questions by examining the early history of the transition of technologies, particularly the three major modes of representation during landscape design process: map overlay analysis and GIS, model making and CAD, collage and montage for perspective view and graphic editing software products.

3.2. Transition from Hand to Computer

3.2.1. Scientific Visualization of Landscape Information:

Map Overlay Method

(1) Technique of instrumentality: layer cake

Among the main visualization techniques in pedagogy and practice of contemporary landscape architecture is map overlay analysis, which maps ecological information and identifies suitable area for particular purpose. The analysis is generally performed using computerized GIS. The method is commonly called 'layer cake', which has been propagated by Ian L. McHarg (1920–2001), an advocator of ecological planning, since the 1960s (Figure 5).[16] Before the advent of various GIS software, the method was undertaken using hand technique. In other words, the mediums of layer cake have been transitioned from hand to computer.[17]

Layer cake analysis is a scientific method in which numerous data of landscape, such as multiple components including physiography, geology, soils, hydrology, vegetation, wildlife, climate, resources, and human, among others, are inventoried, mapped, and calculated by weighting each element's relative importance. Moreover, in terms of drawing type, such maps take the form of a plan, which is one of orthogonal projections that generally require an accurate visualization of landscape information. Such various maps of landscape data are overlaid in one final suitability map in which expected suitable land uses are marked according to precise lines; thereby, the representation of expected land use is projected onto the actual landscape.[18]

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[16] For accounts of McHarg's influence on contemporary landscape architecture, see Frederick R. Steiner, 'Preface', in *The Essential Ian McHarg: Writings on Design and Nature*, ed. Frederick R. Steiner, Washington, DC: Island Press, 2006, pp. xi–xxiv; Anne Whiston Spirn, 'Ian McHarg, Landscape Architecture, and Environmentalism: Ideas and Methods in Context', in *Environmentalism in Landscape Architecture*, ed. Michel Conan, Washington, DC: Dumbarton Oaks Research Library and Collection, 2000, pp. 97–114; Stewart L. Udall, 'Foreword', in *A Quest for Life: An Autobiography*, Ian L. McHarg, New York: John Wiley & Sons, 1996, pp. xi–xiii.

[17] According to landscape architect and scholar Anne Whiston Spirn, the term 'layer cake' was coined by his students. Since 1965, McHarg had taught the class *Potomac River Basin Study* at the University of Pennsylvania where students later called 'the ecological inventory' termed by McHarg as 'layer cake'. When the writings in *To Heal the Earth: Selected Writings of Ian L. McHarg* are examined, McHarg has used the term layer cake since the early 1970s in his writings. See Anne Whiston Spirn, 'Ian McHarg, Landscape Architecture, and Environmentalism: Ideas and Methods in Context', p. 107. Wallace, McHarg, Roberts, and Todd, 'An Ecological Planning Study for Wilmington and Dover, Vermont', in *To Heal the Earth: Selected Writings of Ian L. McHarg*, eds. Ian L. McHarg and Frederick Steiner, Washington, DC: Island Press, 1998, p. 290.

[18] However, McHarg's map overlay methods have been criticized for inaccuracy of reduction of landscape information. For one of recent articles, see Susan Herrington, 'The Nature of Ian McHarg's Science', *Landscape Journal* 29(1), 2010, p. 12.

5. Ian McHarg, *Potomac River Basin Study*.
   (Ian McHarg, *Design with Nature*, pp. 129–145.)
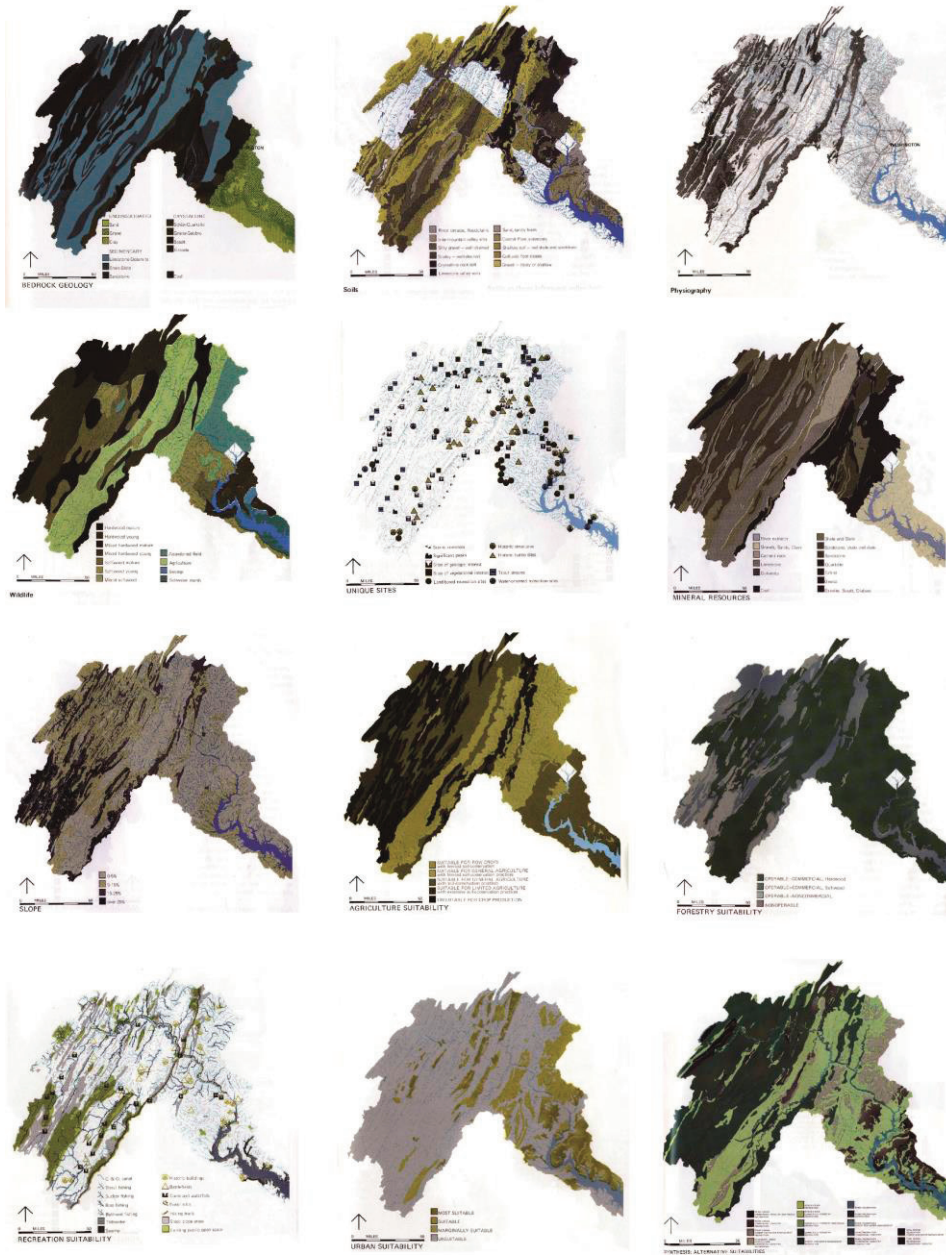
6. Ian McHarg, *Layer Cake Representation of Phenomena*, 1974.
  (Ian L. McHarg, *A Quest for Life: An Autobiography*, p. 258.)

Layer Cake Representation of Phenomena

Phenomena Over Time Equals Process
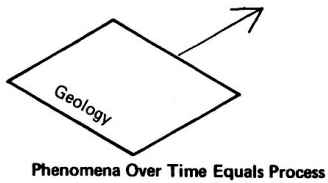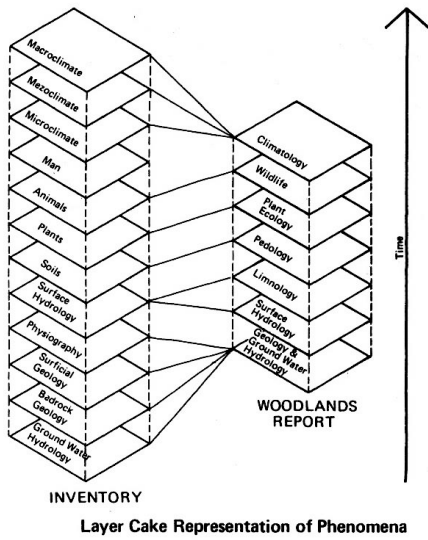
7. Jacqueline Tyrwhitt, *Map Overlay for Land Characteristics*, 1950.
  (Carl Steinitz, Paul Parker, and Lawrie Jordan, 'Hand-drawn Overlays: Their History and Prospective Uses', p. 447.)
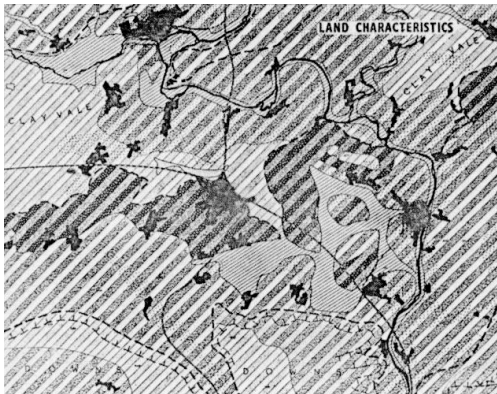
Although layer cake is considered as an accurate plan in terms of drawing type, the specific method of accumulation and representation of such inventory maps conveys a diagram's strategy to a certain degree, in which a visible and an invisible landscape information is intended to be visualized, and strategic judgements of particular values for planning are involved during the process. For example, one diagram for *Woodlands New Community* in Texas from 1971 to 1974 described such diagrammatic features of the layer cake model (Figure 6).[19] In the representation, many maps of landscape information that take the form of parallel projection are accumulated and assembled loosely in chronological sequence. This technique resembles, as mentioned in Chapter II, a diagrammatic representation by American modernist landscape architects in the early and the mid-twentieth century (Figures II-35, 36).

Although the layer cake method is McHarg's most influential contribution to landscape architecture, the origin of such map overlay analysis can be traced back to the contributions of Frederick Law Olmsted, Charles Eliot, and Warren Manning in the late nineteenth century and later other pioneers and contemporaries, such as urban planners, geographers, and civil engineers of the twentieth century.[20] McHarg never stated clearly where he derived his map overlay method, but he stated in his 1996 autobiography *A Quest for Life* that he enrolled in a correspondence course while in the army in the mid-1940s.[21] The course was offered by the London School for Reconstruction and Development and included lectures of British woman town planner Jacqueline Tyrwhitt (1905–1983), who discussed explicitly the map overly methods in her article in 1950 (Figure 7).[22] Thus, McHarg's layer cake analysis might have been affected by those of other practitioners and scholars.[23]

Before the use of the term layer cake, McHarg had already established the map

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[19] Ian L. McHarg, *A Quest for Life: An Autobiography*, New York: John Wiley & Sons, 1996, p. 258.

[20] Carl Steinitz, Paul Parker, and Lawrie Jordan, 'Hand-drawn Overlays: Their History and Prospective Uses', *Landscape Architecture* September 1976, pp. 444–455; Frederick Steiner, 'Revealing the Genius of the Place: Methods and Techniques for Ecological Planning', in *To Heal the Earth: Selected Writings of Ian L. McHarg*, pp. 203–211.

[21] Ian L. McHarg, *A Quest for Life: An Autobiography*, p. 56.

[22] Jacqueline Tyrwhitt, 'Surveys for Planning', *Town and Country Planning Textbook*, ed. APRR, London: The Architectural Press, 1950, pp. 146–196. For a brief description of map overlay method by Tyrwhitt, see Carl Steinitz, Paul Parker, and Lawrie Jordan, 'Hand-drawn Overlays: Their History and Prospective Uses', p. 446.

[23] In addition, according to Spirn, McHarg's bird's-eye view of *Potomac River Basin Study* is remarkably similar to the drawing of Valley Section by Scottish biologist and town planner Patrick Geddes (1854–1932). Anne Whiston Spirn, 'Ian McHarg, Landscape Architecture, and Environmentalism: Ideas and Methods in Context', p. 102. Moreover, historian of architectural and urban development Margot Lystra notes that drawings executed by McHarg in the mid-1960s are similar to those of ecologist Howard T. Odum (1924–2002) in the 1950s. Margot Lystra, 'McHarg's Entropy, Halprin's Chance: Representations of Cybernetic Change in 1960s Landscape Architecture, *Studies in the History of Gardens & Designed Landscapes* 34(1), 2014, p. 75.

overlay method through several projects, such as *Potomac River Basin Study* (1965–1967), *Richmond Parkway Study* (1968), and *Study of Staten Island* (1968). The suitability analysis with map overlay method is described clearly in the first half of the article titled 'A Case Study in Ecological Planning: The Woodlands, Texas' in 1979.[24]

The layer cake analysis is generally conducted through three specific methods. First is an inventory that collects landscape information, followed by an evaluation of values of each landscape components by interpreting relationships between the components to identify suitable areas for particular land use. The last and third is a visualization that not only maps each component but also produces the final suitability map according to the two previous methods.

First, layer cake process starts to collect and map landscape information. The information mainly includes ecological components, such as physiography, geology, soils, hydrology, vegetation, wildlife, climate, and resources (Figure 8).[25] This inventory also includes various human cultural factors, such as ethnographic history, settlement patterns, existing land use, existing infrastructure, and population characteristics.[26]

Second, values of data inventoried in the preceding step are evaluated according to suitability for a particular land use. In this procedure, matrix, which another important analysis tool, is used (Figure 9). The matrix functions to identify relationship or interaction between various elements. Specifically, the matrix format facilitates systemic evaluation of specific relationships between landscape components, land uses, development activities, and concomitant components affected directly or indirectly. Through such evaluation of various interactions, specific opportunities and constraints of landscape components for certain land uses are interpreted and visualized in the form of maps.[27]

Third, visualization is a dominant procedure in layer cake analysis, as mapmaking is a major technique in not only the final suitability map but also the two former processes of inventory and evaluation (Figure 10). In particular, the final map is produced by overlaying various maps of opportunities and constraints to identify suitable areas for particular land use. 'The areas with the greatest number of opportunities and least

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[24] Ian L. McHarg, Arthur H. Johnson and Jonathan Berger, 'A Case Study in Ecological Planning: The Woodlands, Texas', in *To Heal the Earth: Selected Writings of Ian L. McHarg*, pp. 242–263. According to prominent landscape scholar of ecological planning Frederick Steiner, this report is 'the best single description of suitability analysis'. Frederick Steiner, 'Revealing the Genius of the Place: Methods and Techniques for Ecological Planning', p. 209.

[25] Ian L. McHarg, Arthur H. Johnson, and Jonathan Berger, 'A Case Study in Ecological Planning: The Woodlands, Texas', p. 245.

[26] Ian McHarg, 'Natural Factors in Planning', *Journal of Soil and Water Conservation* 52(1), 1997, p. 14.

[27] Ian L. McHarg, Arthur H. Johnson, and Jonathan Berger, 'A Case Study in Ecological Planning: The Woodlands, Texas', p. 249.

8. Ian McHarg, *Some Useful Inventory Maps*, 1979.
(Ian L. McHarg, Arthur H. Johnson and Jonathan Berger. 'A Case Study in Ecological Planning: The Woodlands, Texas', p. 245.)

Table 6. Some Useful Inventory Maps

1. Physiography	Elevation, slope
2. Geology	Bedrock or subsurface geology, surficial deposits, geologic cross-sections
3. Soils	Series or phases, drainage classes, hydrologic groups, capability group, depth to seasonal high water table, as applicable
4. Hydrology	Depth to water table, aquifer yields, direction of ground-water movement, recharge areas, water quality, surface waters (lakes, streams, wetlands), flood zones, drainage basins
5. Vegetation	Distribution of associations, communities, and habitats as identifiable, areas important as noise buffers, food supplies, for wildlife, nesting areas
6. Wildlife	Identification of species and their habitats and ranges, movement corridors
7. Climate	Macro- and microclimate parameters (temperature, moisture, wind). Ventilation and insulation may be determined in conjunction with physiography
8. Resources	Mineral or other valuable natural resources

9. Ian McHarg, *Matrix*, 1979.
(Ian L. McHarg, Arthur H. Johnson and Jonathan Berger. 'A Case Study in Ecological Planning: The Woodlands, Texas', p. 247.)
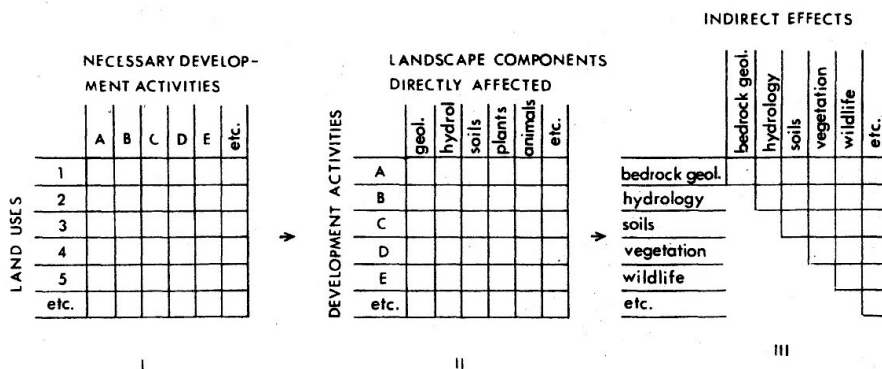
10. Ian McHarg, *Overlay method for determining suitability of a specific land use by combination of opportunities and constraints*, 1979.
   (Ian L. McHarg, Arthur H. Johnson and Jonathan Berger. 'A Case Study in Ecological Planning: The Woodlands, Texas', p. 250.)

INVENTORY MAPS

FLOOD PRONE AREAS SOIL DRAINAGE CLASS UNCONSOLIDATED MANTLE CONDITION TOPOGRAPHY
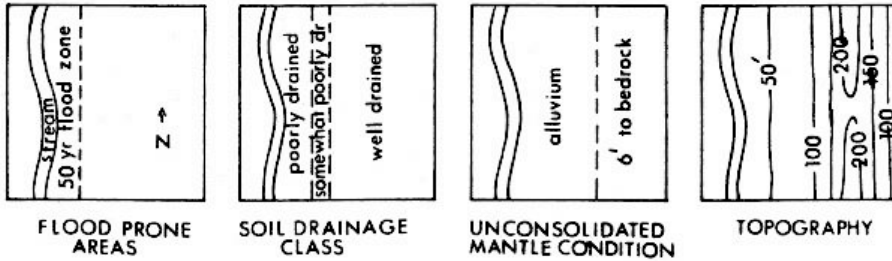
Proposed land use: medium density housing with septic tanks

OPPORTUNITY MAPS

Soil drainage interpreted for septic tank suitability + Geology interpreted for foundation cost savings + Aspect interpreted for energy savings → COMPOSITE OPPORTUNITIES

+

CONSTRAINT MAPS
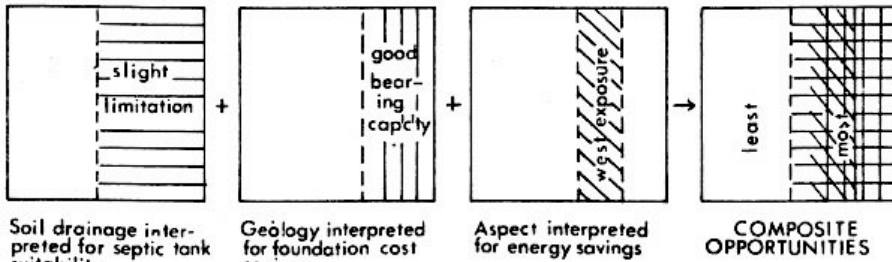
Hydrology interpreted for hazard to life and health- preempts housing + Soil drainage interpreted for septic tank limitations + Soils interpreted for foundations → COMPOSITE CONSTRAINTS

↓
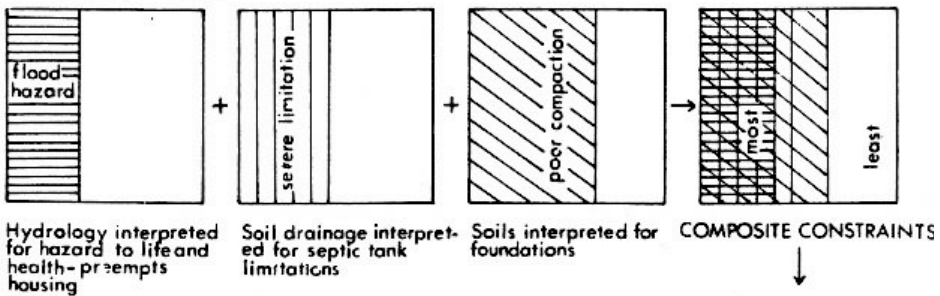
SUITABILITY
♦ prime
O secondary
X unsuitable
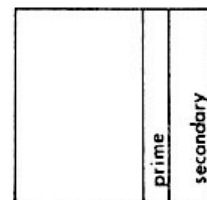
SUITABILITY SYNTHESIS

constraints are the most suitable for the specified land use'.[28]

McHarg's scientific maps of layer cake analysis emphasizes on graphical elaboration. For colouring numerous elements of the aforementioned several maps, many discriminable colours or gradients or patterns are required. In an interview by *GIS World* in 1995 for being the first recipient of lifetime achievement award, McHarg accounted for such elaborated visualization of maps for manual layer cake analysis:

> [Before using computer], we started with magic marker of course. There was a time in which I was very interested in buying magic markers. I wanted colors to be incremental like a step ladder. That was true of magic markers. There were artists who discovered colors and gave them wonderful names like puce and viridian and lilac and all sorts of things. But I wanted colors to be numerical, the gray tones to be numerical, so every value we gave was actually meaningful.[29]

In this sense, compared with other similar methods, McHarg's map overlay analysis was often considered as 'one of the most graphically elaborate examples of overlay analysis'. [30] McHarg likewise believed that visual media play important roles in communication with the public. In 1969, McHarg's significant book *Design with Nature* was published, in which he described as 'a fitting climax of my[his] life', and overwhelmed all his other numerous bibliographies. This book reflected clearly his efforts to elaborate graphic visualization. He was engaged fully in the overall process of the book in terms of not only graphic design of beautiful and vivid inventory maps but also layout design of each page for legibility of graphics and letters.[31] Moreover, McHarg often tailored project reports to meet the needs of different readers. For example, a project report in 1965 for *Plan for the Valleys* exists in two forms, specifically, 'a technical report of some 80,000 words and an illustrated synopsis designed for submission to each participant landowner (Figure 11)'.[32] In other words, McHarg used appropriate visual form of communication with the public.

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[28] *Ibid.*, p. 249.

[29] Ian McHarg, 'In Memoriam: Ian McHarg Reflects on the Past, Present and Future of GIS', *GEO World* June 2001,
[website]
http://www.gisknowledge.net/topic/spatial_thinking_and_gis/geoworld_interview_ian_mcharg_95.pdf. Originally published in *GIS World* October 1995.

[30] Carl Steinitz, Paul Parker, and Lawrie Jordan, 'Hand-Drawn Overlays: Their History and Prospective Uses', p. 448.

[31] Ian L. McHarg, *A Quest for Life: An Autobiography*, pp. 175, 202–206.

[32] Ian L. McHarg and David. A. Wallace, 'Plan for the Valleys vs. Spectre of Uncontrolled Growth', in *To Heal the Earth: Selected Writings of Ian L. McHarg*, p. 272, originally published in *Landscape Architecture*, 55(3), 1965, pp. 179–181.

11. Ian McHarg, *Bird's eye perspective as proposed, the Green Valley and the Worthington Valley, Maryland*, 1965. (http://www.wrtdesign.com/projects/detail/plan-for-the-valleys/316)

(2) Substitute for hand: GIS

McHarg's map overlay analysis was first carried out using hand, and was later replaced by the computer. Although McHarg was not engaged in designing the software, his analysis process informed the development of the early computerized GIS.[33] Several early GIS software, including SYMAP, GRID, and ODYSSEY, was developed at the Harvard Laboratory for Computer Graphics and Spatial Analysis, in collaboration with the Department of Landscape Architecture at the Graduate School of Design from the 1960s to 1970s. In 1967, McHarg was invited by the department to describe his works and techniques; at the time, he presented his suitability analysis using map overlay method to Harvard students.[34]

Before the use of GIS software, McHarg already had paid attention to the potential of computer technology. For example, in 1966, with the funding from the Ford Foundation, he recruited new multidisciplinary and interdisciplinary faculty members within the Department of Landscape Architecture at the University of Pennsylvania. The faculty included not only environmental scientists but also a specialist in computer science and remotely sensed imagery, E. Bruce MacDougall, who later collaborated with McHarg in the initial computerized ecological planning projects in 1970s.[35] In addition, in reviewing The *Study of Staten Island* in a chapter titled 'Processes as Values' in *Design with Nature*, McHarg offered an optimistic prospect for the potential of computer technology that would overcome certain limitations inherent in the manual map overlay method. He explained:

> Certain technical problems are inherent in the method [map overlay method]. The
> first of these is the ensurance of parity of factors. The result will be qualified if the

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[33] Robert D. Yaro, 'Foreword', in *To Heal the Earth: Selected Writings of Ian L. McHarg*, p. xi. As Steiner sated, 'Almost every […] (GIS) presentation begins with a depiction of a layer cake, although rarely crediting McHarg and often without his eloquence or insight into how the data should be collected and analysed'. Frederick R. Steiner, 'Preface', p. xiii.

[34] Nick Chrisman, *Charting the Unknown: How Computer Mapping at Harvard Became GIS*, Redlands, Calif.: ESRI Press, 2006, p. 43. The lecture invited not only McHarg but also soil scientist and forester Angus Hills and landscape architect Philip Lewis to present their works and techniques. According to the report on the presentation, 'none of the methods was complete enough as presented'. McHarg's method was 'despite the grand overview, his [McHarg's] technique boiled down to separate maps of suitability overlaid to produce a composite. How all the variables would be combined was not entirely specified'. Nick Chrisman, *Charting the Unknown: How Computer Mapping at Harvard Became GIS*, p. 43. See Landscape Architecture Research Office, Graduate School of Design, Harvard University, *Three Approaches to Environmental Resource Analysis*, Washington, D.C.: The Conservation Foundation, 1967.

[35] Ian L. McHarg, *A Quest for Life: An Autobiography*, p. 191.

factors are of disproportionate weights. Too, there are limits to the photographic resolution of many factors and this study reached that threshold. The mechanical problem of transforming tones of gray into color of equal value is a difficult one, as is their combination. It may be that the computer will resolve this problem although the state of the art is not yet at this level of competence.[36]

With the expectations of computer technology, in the early 1970s, McHarg began to introduce computer to ecological planning. In 1973, McHarg, MacDougall, and Lewis Hopkins developed the study of computerized route selection for *Wilmington Outer Beltway*. They collected and digitized, in one-acre cells, numerical ecological and cultural information including meteorology, geology, soils, vegetation, wildlife, and historical buildings and places.[37] McHarg looked back on this project, as follows:

> I was introduced to it [computer] by Lou [Lew] Hopkins, a young man who was a student of mine and now [1995] is the chairman of planning at the University of Illinois, […] He asked, "Do you mind if I try it?" I said, "Go ahead, but nobody can help you." He told me that Britton Harris had received a $7 million grant and he has a big mainframe IBM, so he began to assist.[38]

McHarg also published an article with Jonathan Sutton in 1975 in *Landscape Architecture*, titled 'Ecological Plumbing for the Texas Coastal Plain' in which they stated that 'detailed soil and vegetation surveys were computerized' for *Woodlands New Community* in Texas (Figure 12).[39] However, McHarg was, at the initial days of use of computer, dissatisfied with capabilities of computer, which failed to come up to his expectation. Looking back on, McHarg described certain problems of initial computerized analysis:

> […] When the first Intergraph package came out, it gave us a wonderful choice of colors. […] But the first computer programs were really quite terrible. As a matter of fact, we first used typewriter keys over printing, where you color by using color

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[36] Ian McHarg, 'Processes as Values', in *Design with Nature*, New York: The Natural History Press, 1969, p. 115.

[37] Ian L. McHarg, *A Quest for Life: An Autobiography*, pp. 220, 339.

[38] Ian McHarg, 'In Memoriam: Ian McHarg Reflects on the Past, Present and Future of GIS'.

[39] Ian L. McHarg and Jonathan Sutton, 'Ecological Plumbing for the Texas Coastal Plain', *Landscape Architecture* 65, January 1975, p. 81.

ribbons. […] Primitive beyond description: grids [and] rasters[,] the output was typewriter overprinting. An enormous amount of intelligence in a barbarous product.[40]

Initial computer's problems included not only the aforementioned inferior graphic quality but also its lack of accuracy. McHarg described an inherent limitation of the ability of the early 1970s to digitize landscape data:

In the early 1970s, spatial computation was in its infancy. Digitizing was undertaken with cells that introduced a basic error. Cells could only record the presence of a single property, so that the dominant property of a given location would be recorded, and all other properties would be omitted. Moreover, nature is not rectilinear, but the cells were; lines became sawteeth. Even more difficult, the majority determination often failed to represent continuous features[, that is,] river could appear, disappear, reappear as might beach ridges, highways, power lines, and other features.[41]

How did the computer technology function in McHarg's ecological planning using map overlay analysis? To quote again, what he expected from computer technology is the ability of 'ensurance of parity of factors' and 'transforming tones of gray into color of equal value […] [and] their combination'.[42] In other words, McHarg attempted to achieve an accurate and high-quality graphic visualization of landscape information through the help of state-of-the-art computer technology. The main reason for McHarg's expressed dissatisfaction over computerized map overlay analysis in the early 1970s was limited capability of the technology for an accurate and high-quality visualization. As McHarg sated, there were 'magical improvements' in computer technology a decade later.

The first was the capability to digitize in polygons using exact boundaries of attributes; output reflected polygons, and no error was introduced. Next, it became possible to superimpose multiple factors, to engage in analysis and undertake

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[40] Ian McHarg, 'In Memoriam: Ian McHarg Reflects on the Past, Present and Future of GIS'. Similarly, in his autobiography, McHarg described the initial computer's inferior graphic quality as follows: 'The graphic output was as abject: typewriter keys were overlaid to provide texture in a caricature of gray scales; typewriter ribbons were the only source of color'. Ian L. McHarg, *A Quest for Life: An Autobiography*, p. 285.
[41] Ian L. McHarg, *A Quest for Life: An Autobiography*, p. 285.
[42] Ian McHarg, 'Processes as Values', in *Design with Nature*, p. 115.

12. Ian McHarg and Jonathan Sutton, *Synthesis Map showing varying levels of 'landscape tolerance' for man-made developments*, 1975.
   (Ian McHarg and Jonathan Sutton, 'Ecological plumbing for the Texas Coastal Plain', p. 84.)

13. Ian McHarg et al., *Digital terrain model of Mount Desert Island, Maine*, 1994.
   (Ian L. McHarg, *A Quest for Life: An Autobiography*, p. 359.)

suitability searches; that is, to locate those regions where all or most propitious attributes were located with no or few detrimental factors.[43]

Computerized analysis provided other opportunities in terms of instrumentality of technology.

> I believed that the remedy to reduce costs could be provided by the computer and the possibility of creating automatic procedures. The objective was to do such planning with greater accuracy, to include more complex data, and to achieve better analysis, thus producing superior products, faster and cheaper than possible by manual methods.[44]

With the development of computer technology, McHarg and John Radke, a geographer and GIS specialist, reintroduced computers at the Department of Landscape Architecture in 1985.[45] Thus, McHarg considered computer as merely a mechanical technology that could carry out map overly analysis, a tool that served as a substitute for hand. McHarg's optimistic expectation and trust in computer technology continued until the 1990s. McHarg's later inventory proposals at the national and global scale adopted a methodology similar to that of his earlier projects. He further took an extremely optimistic point of view towards computer technology to facilitate such inventories. In 1997, he published an article titled 'Natural Factors in Planning' in which he proposed ecological planning using natural resource information and accounted for the importance of computer technology in such procedures.

> On the positive side the increase in scientific knowledge, the availability of sensors, not the least geo positioning systems (GPS) offer great opportunities for ecological planning. As important are computers, their ability to digitize massive data sets, retrieve data, analyze them, and undertake automatic analytic procedures and finally perform complex planning syntheses. […] The continuing advances in computation may be the greatest reason for optimism. More data can be ingested, evaluated, synthesized faster, more accurately than ever before. […] In sum the opportunities for integration, organisation of rich data, its analysis and planning

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[43] Ian L. McHarg, *A Quest for Life: An Autobiography*, p. 367.
[44] *Ibid.*, p. 367.
[45] Richard Weller and Meghan Talarowski, eds., *Transacts: 100 Years of Landscape Architecture and Regional Planning at the School of Design of the University of Pennsylvania*, San Francisco: Applied Research and Design Publishing, 2014, p. 119.

using GIS are true, they are available.[46]

Advanced computer technology functioned to imitate previous manual techniques, layer cake analysis; specifically, inventory, evaluation, and visualization. First, as indicated in the above quotation, computers could digitize massive datasets faster and more accurately than manual methods. Second, computer could identify easily complex interaction or relationship between inventoried components of landscape information than a matrix of manual method by performing complicated queries. As McHarg stated:

> Most important of all, it is possible to initiate "queries", to ask questions of the system. The object can be as simple as identifying single attributes or as complicated as establishing the concurrence of many attributes to show correlations been several factors.[47]

Third, advanced computer could produce high resolution graphics, and provide not only the ability to visualize static 2D maps but also opportunity to construct landscape terrain based on landscape information in a 3D realm (Figure 13).

> Today it is possible to digitize in polygons, to produce plots of geology, hydrology and soils, vegetation, wildlife, land use, to produce automatically plots of slope, aspect, and insolation categories, to make a [… 3D] digital terrain model and view it from any height or direction.[48]

When a landscape architect Alan Berger asked McHarg of his plans when he becomes a Professor Emeritus, he answered, 'to finish mapping the Earth'.[49] For producing such inventory of information of the Earth and thereby controlling the planet, computer was intended to be exploited fully as a mechanical technology.

In this evolution emerged new technological marvels, sensors, satellite imagery,

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[46] Ian McHarg, 'Natural Factors in Planning', pp. 15–17.
[47] Ian L. McHarg, *A Quest for Life: An Autobiography*, p. 285.
[48] *Ibid.*, p. 285.
[49] Alan Berger, 'Foreword', in *Ian McHarg Conversations with Students: Dwelling in Nature*, eds. Lynn Margulis, James Corner, and Brian Hawthorne, New York: Princeton Architectural Press, p. 7.

geo-positioning systems, computers, and […GIS]. We can feel the world's pulse. We can undertake not only national but also global inventories. We can monitor the planet.[50]

[50] Ian McHarg, 'Landscape Architecture', in *To Heal the Earth: Selected Writings of Ian L. McHarg*, p. 192.

3.2.2. Landform Simulation: Model Making

(1) Physical model

Among the main representation mediums in landscape design is model making for studying landform or terrain of designed landscape. Physical models have been effective for both landscape architects and the public. The 3D small-sized miniature models that simulate the future or existing landscape provide designer with a tactile and a transformable physicality. The 3D physicality can capture the public's attention easily and, thereby, help the public to understand landscape. Although such physical modelling continues to be used frequently in landscape practices to study and present landscape, computer software, such as 3D CAD, SketchUp, and Rhino, are also increasingly being used to study landform.

Kathryn Gustafson (1951–) and George Hargreaves (1952–) have used frequently and effectively such physical modelling to study landform during their design process. The major characteristic of works by the two designers are beautiful visible forms of landscape, which they have used the physical medium to imagine and generate. The initial main usage and function of CAD software in landscape design is found in the realization process that translates physical landform models to physical construction.

To examine the early use of the computer software, manual methods for physical models executed by the two landscape architects must first be discussed. The two designers have made artificial visible landform. For example, Gustafson or her firms' works resemble sculpture, and, thus, certain critics described a significant principle of her works as 'sculpting the land', or 'shaping the land (Figure 14)'.[51] As an art critic Aaon Betsky stated:

> In every [Gustafson's] design, there is a shape: a bulge, a curve, a splay, a rise or just a gate that defines the landscape as having a substance all its own. For […her], landscape is a physical material that she molds in order to reveal something about the place, add something new, and blend nature and invention into a seamless whole.[52]

Similarly, Hargreaves Associates' works have complex graded visible form. The

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[51] Leah Levy, *Kathryn Gustafson: Sculpting the Land*, Washington, D.C.: Spacemaker Press, 1998, p. 11; Aaron Betsky, 'The Long and Winding Path: Kathryn Gustafson Re-Shapes Landscape Architecture', in *Moving Horizons: The Landscape Architecture of Kathryn Gustafson and Partners*, Jane Amidon, Basel: Basel: Birkhäuser, 2005, pp. 7, 10.

[52] Aaron Betsky, 'The Long and Winding Path: Kathryn Gustafson Re-Shapes Landscape Architecture', p. 7.

14. Kathryn Gustafson, *Retention Basin and Park*, *Morbras*, 1986.
    (Jane Amidon, *Moving Horizons: The Landscape Architecture of Kathryn Gustafson and Partners*, p. 35.)

15. Kathryn Gustafson, *Model of Retention Basin and Park*, Morbras, 1986.
    (Jane Amidon, *Moving Horizons: The Landscape Architecture of Kathryn Gustafson and Partners*, p. 34.)

16. Hargreaves Associates et al., *Sand study model of Candlestick Point Park*, 1985–1993.
   (Karen M'Closkey, *Unearthed: The Landscapes of Hargreaves Associates*, p. 14.)

17. Hargreaves Associates, *Clay study model of Parque do Tejo e Trancao*, Lisbon, 1994.
   (Karen M'Closkey, *Unearthed: The Landscapes of Hargreaves Associates*, p. 14.)

only slightly difference is from where such landform is derived. Although Gustafson's landforms generally come from her intuitive feeling, Hargreaves's curvilinear landforms frequently have ecological performance. However, Hargreaves's landforms are also created artificially to resist idealized pastoral landscape. As landscape architects and scholars Karen M'Closkey remarked:

> In many of the firm's [Hargreaves Associates] projects, the earthwork is predominant. […] in all cases, such forms are clearly human-made. […] even though, Hargreaves Associates' work utilizes earth, water, and vegetation as the primary structuring elements (in conjunction with all the unseen physical supports that make these landscapes possible, such as retaining and utilities), the firm's approach to molding the ground reflects an effort to resist naturalization.[53]

To imagine and study such artificial landforms, the two designers' firms have been made physical model. The 2D static projection drawings only play a limited role in conceiving 3D characteristics of complex graded landform. In particular, physical model making was used to study and explore landform in the early stages of design process. In Gustafson's works since the mid-1980s, physical model, particularly clay, has been exploited to embody and study her intuitive landforms (Figure 15). As curator Leah Levy described:

> After she [Gustafson] has conducted library research, site visits, and interview with users and clients, she begins a profoundly introspective design process. She starts by listing words that evoke existing or desired meanings, feelings, ambiances, and then expresses these with sketched images that often relate to the landscape and the human form. These early drawings are the foundation for […3D] clay models, a fluid and tactile transposition of her thoughts into abstract forms. From the clay, she casts rubber molds, then pours plaster into them, creating miniature models of the landscapes she intends to fashion.[54]

For Gustafson's design process, such physical models have functioned as an imaginative and a creative medium to conceive and generate seamless and tactile abstract

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[53] Karen M'Closkey, 'Introduction', in *Unearthed: The Landscapes of Hargreaves Associates*, pp. 12–13.
[54] Leah Levy, *Kathryn Gustafson: Sculpting the Land*, p. 9

pure landform. Moreover, the 3D physical models have been used as an effective medium to communicate with clients, the public, and even other partners and staffs.

> For Gustafson, clay (cast into plaster) is ideal: monochromatic models allow designers and clients to understand pure form giving and making. […] Increasingly, a partner in charge of a given project works on the clay maquette with frequent review with team members.[55]

Hargreaves's firm has frequently used various physical models to explore design idea and study landform. The firm had initially utilized sand as a modelling medium for *Candlestick Point Cultural Park* from 1985 to 1993; the park was among the firm's early major works and a result of collaboration with artist Douglas Hollis and architect Mark Mack (Figure 16). Glenn Allen, who was a principal of the firm, described the advantages of sand as modelling material in the conversation with his colleague Kirt Rieder:

> Sand as a modelling medium had the distinguishing characteristic of conforming to a natural angle of repose approximating that of an actual earthwork; this kept the sandbox study "honest" in terms of slope and footprint.[56]

Because such models had a characteristic of 3D physicality, they enabled his clients and the public to understand landform easily in a way that the photographs of such physical models were shown to other people. In addition, the sandbox models facilitated the communication with his team members, who could test ideas within the models and obtain immediate feedback from others.[57]

After the use of sandbox models, Hargreaves Associates began to utilize clay as modelling material (Figure 17). The medium enabled designers to explore slope and intersection of landform. As clay is 'responsive, plastic, forgiving, and easy to work with' in terms of medium specificity, it could be 'rapidly altered and repeatedly re-worked'.[58] For the advantages of the clay model, M'Closkey stated:

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[55] Jane Amidon, *Moving Horizons: The Landscape Architecture of Kathryn Gustafson and Partners*, pp. 24, 30.
[56] Kirt Rieder, 'Modeling, Physical and Virtual', in *Representing Landscape Architecture*, p. 169.
[57] *Ibid*., pp. 169–170. However, as the sandbox was not portable, the evolving processes were preserved only in photographs.
[58] *Ibid*., pp. 171, 175.

[T]he firm (Hargreaves Associates) relies heavily on physical models made from clay. Working with such material enables the designer to bypass the limits of drawing and develop a facility for working the ground in complex ways. Clay models are not images in the way that drawings or diagrams are. The clay is not notational or pictorial; rather, it is a transformable, malleable, and homogenous substance. Rather than representing movement through notational drawings, or representing temporality through indexing past traces, clay enables the designer to focus on the form of the ground and the importance of sectional change for guiding movement[,] of people and water[,] and creating spaces.[59]

Although digital modelling technology continues to develop, the two designers' firms still use physical models. In particular, such physical models are utilized to conceive and explore initial ideas related to landform. According to Rieder, the usefulness of clay model compared with the virtual ones is as follows:

[3D] clay models are typically more accessible to a broader audience than […3D] computer models because their physicality makes them easier to understand through touch and sight. […] Clay supports free inspection whereas digital models require controlled vantage points.[60]

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[59] Karen M'Closkey, 'Introduction', p. 13.
[60] Kirt Rieder, 'Modeling, Physical and Virtual', pp. 175–176.

(2) Translation from physical models to construction documents: CAD

With the development of digital modelling software, digital models using SketchUp, Rhino, and 3D CAD take the place of physical models, such as sand and clay, to a certain degree. However, this section does not address such transition of technologies from physical to virtual medium. Instead, more importantly, this section discusses a function of digital technology, particularly computer-aided design and drafting (CADD), which translates the physical model into construction documents to realize design on actual site. In other words, such translation performance was the main role of CAD when it was initially introduced in landscape design.

The early development of CAD software was closely related to architectural design, such as the earliest exploration of Ivan Sutherland in the early 1960s. In the early 1980s, ArchiCAD and AutoCAD were released and made available in the fields of built environments, such as engineering, architecture, and landscape architecture.[61] According to Rieder, until the early 1990s, 'there were few computers in landscape architecture offices, and widespread adoption of […] CAD software had yet to occur. The use of clay, Polaroid, copy machines, and tracing preceded the use of CAD'.[62] This slow adoption of computer technology was shown in a survey of ASLA members conducted in 1993, according to which cumulative adoption of CAD until that point accounted for below 70%.[63]

In the 1990s, CAD software mainly functioned as a tool to produce construction documents. Specifically, in terms of model making, the software was mainly used to translate physical models into construction drawings. To realize the 3D miniatures on actual site, construction drawings that represent detailed instructions were needed inevitably, and CAD software was used to perform the translation process from 3D physical models into 2D projection drawings.

For example, *Right of Man Square* in 1991, one of Gustafson's early works, included the translation process using CAD. To create the Dragon Basin's snakelike form, which traverses across the square and was 'most significant visual and artistic gesture', Gustafson made clay model from the early design sketch and the physical model was then translated into construction documents for realization with help from engineers (Figures 18, 19). 'From Gustafson's clay model, Gerard Pras worked with Francois Le manse, who

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[61] Jillian Walliss, Zeneta Hong, Heike Rahmann, and Jorg Sieweke, 'Pedagogical Foundations: Deploying Digital Techniques in Design / Research Practice', *Journal of Landscape Architecture* 9(3), 2014, pp. 72–73.
[62] Kirt Rieder, 'Modeling, Physical and Virtual', p. 187
[63] James Palmer and Erich Buhmann, 'A Status Report on Computers', *Landscape Architecture* 84(7), 1994, p. 55.

18. Kathryn Gustafson, *Dragon Basin Model for Rights of Man Square, Evry*, 1991.
   (Leah Levy, *Kathryn Gustafson: Sculpting the Land*, p. 56.)

19. Kathryn Gustafson, *Elevation of Dragon Basin for Rights of Man Square, Evry*, 1991.
   (Leah Levy, *Kathryn Gustafson: Sculpting the Land*, p. 61.)
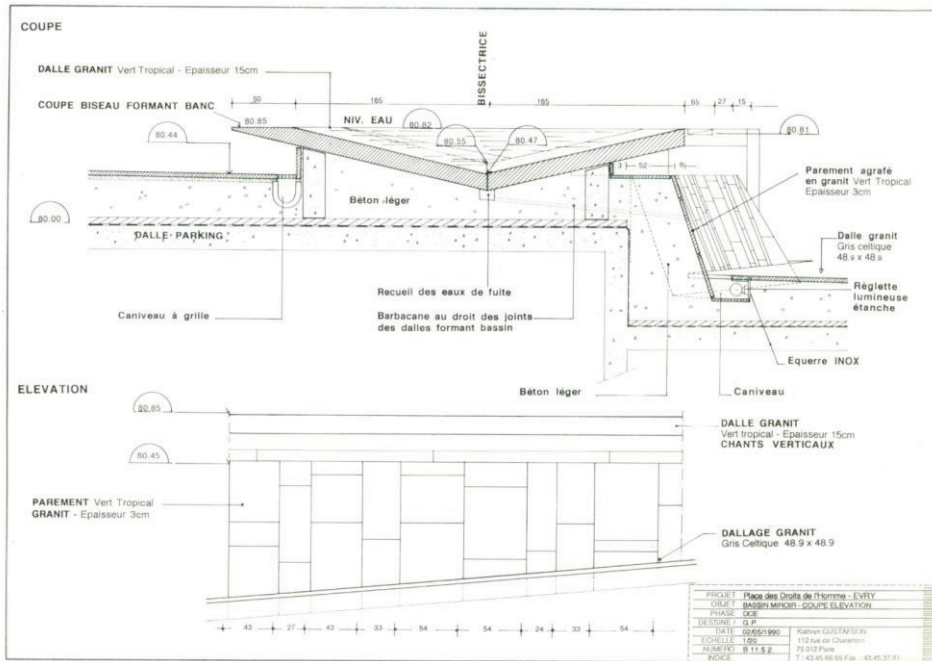
20. Hargreaves Associates, *Clay Model of La Terre en Marche, Chaumont-sur-Loire*, 1995.
   (Kirt Rieder, 'Modeling, Physical and Virtual', p. 176.)
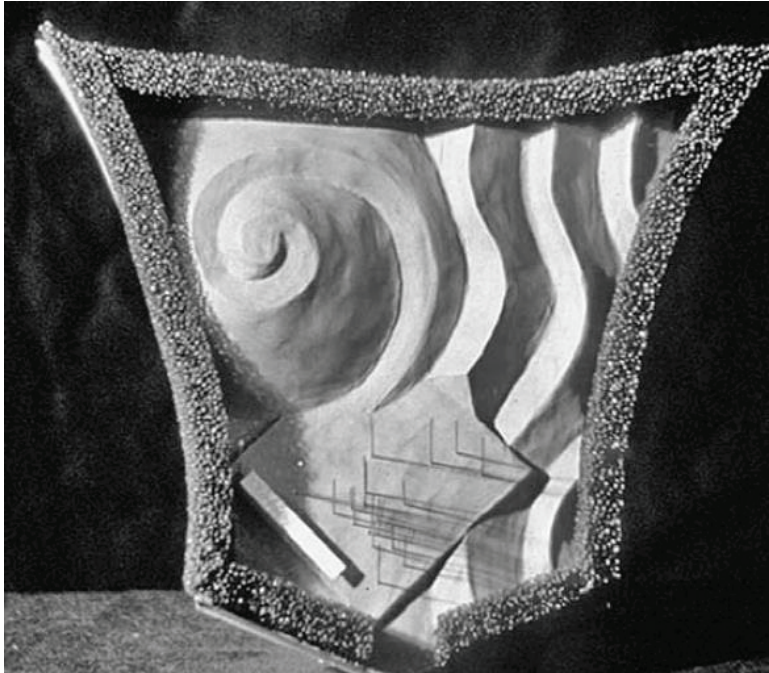
21. *Construction detail drawing*, 1996.
   (James L. Sipes, A. Paul James, and John Mack Roberts, 'Digital Details: Tired of Redrawing the Same Old Construction Details? Consider CAD Detail System', p. 40.)
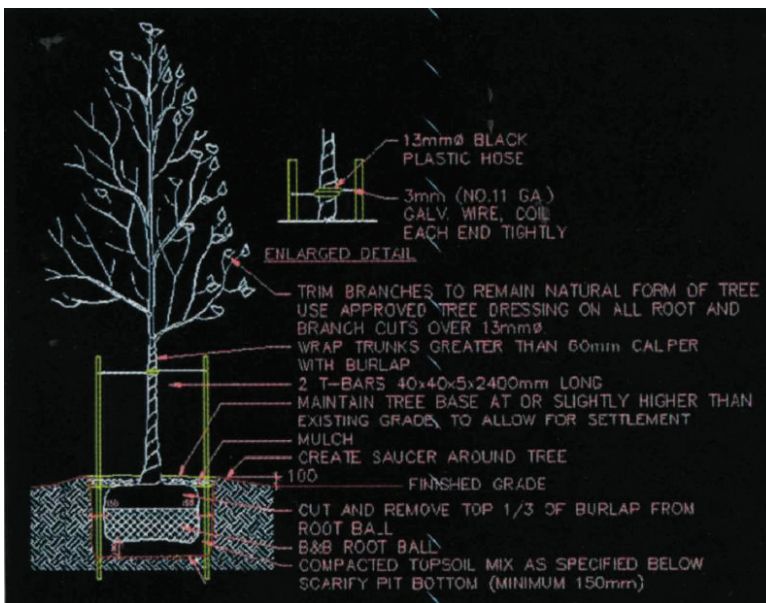
generated a 3D computer model and detailed construction drawings'.[64] In this process, computer technology was used to merely depict mechanically the appearance of designed structure in the form of projection drawings.

Similarly, Hargreaves Associates' landform used the CAD software to produce construction drawings. For example, the firm used clay model to explore initial design concept for a proposal *La Terre en Marche* for the annual Festival of Gardens at Chaumont-sur-Loire in 1995 (Figure 20). The final physical model was shipped to France to persuade the competition administrator. [65] The model was then translated into construction documents with CAD for realization. As Rieder stated, 'translating the […3D] clay model into a set of […2D] construction drawings was a crucial step toward realization'.[66] In this process, computer technology was used as a mechanical tool to produce projection drawings.

In the translation process, another visualization medium was used, that is, photography. Specifically, to make it easier to facilitate the translation process from 3D structures into 2D plane of drawing, the model was first converted to photographs, which were then translated into construction documents. According to Rieder, '[i]n [the] 1990s, students photocopied small clay models to use as crude […2D] bases for their grading plans'.[67]

As shown in the works of the two designers' firms, the use of CAD software as a mechanical tool was general in landscape architecture offices in the 1990s. The aforementioned survey of ASLA members in 1993 concluded that 'while many offices are using AutoCAD, it is primarily oriented toward producing construction documentation. There does not seem to be [a] widespread use of computer software for conceptual design or interactive 3D visualization'.[68]

This CAD's function of instrumentality was only a small part of its potentiality that landscape architects expected in the 1980s when the software was initially introduced into the discipline. As discussed earlier, *Landscape Architecture* in the 1980s contained essays related to creative potential of CAD software.[69] For example, in a special-themed issue of computer technology in July/August in 1988, Mark S. Lindhult described the potentiality of CAD as data collection, linking data with graphic, and visualization of 3D graphic, and further argued that computer software must be used throughout the design

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[64] Leah Levy, *Kathryn Gustafson: Sculpting the Land*, pp. 55–56.
[65] Kirt Rieder, 'Modeling, Physical and Virtual', p. 176.
[66] *Ibid.*, p. 177.
[67] *Ibid.*, p. 178.
[68] James Palmer and Erich Buhmann, 'A Status Report on Computers', p. 55.
[69] Arthur J. Kulak, 'Prospect: The Case for CADD'; Bruce G. Sarky, 'Confessions of a Computer Convert'; Mark S. Lindhult, 'The Road beyond CAD', *Landscape Architecture* 78(5), 1988, pp. 40–45.

process.[70] However, as shown in the survey in 1993, such potentialities had been explored fully by landscape architects and the software had been merely used to produce construction drawings.

Related to CAD's instrumentality, *Landscape Architecture* published 'Digital Details: Tired of Redrawing the Same Old Construction Detail? Consider CAD Detail System' in 1996. In this piece, James L. Sipes, A. Paul James, and John Mack Roberts described in detail CAD's ability to improve efficiency for construction documentation (Figure 21).

> Features of a standard CAD detail that can be changed include dimensions, line weight, line quality (either hard-edged or "squiggly" lines for a hand-drawn look), and fonts. The landscape architect can print out the detail in any resolution, without any loss in quality, and with his or her own title block.[71]

This mechanical efficiency of CAD increasingly facilitated the widespread use of the software for production of construction drawings. According to the essay, the SWA Group's Dallas office produced more than 90% of its construction drawings in CAD, which enabled much faster modifications than manual construction documents.[72] Moreover, CAD provided sources, such as plant symbols and other material patterns. However, these functions were used to produce construction documents after the design rather than to explore and develop idea throughout overall design process. Indeed, not all landscape architects used CAD for construction drawings. *Landscape Architecture* introduced Digital Terrain Models (DTMs) that could be adopted in CAD system and other 3D modelling software of landform and natural phenomena, which could import such DTMs.[73] As shown in the 1993 survey, such 3D modelling technologies were not widely used in landscape design.

Until the early 2000s, this instrumental utility of CAD had continued. When the 2000 survey of ASLA concluded that 'the predominant response was that computers were

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[70] Mark S. Lindhult, 'The Road beyond CAD', pp. 40–45.
[71] James L. Sipes, A. Paul James, and John Mack Roberts, 'Digital Details: Tired of Redrawing the Same Old Construction Details? Consider CAD Detail System', *Landscape Architecture* 86(8), 1996, p. 38.
[72] *Ibid*., p. 40.
[73] Stephen M. Ervin, 'Digital Terrain Modeling', *Landscape Architecture* 84(1), 1994, pp. 31–35; James L. Sipes, 'Simulating Natural Phenomena', *Landscape Architecture* 84(5), 1994, pp. 30–32; James L. Sipes, 'Creating Digital Worlds: A New Generation of Computer Programs Makes it Possible to Simulate the Visual Complexities of Real Landscapes', *Landscape Architecture* 86(11), 1996, pp. 48–53.

not intuitive and design is intuitive', the computers referred to CAD software.[74] It is during the production of working drawings when CAD software was most frequently used.[75] Such construction drawings, which have major characteristics of projection drawings, are generally produced in a mechanical way that they use standardized symbols and formats to be easily understood by construction workers (Figure 21). What landscape architects expected from CAD was mechanical and instrumental functions to facilitate efficiency for construction documentation. Landscape architects considered 'computer-generated drawings to be more accurate than traditional drawings. […They] also expressed a desire for improvement in various aspects of technology, including more speed, ease and power, compatibility, more/better symbols, and more/better software for precision/calculation'.[76] Therefore, landscape architects considered that 'computers could replace neither the intuitive process nor personal interaction'.[77] The 3D visualizations were increasingly required by clients, but such technology was not frequently used in landscape design.[78]

In sum, as shown in the early works of Gustafson and Hargreaves's firms, CAD was generally used to translate physical models into construction documents. In other words, in the early history of instruction of CAD software into landscape architecture, the former was mainly used as a mechanical tool to produce projection drawings. The software's mechanical capabilities facilitated efficiency for production of drawing and, thereby, quickly became a substitute for hand. Although such mechanical way of using computer technology has several advantages for construction documentation, its production process does not considerably differ from manual method for projection drawing. In other words, in producing construction drawings, computer screen is not much of a creative playground that explores and develops design idea but more of another version of drafting board that illustrates merely an appearance of landscape already designed elsewhere in a way that imitates previous manual method for projection drawing.

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[74] Lolly Tai, 'Assessing the Impact of Computer Use on Landscape Architecture Professional Practice: Efficiency, Effectiveness, and Design Creativity', p. 121.
[75] *Ibid*., p. 119.
[76] *Ibid*., pp. 119, 121.
[77] *Ibid*., p. 121.
[78] *Ibid*., p. 118.

3.2.3. Exploration of Perspective View: Collage and Montage
(1) Image and imagination

Historically, perspective view has been frequently used as an appropriate drawing type in landscape design, as its visual form can capture easily the public's eye who has been schooled in visual representation, such as landscape painting. At present, such perspectives are mainly produced using sophisticated graphic editing software, such as Adobe Photoshop and Illustrator. Before the advent and widespread use of such technologies, perspective drawings were made with hand rendering techniques. As discussed in Chapter II, various manual drawing mediums and techniques have been explored by landscape designers, such as Kent, Repton, Olmsted, and others.

This section addresses historical exploration for creative perspective views with manual method in landscape architecture of the 1980s to 1990s, specifically, image construction using montage and collage. In particular, such manual techniques frequently used photograph materials for image construction, which, in terms of its aesthetics and production process, are associated with recent photorealistic perspective views using image modification software that will be addressed in Chapter IV. In other words, the medium of production of perspective views has been changed from manual to computer.

To fully understand this transition of mediums of such image construction, manual techniques of montage and collage in the 1980s and the 1990s must first be scrutinized. Specifically, diverse visuals executed by Yves Brunier (1962–1991), Adriaan Geuze (1960–), Dieter Kienast (1945–1998), and other landscape architects are examined in terms of *re-presentation* of landscape. More importantly, this section further reviews Corner's theoretical writings and works before 2000s in terms of *re-presentation* and its creative function during design process.

It was generally regarded that *re-presentation* of landscape is an essential role for such montage and collage techniques by landscape architects in the 1980s to the 1990s. Specifically, such image construction was intended to convey new vision for nature against the Arcadian and pastoral ideal of nature, which had been adopted continuously as a central principle of landscape design since the eighteenth-century English landscape gardening and later Olmsted's Central Park. For example, French landscape architect Brunier explored collage technique for *Museumpark Rotterdam* from 1989 to 1993, in collaboration with the Office for Metropolitan Architecture, Rotterdam. Among the works, using manual collage technique using mixed media, such as gouache, oil pastel, ink, crayon, photograph, and other materials, does not depict pastoral landscape, but it *re-present*s cityscape and proposes man-made future park in a way that he covered trunks of apple trees with white gouache, which invoke visual illusions as if nearby popular trees with naturally white

trunks were scaled down (Figure 22).[79] As an architect, Rem Koolhass, with whom Brunier once had worked together, described Brunier's perception of nature and visualization as follows: 'his [Brunier's] relationship with nature was invariably aggressive, as if he wanted to rape nature, strip her of her natural character, and turn her into an expressionist object. […] Yves was a man of few words. He expressed his ideas in the form of drawings and collages tossed off wordlessly. They always contained an element of violence, aggression, and unbelievable impatience'.[80]

Similarly, Dutch landscape architect Geuze, among the founders of West 8, utilized collage and montage technique to resist such Arcadian ideal of nature and further represented artificial and cultural landscape such as cityscape. Geuze redefined landscape architecture as the practice not much to imitate pastoral ideal but to design artificial nature, urban space. As Geuze stated:

> The contemporary landscape is a collage of different territories cut up by athletic infrastructures. Rural landscape, nature and city archaeology of century's extensions form an amalgam. […] A contemporary citizen with his mobile lifestyle and ever changing addresses and activities should not be pushed to live in a functionalist home with a "view" over Arcadian nature; the modernist ideal. […] Instead of reprinting traditional urban tissue without any authentic environmental context, urban planners better create new man-made nature: regenerated forests, landfills and agricultural plantations, new landscape to be colonised.[81]

Geuze's perception of contemporary landscape as a 'collage' of rural landscape, nature, and city was reflected in a specific way of image construction, collage, which was used to *re-present* the mood of complex urban context (Figure 23).[82] A perspective collage for *Schouwburgplein* in 1990, one of early built works by Geuze, represents his future vision for the square at the heart of Rotterdam. In the visual, collage technique was used to

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[79] Anette Freytag, 'Back to Form: Landscape Architecture and Representation in Europe after the Sixties', in *Composite Landscapes: Photomontage and Landscape Architecture*, p. 109.

[80] Odile Fillion, 'A Conversation with Rem Koolhaas', in *Yves Brunier: Landscape Architect*, ed. Michel Jacques, Basel: Birkhäuser, 1996, pp. 89–90.

[81] Adriaan Geuze, 'Introduction', in *West 8*, ed. Luca Molinari, Milano: Skira Architecture Library, 2000, pp. 9–10, 12.

[82] Geuze's perception of landscape architecture has been affected by history of urban and landscape design in his country the Netherlands. He considers history of Dutch built environment as a continuous evolution of construction of infrastructure, such as polders, to prevent natural disasters, such as frequent floods; thereby, he embraces man-made nature. See Udo Weilacher, 'Hyper-realistic Shock Therapy', in *Between Landscape Architecture and Land Art*, Basel: Birkhäuser, 1999, pp. 232, 235–236; Adriaan Geuze, 'Flatness', in *Mosaics West 8*, eds. and trans. Fanny Smelik, Chidi Onwuka, Daphne Schuit, Victor J. Joseph, and D'Laine Camp, Basel: Birkhäuser, 2008, p. 8.

22. Yves Brunier, *Collage for Museumpark Rotterdam*, 1989–1991.
   (Charles Waldheim and Andrea Hansen, eds. *Composite Landscapes: Photomontage and Landscape
   Architecture*, p. 159.)

23. West 8, *Vertical Landscape*, 1996.
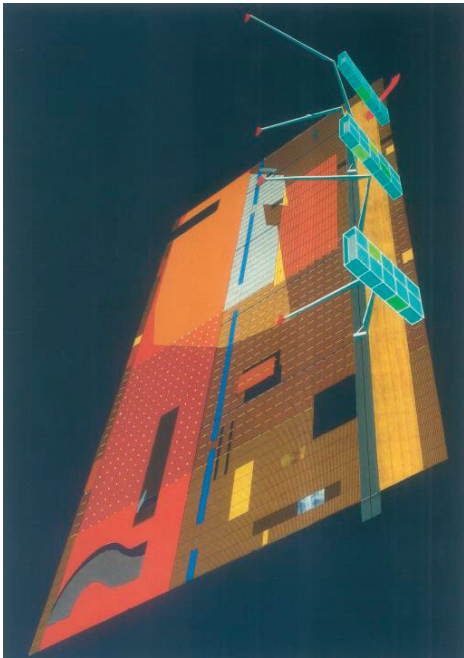   (Luca Molinari, ed. *West 8*, p. 60.)

24. Adriaan Geuze, *Schouwburgplein perspective collage*, 1990.
 (Charles Waldheim and Andrea Hansen, eds. *Composite Landscapes: Photomontage and Landscape Architecture*, p. 197.)

25. David Hockney, *Sitting in the Zen garden at the Ryoanji Temple*, 1983.
 (Gina M. Crandell, 'Moving Pictures: The Photo Collages of David Hockney', p. 69.)

express dynamism of the square and visualize multiple expected uses of the square, seminal designed structures, and red crane-like lighting fixtures (Figure 24). As a landscape architect, Anette Freytag noted that in the representation, a 'viewer seems to be able, like the inhabitants of Los Angeles in 2019 in the 1982 science-fiction film Blade Runner, to easily float through the different levels of the city'.[83]

As shown in the aforementioned visualizations, collage and montage techniques generally did not depict realistically existing or future designed landscape. In the images using collage and montage executed by Brunier and Geuze, designed landscapes were not illustrated as Arcadian nature but conceived as artificial one. Such creative visualization techniques were also used by artist David Hockney (1937–) in the early 1980s (Figure 25). Hockney's works were introduced in 1985 in *Landscape Architecture* in an essay titled 'Moving Pictures: The Photo Collages of David Hockney', in which the author, landscape architect and scholar Gina Crandell, described Hockney's collage technique as 'a new way of seeing, […] a mode of seeing whose intention is not to detach the seer from the scene in a still picture, but to involve the seer in a picture that moves'.[84] Thus, collage and montage techniques were intended to resist established conventions of perception, experience and visualization of nature and, instead, *re-present* nature.

Interestingly, such representations that do not adopt realistic depiction can rather convey similar bodily experiences of landscape in terms of sense. Although the collage work for *Museumpark* executed by Brunier does not depict the future landscape realistically in terms of a close resemblance, the representation embodies the tactile qualities of the landscape, namely, white trunks of the apple trees, square covered by white gravel, and juxtaposed with photographs that capture green leafy trees, by virtue of materiality of various collage mediums. Brunier described his vision of *Museumpark*, in which 'differing uses, atmospheres, needs and longings give one the urge to make use of the existing potentialities by simply recomposing and characterising them, instilling a new and more sensational image'.[85] Thus, image construction using collage technique appropriately supports and resonates with his design concept for *Museumpark*.

Swiss landscape architect Kienast also explored tactile qualities of collage materials for landscape design in the 1980s to the 1990s. Kienast frequently used a combination of hand drawing and collage techniques. Specifically, the hand-rendering technique, such as frottage, was exploited to generate various visual patterns whose texture

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[83] Anette Freytag, 'Back to Form: Landscape Architecture and Representation in Europe after the Sixties', p. 111. According to Freytag, this technique is, to a certain degree, affected by neo-avant-gardist architectural drawings in the 1980s that adopted Suprematist painting. *Ibid.*, p. 111.

[84] Gina M. Crandell, 'Moving Pictures: The Photo Collages of David Hockney', *Landscape Architecture* 75(6), 1985, pp. 64, 68.

[85] Yves Brunier, 'Museumpark at Rotterdam', in *Yves Brunier: Landscape Architect*, p. 106.

was visually similar to actual material that he used in the site.[86] He created his own pattern books to use them as materials of collage, which stimulate similar tactility of actual material (Figure 26).[87]

The most significant role of collage and montage techniques was their ability to generate imaginative ideas during design process. For example, Isabelle Auricoste, who once collaborated with Brunier, observed Brunier's way of using visual representation during design process, and stated:

> The storyteller [Brunier], who draws from the treasure trove of representational media, and musters them to help with the technique of narration, thereby plays a thoroughly creative role, for the very logic of the forms and matter assembled brings into play new dimensions, and unprecedented figures, which endlessly redraw the imaginary space. […] All his ideas were instantly embodied in a welter of forms and colours, and all those forms in turn triggered new ideas.[88]

The aforementioned landscape architects exploited photographs as among the materials for collage. Thus, this image construction technique or its products can often be called photomontage, which is a previous technique of recent presentation drawings, particularly perspective views using graphic editing software that will be addressed in Chapter IV. As photographic image is considered easily as an index of object that it represents by virtue of its sense of presentness, the medium initially could be used by landscape architects to depict a realistic existing condition of the site, as shown in *the Greensward Plan of Central Park* of Olmsted and Calvert Vaux in 1858; this topic was discussed in Chapter II. Unlike Olmsted's and Vaux's collage and montage works in the 1980s to the 1990s, the medium's sense of presentness was exploited to construct creative images to support their design ideas. The photographic materials inserted in images from mixed media facilitated dual function: reality and fiction. According to Freytag, Brunier's collage works are 'abstract due to the imprecise forms created by the tearing of the paper and concrete due to the photographic image that it depicts'.[89]

Interestingly, photographic images that capture actual humans were frequently used for image construction (Figure 27). Photographic human figures could embody the

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[86] Anette Freytag, 'Back to Form: Landscape Architecture and Representation in Europe after the Sixties', p. 100.
[87] *Ibid*., pp. 98–102.
[88] Isabelle Auricoste, 'The Manner of Yves Brunier', in *Yves Brunier: Landscape Architect*, pp. 16–17.
[89] Anette Freytag, 'Back to Form: Landscape Architecture and Representation in Europe after the Sixties', p. 107.

26. Kienast Vogt Partner, *International Garden Exhibition 2000 in Styria*, 1997.
   (Charles Waldheim and Andrea Hansen, eds. *Composite Landscapes: Photomontage and Landscape Architecture*, p. 101.)
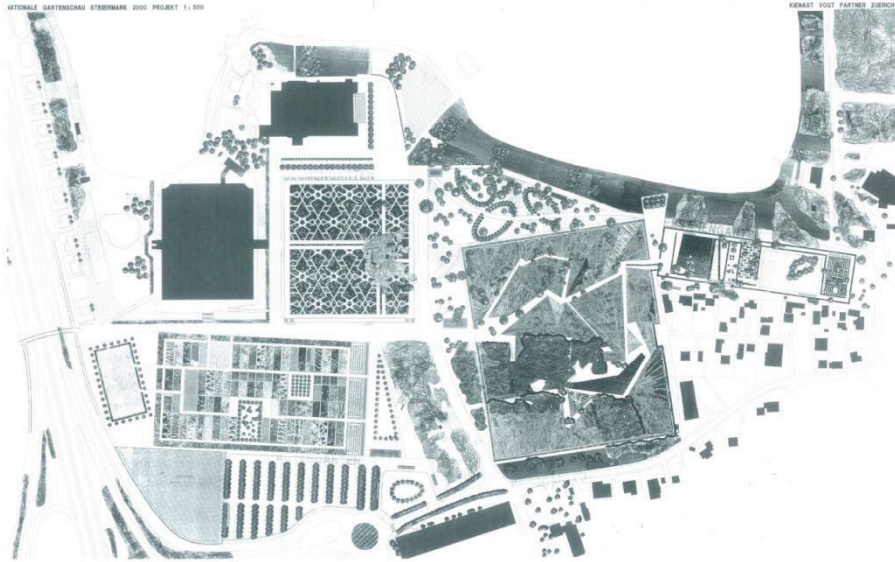
27. Martha Schwartz, *Collage for Jacob Javits Plaza*, 1995.
   (Udo Weilacher, *Between Landscape Architecture and Land Art*, p. 215.)

28. Kienast Vogt Partner, *Square and garden of the Government Building, Chur*, 1994–1995.
   (Dieter Kienast, *Kienast Vogt: Open Spaces*, p.138.)

29. Anu Mathur, *Step and Terrace Axonometric Detail*, 1990.
   (James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', p. 272.)
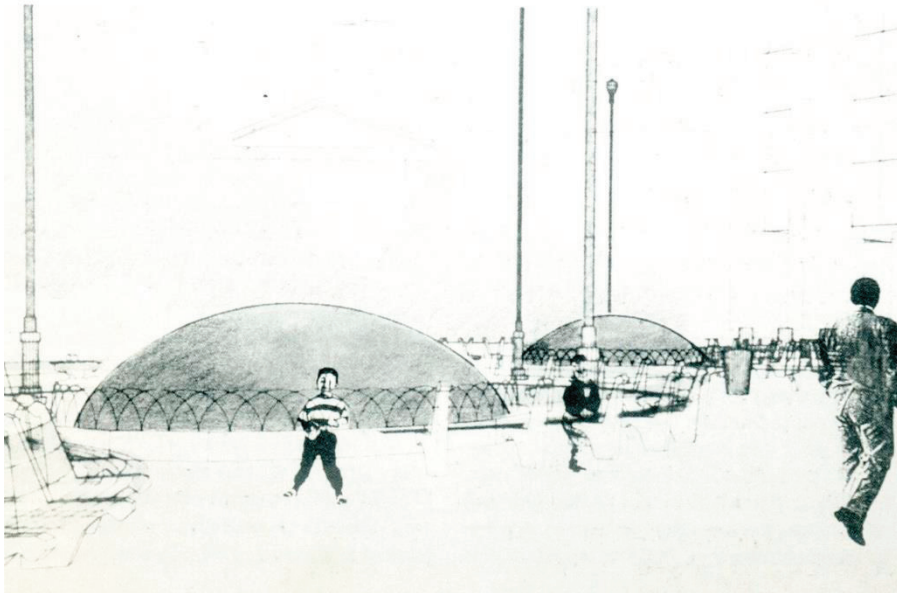
sense of presentness of actual humans in the picture plane, as human figures are hard to be realistically depicted by hand-rendering technique. Moreover, such human figure demonstrates the function of designed landscape, which the image represents, helps the viewer perceive the actual size of the objects, and embodies the landscape's atmosphere by inserting the human figure's feelings. These uses of human figure and its function in landscape representation can be traced back to hand-drawn sketches executed by Kent, and their historical uses continue to reappear in recent digital landscape representation. (The latter topic will be addressed in Chapter IV). Such human images included not only anonymous individuals but also often celebrities, such as movie stars and directors (Figure 28). In a representation executed by Kienast, for example, a photographic image of Italian film actress Giulietta Masina is inserted in her role as Gelsomina in Italian film director Federico Fellini's *La Strada* in 1954. The figure vitalizes the manual drawing and makes 'cameo appearance' in the final presentation drawing.[90]

James Corner (1961–), among the prominent landscape architects and scholars, has deployed collage and montage techniques in both his practice and theoretical writings since the early 1990s. He has considered such visualization methods as creative techniques for *re-presentation*, which has been one of crucial issues throughout his landscape architectural works of past and present.

Throughout the 1990s, Corner published seminal theoretical works in which creative roles of representation during design process is explored carefully. In 'Representation and Landscape: Drawing and Making in the Landscape Medium', which was published in *Word & Image* in 1992, Corner described in detail the difference of medium-specificity between drawing and landscape, and then proposed creative strategies of landscape architectural drawing to overcome such inherent limitations derived from different characteristics between the two medium.[91] Here, Corner first stated that landscape architects generally work with 'a completely different medium, an intermediary and translator medium that we call drawing'.[92] Although landscape medium is 'irreducibly rich in sensual and phenomenological terms […a] living biome that is subject to flux and change by natural processes operating over time',[93] drawing is as 'limited as it is in the realms of space and time', and therefore cannot 'reproduce or represent the actual qualitative experience of materials which constitute the tactile landscape'. Corner characterized specific distinctions between drawing and landscape:

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[90] *Ibid.*, p. 103.
[91] James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', *Word & Image: A Journal of Verbal/Visual Enquiry* 8(3), 1992, pp. 243–275.
[92] *Ibid.*, p. 245.
[93] *Ibid.*, pp. 246, 249.

First, the flatness and framing of the graphic presentation fails to capture the all-enveloping quality and sheer scale of landscape space. […] Second, the drawing is autonomous […] It is not situated as are places and locations, and remains unaltered when estranged from the complexity of life-situations. Third, the drawing is static and immediate, meaning that it is quickly decoded as the eye scans the image from a totalizing and singular point of view. Landscape experience, meanwhile, is received in moments, glances, and accidental detours, kinaesthetically unfolding through rambling and habitual encounters over time. Fourth, a drawing is made of its own materials[;] it has its own substance, and is therefore unable to reproduce and actualize the sensuous and tactile experience of the corporeal landscape, […] Fifth, and perhaps most significantly, the drawing is experienced optically, with rapt and full attention being paid to the image, whereas landscape is so much more, experienced as much if not more through the body than the eye. The subject in the landscape is a fully enveloped and integral part of spatial, temporal and material relations, and nothing can reproduce the meaning that comes from this lived experience, no matter how accurate or skilful is the representation in other mediums.[94]

Therefore, when a drawing has the aforementioned inherent limitations and imitates landscape experience in terms of a close resemblance, problems can arise. Corner described this as follows:

The danger of pictorial representation lies in the designer making "pictures" as opposed to "landscapes", scenes and visual compositions based upon the illusionary logic of the picture plane, rather than upon the sensual arrangement of landscape form, replete with a fullness of spatial, temporal and material qualities.[95]

To overcome such limitations of drawing, Corner argued that landscape architects use drawing not as a medium for realistic depiction of landscape but as an imaginative tool for *re-presentation* of existing and future landscape during design process. Landscape architectural drawing is 'fundamentally an eidetic and *generative* activity, one where the drawing acts as a producing agent or ideational catalyst […] it is itself a catalytic locale of inventive subterfuges for the making of poetic landscapes'.[96]

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[94] *Ibid.*, pp. 250–251.
[95] *Ibid.*, p. 260.
[96] *Ibid.*, pp. 243–244, 275. Korean landscape architects and scholars Kwangbin Lee's and Jungsong

Another seminal essay on landscape representation is 'Eidetic Operations and New Landscapes', which was published in *Recovering Landscape: Essays in Contemporary Landscape Architecture* edited by Corner in 1999.[97] Although in 'Representation and Landscape', he described different characteristics between drawing and landscape medium and thereby proposed alternative strategies for landscape representation, in 'Eidetic Operations and New Landscapes', he introduced 'image' that includes not only graphic representation but also synesthetic sense, and described the fact that 'landscape and image are inseparable'. Specifically, Corner defined the theory of image by an art historian W.J.T. Mitchell whose five families of image include not only 'the graphic (as in picture)' but also 'the optical (as in mirror), perceptual (as in cognitive sense), mental (as in dreams, memories, and ideas), and verbal (as in description and metaphor)'.[98] As such, Corner used the term 'eidetic' to refer to 'a mental conception that may be "picturable" but may equally be acoustic, tactile, cognitive, or intuitive'.[99] Extending this definition to landscape architecture, Corner preferred to use the old German *landschaft*, which refers to 'the formation of synesthetic, cognitive images forge a collective sense of place and relationship evolved through work', rather than the old English term *landskip*, which refers to 'the making of a picture participates in and makes what is to be pictured'.[100] In other words, rather than pictorial representation, Corner resituates landscape design as a formation of synesthetic and cognitive images of landscape.

Thus, in terms of landscape representation, Corner does not underestimate all visualization methods of landscape methods, but rather criticizes a particular way of representing landscape, specifically the realistic depiction that produces visually privileged images. Instead of such instrumentality of visualization, Corner argued that any representation must be exploited for a tool to generate imaginations and facilitate design ideas during design process. As Corner stated, 'If it is true that there can be no concept of

Cho's arguments build on Corner's theory of representation. They argued that landscape architectural drawing needs to be not a picture that depicts visual reality but text through which context of design and its whole can be understood. Kwangbin Lee and Jungsong Cho, '텍스트로서의 조경드로잉: 읽기의 틀과 실제 [Landscape Drawing as a Text: Practical and Theoretical Approach]', 한국조경학회지 [*Journal of the Korean Institute of Landscape Architecture*] 27(1), 1999, p. 56.

[97] James Corner, 'Eidetic Operations and New Landscapes', in *Recovering Landscape: Essays in Contemporary Landscape Architecture*, ed. James Corner, New York: Princeton Architectural Press, 1999, pp. 153–169.

[98] *Ibid*., 161. For more description of theory of image by Mitchell See W. J. T. Mitchell, *Iconology: Image, Text, Ideology*, Chicago: University of Chicago Press, 1986.

[99] James Corner, 'Eidetic Operations and New Landscapes', p. 153. The term 'eidetic' appeared previously in his 'Representation and Landscape' in 1992, in which the term was similarly used to refer to 'visual formation of ideas, or to the reciprocity between image and idea. That [eidetic] drawing is fundamentally about making images suggests that it might actually *generate* and transform ideas for the percipient rather than simply representing them'. James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', p. 244.

[100] James Corner, 'Eidetic Operations and New Landscapes', p. 161.

landscape without prior imaging […] then innovations in image projection are necessary for the virtual to be both conceived and actualized'.[101] Most useful techniques of landscape representation are '*eidetic operations*[, that is,] specific ideational techniques for construing (imaging) and constructing (projecting) new landscapes'.[102]

Although Corner emphasized the need to explore imaginative techniques of landscape architectural drawing, the representation, at the same time, needs to include instrumental functions for demonstrative and analysis of landscape. In 'Eidetic Operations and New Landscapes', Corner stated that 'perhaps a key to understanding eidetic imaging in design is found in a kind of thinking that in neither instrumental nor representational but simultaneously both'.[103] This dialectic understanding of double function of landscape architectural drawing already appeared in his early writing, 'Representation and Landscape' in which he suggested:

> A more significant type of drawing in landscape architectural design might arise from a twofold use of the graphic medium: one is the speculative function, and the other is the demonstrative function. In the first, drawing is used as [a] vehicle of creativity, and in the second, drawing is used as a vehicle of realization.[104]

In the 1990s, Corner explored theoretically and practically collage and montage techniques related to creative and imaginative functions, that is, *re-presentation*. For example, in 'Representation and Landscape', Corner cited certain drawings using montage and collage methods executed by landscape architect Mathur whose eidetic images stimulate imagination and demonstrate a site; Corner said that Mathur's images generally take a similar form of perspective view (Figure 29). Similarly, one of Corner's collage and montage drawings is *Pivot Irrigators I* in 1996, in which 'the [United States Geological Survey (USGS)] map is cut as a circle without scale, place names or geographical coordinates visible; the cropping and reframing effectively de-territorialized the map and its referent' (Figure 30).[105] As Corner argued, such techniques can function as a creative tool to 'image the world in a new way and to body forth those images in richly phenomenal and

[101] James Corner, 'Introduction: Recovering Landscape as a Critical Cultural Practice', in *Recovering Landscape: Essays in Contemporary Landscape Architecture*, 1999, p. 8.

[102] James Corner, 'Eidetic Operations and New Landscapes', p. 162.

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

[104] James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', p. 265.

[105] James Corner, 'The Agency of Mapping: Speculation, Critique and Invention', in *Mappings*, ed. Denis Cosgrove, London: Reaktion Books, 1999, p. 247.

30. James Corner, *Pivot Irrigators I*, 1996.
   (James Corner and Alex S. Maclean, *Taking Measures Across the American Landscape*, p. 90.)
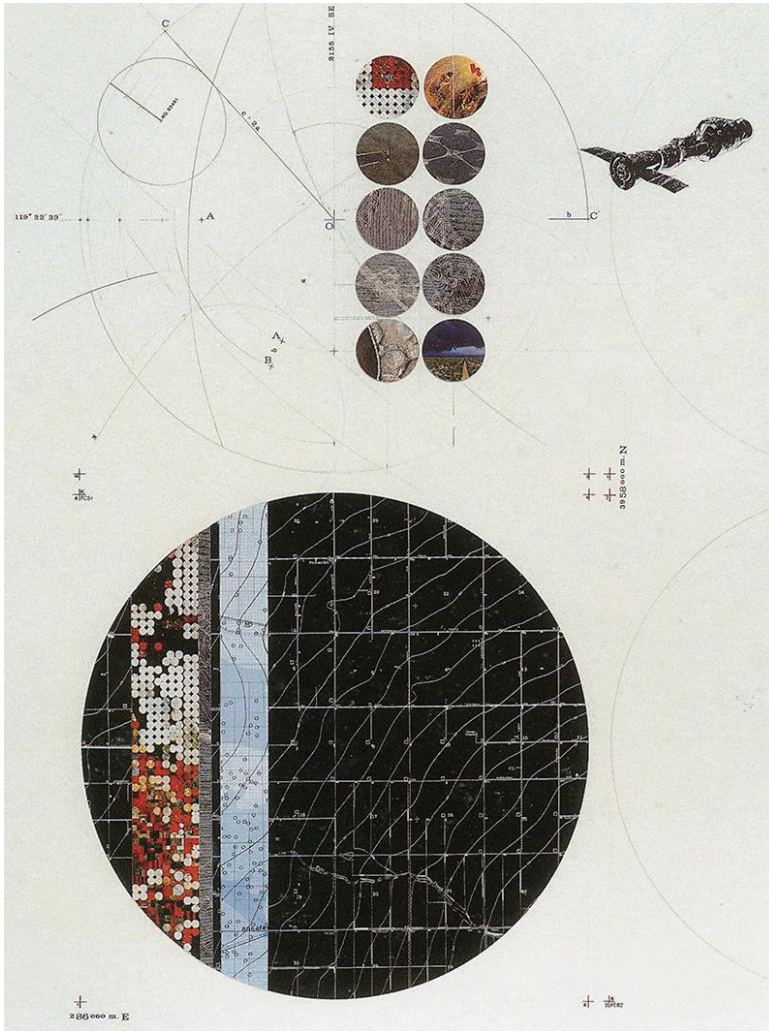
efficacious terms'.[106]

In the 1990s, image construction techniques evolved from collage and montage to mapping. In 'The Agency of Mapping: Speculation, Critique and Invention' published in 1999, Corner presented mapping as an appropriate technique for diagrammatic visualization

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[106] James Corner, 'Eidetic Operations and New Landscapes', p. 167.

in landscape architectural design.[107] As mapping generally takes the form of plan (i.e. one of projections), it can appropriately visualize information of landscape and further be transformed into various creative representations that unfold diagrammatic strategies. In the similar way that Corner expects from collage and montage, he suggested that mapping technique must be exploited as an imaginative tool for *re-presenting* landscape. As Corner stated, 'mapping is never neutral, passive or without consequence; on the contrary, mapping is perhaps the most formative and creative act of any design process, first disclosing and then staging the conditions for the emergence of new realities'.[108] Corner thus considered mapping not significantly as 'maps as finished artifacts' but more as technique 'as a creative *activity*'.[109] Indeed, such creative activity involves double function of the demonstrative (i.e. instrumentality of visualization) and the generative (i.e. imaginability of visualization). As Corner emphasized, 'the map is first employed as a *means* of "finding" and then "founding" new projects, effectively re-working what already exist. Thus, the *processes* of mapping, together with their varied informational and semantic scope, are valued for both their revelatory and productive potential'.[110]

In this context, Corner situated mapping as an evolving form of collage and montage, that is, 'systemic montage', which is an appropriate strategy in landscape architectural practice. Corner characterized the distinctions between collage and mapping as follows:

> Unlike collage, however, which functions mostly connotatively (by suggestion), mapping typically *systematizes* its material into more analytical and denotative schemas. Where mapping may become more inclusive and suggestive, then, is less through collage, which works with fragments, and more through a form of systematic montage, where multiple and independent layers are incorporated as a synthetic composite.[111]

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[107] James Corner, 'The Agency of Mapping: Speculation, Critique and Invention', pp. 213–252.
[108] *Ibid.*, p. 216.
[109] *Ibid.*, p. 217.
[110] *Ibid.*, p. 224. For Korean-language studies on mapping as a creative tool for landscape design, see Jeonghann Pae, '현대 조경설계의 전략적 매체로서 다이어그램에 관한 연구 [A Study on the Diagram as Strategic Media in Contemporary Landscape Architectural Design]', 한국조경학회지 [*Journal of the Korean Institute of Landscape Architecture*] 34(2), 2006, pp. 99–112; Kyungjin Zoh, '환경설계방법으로서의 맵핑에 관한 연구 [A Study on the Mapping as a Environmental Design Method]', 공공디자인학연구 [*Journal of Korean Society of Public Design*] 1(2), 2006, pp. 72–84.
[111] James Corner, 'The Agency of Mapping: Speculation, Critique and Invention', p. 245. In a similar context, Corner paid attention to datascapes as a technique to visualize landscape information. *Ibid.*, p. 246. Moreover, in 'Eidetic Operations and New Landscapes', Corner described datascapes as 'not only are these imagings [datascapes] constructive and suggestive of new spatial formations but also they are so "objectively" constructed, derived from numbers, quantities, facts, and pure data, that they

31. James Corner and Stan Allen, *Habitat Nests*, *Emergent Ecologies*, Downsview Park International
    Design Competition, 1999. (Julia Czerniak, ed. *Case: Downsview Park Toronto*, p. 61.)
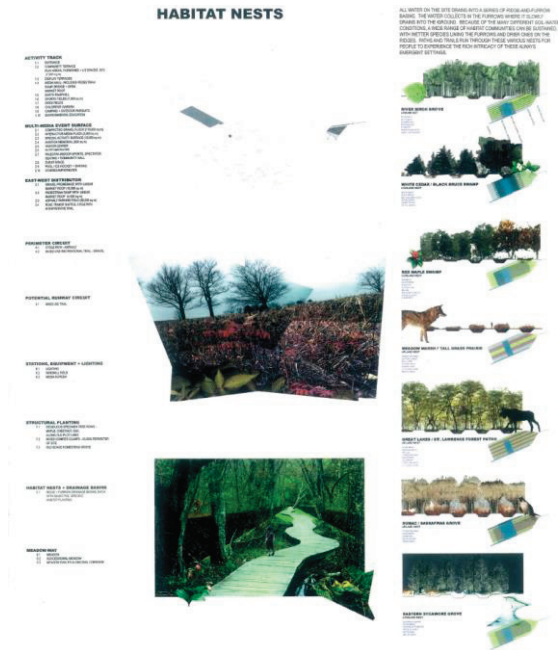
32. James Corner and Stan Allen, *Emergence through Adaptive Management, Emergent Ecologies*,
    Downsview Park International Design Competition, 1999.
    (Julia Czerniak, ed. *Case: Downsview Park Toronto*, pp. 62–63.)
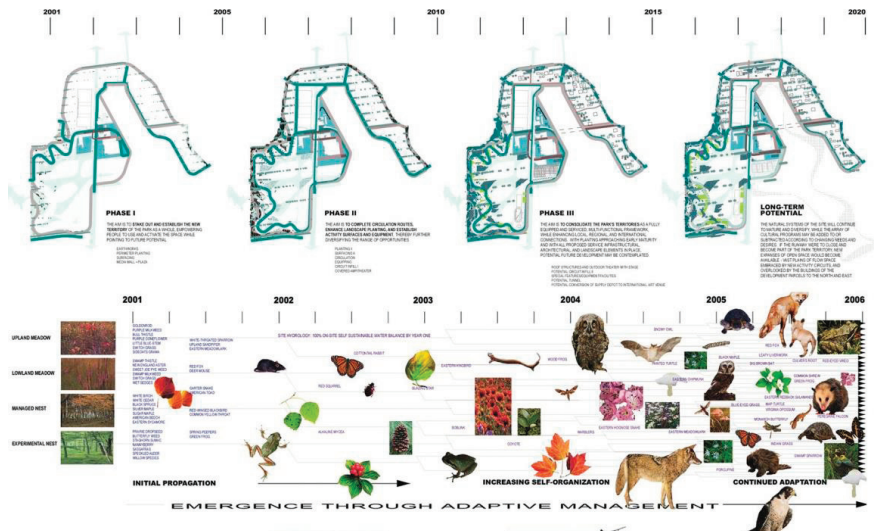
have great persuasive force in the hugely bureaucratic decision-making and management aspects of
contemporary city design'. James Corner, 'Eidetic Operations and New Landscapes', p. 165.

Such demonstrative, generative, and systemic functions of mapping have enabled Corner to exploit its enormous potentialities in his practice on Landscape Urbanism since the late 1990s. In *Emergent Ecologies*, a finalist in the Downsview Park International Design Competition in 1999, Corner and architect Stan Allen explored photomontage to support their design strategy. They attempted to resolve the dichotomy of human activities and natural systems through the two strategic systems for a future park; 'CIRCUITS accommodate all activity programs, event spaces, and circulation, and THROUGH-FLOWS support all the hydrological and ecological dynamics of the site'.[112] To visualize such systems, the team deployed photomontage in the form of perspective view (Figure 31). In addition, the proposal included mappings to visualize such systems in a way that several plans of evolving processes of ecological and cultural systems over time were displayed (Figure 32). These techniques gradually evolved in his work, particularly *Lifescape*, a winning proposal of Fresh Kills Landfill Park competition in 2001 in which James Corner/Field Operations and others used mapping appropriately to support their proposal and, more importantly, the team exploited the potential of computer technology to achieve such visualization techniques.

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[112] James Corner and Stan Allen, 'Emergent Ecologies', in *Downsview Park Toronto*, ed. Julia Czerniak, Munich, London, and New York, Prestel Verlag, 2001, p. 58. Corner frequently drew analogy between ecology and representation, such as collage and montage. For example, Corner argued that landscape design must address not only natural but also social ecology, which has inherent vocabularies similar to collage technique, that is, 'terms such as indeterminacy, inclusivity, overlay, rupture, simultaneity, stochastic event, instability, association, [and] collusion'. James Corner, 'Ecology and Landscape as Agents of Creativity', in *Ecological Design and Planning*, eds. George Thompson and Frederick Steiner, New York: John Wiley & Sons, 1997, p. 100.

(2) Potential of technology

With the development of graphic editing software, collage and montage technique for image construction of perspective view has been performed using computer technology. This section discusses such transition of mediums, from manual rendering to computer image processing. Specifically, this section examines the performances of graphic editing software, that is, how graphic editing software functions during production process of collage and montage.

Although, historically, graphic editing software and other simulation software had been explored and used in landscape architecture, production of perspective view of montage and collage for presentation drawings, which is among the most frequently used visualization techniques in recent landscape architecture, has been closely related to the use of Adobe Photoshop and Illustrator. The Adobe initially released Illustrator in 1987 and Photoshop in 1990; these programmes began to be widely used for producing presentation drawings in landscape architectural design in the late 1990s.

At present, with the development of computer technology, it becomes more difficult for such images using software to be distinguished from those using manual methods even with a naked eye. Moreover, various visual effects that software provides enable digital drawing to be transformed into revised image that looks as if done by manual drawing.

Thus, consideration must be given to specific function of such software in producing image construction. As described earlier, collage and montage with manual method process consists of preparation of materials and its assemblage on picture plane. Similarly, image construction using graphic editing software includes preparation of digitized resources and their assemblage on canvas of software. Although manual methods can use tactility of materials during image construction, graphic software does not change specific procedure of manual collage and montage. In other words, graphic editing software can function to imitate previous media, in this case manual collage and montage, in a way that deals with more easily and quickly such visualization than hand-rendering. For example, in the aforementioned proposal by Corner and Allen, *Emergent Ecologies* for Downsview Park competition, photomontages can function as an agent of creativity that facilitates design ideas (Figure 31). However, it is hard to consider such creative representations as images that fully facilitate the potential of computer technology because in the production of image, software seemingly does not perform any creative functions. Thus, graphic editing software, similar to other two types of software, such as GIS and CAD, functions as a mechanical tool to imitate manual technique.

Interestingly, the way by which graphic editing software process images is

closely analogous to manual collage and montage. Various commands, such as crop, paint, brush, eraser, merge layers, that such software provides imitate explicitly those of previous physical media, such as painting, drawing, and collage and montage. Thus, various effects of such software allow landscape architects to replace previous manual methods with computer technology.

Lev Manovich, a prominent scholar of media theory, analysed the properties of image construction using graphic editing software by examining characteristics of layer palette and various commands, including filters. Manovich described the distinctive characteristic of layer palette in Photoshop as follows (Figure II-2):

> Since each layer can always be made invisible, layers can also act as containers for elements that potentially may go into the composition; they can also hold different versions of these elements. A designer can control the transparency of each layer, group them together, change their order, etc. […] s/he now works with a collection of separate elements. […] Photoshop software is "shooting" the image created through a juxtaposition of visual elements contained on separate layers.[113]

Thus, the characteristic of image construction using Photoshop is similar to that of manual methods in which individual visual fragments are assemblage on one picture plane in various ways.

A number of filters generate another interesting characteristic of graphic editing software. Manovich divided Photoshop filters into two types, namely, 'the simulations of previous tools' and 'techniques which do not explicitly simulate prior media'.[114] The former includes Brush Strokes and Sketch filter family, which imitate previous media tools, such as painting and drawing; the latter includes Add Noise, which does not imitate previous tools. Although digital landscape representation using graphic editing software imitates previous manual collage and montage techniques in overall process, many filters of the software can also provide various visual effects for the digital image.

Although graphic software generally has been used as a mechanical tool to imitate manual collage and montage, a number of landscape architects attempted to explore the potential of the software for image construction. In particular, Corner deployed effectively a number of creative strategic visualization techniques to exploit the potential of computer technology in *Lifescape* for Fresh Kills Park competition. To understand how

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[113] Lev Manovich, *Software Takes Command*, New York and London: Bloomsbury Academic, 2013, pp. 142, 145.
[114] *Ibid*., p. 139.

such software can function as a creative tool for visualization in his practice, theoretical foundation that stimulates such creative use must first be examined.

Although Corner has not published any writing devoted to computer technology, his opinion on computer technology can be understood within his critical writings concerning modern technology. In 'Aerial Representation and the Making of Landscape', which was published in *Taking Measures Across the American Landscape* in 1996, Corner deployed a critical viewpoint on aerial photography that is a product of modern technology. In this article, Corner considered aerial representation as a powerful tool for 'instrumental utility in the modernization of the earth's surface […] in the planning and shaping of regions'.[115] He argued that such instrumental utility of aerial photography is found explicitly in McHarg's *Design with Nature*. He stated:

> Such planning methodology is described in Ian McHarg's seminal book *Design with Nature* [… , which] opens his treatise with an *Apollo* photograph of the planet Earth […] He supports his arguments and methods with additional satellite and remote-sensing views, aerial photographs, bird's-eye perspectives, and analytical maps and plans. […] Whereas McHarg, like other environmentalists, occasionally portrays humankind as an enormous "planetary disease" […] it is, ironically, the same humankind and its technology (aerial and otherwise) that he and other planners cite as the heroic arbiter and measure of all things.[116]

Corner described the history of such instrumental use of aerial view in the United States that traces back to the eighteenth century, since when technological instrumentality of the aerial view, such as bird's-eye panoramic drawings, maps, and plans, has been used for rational construing and surveying, and colonizing of lands, such as in the Land Division Survey of the late 1700s.[117] Corner considered such 'aerial sensibility' as an 'attitude toward controlling the land from above', which has continued in recent massive engineering projects. In particular, new technologies, such as 'satellite imaging […] to correlate data with computerized [GIS…] lead some in society to believe that humankind has supreme power and control over the earth'.[118] In this sense, Corner viewed plan, particularly master plan, with scepticism, as such plans reflect the instrumentality of

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[115] James Corner, 'Aerial Representation and the Making of Landscape', in *Taking Measures Across the American Landscape*, eds. James Corner and Alex S. MacLean, New Haven and London: Yale University Press, 1996, p. 15.
[116] *Ibid.*, pp. 15–16.
[117] *Ibid.*, p. 16.
[118] *Ibid.*, p. 16.

modern technology.[119]

Nevertheless, Corner suggested that such modern technology can be exploited for creative method of visualization. As he stated, 'Like other instruments and methods of representation, the aerial view reflects *and* constructs the world; it has enormous landscape agency, in real and imaginary ways'.[120]

Corner distinguished clearly between technology and technique, so does M'Closkey, as discussed earlier. In other words, as technology is a medium to use particular techniques, problem lies in not the technology itself but in a particular technique that exclusively uses its instrumentality without utility of creative potential of the technology. In 'The Agency of Mapping', Corner noted:

> [G]iven the importance of representational technique in the creative process, it is surprising that […] there has been so little advancement and invention of those specific tools and techniques […] Some advances in these techniques have occurred over the past 30 years with the rise of satellite and remote-sensing capabilities, together with new computer technologies such as […GIS], but in principle they remain unchanged. These techniques remain largely unquestioned, conventional devices of inventory, quantitative analysis and legitimization of future plans.[121]

Thus, visualization techniques that can exploit creative potential of technology need to be explored fully. Mapping is one of such creative techniques. As Corner stated:

> Avoiding the failure of universalist approaches toward master-planning and the imposition of state-controlled schemes, the unfolding agency of mapping may allow designers and planners not only to see certain possibilities in the complexity and contradiction of what already exists but also to actualize that potential. […] Mapping, by contrast, discloses, stages and even adds potential for later acts and events to unfold. Whereas the plan leads to an end, the map provides a generative

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[119] *Ibid*., p. 19. Corner expressed his condemnation of projection drawings, including master plan. On this topic, see James Corner, 'The Agency of Mapping: Speculation, Critique and Invention', pp. 215, 224.

[120] James Corner, 'Aerial Representation and the Making of Landscape', pp. 16, 18. Similarly, Corner drew the double function of the instrumental and imaginative form of spatial measurement. On this topic, see James Corner, 'Taking Measure: Irony and Contradiction in an Age of Precision', in *Taking Measures Across the American Landscape*, pp. 25–37.

[121] James Corner, 'The Agency of Mapping: Speculation, Critique and Invention', pp. 217, 220–221.

means, a suggestive vehicle that "points" but does not overly determine.[122]

The creative visualization techniques as an important vehicle of design development were fully deployed in *Lifescape* for the winning proposal of Fresh Kills Park competition in 2001.[123] Phasing plan, layering diagram, collage and montage, which appeared in *Emergent Ecologies* for Downsview Park competition, were evolved systemically and reappeared in *Lifescape* (Figure 33). In particular, Corner's team relied increasingly on mapping in similar form of plan as one type of projections rather than photomontage in a form of perspective view.

More importantly, in performing these visualization techniques, Corner exploited the potential of computer technology. Although manipulation method of layer palette of Photoshop, as discussed earlier, corresponded to those of collage and montage, the method also corresponded with layering mapping method (Figure 3). The layering mapping technique was affected by those deployed by Bernard Tschumi and Rem Koolhaas/OMA for Parc de la Villette in Paris in 1983. In 'The Agency of Mapping', Corner described such techniques of Tschumi and Koolhaas as (Figure 34):

> Generally, these projects dismantle the programmatic and logistical aspects of the park into a series of layers, each of which is then considered independently from the other layers. There is an internal logic, content and system of organization to each layer, depending on its function or intended purpose. […] When these separate layers are overlaid together, a stratified amalgam of relationships amongst parts appears. The resulting structure is a complex fabric, without centre, hierarchy or single organizing principle. The composite field is instead one of multiple parts and elements, cohesive at one layer but disjunct in relation to others.[124]

Similarly, in Photoshop, 'layers can also act as container for elements that potentially may go into the composition; they can also hold different versions of these elements. […] Photoshop software is "shooting" the image created through a juxtaposition of visual elements contained on separate layers'.[125]

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[122] *Ibid.*, pp. 214, 228.

[123] Wookju Jeong and James Corner, '프레쉬 킬스 공원 조경설계 [Fresh Kills Park Design, Staten Island, New York]', 한국조경학회지 [*Journal of the Korean Institute of Landscape Architecture*] 33(1), 2005, p. 97.

[124] James Corner, 'The Agency of Mapping: Speculation, Critique and Invention', p. 235.

[125] Lev Manovich, *Software Takes Command*, pp. 142, 145.

33. Field Operations, *Phasing and Development Sequence, Lifescape,* Fresh Kills Landfill Park
    Competition, 2001. (Julia Czerniak and George Hargreaves, eds. *Large Parks*, p. 110.)
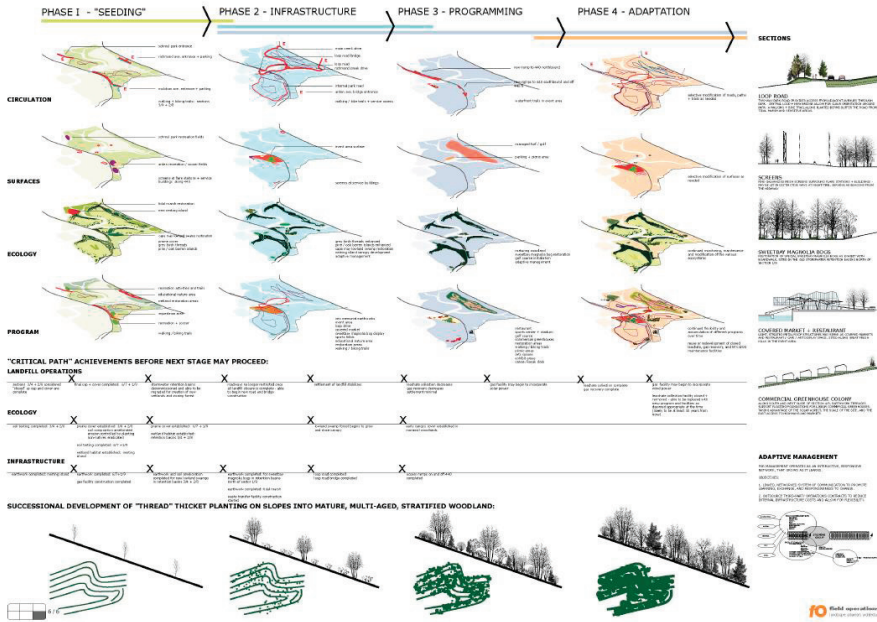
34. Bernard Tschumi, *Points, Lines, Surfaces*, 1983.
    (Frédéric Migayrou, ed. *Bernard Tschumi: Concept and Notation*, p. 111.)
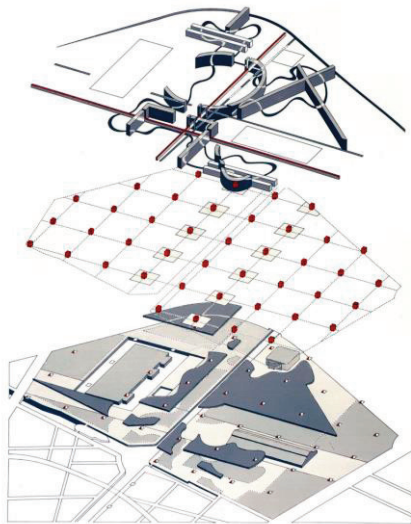
35. Field Operations, *Plan Collage, Lifescape,* Fresh Kills Landfill Park Competition, 2001.
(Wookju Jeong and James Corner, '프레쉬 킬스 공원 조경설계 [Fresh Kills Park Design, Staten Island, New York]', p. 104.)
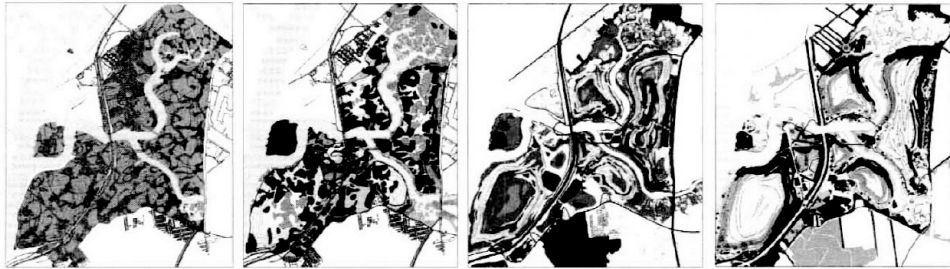
Another notable visualization technique in *Lifescape* is 'plan collage' that hybridized plan with collage (Figure 35). The composite technique is a creative visualization method with which a designer considers a large-scale site as an object and assembles and hybridizes freely various images regardless of scale. Such seemingly random image changes gradually and evolves as a plan over design process.[126] The somewhat subjective and arbitrary work is used in conjunction with objective works, including mappings of slope, sun angle, circulation, materiality of the site. In other words, such technique is exploited to generate a form of designed landscape. Thus, the plan of *Lifescape* functions as a 'diagrammatic plan simultaneously depict[ing] [an] image of designed landscape (i.e. plan) and carr[ying] design intentions (i.e. diagram)'.[127] In other words, the composite technique transforms established instrumental function of plan, which is appropriate drawing type that is concerned with large-scale site, into a renewed creative and generative performance of diagram, which is an effective visualization type that deploys design strategies; thereby, the representation functions to generate new form of the site. Thus, the plan collage of *Lifescape* most productively achieves the double function of the instrumentality that demonstrates the existing site and the imagination that generates design idea, which had been deployed continuously in Corner's early writings since the early 1990s.

In *Lifescape*, computer technology functions as a major tool to perform creative visualization techniques, including plan collage, and develop design idea throughout design process. As Corner noted, not only paper surfaces but also 'computer screens of design imaging are highly efficacious operational fields on which the theories and practices of

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[126] Wookju Jeong and James Corner, '프레쉬 킬스 공원 조경설계 [Fresh Kills Park Design, Staten Island, New York]', pp. 98, 104.
[127] *Ibid.*, p. 105.

landscape are produced'.[128]

> In deploying representational methods [in *Lifescape*], computers played important roles that supported landscape architects to create hierarchy and easily classify a lot of information of the site. As a computer has the capability to easily and effectively accumulate and arrange information, it will perform not so much merely the role of drafting tool as, more importantly, innovative methods to deploy design.[129]

Thus, in *Lifescape*, computer technology, in this case graphic editing software, was used as a creative tool for design development. These layering and plan collage techniques, to a certain degree, can be performed using manual technique in a similar process. However, marbling-looking shape of plan collage is created using graphic editing software, which facilitates chemical composition of plan and collage.

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[128] James Corner, 'Eidetic Operations and New Landscapes', p. 153.
[129] Wookju Jeong and James Corner, '*프레쉬 킬스 공원 조경설계* [Fresh Kills Park Design, Staten Island, New York]', p. 106.

IV. Digital Landscape Representation's Photo-fake

4.1. Pictorial of Digital Landscape Representation

This chapter focuses on production and reception of landscape representation using digital technology over the past quarter century. Presentation drawing has gained increasing importance in communicating with the public. As vivid rendered visuals in graphic editing software capture public attention, landscape architects tend to elaborate sophisticated post-processing of landscape representation.

This pervasive trend is particularly evident in recently published volumes pertaining to digital landscape representation. For example, *Representing Landscapes: Digital*, which was edited by Amoroso and published in 2015, collects essays and visuals according to various drawing types. The visuals in the volume are first constructed using digital modelling software, and then, more importantly, finalized with graphic editing software, such as Adobe Photoshop and Illustrator, that enable photo-realistic visualization.[1] A number of collected essays in the volume also elaborate in detail the visualization process of presentation drawing. Joshua Zeunert described the production of digital presentation plan as follows: early manual drawing is transformed into 2D CAD programme, and then converted into 3D modelling using SketchUp and Rhinoceros, and is sophisticated and finalized using Photoshop and Illustrator artistic effects.[2] Similarly, David Fletcher described the process of aerial perspective rendering as follows: first is generation background image from Google Earth source imagery, and then hybridized with 3D model rendering, and is, finally, sophisticated with finishing techniques, such as various filters and commands to convey 'phenomenal effects'.[3]

However, certain landscape architects and theorists state that landscape architecture, compared with other disciplines such as architecture and civil engineering, has embraced digital technology slowly in landscape design. Jillian Walliss and others observed:

> Landscape architecture has been slow to embrace the potentials of digital technologies to expand design processes and techniques. Instead, these technologies often remain framed as an advanced representation tool, considered

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[1] Nadia Amoroso, ed., *Representing Landscapes: Digital*, London and New York: Routledge, 2015.
[2] Joshua Zeunert, 'Digital Presentation Plans: Still the Foundation of Landscape Design Representation?', in *Representing Landscapes: Digital*, pp. 71–73.
[3] David Fletcher, 'Hover Craft', in *Representing Landscapes: Digital*, pp. 180–182.

to lack the intuitive capability of more traditional design processes.[4]

Slow engagement of digital technology in the discipline was already observed by other landscape architects and theorist in 1980s. For example, according to one survey conducted in 1983, 'Landscape architects use[d] computer technology less than architects and urban planners'.[5] A few years later, in an essay published in *Landscape Architecture* in 1988 that quoted this 1983 survey, Lindhult stated that 'For more than two decades, landscape architects have used computers for […GIS…] Landscape architects are reluctant to accept and apply […] CAD technology'.[6] Moreover, 1993 and 2000 surveys of ASLA members indicated that CAD software (mainly AutoCAD) was mainly used for production of construction drawings as a drafting tool that merely depicted the appearance of landscape rather than creative or generative medium in design process.[7]

Notably, the aforementioned remarks on the slow adoption of digital technology mainly addressed CAD or 3D modelling software that enables generation of structural forms. Such computer technologies' generative or creative role in design process has been more significantly addressed in architecture or engineering that generates structural forms. In landscape design, not only the technologies related to generating structures but also GIS and, more importantly, graphic editing software have developed. Architectural historian Antoine Picon remarked that 'Harvard's SYMAP mapping program, one of the major forerunners of present-day GIS systems, dates back to the 1960s, a time when computer-aided architectural design was still in its infancy'.[8] Moreover, in Corner/Field Operations and others' *Lifescape* for Fresh Kills Park competition, what the designers of the team considered as creative or generative tools for design development were mainly graphic processing software, such as Adobe Photoshop and Illustrator.

The early explorations of potential of digital technology for generating structural form in the design process appeared in architectural design in the early 1990s. *Folding in*

[4] Jillian Walliss, Zeneta Hong, Heike Rahmann and Jorg Sieweke, 'Pedagogical Foundations: Deploying Digital Techniques in Design/Research Practice', *Journal of Landscape Architecture* 9(3), 2014, p. 72. This remark continues in the most recent work by Wallis and Rahmann *Landscape Architecture and Digital Technologies: Re-conceptualizing Design and Making*. See Jillian Walliss and Heike Rahmann, *Landscape Architecture and Digital Technologies: Re-conceptualising Design and Making*, London and New York: Routledge, 2016, p. vii.
[5] Paul F. Anderson, 'Stats on Computer Use', *Landscape Architecture* 74(6), 1984, p. 101.
[6] Mark S. Lindhult, 'The Road beyond CAD', *Landscape Architecture* 78(5), 1988, pp. 41–43.
[7] James Palmer and Erich Buhmann, 'A Status Report on Computers', *Landscape Architecture* 84(7), 1994, pp. 54–55; Lolly Tai, 'Assessing the Impact of Computer Use on Landscape Architecture Professional Practice: Efficiency, Effectiveness, and Design Creativity', *Landscape Journal* 22(2), 2003, pp. 113–125.
[8] Antoine Picon, 'Substance and Structure II: The Digital Culture of Landscape Architecture', *Harvard Design Magazine* 36, 2013, pp. 124, 126.

Architecture, a special-themed issue of *Architectural Design* in 1993 edited by Greg Lynn, included the writing of philosopher Gilles Deleuze whose definition on 'the fold' informed other essays and design explorations in the issue by other architects, such as Lynn, Peter Eisenman, and others. They redefined the digital technology as a tool for thinking and generating new architectural form, which has mainly fluid and curvilinear surface and volume.[9] In the early stage of the digital in architecture, architects attempted to 'divest itself [architectural culture] of the *representational* as the dominant logical and operative mode of formal generation in design',[10] that is, '*anti-representational*',[11] and, instead, they aimed to work towards form generation within a 3D realm through the logic of the algorithm.

Landscape architects explored the potential of digital technology for generating landform. However, such exploration of landform generation using digital technology in the discipline still frequently relied on pictorial depiction. In other words, architectural design tended to resist the representational in thinking and making form using computer software, whereas landscape architects mainly explored the potential of the digital within the representational tradition affected by picturesque aesthetics. This difference between the two disciplines pertains to the media-specificity of architectural form and landform or landscape; the former generally takes the form of vertical structure, and the latter emphasizes on horizontal surface of landform. Architectural drawing has needed to visualize not only frontal appearance of building but also structural relations inside the building, whereas landscape representation has visualized mainly the appearance of horizontal surface of topography or scenery and simulation of natural phenomenon.

For example, as discussed in Chapter III, although the works of certain landscape architects, such as Gustafson and Hargreaves, have emphasized the complex graded visible landform, they have used digital modelling rarely compared with physical models, such as sand and clay.[12] Moreover, Geuze's firm, West 8, has used computer modelling in generating structures of landform, bench, and bridge (Figures 1, 2); however, at the same time, the firm renders overall surrounding landscape hybridized with the digital modelling.

The origin of this pictorial aesthetics of digital landscape representation can be traced back to early digital drawings in the 1980s to the 1990s, when *Landscape*

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[9] Greg Lynn, ed., *Folding in Architecture*, *Architectural Design* 63(3/4), 1993.

[10] Rivika Oxman and Robert Oxman, 'Introduction: Vitruvius Digitalis', in *Theories of the Digital in Architecture*, eds. Rivika Oxman and Robert Oxman, London and New York: Routledge, p. 1.

[11] Rivika Oxman and Robert Oxman, 'Theory: A Universe of Discourse', in *Theories of the Digital in Architecture*, p. 12.

[12] Walliss and Rahmann stated that 'most landscape architects would be far more familiar with the colourful drawings and clay models [...] than the extensive digital modelling required to realise the design [...]'. Jillian Walliss and Heike Rahmann, *Landscape Architecture and Digital Technologies: Re-conceptualising Design and Making*, London and New York: Routledge, 2016, p. xxi.

1. West 8, *Sporenburg Bridges*, 1998.
   (Luca Molinari, ed. *West 8*, p. 109.)
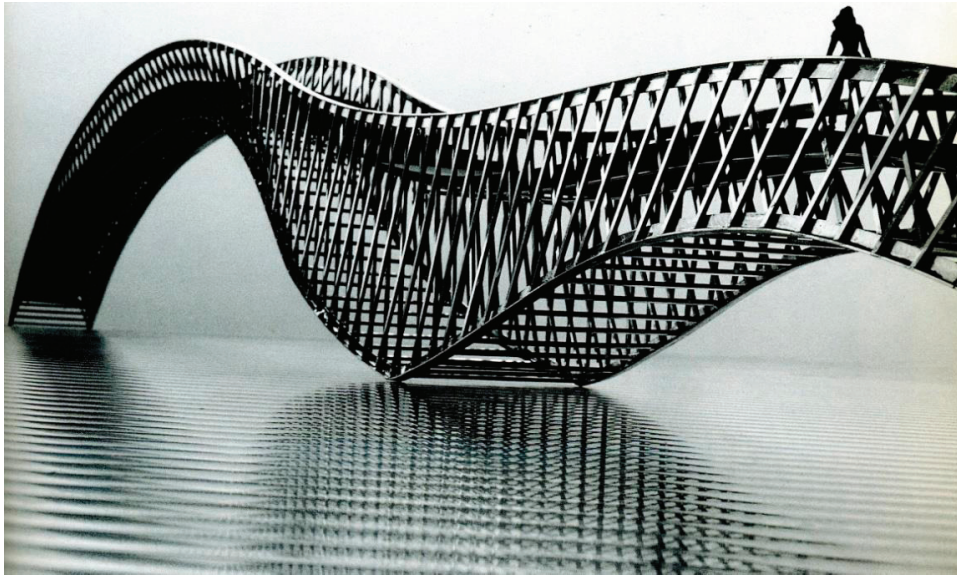
2. West 8, *Expo 02, Yverdon-les-bains*, 1999.
   (Fanny Smelik, Chidi Onwuka, Daphne Schuit, Victor J. Joseph and D'Laine Camp, eds. and trans. *Mosaics West 8*, p. 51.)

3. *Digital drawing using early perspective software*, 1985.
   (Mark S. Lindhult and Nicholas T. Dines, 'Perspective Sketching with Microcomputers', p. 57.)

4. *3D Simulation*, 1988.
   (John W. Danahy and Robert Wright, 'Exploring Design through 3-Dimensional Simulations', p. 69.)

5. Karl Sims/thinking Machines Corporation, *Panspermia*, 1994.
   (James L. Sipes, 'Simulating Natural Phenomena', p. 30.)

Architecture addressed various cutting-edge digital technologies, particularly computer programmes to generate perspective view of landscape. In the 1980s, the magazine introduced various visualization technologies, such as landform modelling and landscape simulation. For example, in 1981, Devon Nickerson and Mary Arneson introduced PERSPECTIVE PLOT, one of early software that could generate a perspective view of topography and rendered not only landform but also vegetation symbols over the surface of the landform.[13] Similarly, in 1985, Lindhult and Nicholas T. Dines introduced CREATE, LOCATE, and VIEW programmes enabled users to generate a view from any position (Figure 3).[14] The special-themed issue in July/August 1988 of *Landscape Architecture* focused on computer technology pertaining to landscape architecture, specifically 3D simulation software with CAD and GIS (Figure 4).[15] The same issue carried an essay of Lindhult that explored the potential of CAD software, suggesting the use of potential of CAD as the base of 3D simulation, which then could be superimposed on video image to create realist effects.[16] Later, a number of articles published in *Landscape Architecture* in the mid-1990s introduced not only landform modelling technology, such as DTMs but also simulation technologies of natural phenomena, such as water, vegetation, and leaves moved by wind (Figure 5).[17] Moreover, the composite technique, which makes pictorial presentation view by adding vivid colours manually on the computer modelling using CAD software, was introduced (Figures 6, 7).[18] Thus, in the 1980s to the 1990s, the advancement of computer technology to depict realistically an appearance of actual landscape, which generally was rendered as the form of perspective view, was seminal to digital landscape representation.[19]

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[13] Devon Nickerson and Mary Arneson, 'Technik: Previewing Ski-Slopes by Computer', *Landscape Architecture* 71(6), 1981, pp. 738–739.

[14] Mark S. Lindhult and Nicholas T. Dines, 'Perspective Sketching with Microcomputers', *Landscape Architecture* 75(4), 1985, pp. 56–57.

[15] John W. Danahy and Robert Wright, 'Exploring Design through 3-dimensional Simulations', *Landscape Architecture* 78(5), 1988, pp. 64–71; Brian Orland, 'Video Imaging: A Powerful Tool for Visualization and Analysis', *Landscape Architecture* 78(5), 1988, pp. 78–88.

[16] Mark S. Lindhult, 'The Road beyond CAD', pp. 41–42.

[17] Stephen M. Ervin, 'Digital Terrain Modeling', *Landscape Architecture* 84(1), 1994, pp. 31–35; James L. Sipes, 'Simulating Natural Phenomena', *Landscape Architecture* 84(5), 1994, pp. 30–32; James L. Sipes, 'Creating Digital Worlds: A New Generation of Computer Programs Makes it Possible to Simulate the Visual Complexities of Real Landscapes', *Landscape Architecture* 86(11), 1996, pp. 48–53.

[18] Mark Lindhult and Todd Richardson, 'Computer-Aided Manufacturing of Custom Landscape Elements', *Landscape Architecture* 84(3), 1994, p. 32.

[19] As early computers cannot achieve realistic depiction or simulation of landscape, photography is used as a more effective medium to simulate landscape. For a more specific account on this topic, see Ervin H. Zube, David E. Simcox, and Charles S. Law, 'Perceptual Landscape Simulations: History and Prospect', *Landscape Journal* 6(1), 1987, pp. 62–80. For a brief description of various uses of computer before 2000 in landscape architecture, see Stephen M. Ervin and Hope Hasbrouck, 'Technology: Thirty Years of Computing in Landscape Architecture', *Landscape Architecture* 89(11), 1999, pp. 54–55.

6. *CAD model for Armed Forces Memorial*, 1994.
   (Mark Lindhult and Todd Richardson, 'Computer-Aided Manufacturing of Custom Landscape Elements', p. 32.)
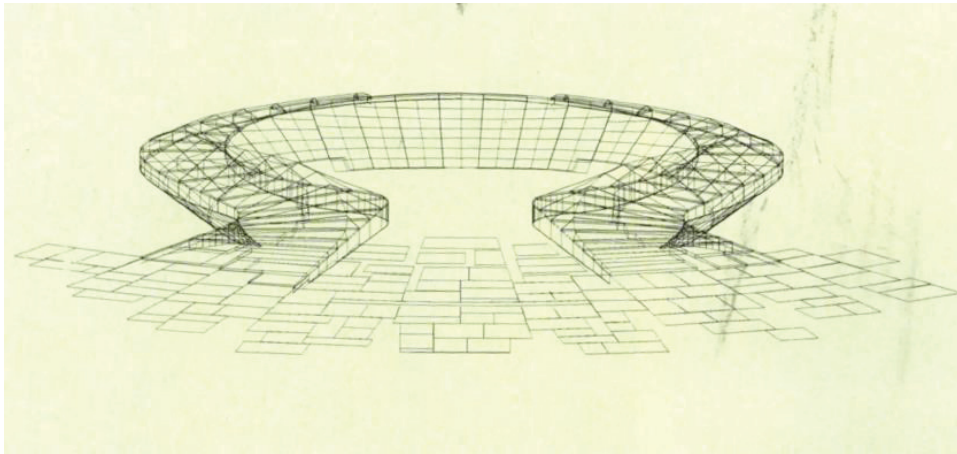
7. *Illustration for Armed Forces Memorial*, 1994.
   (Mark Lindhult and Todd Richardson, 'Computer-Aided Manufacturing of Custom Landscape Elements', p. 32.**)**

This desire towards realism in visualizing appearance of landscape (particularly perspective view) can be further traced back to the pictorial depiction of manual drawing by English landscape gardeners. As discussed in Chapter II, the techniques of pictorial depiction used by landscape gardeners such as Kent and Repton still have noticeable effects on recent digital landscape representation. Specifically, the composite technique adopted in manual drawings executed by Kent, which hybridized the elevation of the frontal appearance of architectural structures within the overall perspective view of the picturesque landscape, reappears with slight variation in digital landscape representation in a way that digital modelling of structure is refined and rendered in graphic editing software. Another example in this genealogy of pictorial depiction is beautiful elaborated presentation drawings included in *Greensward* plan for Central Park in the nineteenth century.[20]

At present, realistic depictions persist in digital landscape representation.[21] The photo-realistically rendering of presentation drawing, rather than static traditional drawing types of projections, can easily capture the clients and the public who have been schooled in realistic principles of public visual media. However, the graphically stunning visual's function and roles in landscape design process must be reconsidered carefully. As Treib observed, recent countless digital visuals merely might be produced mechanically and routinely without any design idea.[22]

This trend of realistic depiction of digital landscape representation is particularly evident in production of synthetic photograph using graphic editing software. With the development of photo editing technology, photomontages that re-compose fragments of digital photographs function as among the most frequently used techniques of landscape representation. Digital photographs, in which the difference between the original and the copy is indistinguishable, are copied endlessly without loss or degradation of information,

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[20] Visual representation often functions to satisfy the client's stronger desire to possess the representation of the landscape rather than the actual landscape because highly artistic landscape representation is perceived as a work of art. For example, beautiful presentation plans executed by André Le Nôtre and his school in the seventeenth century were collected by Nicodemus Tessin; Repton was often asked by his clients to produce high-quality watercolour sketches (which took the form of his Red Books) without any actual improvements to the property, as the clients wanted to show these visual artefacts to their peers. André Rogger, *Landscapes of Taste: The Art of Humphry Repton's Red Books*, London and New York: Routledge, 2007.

[21] Recent scholars raise problems of realistic depiction in digital landscape representation. See Katie Kingery-Page and Howard Hahn, 'The Aesthetics of Digital Representation: Realism, Abstraction and Kitsch', *Journal of Landscape Architecture* 7(2), 2012, pp. 68–75; Blake Belanger and Ellen Urton, 'Situating Eidetic Photomontage in Contemporary Landscape Architecture', *Landscape Journal* 33(2), 2014, pp. 109–126; Karl Kullmann, 'Hyper-realism and Loose-Reality: The Limitations of Digital Realism and Alternative Principles in Landscape Design Visualization', *Journal of Landscape Architecture* 9(3), 2014, pp. 20–31.

[22] Marc Treib, 'Introduction', in *Representing Landscape Architecture*, ed. Marc Treib, London and New York: Taylor & Francis, 2008, p. xix.

unless they are compressed.[23] In addition, sophisticated composite software, such as Photoshop, has become more affordable and common, transforming landscape designers and the public from mere beholders to active users who create virtual landscapes. The 3D digital landforms created with the aid of cutting-edge rendering software are still often synthesized in graphic editing software with photographs that capture actual humans and nature to evoke a sense of reality;[24] originality in photography lies in its objective character, 'like a phenomenon in nature'.[25]

Indeed, as art historian Ernst Gombrich argued, as all arts of representation have intended to create an illusion effect that allows viewers to see an image in terms of reality,[26] landscape representation has also tended to create realistic effects that can be perceived by the viewer in terms of reality. Thus, to understand fully the desire for realism in landscape representation, the first step is to rethink the ontological status of the photographic image, that is, the pseudo-presence of images. In other words, consideration should be given to how an image can be experienced and even perceived as equivalent to the not-yet-actualized landscape it represents.

The following sections offer a critique of photographic realism in current landscape design. Firstly, the landscape representations of the past couple of decades are briefly examined again, as already discussed in Chapter III, during which the function of digital synthetic photographs in landscape design has transitioned from generating imaginative ideas in designing strategies to photo-realistic depiction of not-yet-actualized landscapes. Presently, photomontages tend to be used only to offer illustrations of the physical world in terms of resemblance (i.e. instrumentality of visualization) rather than facilitate operational design strategies (i.e. imaginative function). To illustrate such pervasive trends, the author has coined the term 'photo-fake': an image that imitates the actual existence of a designed but not-yet-actualized landscape.

In the sections that follow, this work examines several photo-fake conditions, including framing, point of view, composition, expression, landscape and human figure, and digital aura. Specifically, visuals of proposals in recent international design

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[23] William J. Mitchell, *The Reconfigured Eye: Visual Truth in the Post-Photographic Era*, Cambridge, MA: MIT Press, 1992, p. 6.

[24] Whereas purely computer-generated images such as vegetal simulation of e-on Vue have limitations, such as 'uncanny valley' and 'kitsch', digitized photographic source materials capturing actual people and landscape easily evoke a stronger sense of reality compared with computer-rendered images. On this limitations of digital representation, see Karl Kullmann, 'Hyper-realism and Loose-Reality: The Limitations of Digital Realism and Alternative Principles in Landscape Design Visualization', p. 22.

[25] André Bazin, 'The Ontology of the Photographic Image', in *What is Cinema?*, ed. and trans. Hugh Gray, Berkeley and Los Angeles: University of California Press, 1967, p.13.

[26] Ernst H. Gombrich, *Art and Illusion: A Study in the Psychology of Pictorial Representation*, New York: Princeton University Press, 1969.

competitions are presented as epitome of the current trend with regard to visual representation. The analysis argues that the realism of a photo-fake is not actual realism of the real world but lies in an established pictorial convention that traces back to the picturesque depictions of the eighteenth century within the discipline of landscape design and even earlier historical landscape paintings of the seventeenth century.

4.2. Photo-fake

4.2.1. Defining Photo-fake

(1) Photograph as index: ontology of the photograph

To understand the desire for realism in synthetic photography—that is, the photomontage—the correlation between photographic images and real-world objects need to be reconsidered.[27] Photography is generally characterized by multiplicity and ubiquity, as photographs can be reproduced and distributed widely and easily. However, of all its characteristics, the equivalence derived from photography's relative reality is seminal to its ontology. In other words, photographic images are easily considered indices of actual objects. As discussed in Chapter II, Peirce noted that a photograph is an index rather than an icon or symbol.[28] An index denotes an object and has an actual connection with that object; without the existence of either connection or object, a sign cannot be interpreted as an index.[29] Thus, a photographic image is considered an index by virtue of its sense of presentness, which makes it akin to seeing the subject.

Peirce's typology of signs was followed by those of critics such as Susan Sontag, Rosalind Krauss, and Roland Barthes, whose medium-specific discourse on photographs shed new light on the ontological aspects of photography by addressing its indexicality, which refers to the pseudo-presence of photographic images by virtue of their bearing witness to being present.[30] As Susan Sontag remarked, '[…] photography— any

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[27] This section in this dissertation is a revised version of my previous work. The problems of pictorial depiction of digital landscape representation were first raised, to a certain degree, in my Korean-language critical essay on the International Competition for the Master Plan of Yongsan Park. Myeongjun Lee, '네 장의 청사진에 대한 상상적 감상 [Imaginative Appreciation of Four Blueprints]', in 용산공원: 용산공원 설계 국제공모 출품작 비평 [*Criticism on the International Competition for the Master Plan of Yongsan Park, Korea*], Jeonghann Pae et al., Goyang: Namudosi, 2013, pp.106–117. The same year, the term photo-fake was first coined in another Korean critical essay on the competition. Myeongjun Lee, '포토페이크의 조건 [Conditions of Photo-fake]', 환경과 조경 [*Environment & Landscape Architecture*] 303, 2013, pp. 82–87. The following year, this essay was revised and presented at the European Council of Landscape Architecture Schools Conference 2014. Myeongjun Lee and Jeonghann Pae, 'Condition of Photo-fake: Rethinking Photomontage in Contemporary Landscape Design', *Peer Reviewed Proceedings of European Council of Landscape Architecture Schools Conference 2014; Landscape: A Place of Cultivation*, eds. Isabel Martinho da Silva, Teresa Portela Marques, and Gonçalo Andrade, Porto: University of Porto, 2014, pp. 409–412. At present, a revised essay of above works, titled 'Photo-fake conditions of digital landscape representation', has been submitted to and accepted by *Visual Communication*; it will be published soon.

[28] Charles Sanders Peirce, *Collected Papers of Charles Sanders Peirce Vols. I–II*, eds. Charles Hartshorne and Paul Weiss, Cambridge, MA: The Belknap Press of Harvard University Press, 1960, p. 184.

[29] *Ibid.*, p.170.

[30] Susan Sontag, *On Photography*, New York: Picador, 1977; Rosalind Krauss, 'The Photographic

photography—seems to have a more innocent, and therefore more accurate, relation to visible reality than do other mimic objects'. [31] Barthes discussed the concept of 'photographic referent', describing it as 'not the optionally real thing to which an image or a sign refers but the necessarily real thing which has been placed before the lens, without which there would be no photograph'.[32] Such a discourse reveals that photographic images not only consist of a likeness or resemblance with regard to a subject but also depend on their degree of equivalence with the actual object.

Conditions of Surrealism', *October* 19, 1981, pp. 3–34; Roland Barthes, *Camera Lucida: Reflections on Photography*, trans. R. Howard, New York: Hill and Wang, 1981.
[31] Susan Sontag, *On Photography*, p. 6.
[32] Roland Barthes, *Camera Lucida: Reflections on Photography*, p. 76.

(2) Photomontage with spacing

Composite digital representation has its origin in the photomontage. Photomontage generates 'spacings' through the cutting up and re-assembly of torn photographs. Such spacings are roughly divided into two types: visible and invisible. Photomontages are thus typed in accordance with the presence or absence of traces of manipulation, namely, spacing.

Visible spacings are meant to be discernible traces of cutting and assembling: the white areas between pasted photographs and distortion of images by exaggeration or scaling down. Meanwhile, invisible spacings consist of cognitive inconsistencies constructed by putting together an artefact whose parts have disparate perceptual characteristics without an otherwise observable gap.

The origin of visible spacing can be traced to Dadaism in the early twentieth century (Figure 8), whereas invisible spacing goes back to the work of contemporary Surrealists (Figure 9). The former image shows 'what they [Nazis] really were, not just bombastic but money-fed',[33] whereas the latter represents a surrealist scene in which the Paris Opera 'rises in the middle of a field of cows',[34] Spacing in photomontages has been considered a 'subversion of the photograph', as it destroys the 'Aristotelian unities of place and time'.[35] Nonetheless, as in the aforementioned works—paradoxically because of their very 'subversion'—spacing serves as a series of gaps in which critical and imaginative ideas can be generated regarding the way the spacing manipulates and transforms the meaning of the original photographs.[36]

In fact, in the 1990s and early 2000s, such creativity in spacing was what landscape designers and theorists expected from visual representation. Furthermore, as discussed in Chapter III, visual representations that involve spacing, such as collages, montages, mappings, and diagrams, were conceived as new methods of representation; they were considered innovative for enabling 'the virtual to be both conceived and actualized'.[37] James Corner suggested that the creativity of collages could *re-present* future landscapes in his early writing, pertaining to drawing and representation, stating, 'Metaphorical /analogical drawing is thus radically different from analytical drawing, which is more

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[33] Dawn Ades, *Photomontage*, London: Thames and Hudson, 1986, p. 49.
[34] *Ibid.*, p.136.
[35] William J. Mitchell, *The Reconfigured Eye: Visual Truth in the Post-Photographic Era*, p. 163.
[36] Biljana Scott, 'Picturing Irony: The Subversive Power of Photography', *Visual Communication* 3(1), 2004, p. 39.
[37] James Corner, 'Introduction: Recovering Landscape as a Critical Cultural Practice', in *Recovering Landscape: Essays in Contemporary Landscape Architecture*, ed. James Corner, New York: Princeton Architectural Press, 1999, p. 8.

8. John Heartfield, *Adolf the Superman Swallows Gold and Spouts Junk*, 1932.
   (http://www.johnheartfield.com/John-Heartfield-Exhibition)

9. René Magritte, *Paris Opera*, 1929.
   (http://gallica.bnf.fr/ark:/12148/cb34381250f/date.r=la+r%C3%A9volution+surr%C3%A9aliste.langFR)
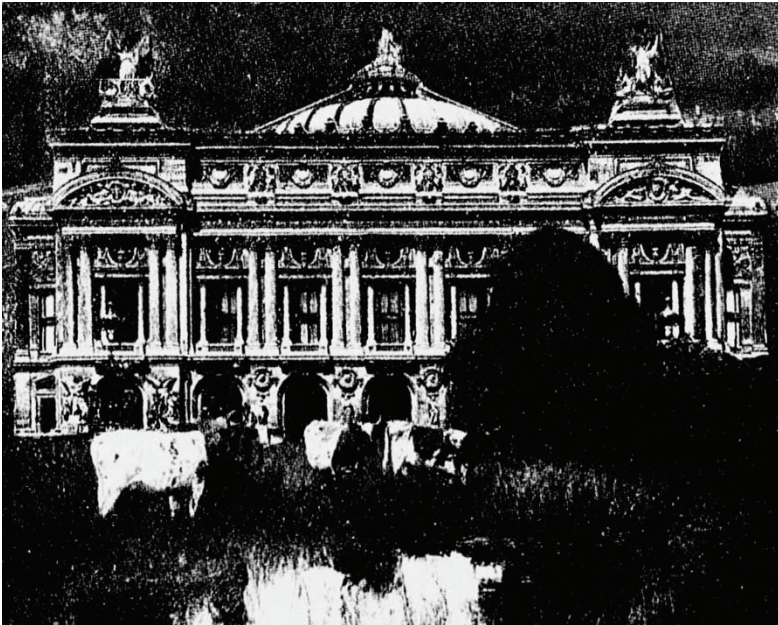
10. James Corner and Stan Allen, *Emergent Ecologies*, Downsview Park International Design
    Competition, 1999. (Julia Czerniak, ed. *CASE: Downsview Park Toronto*, p. 61.)

11. Bernard Tschumi et al., *The Digital and the Coyote*, Downsview Park International Design
    Competition, 1999. (Julia Czerniak, ed. *Case: Downsview Park Toronto*, p.87)

instrumental and calculative than it is poetic and imaginative'.[38] New representational tools can thereby be understood as one mode of montage creation: they do not correctly depict future landscapes in terms of resemblance but facilitate alternative conception or thought by producing spacings between visual images and the actual world.[39]

Such photographic images with visible and invisible spacings appeared in the panels of the finalist teams in the Downsview Park International Design Competition held in 1999. As Julia Czerniak stated, 'The proposals were at once graphically stunning and rigorous, densely filled with diagrams, perspectives, photographs, sections, plans and details'.[40] Visuals of the proposals supported their design concepts on the appearance and function of landscapes. For example, James Corner and Stan Allen's team largely used a photomontage with visible spacing (Figure 10). Their visuals supported the concept of *Emergent Ecologies*, which was the title of their proposal, and more importantly, one of Corner's major concerns: giving the impression of a dynamic and complex ecology.[41]

Meanwhile, Bernard Tschumi and his team's proposal, *The Digital and the Coyote*, included a photomontage with invisible spacing (Figure 11) that supported their strategy of coexistence of the digital and the wild. Although the image does not have visible traces of assemblage, the unrealistic coexistence of the wild (the shaded coyote and wilderness) and the digital (the cultural structure) gives the viewer a surrealistic impression.

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[38] James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', *Word & Image: A Journal of Verbal/Visual Enquiry* 8(3), 1992, p. 275.

[39] James Corner, 'The Agency of Mapping: Speculation, Critique and Invention', in *Mappings*, ed. Denis Cosgrove, London: Reaktion Books, 1999, pp. 213–252. For a Korean-language study of possibilities and limitations of photomontage in landscape design, see Yujin Song, 현대 조경설계의 매체와 표현 [*Media and Presentation Focusing on Photomontages in Contemporary Landscape Design*], 서울대학교 석사학위논문 [Master's Thesis of Landscape Architecture, Seoul National University], 2006.

[40] Julia Czerniak, 'Introduction: Appearance, Performance: Landscape at Downsview', in *Case: Downsview Park Toronto*, ed. Julia Czerniak, Munich, London, and New York: Prestel Verlag, 2001, p. 13.

[41] Corner often drew analogies between ecosystems and landscapes in his design concepts. Indeed, one motto of landscape urbanism—'Landscape is the medium of urban design'—originated from his analogies. For critical research on Corner's analogies, see Richard Weller, 'Between Hermeneutics and Datascapes: A Critical Appreciation of Emergent Landscape Design Theory and Praxis through the Writings of James Corner 1990–2000 (Part One)', *Landscape Review* 7(1), 2001, pp. 3–24; Richard Weller, 'An Art of Instrumentality: Thinking Through Landscape Urbanism', in *The Landscape Urbanism Reader*, ed. Charles Waldheim, New York: Princeton Architectural Press, 2006, pp.69–85; Charles Waldheim, 'Landscape Urbanism: A Genealogy', *Praxis* 4, 2002, pp. 4–17.

(3) Defining the photo-fake: photomontage without spacing

At present, however, photomontages of presentation drawing in landscape design tend to eliminate such spacings. Visible spacings are delicately erased by such computational tools as Adobe Photoshop and Illustrator's various filters and other commands. Meanwhile, invisible spacings do not come into being incidentally, as torn photographs with similar and familiar contexts are selected such that human awareness of their perceptual inconsistency is diffused when they are assembled. The complete representation is thus perceived as if it were a copy of an actual landscape. As Karen M'Closkey argued, over the past quarter century, the functions of photomontages in North American practice have transitioned from imaginative 'project ideation' to photo-realistic 'project depiction'.[42] In a strict sense, a synthetic photograph without spacing does not have the authentic characteristics of the photomontage, in which gaps that can generate imaginative and critical ideas are absent.[43]

This phenomenon evokes the 'double logic of remediation' in media theory, as already discussed in Chapter II, to explain the logic of hybridization between drawing types. To quote again, Jay David Bolter and Richard Grusin treated the history of media as a matter of contradictory modes of revealing or concealing the existence of media, namely, 'hypermediacy' and 'immediacy'; the former wants 'to multiply its media', and the latter, 'to erase its media'.[44] In this logic, photomontages with visible and invisible spacings belong to 'hypermediacy', whereas images with no spacing, to 'immediacy', by virtue of the concealed traces of media manipulation.

Thus, the author has coined the term photo-fake to refer to a synthetic photograph with its spacings removed. A visual representation with no spacing 'fakes' the actual existence of a designed landscape that has not been actualized. According to the aforementioned theories on the indexical nature of photography, photographs represent the 'past' of real objects in the present tense. In contrast, photo-fakes, as observed in Chapter II, similar to drawings in most other fields related to built environments, generally represent not-yet-actualized objects (i.e. potential future) in the present tense. In accordance with Baudrillard's definition, 'to simulate [photo-fake] is to feign to have what one hasn't'.[45]

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[42] Karen M'Closkey, 'Structuring Relations: From Montage to Model in Composite Imaging', in *Composite Landscapes: Photomontage and Landscape Architecture*, eds. Charles Waldheim and Andrea Hansen, Ostfildern: Hatje Cantz Verlag, 2014, p. 117.

[43] According to James Corner, 'more than just representational pictures, montage effectively conjoins ideas and conjectures to produce often surprising new possibilities and sets of relationships'. James Corner, 'Foreword: Composite Landscapes', in *Composite Landscapes: Photomontage and Landscape Architecture*, p. 9.

[44] Jay David Bolter and Ricard Grusin, *Remediation: Understanding New Media*, Cambridge, MA and London: The MIT Press, 1999, p. 5.

[45] Jean Baudrillard, 'Simulacra and Simulations', in *Jean Baudrillard: Selected Writings*, ed. Mark

If a photo-fake is perceived as a photographic image with no sense of irritation, then the new composite image has the equivalence of a not-yet-actualized landscape—at least to the viewer—and the experience is evidence of the pseudo-presence of the image. Thus, the image, including its phenomenological and ontological dimensions, can be called the 'image world'. Torn photographs that are dislocated from their original contexts are located on a new canvas, such as a computer monitor, and then given a new pseudo-presence in the context of a new image world. In turn, the new image world becomes unique because of its pseudo-presence with respect to the specific indexicality of the torn photographs.

Notably, the realism of a photo-fake is not a realistic one. Lev Manovich's statement on this point is eminently useful as a perspective on the analysis of a photo-fake's realism: '[…] what computer graphics have (almost) achieved is not realism, but rather only photorealism—the ability to fake not our perceptual and bodily experience of reality but only its photographic image'.[46] The author would go further and rephrase as follows: what the photo-fake achieves is not realism but photorealism, and more generally, pictorial realism.[47] Specifically, landscape architecture remains affected by picturesque aesthetics, both aesthetically and practically.[48]

John Dixon Hunt remarked that landscape design has become 'computeresque' with the emergence of digital synthetic software, such as Photoshop and Illustrator, and that the computeresque has 'the very qualities that also characterize[d] the original picturesque'.[49] As such, the techniques of pictorialization are important in the production of composite photographs—in this case, photo-fakes—because they are ultimately works of art, comparable to paintings, made from digital photographic materials that pursue a realistic (or more strictly, photorealistic) visual experience. By virtue of the specific

Poster, Stanford: Stanford University Press, 1988, p. 167.

[46] Lev Manovich, *The Language of New Media*, Cambridge, MA: MIT Press, 2001, p. 200.

[47] Lev Manovich, a prominent scholar of media theory, uses the term 'realism' to refer to the ability to simulate humans' perceptual and bodily experience of reality; 'photorealism' is defined as 'the ability to simulate any object in such a way that its computer image is indistinguishable from its photograph'. Lev Manovich, *The Language of New Media*, pp. 199–200. In a similar context, the term 'pictorial realism' is used in the current work to refer to the ability to simulate any object in such a way that its computer image is indistinguishable from its realistic painting. In other words, the photo-fake does not simulate the human perceptual or optical experience of seeing a real object but imitate at best the techniques or conventions of its visual representations, such as skilfully manipulated photograph and elaborately executed painting. For a description of differences between perception of realistic landscape visualization and actual optical perception of actual landscape, see Karl Kullmann, 'Hyper-realism and Loose-reality: The Limitations of Digital Realism and Alternative Principles in Landscape Design Visualization', p. 21.

[48] Susan Herrington, 'Framed Again: The Picturesque Aesthetics of Contemporary Landscapes', *Landscape Journal* 25(1), 2006, pp. 22–37.

[49] John Dixon Hunt, 'Picturesque & the America of William Birch: "The Singular Excellence of Britain for Picture Scenes"', *Studies in the History of Gardens and Designed Landscape* 32(1), 2012, p. 3.

indexicality of torn photographs, the photo-fake conjures the actual existence of the not-yet-actualized landscape.

Graphic editing software products, particularly Adobe Photoshop, enable seamless depiction (i.e. photo-realistic representation). Manovich argued that 'what we as users experience as properties of media content comes from software used to create, edit, present, and access this content'.[50] As such, except for computer programmers who use algorithms, the public generally interacts with digital media files using a number of commands in media applications. The main media software product pertaining to photo-fakes is Adobe Photoshop. Specifically, the original torn photographs (on 'layer palettes') can be re-assembled (using 'merge layers' command) into a final composite image; discernible traces of cutting and assembling (i.e. visible spacings) can be eliminated using Photoshop's filters (e.g. 'clone stamp tool' and 'eraser tool'). As a result, the final complete representation is perceived as a photograph that seems to capture an actually existing landscape. These new aesthetic properties of digital landscape representation during production and reception come from the specific software product used, in this case Photoshop (e.g. 'filters' and 'layer palettes').

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[50] Lev Manovich, *Software Takes Command*, New York and London: Bloomsbury Academic, 2013, p. 150.

4.2.2. Photo-fake Conditions

(1) Invisible frame and the viewer's position

A photo-fake's frame is generally invisible. The invisible rectangular border between the synthetic photographic image and white canvas on which it is placed, such as a design panel, closes the boundary and tames the virtual landscape (Figure 12). This setup is in contrast to a photomontage with visible spacings, as mentioned earlier, in which the rectangular frame is broken intentionally (Figure 10). In the case of a visual image with visible spacing, the photographic pseudo-presence extends to the outside of the frame or intrudes into it, thereby playing an imaginative and critical role in manipulating the image. Photo-fake images, meanwhile, are cropped and reframed within a rectangular invisible spacing to create a stationary and safe state for viewers. The photo-fake's virtual frame generates a similar visual experience to the picture frame. As Gina Crandell pointed out, pictures were perceived as integral components of surroundings, before picture frames developed in Europe in the fifteenth century detached such visual representation from their surroundings.[51]

As such, the frame determines the viewer's position—in this case, in front of the image. Likewise, a virtual viewer looking at a distant landscape within the image space is usually placed in the foreground of the image. The visual experience of a photo-fake epitomizes Jay Appleton's prospect–refuge theory,[52] in which the virtual viewer is able to view a scenery without risk—without exposing him/herself to others, or by putting him/herself at a distance from the scenery. In visual culture, the tradition of positioning the virtual viewer and scenery has a long history, dating back at least to Claude Lorrain's historical landscape painting in the seventeenth century and to the later English picturesque aesthetics of the eighteenth century. Lorrain's the *Pastoral Landscape* (1648) includes human figures contemplating the scenery depicted by the painting; the figures function as surrogate spectators mediating the real viewer and represented landscape in the middle and background of the picture plane. This relationship is embodied in most visual representations involving not only landscape painting but also photographs and even films; thus, it is likely a universal visual experience of any landscape.

In a photo-fake, refuge elements, such as trees, buildings, and caves, are generally

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[51] Gina M. Crandell, 'Moving Pictures: The Photo Collages of David Hockney', *Landscape Architecture* 75(6), 1985, p.67.
[52] Jay Appleton, *The Experience of Landscape*, Chichester: John Wiley & Sons, 1996. For a Korean-language description of Appleton's landscape aesthetics, see Jeonghann Pae and Jungsong Cho, 'Appleton과 Bourassa의 '*경관미학 이론에 대한 비판적 고찰* [Theory in the Aesthetics of Landscape: A Critical Review of J. Appleton and S. Bourassa]', *한국조경학회지* [*Journal of the Korean Institute of Landscape Architecture*] 23(1), 1995, pp. 7–22.

12. West8 and Iroje et al., *Healing: The Future Park*, International Competition for the Master Plan of
    Yongsan Park, 2012. (Korean Ministry of Land, Infrastructure and Transport)

13. West 8 et al., *Governors Island Park and Public Space Master Plan*, 2007–2016.
    (http://www.west8.nl/projects/governors_island/)

placed in the foreground or the virtual viewer's position, in which the viewer can safely
contemplate the mid-ground and background. In the current work, West 8 and others'
winning proposal for the Yongsan Park Competition in 2012, for example, involved several
photo-fake images, one of which (Figure 12) contained the prospect–refuge relationship:
the virtual viewer can contemplate the scenery while hidden among a dozen tree trunks,
which provide refuge. Similarly, one of the visuals in the winning proposal for the
Governor Island Park and Public Space Master Plan in 2007–2016 depicts two virtual
viewers in the foreground, where they contemplate the overall scenery (Figure 13). This

setting was also affected by the technique of landscape painting in the seventeenth century. According to Crandell, 'seventeenth century landscape paintings were framed by the technique of *coulisse*. Trees and buildings framed the central subject and provided a secure vantage point for the spectator'.[53]

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[53] Gina M. Crandell, 'Moving Pictures: The Photo Collages of David Hockney', p. 67.

(2) Creating illusions

Other photo-fake conditions involve pictorial structure and expression, which are significant in the creation of illusionist effects. The manner of creating illusions in a photo-fake owes its origin to the two established conventional modes of painting, namely, linear perspective and sfumato, invented during the Renaissance era.

The term 'linear perspective' refers to the art of generating depth in the pictorial space in the way that cropped photographs converge towards a vanishing point. As shown in Figures 14, 15, and 16, construction is principally devoted to creating a visual experience of a linear streetscape and stream scene. The vanishing point, to which the eyes of viewers should be drawn, leads to a thorough investigation of the image world (Figures 14, 15, and 16). The use of many photographic materials heightens the sense of depth and enables estimation of the full scale of the image world, where materials whose scale is well known are inserted. However, depth perception in such a picture plane does not correspond to that of a human view of an actual space. It is merely the product of an arrangement of cropped photographs orientated towards the vanishing point to be viewed as if it is the actual world.[54]

Figure 14 is the proposal that won the second prize in the Yongsan Park Competition, and it includes visual representations of a stream scene constructed using linear perspective. In the image, the linear form, as an axis of the picture plane, creates a sense of depth and a visual experience in which the viewers' eyes follow the line, which is filled with blossoming cherry trees. The viewers' oculus corresponds directly to that of the two tourists, the virtual viewers, in the foreground of the image. Similarly, Diller Scofidio + Renfro and others' winning proposal for the International Landscape and Architectural Competition for the Design of Zaryadye Park, *Wild Urbanism*, includes photo-fake images; one figure holding a camera (Figure 16) is placed in the foreground of the image; the viewers' eye corresponds to the invisible gaze of the virtual viewer with a camera. In other words, the viewers are allowed to contemplate the landscape of the images (Figures 14, 16) in a similar way that the tourists/virtual viewers do in their invisible gaze. Thus, the visually privileged image achieves realistic illusions, which was likely the intention of the producer of the image or designer of the landscape.

Sfumato, which creates a dreamlike atmosphere in an image space reconstructed within the picture plane, deliberately blurs distance in photographs (Figure 17). This distance from the picture plane weakens the viewers' discriminating power and stimulates a

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[54] Karl Kullmann, 'Hyper-realism and Loose-reality: The Limitations of Digital Realism and Alternative Principles in Landscape Design Visualization', p. 21.

14. Synwha Consulting and SeoAn R&D Landscape Design et al., *Yongsan Park for New Public Relevance*, International Competition for the Master Plan of Yongsan Park, 2012.
    (Korean Ministry of Land, Infrastructure and Transport)
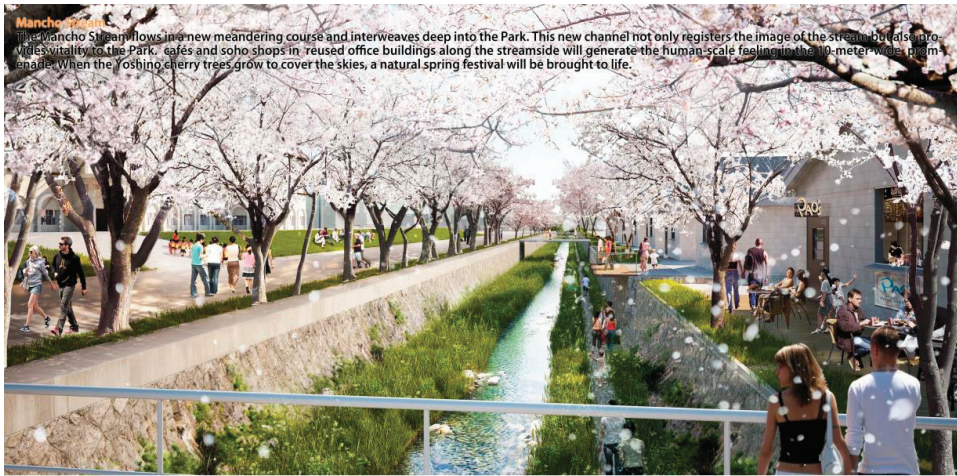
15. West 8 et al., *Governors Island Park and Public Space Master Plan*, 2007–2016.
    (http://www.west8.nl/projects/governors_island/)

projective performance. It is an appropriate technique with which to produce an illusionist effect by reducing the visual information in the plane.[55] Unlike the composition of linear perspective, the technique of sfumato does not require many photographic materials. The dim, blurred image world leaves room for the viewers' imagination to work and creates an emotional atmosphere in the picture plane. Furthermore, the blur effect often extends to the

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[55] Ernst H. Gombrich, *Art and Illusion: A Study in the Psychology of Pictorial Representation*, pp. 221–222.

16. Diller Scofidio+Renfro et al., *Wild Urbanism*, International Landscape and Architectural Competition for the Design of Zaryadye Park, 2013. (http://www.dsrny.com/projects/zaryadye-park)

17. West 8 and Iroje et al., *Healing: The Future Park*, International Competition for the Master Plan of Yongsan Park, 2012. (Korean Ministry of Land, Infrastructure and Transport)
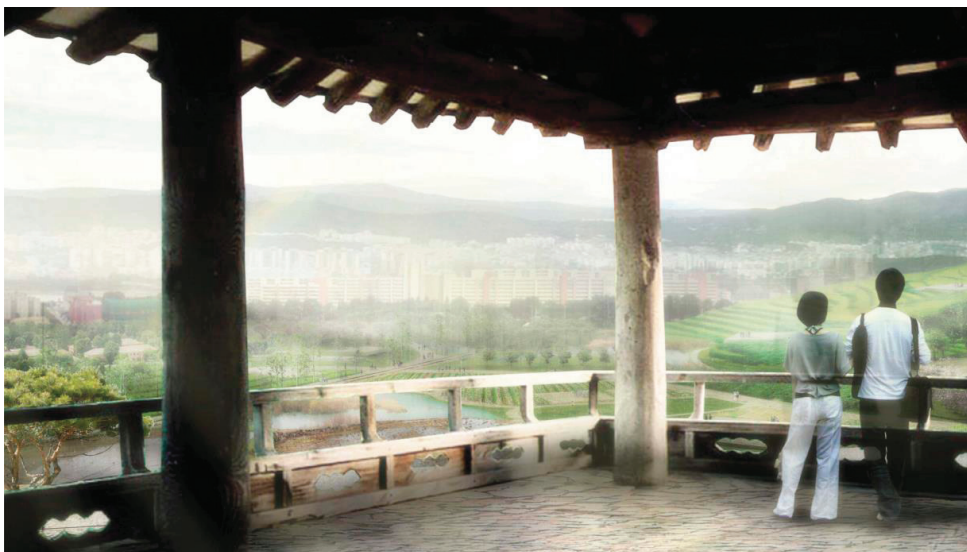
trail of an object, producing a streaking after-image that creates the illusion of motion. Motion blur, a filter in Adobe Photoshop, functions in the literal sense as a tool to create 'motional' illusion by 'blurring'. This manipulation technique can be traced to the 'stroboscopic effect' popularized in the mid-seventeenth century.[56]

Healing: The Future Park, which won the first prize in the Yongsan Park Competition, effectively used sfumato to represent the atmosphere of the proposed landscape as a visualization of illusion (Figure 17). This approach accords with that team's design strategy, which was to generate a spatial illusion of a traditional Korean landscape and thus produce supportive, entrancing visual imagery. Another photo-fake image included in the winning proposal for the Governors Island Park and Public Space Master Plan creates a silent meditative mood by adopting the technique of sfumato (Figure 18). Similar to linear perspective, sfumato privileges the visual characteristics of a virtual landscape; it allows the viewers to identify with their counterparts in the representation. The virtual viewers are often placed in the image foreground, contemplating the scenery in the mid-ground and background. Thus, linear perspective leads the viewers to observe the image world closely, whereas sfumato guides the viewers to wander through it slowly and fluidly.

18. West 8 et al. *Governors Island Park and Public Space Master Plan*, 2007–2016.
   (http://www.west8.nl/projects/governors_island/)

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[56] *Ibid.*, pp. 228–229. Lev Manovich provided a genealogy of software, including Photoshop, whose tool functions date back to media technology before the digital age. See Lev Manovich, *Software Takes Command*.

(3) Landscape as theatre, human figures as spectators

The significance of landscapes and human figures in photo-fakes relates to their illusionist effects on reality. Although the development of computer graphic technology will continue indefinitely, photographic images that capture actual landscapes and people still provide a more realistic impression compared with purely computer-generated images. Thus, photographs of landscapes and people still frequently appear in most contemporary designers' proposals because of the way they add to 3D modelling structures.

An image world exclusively filled with photographs of individual objects of nature, such as trees, water, and grass, is often unable to allow viewers to identify the particular location of the image world. Unknown pictorial spaces are named when specific and familiar-looking (i.e. possessing an indexical function) landscape photographs with proper names are located inside the photo-fake plane. For example, most of the teams in the Yongsan Park Competition indicated the location of the image world—Namsan Tower, in Seoul, Korea—through the way the image was principally inserted in the background as a theatre, in front of which human activities could proceed (Figure 19). Similarly, a photo-fake image of the winning proposal for the Governors Island Park and Public Space Master Plan placed the image of the Statue of Liberty in the background (Figure 13). Thus, the viewers can perceive the location of the place. This manipulation frequently acts as a trick to produce a scene effortlessly by inserting a specific landscape photograph in a general circumstance depicting cliché activities, such as relaxing and contemplating the scenery. Indeed, a photo-fake produced by James Corner/Field Operations and others, one of the third-prize winners of the Yongsan Park Competition, has a visual background that can be perceived and identified as a specific site, Namsan (South Mountain) in Seoul, only by virtue of the indexicality of the photograph of Namsan, which is inserted in the background of the plane (Figure 19). As Karen M'Closkey stated:

> Even Corner, whose writings and drawings throughout the nineties were pleas to expand the procedural and conceptual relations of montage and collage beyond the imitative and pictorial, has used digital means to produce – through the work of his practice James Corner Field Operations – some of the most convincing "pictures" of the firm's designed landscapes. This change, which is coincident with his shift from speculative and theoretical work to a commercially successful international practice, transforms the role of montage from image making that is critical to one that is conciliatory.[57]

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[57] Karen M'Closkey, 'Structuring Relations: From Montage to Model in Composite Imaging', p. 122.

Landscape images—which do not generally depict wildernesses but spaces in which human civilization intervenes—are vitalized by the gestures of human photographs. When inserted in the photo-fake plane, human figures decontextualized from their original image worlds are given a renewed pseudo-presence that corresponds with a new image world. The image of a human figure functions as the scale of the image world, helping viewers perceive its actual size. More importantly, the human figure demonstrates the function or performance of the landscape image. In this case, the positioning of human figures engaged in activities, such as sitting, running, or looking, becomes more important. Thus, the characteristic of signs as icons is stronger than the identification as indices of pseudo-presence.

The representation of human figures in the history of landscape design goes back to the picturesque depictions of the eighteenth century. John Dixon Hunt argued that the function of human figures in William Kent's landscape sketches is divided into two types—'actors' who use the landscape and 'spectators' who view the scenery—and that both are expected to engage the virtual landscape.[58] These elements frequently appear in landscape representation: in photo-fakes, human figures function to create imaginary but realistic visual experiences of virtual landscapes and provide a virtual experience to the viewers.[59]

Both the performer and onlooker in the photo-fake can be considered alter egos or agents that project the designer's desire. The human figure in the photo-fake reveals 'the attitude of the designer towards the human being in that environment'; specifically, figures are 'added' to the image world already formed 'for them', not 'by them'.[60] The onlooker in the image, who often occupies a large portion of the foreground in the picture plane and contemplates the scenery in the mid-ground and background, is intended to be identified with viewers' own point of view. The viewers in the real world should contemplate the image world in terms of the onlooker placed in the foreground; that is, the viewers should follow the designer's intention or desire. Thus, the landscape is turned into an object of visual pleasure. In this context, viewers ought to notice that the figure as onlooker is often holding a mechanical device, such as a camera (Figures 16, 19, and 20). The camera held by the figure can be interpreted as a substitute for the palette and brush held by the figure

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[58] John Dixon Hunt, *Gardens and the Picturesque: Studies in the History of Landscape Architecture*, Cambridge, MA: MIT Press, 1992, p. 42.

[59] Human figures comprise an important element not only in the history of landscape representation but also architectural drawings. In the history of architectural representation, human figures were used to evoke the anthropomorphism of architecture and embody experiences in architecture. However, in contemporary architectural representation, they are mostly used to provide a simple indication of scale or depth. On this topic, see Alex T. Anderson, 'On the Human Figure in Architectural Representation', *Journal of Architectural Education* 55(4), 2002, pp. 238–246.

[60] Marc Treib, 'Paper or Plastic?: Five Thoughts on the Subject of Drawing', in *Drawing/Thinking: Confronting an Electronic Age*, ed. Marc Treib, London and New York: Routledge, 2008, p. 20.

19. James Corner Field Operation and Samsung Everland et al., *Openings: Seoul's New Central Park*,
International Competition for the Master Plan of Yongsan Park, 2012.
(Korean Ministry of Land, Infrastructure and Transport)

20. West 8 et al. *Governors Island Park and Public Space Master Plan*, 2007–2016.
(http://www.west8.nl/projects/governors_island/)

represented as a landscape painter in Humphry Repton's landscape sketches treated in
Chapter II.

In both landscape painting and photography, representing an object entails
appropriating the object represented. Likewise, as Sontag stated, the word 'photograph'

literally refers to 'taking a picture' of the object being photographed.[61] Therefore, those who photograph the scenery in the photo-fake can be considered a projection of the producer's desire, represented to capture an imaginary not-yet-actualized landscape, make it an object of visual pleasure, and possess it. Thus, the presence of a person with a camera shows that the photo-fake accepts, as well as transforms, the well-established pictorial canon that dates back to picturesque aesthetics. No person appears accidently in a photo-fake.

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[61] Susan Sontag, *On Photography*, p. 4.

(4) Paradox of photo-fake: digital aura

At this point, the final condition of the photo-fake can be discussed: does an aura exist within it? Cultural critic Walter Benjamin argued that the aura of a work of art decays in the age of mechanical reproduction; he defined the term 'aura' as 'the unique phenomenon of a distance, however close it may be'.[62] With the invention of new reproduction technology, such as photography and cinema, numerous reproductions of a work of art—whose 'exhibition value' is experienced in public inside an art gallery or theatre—are substituted for the original, whose 'cult value', or authenticity of unique existence, is experienced only at the place where it happened.[63] This phenomenon is commonly called the 'decay of aura'.

The photo-fake is fundamentally a type of assemblage that does not resemble the original photograph; therefore, it may be misunderstood by believing that the aura of the image disappears. However, where a play is a visual representation or realization of virtuality, in accordance with Deleuze's phraseology, a virtual image is one of many realized landscapes that exist only in a designer's mind; thus, the photo-fake can be appropriately understood to embody its own originality.[64] More importantly, its 'cult value' coexists with its 'exhibition value'. Such visual representation is often found not only on the computer screen (privately) but also on display in a museum (publicly). A high-resolution image file of a photo-fake can be stored on numerous users' hard drives, to be recycled into other photo-fakes or admired by users as if it is their private possession.

The seemingly paradoxical co-experience of exhibiting and admiring a photo-fake is a clear indication that it is appreciated as a work of art. Composite presentation drawings, as the examples in recent competitions show, tend to produce realistic illusions using established pictorial conventions. They permit viewers to view an artefact as a single original photograph of an actual landscape, as if it actually captured or depicted a landscape that exists in the world; hence, the photo-fake is a type of landscape painting that is made of photographs. More critically, the photo-fake is only perceived as a reality in the virtue of its high probability and renewed pseudo-presence; the image no longer serves the imaginative, generative, and critical roles that are authentic to the photomontage. Thus, the experience of the photo-fake generates renewed or reformed aura by permitting the viewers to be immersed in the visual representation of a not-yet-actualized landscape.

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[62] Walter Benjamin, 'The Work of Art in the Age of Mechanical Reproduction', in *Walter Benjamin Illuminations*, ed. Hannah Arendt, New York: Schocken Books, 1968, p. 222.

[63] *Ibid.*, p. 225.

[64] For Deleuze, 'Purely actual objects do not exist. Every actual surrounds itself with a cloud of virtual images'. The virtual image is thus an aspect of the actual object. Gilles Deleuze and Claire Parnet, 'The Actual and the Virtual', in *Dialogues II*, trans. Hugh Tomlinson and Barbara Habberjam, New York: Columbia University Press, 2007, p. 148.

The pseudo-aura of the photo-fake strengthens the imaginary appropriation of the landscape it represents, and it continues to exist until it is actualized. The viewers, whose eye has been schooled in the pictorial principles of the photo-fake, might attempt to capture the physically constructed designed landscape in a way that is similar in appearance with the original photo-fake. With the growing popularity of social networking services and mobile applications, users can retouch photographs that capture actualized landscapes using image editing applications and then upload the revised versions to social networking sites; thus, users can appropriate the image world as desired. An image that has a more hierarchical existence than a not-yet-actualized (or even an actualized) landscape is therefore one whose reality is even more perfectly real than the actual reality.[65] This phenomenon is simultaneously the paradox of the photo-fake and its final condition (Figure 21).

21. West 8 and Iroje et al., *Healing: The Future Park*, International Competition for the Master Plan of Yongsan Park, 2012. (Korean Ministry of Land, Infrastructure and Transport)

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[65] The photo-fake's reality resonates with Baudrillard's 'hyper-real'. For Baudrillard, 'simulation' is 'the generation by models of a real without origin or reality: a hyper-real', in which the image no longer imitates the existing real but the real mimics the virtual image. See, Jean Baudrillard, 'Simulacra and Simulations', p. 166.

4.2.3. Opportunities and Limitations of the Photo-fake

The aforementioned photo-fake conditions of digital presentation drawing have both opportunities and limitations in landscape design. The realistic depiction mimic and, more importantly, sophisticatedly refine those of historical landscape drawings (both manual and computational). Furthermore, as discussed in Chapter III, many commands and filters in graphic editing software products enable landscape architects to visualize dynamic, complex, and nuanced landscapes that are unlikely to be expressed by hand drawing.[66] More importantly, photo-fake techniques can provide purely computerized modelling with a sense of presentness; such representation can be easily understood by the public and also used as a tool for conceiving, exploring, and generating alternative landscapes.

However, photo-fake techniques have several limitations. Firstly, while landscape architects can visualize the complexity of a landscape using graphic editing software, such representation still remains, at best, static visual image; in terms of media specificity of visual images, photo-fake images can never embody all the multisensory characteristics of a landscape. Although realistic depiction of perspective has historically been one of the dominant modes for landscape visualization, landscape architects, knowing the limitations of 2D realistic depiction, attempted to explore alternative modes of visualization to overcome such limitations. For example, as indicated in Chapter III, while Repton's beautiful manual drawings generally took the form of perspective view, he also knew the limitations of the drawing type. To overcome these, he visualized landscapes in the form of panorama, which is similar to the wide human visual field, although the panorama is, at best, static visual image; furthermore, he intended to create illusions of experience of movement through the landscape by displaying a sequence of several illustrations.

Secondly, photo-fakes often deceive viewers, as designed landscape depicted in the photo-realistic representation is not-yet-actualized virtual reality. The limitation, paradoxically, derives from the medium specificity of photography, which provides the photo-fake image with the sense of presentness. On the one hand, such indexicality of the photograph provided landscape architects with opportunities to survey existing conditions of a landscape, as discussed in Chapter II, and such realistic depiction was the major function in the early stage of use of photography in landscape architecture in the mid- to late nineteenth century. On the other hand, such indexicality allows landscape architects to deceive the public such that the not-yet-actualized landscape is perceived to exist. Karl Kullmann stated:

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[66] Roberto Rovira, 'The Site Plan is Dead: Long Live the Site Plan', in *Representing Landscape: Digital*, p. 99; Daniel H. Ortega and Jonathon R. Anderson, 'Vertical Plane Typologies: Examining Sections and Elevations', in *Representing Landscape: Digital*, pp. 129–130.

[T]he constructed design rarely approximates the image that was initially presented as its accurate simulation […, as], certainly, almost all design visualizations involve a degree of idealized temporal conflation, whereby each element in the image it depicted in its most attractive, identifiable, or knowable moment in time […] In addition, an image may show the design being used to its fullest capacity through the inclusion of various uses that are unlikely to occur at the same time.[67]

In this sense, visible and invisible spacings constructed by the techniques of montages and collages in landscape representation in the 1980s to the 1990s, as treated in Chapter III, functioned to allow viewers to conceive landscapes as not so much static objects of visual pleasure as movable, dynamic, and multisensory organisms; more importantly, such spacings revealed the visual truth that such representations made of photographic images were merely not-yet-actualized virtual reality by breaking the established ontology of photographic images, namely, the indexicality of existing actual landscape.

Thirdly, the most critical problem of photo-fake techniques lies in the photo-fake's function in design, when such production of photo-fakes takes up a large portion of the overall design process compared with the design idea development. The post-processing of final presentation drawings should not dominate the overall design process, in which digital representation needs to be used to conceive and generate creative design ideas.

The primary purpose of presentation drawings, of course, is to facilitate communication with client and the public, whose eyes can be easily captured by photo-realistic images. Thus, photo-fake techniques need to be used to convey vividly the designer's specific vision of the designed landscape. For example, aforementioned digital presentation drawings of West 8 and others' winning proposal for the Yongsan Park Competition show the appropriate use of photo-fake depiction, which fully supports their design concept, 'Creating illusions of Korean traditional landscapes'. Such techniques are properly used to visualize their designed landscape, whose unique architectural structure *madang*—references to the Korean traditional yard and would be constructed by recycling a small portion of existing architectural structures—are juxtaposed with the illusion of Korean traditional landscapes (Figure 21). The team attempted to overcome the limitation of drawing—frozen as a single moment in time—by visualizing various seasons, daytime

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[67] Karl Kullmann, 'Hyper-realism and Loose-reality: The Limitations of Digital Realism and Alternative Principles in Landscape Design Visualization', p. 22.

22. Diller Scofidio+Renfro et al., *Wild Urbanism*, International Landscape and Architectural
   Competition for the Design of Zaryadye Park, 2013. (http://www.dsrny.com/projects/zaryadye-park)

23. Diller Scofidio+Renfro et al., *Wild Urbanism*, International Landscape and Architectural
   Competition for the Design of Zaryadye Park, 2013. (http://www.dsrny.com/projects/zaryadye-park)

scenes, and nightscape.[68]

Another example of the appropriate use of photo-fake techniques can be found in the aforementioned Diller Scofidio + Renfro and others' winning proposal for the Zaryadye Park Competition. Their sophisticated and vividly rendered visuals apply several photo-fake conditions to support their vision of a future landscape. Similar to visuals executed by West 8 and others for the Yongsan Park Competition, Diller Scofidio + Renfro and others visualized both specific design elements and scenes of different moments in time (Figure 22). Such representations embody their specific visions and atmosphere of designed landscape consisting four typical Russian landscape types: tundra, steppe, forest, and marsh (Figure 23).

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[68] Myeongjun Lee, '*네 장의 청사진에 대한 상상적 감상* [Imaginative Appreciation of Four Blueprints]', pp. 112–115.

4.2.4. Korean Landscape Architecture

In digital landscape representation in Korean landscape architecture, how do photo-fake conditions appear? Recent design competitions held in Korea related to built environments increasingly tend to invite foreign firms to submit proposals. Furthermore, Korean landscape architects, as a result of directly following recent trends of advanced visualization produced by foreign firms, have achieved considerable improvements of their visuals submitted in competitions, which are comparable to those of foreign firms. Such advanced digital landscape representation in Korea, of course, tends to adopt the photo-fake conditions. To a degree, graphic editing software popularized around the twenty-first century enabled landscape architects to produce photo-fake representations. One of the early design competitions held in Korea that formed the discourse on photo-fake depiction is Seoul Forest competition, in 2003 (Figures 24, 25). Several Korean scholars pointed out that visuals of design proposals 'had no vitality as if they were stuffed specimens [... thus, such visuals can be called] digital picturesque'[69] and were used as a 'tool for producing illustrations [that merely depicted the future designed landscape] for communication with others who would use such future landscape rather than [developing design ideas] in the design process'.[70]

Korean landscape architectural firms often outsource production of visuals for design competition to firms specializing in computer graphics, whose monotonous and conventional visuals often appear in competitions in Korea. Ahyeon Kim, Korean landscape architect and scholar, stated that detailed designs are 'often determined not by a designer but graphic office staff', and that when a drawing is not executed by a designer, 'spatial imaginations in the designers' mind disappear through the process [of instruction passing among the graphic office staff]'; she further alleged that 'many competition panels show not so much designers' personalities as a level of the visualization technique of such computer graphic offices'.[71]

The photo-fake depictions, as analysed earlier, are found in the most recent works. Similar to case of the Seoul Forest competition, Korean critics raised problems related to

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[69] Jeonghann Pae, '*세로지르기, 서울숲 설계경기의 전략, 매체, 테크닉* [Traversing Design Strategies, Media, and Techniques of Seoul Forest Competition]', in *조경의 시대, 조경을 넘어* [*Beyond the Landscape Architecture*], Paju: Jogyeong, 2007, pp. 93, 95.

[70] Sangmin Lee, *설계 매체로 본 한국 조경설계의 특성: 현상설계 작품을 중심으로* [*A Study on the Contemporary Korean Landscape Architecture in View of 'Design Media' with a Reference to Competition Entries*], *서울대학교 박사학위논문* [Ph.D. Dissertation, Seoul National University], 2006, p. 86.

[71] Ahyeon Kim, '*재현과 표현: 드로잉과 상상력, 공간의 삼각관계에 대한 추적* [Representation and Expression: Drawing and Imagination, and Space]', *환경과 조경* [*Environment & Landscape Architecture*] 257, 2009, p. 189.

24. Dongsimwon Landscape Design and Construction Co. et al., *Seoul Forest Competition*, 2003.
(Dongsimwon Landscape Design and Construction Co.)

25. Dongsimwon Landscape Design and Construction Co. et al., *Seoul Forest Competition*, 2003.
(Dongsimwon Landscape Design and Construction Co.)

photo-fake depiction. Whereas West 8 team's winning proposal overcame the limitation of such photo-realist depiction by properly supporting their vision of the future landscape, other teams' proposals included monotonous and conventional visuals that failed to describe adequately the original design ideas. Again, James Corner/Field Operations' team merely depicted cliché activities and effortlessly produced a visual by inserting a specific landscape photograph (Figure 19).[72] Youngmin Kim, Korean landscape architect and scholar, remarked that such conventional images mainly recycle previous works of the firm and fail to create a new identity, such as one that befits Yongsan Park. As James Corner/Field Operations' team reused images of the firm's recent works for design competitions, it is hard to distinguish the proposal for Yongsan from other works for Magok in Korea or Queen Elizabeth Olympic Park in England.[73]

One of reasons that photo-fake techniques can be used relatively easily in Korean digital landscape representation relates to a Korean way of understating landscape. Kyungjin Zoh, Korean scholar of landscape architecture, explained a subtle difference between Western and Korean perceptions: whereas in Western culture the term landscape tends to refer to horizontal surface or infrastructure, in Korean culture, it relates to ecological environment.[74]

When Western approach—that is perception of landscape as horizontal surface—is applied in Korean conditions of landscape as ecological environment, inappropriate solutions that do not reflect Korean conditions of landscape are frequently proposed. In Korean cityscape, mountains account for seventy percent of the entire country and have been a dominant type of land; furthermore, mountains had been worshiped as holy […] since ancient times. Thus, it is hard to embody horizontality and potentiality of such surface [western perception of landscape] in Korean landscape.[75]

Such Korean perception of landscape has informed the attitude to landscapes, and

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[72] Myeongjun Lee, '네 장의 청사진에 대한 상상적 감상 [Imaginative Appreciation of Four Blueprints]', p. 108.

[73] Youngmin Kim, '그들은 왜 산수화를 그렸을까 [Why They Did a Korean Traditional Landscape Painting?]', in 용산공원: 용산공원 설계 국제공모 출품작 비평 [*Criticism on the International Competition for the Master Plan of Yongsan Park, Korea*], p. 95.

[74] Kyungjin Zoh, '한국적 랜드스케이프 어바니즘의 전망: 딜레마와 가능성 [Prospect of Korean Landscape Urbanism: Dilemma and Potential]', in *Proceedings of International Symposium of KILA 2010; Landscape Urbanism: The New Paradigm of Landscape Architecture and Urbanism for Green-led Regeneration in the 21st Century*, Seoul, 2010, p. 210.

[75] *Ibid*., p. 211.

to a degree, landscape visualization. As discussed in Chapter III, the creative exploration of visualization derives from a new perception of landscape, which is not so much static, untouched, and pastoral as ever changing, human-made, and dynamic. Unlike such Western conception, Korean landscape as ecological environment is considered within the realm of environmental preservation; therefore, it rarely explored dramatic topographic alterations. As such, Korean digital landscape representation tends to use minimal digital modelling technology compared with Western landscape design. The limited use of digital modelling technology allows the image producer—designer or graphic office staff—to produce photo-fake representations using only photographic materials that capture actually existing landscapes and human figures.

4.3. Beyond the Depiction of Appearance

4.3.1. Modelling Landscape Performance

A problem with photo-fake depiction lies in the desire towards realism of *appearance* of future designed landscape. Purely visualizing landscape appearance causes the problem of visual-oriented experience, in which viewers are merely allowed to contemplate the depicted landscape as a static picture owing to the reduced multisensory features of the landscape.[76]

Thus, landscape architects are increasingly exploring computer simulation not only of landscape appearance but also of its *performance*. Parametric modelling technologies, such as CAD, Rhino, and Grasshopper, are used for such simulation. Karen M'Closkey, one of the landscape architects with a positive attitude to such digital modelling and a founding partner of PEG office of landscape + architecture, described 'digital modeling with parametric media [as having] potential to relate quantitative and qualitative information through feedback mechanism [and] provides new opportunities for envisioning the dynamism inherent to the medium of landscape (Figure 26)'.[77] Specifically, such parametric software can model 'numerical information in terms of force, quantity, and direction (such as water or wind flow) [...which] are defined by virtue of their association with other elements'.[78] This visualization technique does not merely adopt the principles of realistic depiction of landscape appearance but *re-present*s performance inherent in landscape that visualizes 'fields of intensity constructed by aggregations of points or lines (i.e. gradients)'.[79]

These models of landscape performances can be superimposed with pictorial depiction. For example, 3D modelling of Landscape Visualization and Modeling Lab at the Swiss Federal Institute of Technology incorporate photographic depictions with point cloud data derived from terrestrial laser scans and photogrammetry (Figure 27).[80] Whereas this modelling includes what appears to be photographic image, the pictorial images 'are intended to create multifaceted impressions based on the inherent connectivity, locality, complexity of topological spatial models'.[81] M'Closkey further stated:

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[76] James Corner, 'Representation and Landscape: Drawing and Making in the Landscape Medium', pp. 243–275; Jeonghann Pae and Jungsong Cho, '조경 설계와 회화적 자연관의 문제 [Landscape Design and Pictorialized View on Nature: A Critical Examination]', 한국조경학회지 [*Journal of the Korean Institute of Landscape Architecture*] 27(3), 1999, pp. 80–87.
[77] Karen M'Closkey, 'Structuring Relations: From Montage to Model in Composite Imaging', p. 126.
[78] *Ibid.*, pp. 126–127.
[79] *Ibid.*, p. 127.
[80] Christophe Girot, 'About Topology', *Topos* 82, 2013, p. 27.
[81] Karen M'Closkey, 'Structuring Relations: From Montage to Model in Composite Imaging', p. 127.

26. PEG Office of landscape + architecture, *Water and air flow simulations with resulting turbidity zones, Biscayne Bay*, 2012.
   (Charles Waldheim and Andrea Hansen, eds. *Composite Landscapes: Photomontage and Landscape Architecture*, p. 126.**)**
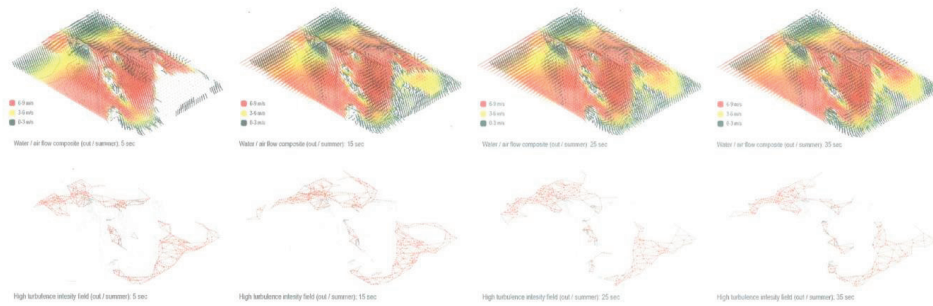
27. Christophe Girot, *Section through true-colour point-cloud, Goschenen, Switzerland*, 2013.
   (Charles Waldheim and Andrea Hansen, eds. *Composite Landscapes: Photomontage and Landscape Architecture*, p. 129.**)**

[The pictorials] are not [2D], raster-based images; rather, they are models formulated by points encoded with precise numerical data, position (x, y, z coordinates), and color (RGB values). The resulting composite images are quantitatively imbued but permeated with qualitative effect; a clear expression of a hybrid of the pictorial and the metric.[82]

Christophe Girot, co-founder of Landscape Visualization and Modeling Lab, stated that 'topology' encompasses 'both a theoretical and constructive understanding of the discipline of landscape architecture'.[83] Topological spatial models tend to be 'more qualitative than quantitative, intuitive instead of rational, and inductive rather than deductive'.[84] Thus, this modelling technology can function not only for the visualization of landscape information but also as an imaginative vehicle for the *re-presentation* of landscape. As Girot argued, 'Topology can become a very strong vehicle of design where terrain information and poetic intuition merge together to confer authority on new visions and directions'.[85]

Similar to 2D montage and collage techniques, parametric modelling uses a composite technique that hybridizes different elements of information related to landscape performance. 'Handmade composites achieve this effect in [2D] images that use *discrete* differences. The digital composites called for here operate in [3D] modeled space th[r]ough *intensive* differences, that is, the entities are topological'.[86]

At what stage in the overall design process is this modelling technology used? What is the specific function of such digital technology during design? Such digital technology should arguably be used for developing design ideas in the design process. Jillian Walliss and Heike Rahmann pointed out, in their recent volume of *Landscape Architecture and Digital Technologies: Re-conceptualising Design and Making*, that landscape design 'often diminishes the role of digital technologies in the generative design process [and] privilege[s] a particular "artistic" framing'.[87] Instead, landscape architects need to 'extend the definition of creativity to be inclusive of design development,

[82] *Ibid*., p. 127.
[83] Christophe Girot, 'About Topology', p. 26. For more discussions on topology pertaining to landscape visualization, see Christophe Girot, Anette Freytag, Albert Kirchengast, and Dunja Richter, eds., *Topology: Topical Thoughts on the Contemporary Landscape, Landscript 3*, 2013, Berlin: Jovis Verlag GmbH.
[84] Christophe Girot, 'About Topology', p. 26.
[85] *Ibid*., p. 29.
[86] Karen M'Closkey, 'Structuring Relations: From Montage to Model in Composite Imaging', p. 127.
[87] Jillian Walliss and Heike Rahmann, *Landscape Architecture and Digital Technologies: Re-conceptualising Design and Making*, p. xx.

materiality and construction'.[88] Digital technology, as they stated, needs to be used as a tool for not so much 'computerisation' (i.e. virtual drafting board) as 'computation' (i.e. creative tool that deals with highly complex situations).[89] Thus, recent works using digital technology introduced in their volume include not only the early stage of design, or the development of design ideas, but also later stages, or the physical construction, such as materiality and fabrication.

One notable Korean example is the work of PARKKIM, *Mud Infrastructure*, a waterfront park in the Yanghwa area of the Han River in Seoul designed in 2009 and completed in 2011 (Figure 28). In the work, digital technology is used as a primary design tool to test and develop the main design idea. Specifically, PARKKIM used 3D modelling software to create a seamless surface of landform, which was then refined through the test to modulate a series of slope gradients allowing not only increased water circulation during the time of flooding to prevent sedimentation but also, to a degree, increased sedimentation to build up new habitat for fish and birds.[90] Such landform modelling further evolved following consultation with a hydraulic engineer and then was converted into AutoCAD for contour planning and documentation drawings. Whereas PARKKIM's *Mud Infrastructure* used digital technology as an intuitive design tool rather than accurate parametric modelling, such visible landform reflects its ecological performance (Figure 29).[91]

Another recent work of PARKKIM is *Thermal City*, a competition entry for the Danginri Underground Combined Heat Plant in Seoul in 2013, where visible landform is carefully created following thermal comfort levels based on simulations of environmental performance using digital technology (Figure 30).[92] The visible curved stone surfaces, which references the traditional Korean technique for heating architecture *ondol*, functions to provide heated seating and control microclimates in winter within the open spaces in such a way that excess hot water from the power station is circulated through pipes located under the curved features. The stone features were strategically placed within the site following Arup HK's simulation testing of thermal comfort indices (Figure 31).

Digital technology is increasingly used not only to develop design ideas but also to simulate materiality and fabrication during construction. For example, Gustafson Porter's *Diana, Princess of Wales Memorial*, designed in 2002 and completed in 2004, adopted various digital technologies, with a help of engineers of automotive and aerospace industry,

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[88] *Ibid*., p. xxi.
[89] *Ibid*., p. viii. They borrow this distinction between computerisation and computation from Brady Peters, 'Computation Works: The Building of Algorithmic Thought', *Architectural Design* 83(2), 2013, pp. 8–15.
[90] Jillian Walliss and Heike Rahmann, *Landscape Architecture and Digital Technologies: Re-conceptualising Design and Making*, p. 23.
[91] *Ibid*., pp. 23–24.
[92] *Ibid*., pp. 116–117.

28. PARKKIM, *Mud Infrastructure*, 2009.
   (http://parkkim.net/?p=1016)

29. PARKKIM, *Rhino model for Mud Infrastructure*, 2009.
   (Jillian Walliss and Heike Rahmann, *Landscape Architecture and Digital Technologies: Re-conceptualising Design and Making*, p. 21.)

30. PARKKIM, *Thermal City*, 2013.
   (http://parkkim.net/?p=1491)
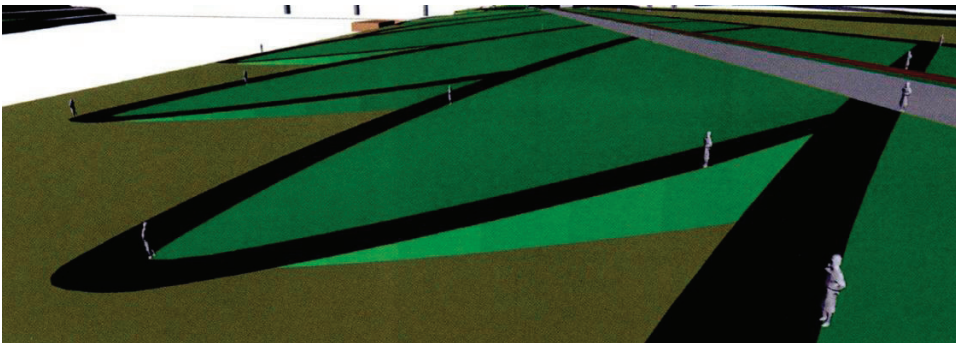
31. PARKKIM, *Thermal City*, Arup's *Thermal Sensation Index simulation*, 2013.
   (Jillian Walliss and Heike Rahmann, *Landscape Architecture and Digital Technologies: Re-conceptualising Design and Making*, p. 117.)

32. Gustafson Porter, *Diana, Princess of Wales Memorial*, 2004.
   (http://www.gp-b.com/diana-princess-of-wales-memorial)

33. Gustafson Porter, *3D jelly mould for Diana, Princess of Wales Memorial*, 2004.
   (Jillian Walliss and Heike Rahmann, *Landscape Architecture and Digital Technologies: Re-conceptualising Design and Making*, p. xxii.)

34. Gustafson Porter, *3dsMax surface texture modelling for Diana, Princess of Wales Memorial*, 2004.
   (Jillian Walliss and Heike Rahmann, *Landscape Architecture and Digital Technologies: Re-conceptualising Design and Making*, p. 180.**)**

to construct seamlessly curvilinear surface of stone memorial (Figure 32).[93] Gustafson relied on clay model to formulate initial form of the memorial in early stage of design process and the clay model then provided a rubber mould to produce a cast. The cast then was digitally scanned using GOM scanner to produce accurate 3D point clouds of the cast. This scan was translated into 3D CAD model, jelly mould, which was then broken into 3D puzzle 549 separate blocks to formulate detail shape. Visualizing and testing surface textures of the stone feature was also important stage of construction process. Surface textures abstracted from photographs were tested and then extruded into digital models within Photoshop and 3dsMax. In addition, prototypes of the digital models were tested and developed several times within digital and physical realm using various CAD/CAM technologies, then, assembled on site (Figures 33, 34). As Walliss and Rahmann stated, 'fabrication process did not diminish the poetics of the design. Instead the digitally driven process was essential to realising the design ambition expressed in Gustafson Porter's original competition entry'.[94]

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[93] *Ibid*., pp. 178–184.
[94] *Ibid*., p. 184.

4.3.2. Hybridization Strategies

Another problem of photo-fake depiction lies in the desire toward *realism* of appearance of future designed landscape as if such representations were existing landscapes. Such photo-realistic representation, which can never embody all the multisensory characteristics of landscapes, frequently visualizes idealized temporal conflation that would not occur at the same time. Furthermore, it is used not so much to generate and develop design ideas as to produce final presentation drawings. Thus, creative explorations of visualization are necessary for conceiving the multisensory characteristics of future landscapes, supporting the designer's original idea and revealing visual truth that the representation is merely a visual image, although not perceived as a realistic photographic image. Most importantly, alternative visualization techniques that fully exploit the potential of digital technology should be explored and used as a creative and generative tool during design.

Hybridization is considered as one of the innovative strategies of representation: hybridization can be explored with different drawing types and drawing media. Firstly, one drawing can be composed of different modes of representation, such as plan, elevation, and section (i.e. orthogonal projections), perspective view, and other diverse diagrams. As discussed in Chapter II, composite techniques already appeared in historical manual drawing. Diverse characteristics embodied in different drawing types, complementary to one another, were synthesized in one specific drawing, which could visualize the multidimensionality of a designed landscape akin to its construction. For example, the mode of perspective view of vegetation could be hybridized in diverse projections, such as plan, elevation, and section, and vice versa (Figures II-22, 23, 24, 25, 26). Furthermore, as mentioned in Chapter III, composite techniques, such as the collage and montage, exploited other types, including satellite photography and various maps executed by Corner; they functioned to explore alternative modes of visualization although not used for design (Figure III-30).

In addition, the hybridization of various types of drawing has already been explored in the digital realm. With the development of digital technology, divergent drawing types can be easily hybridized in the screens of digital software, and then used as a creative tool for imagining designed landscape (Figure 35). Whereas design competitions almost still require design panels, composite techniques allow landscape architects to overcome such limitations as static visual image tamed in a rectangular frame in such a way that divergent drawing types are freely placed and assembled in the panel (Figure II-9).

Secondly, different drawing mediums can be used simultaneously, and then their visual products can be hybridized. As described in Chapter III, landscape architects and scholars have had a dichotomous way of conceiving drawing media, particularly, the

35. Marshall Cowan, *Section-Perspective model using Rhino and Photoshop*.
    (Nadia Amoroso, ed. *Representing Landscapes: Digital*, p. 132.)

36. *Freeform collage with images from different sources and hand-sketched cross-section and notation*.
    (Karl Kullmann, 'Hyper-realism and Loose-reality: The Limitations of Digital Realism and Alternative Principles in Landscape Design Visualization', p. 26.)

manual and the digital. Specifically, the former has been considered a creative medium, whereas the latter, a mechanical medium of instrumentality. However, as the two mediums have different advantages and limitations, hybridized use that can strengthen the advantages and overcome the limitations needs to be explored. Kullmann argued that photo-realistic depictions in digital landscape representation, or hyper-realism, have several limitations, and he proposed a 'loose-reality' to overcome such limitations. One technique to achieve such loose-reality is the combined use of two drawing mediums (Figure 36).[95] As shown in Figure 36, such mixed technique only loosely visualizes landscape in a way that digitized photographic images and hand drawings are combined, instead of accurately depicting future designed landscapes; the complete representation provides not only a realistic scene but also information of vegetation, sensibility, and roughness of hand-rendering. Likewise, Wookju Jeong, a Korean landscape architect and scholar, asserted that the two should to be used simultaneously to overcome the limitations of each.[96]

The strategies of hybridization of both drawing types (i.e. technique) and drawing mediums (i.e. technology) are important, as the alternative methods can generate visible and invisible spacings, in which critical and imaginative thinking can be intervened. When different drawing types are superimposed, or when hand and computer drawings are combined, then a landscape's visible appearance and invisible performance are visualized simultaneously. In turn, viewers can perceive and understand the landscape that the image represents not as a static object of visual pleasure but as a multisensory and complex organism. Such spacing produced by hybridization techniques can further function as creative vehicles of design; landscape architects can explore and develop design ideas in a way that the multifaceted appearance and performance of virtual landscapes in the designer's mind are visualized in various ways.

Recent design competitions are increasingly requiring videos that detail the proposal; their function and role need to be reconsidered and discussed in the perspective of hybridization. In terms of media specificity, videos can overcome drawings' limitations; whereas drawing has a static visual image, video has a visual image with motion and sound. Interestingly, videos, similar to other media's early historical use and function, translate mechanically modes of representation (presentation drawing) into another media (moving image). Videos generally function to describe in detail presentation drawings with designers' statement as the form of sound and flythrough as the form of motion, and thereby can more successfully communicate with the public.

Historical manual drawings, as treated in Chapter II, involved several techniques

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[95] Karl Kullmann, 'Hyper-realism and Loose-reality: The Limitations of Digital Realism and Alternative Principles in Landscape Design Visualization', pp. 20–31.
[96] Wookju Jeong, '설계 도구: 자유 혹은 구속 [Design Tool: Freedom or Restriction?]', 환경과 조경 [*Environment & Landscape Architecture*] 262, 2010, p. 172.

of verbal description and vision in motion of designed landscapes. For example, André Le Nôtre included verbal descriptions of *Plan of the Grand Trianon* (Figure II-22); Humphry Repton displayed sequences of several illustrations to create illusions of motion of designed landscapes in his Red Books. Videos can embody these two functions: verbal description takes the form of the designers' actual voice and illusion of motion is automatically generated through camera movements in digital software. Thus, in terms of hybridization, videos provide landscape architects with various opportunities to use plural senses, such as vision and sound, divergent drawing types including diagrams, plans, and perspective views, and different media such as hand and computational renderings.

Sophisticated camera movement and angles are crucial in directing videos for environmental design. For example, Diller Scofidio + Renfro's video uses a variety of camera movement and angles to visualize their vision of a future designed landscape (Figures 37, 38). Specifically, it used camera angles, such as eye level and aerial vantage point. In simulating specific thematic places of designed landscape, on the one hand, it adds various effects of movements in the static eye level presentation drawings by including other details of natural phenomena, such as snowfall and fallen leaves, to enhance the richness of the scene, where the camera generally remains static with eye level. In moving between such specific places, on the other hand, the video uses flythrough with aerial vantage point in ways that the camera follows and often penetrates into surfaces of different landforms or architectural structures; thereby, it provides information of spatial relationships between various specific places and structures.

Such aerial flythrough has been informed by various virtual spaces, such as YouTube, Google Maps, Google Earth, and computer games. As architectural historian Mitchell Schwarzer argued, modern perception and sense of space and place have been affected by different modes of visual media.[97] These camera movements and angles evoke, to a certain degree, technique of sketches executed by Repton, who displayed a sequence of eye-level stills to represent the visual experience of movement through landscape. Furthermore, recent videos for design competition tend to adopt not only the eye level but also the virtual eye's points of view that can capture the public's eye schooled in divergent digital media.

However, videos that generally add effects of movement in static presentation drawings might still be another version of the photo-fake. Alternative techniques of directing that can exploit the potential of such moving images need to be explored. Furthermore, videos need to be used not only to translate presentation drawings into moving images but also to conceive and generate a future designed landscape during the design process.

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[97] Mitchell Schwarzer, 'Landscape Navigator', *Harvard Design Magazine* 36, 2013, pp. 136–144.

37. Diller Scofidio+Renfro et al., *Wild Urbanism*, International Landscape and Architectural
   Competition for the Design of Zaryadye Park, 2013.
   (https://www.youtube.com/watch?v=_Lmx8dwk34U)
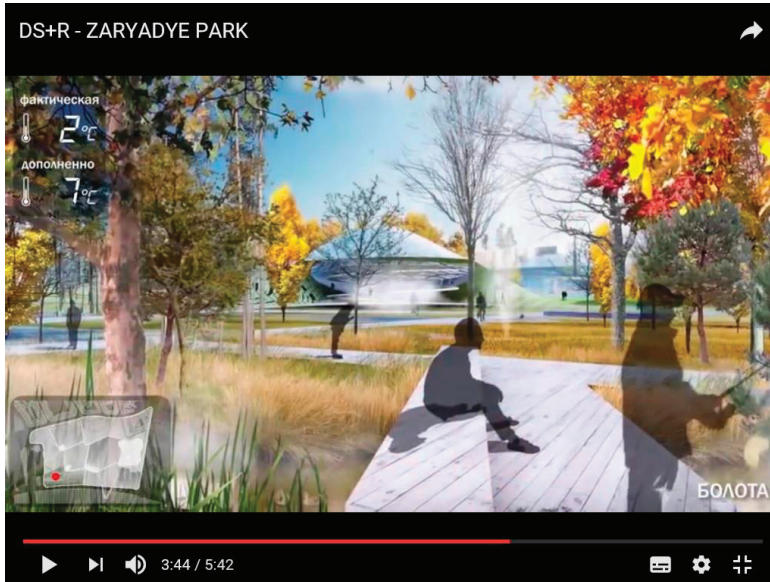
38. Diller Scofidio+Renfro et al., *Wild Urbanism*, International Landscape and Architectural
   Competition for the Design of Zaryadye Park, 2013.
   (https://www.youtube.com/watch?v=_Lmx8dwk34U)

V. Conclusion

This dissertation critically examines where the present dominant trend for achieving realism in digital landscape representation is derived and why the desire became a problem in landscape architectural design, by restaging the historical representational techniques and their relationship with the present conditions of digital drawing.

Firstly, it discussed the fundamental roles and functions of landscape architectural drawings as twofold: illustrations of designed landscape (i.e. instrumentality) and generation of creative design idea (i.e. imagination). Historically, the twofold function generally embodied the specific drawing types (projections, perspective view, and diagram). However, as described throughout this study, the established conventions have been hybridized in a mutually complementary manner to visualize different aspects of the designed landscape, although particular drawing types have often emerged as suitable and thereby dominant forms, depending on the particular historical style of designed landscape. Specifically, the pictorial representation of plants in the form of perspective view has frequently been hybridized within projection drawings and vice versa. Through the restaging of historical drawings, this study attempted to rethink the established histories of landscape architectural drawing and design.

Secondly, to shed light on the role and function of digital technology during the design process, this study examined the early history of computer software still frequently used as major tools of landscape design. GIS, for map overlay analysis, CAD, for construction drawings, and Adobe Photoshop and Illustrator, for collage and montage techniques, generally functioned as mechanical devices to imitate previous manual techniques. In other words, landscape architectural design has not yet fully explored the innovative invention of creative landscape visualization techniques. Moreover, this result carries theoretical implication on the current understanding of the properties of landscape architectural drawings, whose actual characteristics depend not so much on whether they are produced by hand or using computer software (i.e. drawing technology) as on how they specifically visualize the designed landscape and thereby perform instrumental or imaginative functions, or both, during the design process (i.e. drawing techniques).

Thirdly, this study offered a critique of the dominant trend towards realism in recent digital landscape representations. At present, in design studio and for competition proposals, presentation drawings tend to be elaborately finalized in graphic editing software, with which discernible traces of cutting and assembling are removed and vivid visual effects are applied in such representations, thereby rendering the final images as copies of the actual landscape. To refer to the pervasive trend, this work coined the term photo-fake, an image that imitates the actual existence of a designed but not-yet-actualized landscape. It

then analysed the specific conditions of the photo-fake visuals of recent international competitions, including framing, point of view, composition, expression, landscape and human figure, and digital aura.

In particular, this work resituated the photo-fake as a descendant of the picturesque aesthetics itself derived from eighteenth-century English landscape gardens. Through techniques, landscape architects can produce realistic visuals that easily grasp the public's eyes; however, it is difficult for the static images to achieve all of the multisensory aspects of a landscape medium. Additionally, there is a concern that the techniques might be used to produce mechanically cliché drawings. Thus, the techniques need to be used carefully and authentically to deploy the designer's original vision of the not-yet-actualized designed landscape. In addition, digital modelling of landscape performance and various hybridized techniques with different drawing types and technologies can provide opportunities in exploring the various aspects of landscape and stimulating design ideas.

As highlighted in the introduction in this dissertation, this study attempted to rethink the prior histories of landscape representation. Specifically, techniques and technologies in historical landscape architectural drawings were restaged to view the present conditions of digital drawings with a critical perspective. In the process, this study discovered the sense of presentness in the past. Thereby, this work contributes to the historiography of landscape visualization, a history as critical theory.

If a designer's vision of a future landscape cannot be immediately realized on the actual site, then such visions inevitably need to be rendered in advance visualization using any form of medium, including drawing, modelling, video, and virtual and augmented reality. At the centre of the various visualization techniques and technologies is evidently the landscape. In terms of medium specificity, any visualization can never fully embody the multisensory phenomenon of actual landscape. Thus, the numerous landscape architectural drawings, from the manual to computer-generated ones, which were covered in this study, can be considered as constant explorations to overcome the limitations of visualization, although they are necessarily incomplete.

This work, of course, has several limitations. Admittedly, it reduced and thereby generalize the rich and diverse history of landscape architectural drawings to several specific drawing types and periods. For example, in discussing historical manual methods, it addressed the several important eras and drawings by a handful of landscape architects, thereby inevitably excluding numerous other works. Additionally, in examining the early history of computer technology, it mainly treated the cases of the most frequently used digital software to perform important landscape visualization techniques by several well-known landscape architects. As such, this study could not trace the process of evolution of the digital software. In addition, in critically reviewing the recent digital landscape

representation, this work discussed the presentation drawings of several international competitions, consequently excluding other drawing formats and technologies during specific design processes. Above all, it only briefly discussed the history and present conditions of realism embodied in Korean digital representation, whose initial and recent history as well as present conditions will need to be scrutinized later.

This study attempted to suggest alternative ways to proceed in producing digital representation, but specific strategies and products could not be presented. Thus, visualization techniques, both for generating creative ideas and exploiting the potential of digital technology, need to continue to be simultaneously explored in landscape theory and practice. This study hopes it will provide a critical lens in viewing the enormous potential of landscape visualization.

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국문초록

조경 드로잉의 역사와
디지털 재현의 '포토-페이크'에 대한 비평

공학박사학위논문

이명준

지도교수: 배정한

2017년 2월

서울대학교 대학원
협동과정 조경학

이 연구는 디지털 조경 드로잉의 시각화 테크닉과 컴퓨터 테크놀로지의 이용 방식이 역사적으로 어디서 비롯되었는지를 파악하고, 이를 바탕으로 최근 디지털 조경 드로잉에 나타나는 회화적 사실주의에 대한 열망을 해석하고자 하였다. 구체적으로, 손에서 컴퓨터에 이르는 조경 드로잉 테크닉의 역사를 포괄적으로 검토하고, 드로잉 매체가 손에서 컴퓨터로 이행하는 과정에서 컴퓨터 테크놀로지가 담당했던 역할을 파악한 후, 현재의 디지털 프리젠테이션 드로잉에 만연한 사실주의적 묘사 경향을 비판적으로 진단하였다.

먼저, 손 드로잉의 역사를 검토하여 조경 드로잉의 특성과 변천 과정을 개관하였다. 조경 드로잉은 도구성과 상상성이라는 호환가능하고 상대적인 두 특성을 지니고 있고, 그러한 특성은 투사, 퍼스펙티브 뷰, 다이어그램이라는 구체적 드로잉 유형으로 구현되어 왔다. 이러한 드로잉 관습은 뚜렷이 구별된다기보다 오히려 상호 보완적으로 혼성화되면서 설계 경관에 대한 비전을 시각화해 왔는데, 특히 식물 소재는 회화적 퍼스펙티브 뷰의 형식을 취한 채 투사 드로잉과 혼성화되는 경향이 있었다. 물론, 특정 지역과 시기에 특정 정원 양식에 적합한 드로잉 유형이 등장하고 때때로 우세하는 방식으로 나타났다. 16세기 이탈리아 르네상스 정원과 17세기 프랑스 바로크 정원 설계에는 투사 드로잉이 중요했고, 18세기에서 19세기 초 영국 풍경화식 정원 드로잉에서는 회화적 묘사가 강조된 퍼스펙티브 뷰의 형식이 선호되었다. 19세기 중후반 조경이라는 영역이 확립되어가던 시기의 미국에서 드로잉은 용도에 따라 분화되고 대상지 조사에 적합한 맵 오버레이 기법이 등장하기 시작하였고, 20세기 초중반 미국의 모더니스트는 설계 전략을 시각화하기 위해 다이어그램을 이용하기 시작했다. 하지만

이러한 다양한 드로잉 방식은 그것이 출연한 이후에는 대체로 공존해 왔고, 드로잉의 도구성과 상상성은 종종 상호 보완적으로 혼성화되어 설계 경관을 시각화하였다.

둘째, 현재 조경 설계에 이용되는 주요 시각화 테크닉의 매체가 손에서 컴퓨터로 이행하던 시기를 검토하여 이 때 컴퓨터 테크놀로지가 담당했던 주요 역할을 분석하였다. 대체로 컴퓨터는 손 드로잉의 테크닉을 모방하거나 컴퓨터 파일의 형식으로 번역하는 기계적 도구로 기능했다. 먼저, 경관 정보를 과학적으로 시각화하는 이안 맥하그의 맵 오버레이 기법, 일명 레이어 케이크의 매체가 손에서 GIS 소프트웨어로 이행하는 1970－80년대에, 컴퓨터는 손으로 처리되던 맵 오버레이 분석의 인벤토리, 가치 평가, 시각화를 대신 처리해주는 효율적 기계 도구로 기능하였다. 또한, 캐서린 구스타프슨과 조지 하그리브스는 1980－90년대부터 랜드폼을 스터디하기 위해 물리적 모형을 만들어왔고, 이 과정에서 CAD 소프트웨어는 그러한 모형을 시공 도면이라는 투사 드로잉으로 번역하는 모사 도구로 기능하였다. 1980－90년대 이브 브리니어, 아드리안 허즈, 제임스 코너 등이 만들어온 물리적 재료를 이용한 콜라주와 몽타주 기법도 1990년대 후반부터 포토샵으로 대표되는 그래픽 소프트웨어를 통해 제작되고 있는데, 이 과정에서도 그러한 소프트웨어는 대체로 수작업과 유사한 절차를 처리하는 데 이용되고 있었다. 예외로, 제임스 코너는 2001년 프레쉬킬스 공모전 당선작에서 그래픽 테크놀로지의 잠재력을 활용하여 플랜 콜라주라는 테크닉을 발명하고 이를 설계 아이디어를 발전시키는 생성적 도구로 이용했다.

셋째, 최근 디지털 프리젠테이션 드로잉에 만연한 사실주의적 묘사 경향을 비판적으로 진단하였다. 대중과의 의사 소통이 점차 중요해지면서 조경 설계에서 프리젠테이션 드로잉의 제작이 차지하는 비중이 커지고 있고, 여기서 경관의 외양을 사실적으로 묘사하려는 경향이 있다. 조경가는 역사적으로 설계 경관의 외양을 회화적으로 묘사하는 기법에 익숙했고, 포토샵과 같은 그래픽 소프트웨어는 그러한 기법을 효과적으로 처리해내는 도구로 이용되고 있다. 이러한 경향은 사진 합성을 통해 만들어지는 퍼스펙티브 뷰에서 잘 드러나는데, 포토샵의 다양한 명령어를 통해서 사진 재료의 조립 흔적이 지워지고 회화적 환영을 만들어내는 다양한 효과가 덧입혀져 현실의 경관을 포착한 한 장의 사진처럼 보이도록 생산되고 있다. 이 연구는 그러한 시각화 기법과 이미지를 '포토-페이크'로 정의하고, 근래에 개최된 국제 공모전 출품작의 프리젠테이션 드로잉을 사례로 하여 그것의 구체적 조건을 분석했다. 포토-페이크의 조건은 보이지 않는 프레임과 관찰자의 자리, 환영을 만들어내는 방법, 배경으로서의 경관과 구경꾼으로서의 인물, 그리고 디지털 아우라이다. 포토-페이크 제작에는 이전의 수작업에서 이용되던 테크닉이 재등장하는데, 그러한 기법은 18세기 픽처레스크 미학이나 17세기 역사주의적 풍경화를 비롯한 시각 문화의 영향을 받고 있었다.

포토-페이크 이미지는 대중들의 시선을 쉽게 사로잡을 수 있는 효과적 의사 소통 수단이지만, 동시에 시각 이미지라는 한계 때문에 경관의 다감각적 특성을 온전하게 시각화

하기는 힘들다. 따라서 그러한 기법은 조경가의 설계 경관에 대한 비전을 잘 드러내도록 활용되어야 할 것이다. 또한 경관의 외양뿐만 아니라 기능 정보를 시각화하는 삼차원 모델링 기법, 다양한 드로잉 유형과 테크놀로지의 혼성적 이용 방식은 경관의 다채로운 국면을 탐구하고 설계 아이디어를 발전시키는 창조적 도구로 활용될 수 있다. 조경가의 설계 아이디어를 곧바로 현실에 조성할 수 없다면, 그러한 아이디어는 불가피하게 어떠한 형식이든 시각화의 과정을 거치게 된다. 설계 아이디어를 생성하고 발전시켜나가며 동시에 디지털 테크놀로지의 잠재력을 이끌어낼 수 있는 시각화 테크닉의 창조적 실험이 조경 이론뿐만 아니라 실천에서 충만해지길 기대한다.