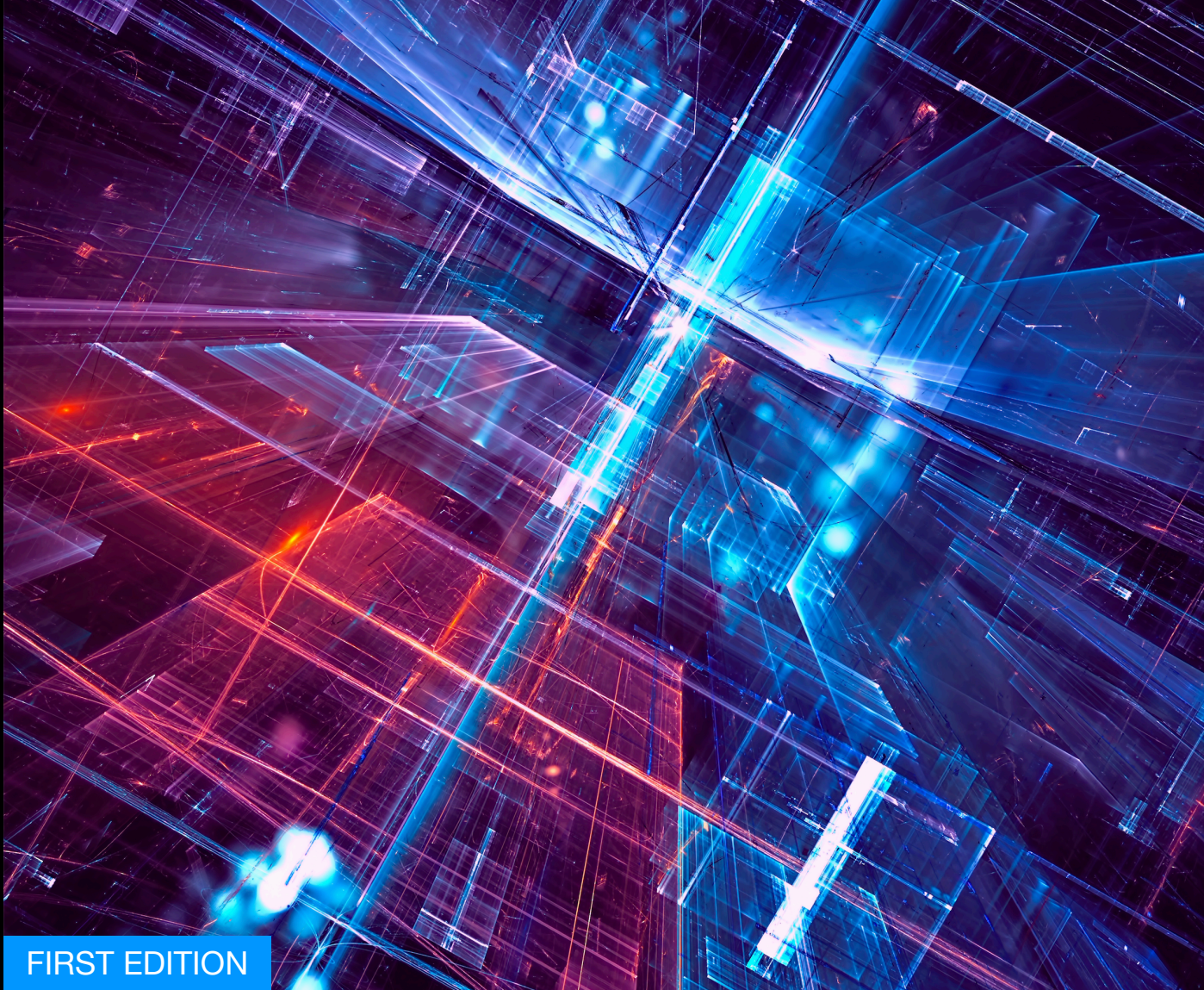


An essential resource for those seeking enlightenment on the vast, intricate, and fascinating subject of perspective.



FIRST EDITION

The Art and Science of Perspective  
VOLUME ONE

Alan Stuart Radley

## PAST, PRESENT, AND FUTURE OF Visual and Optical Perspective

Behold the epic story of perspective. Explore our 30-year project to unify knowledge on perspective, vision, imaging and spatial topics across all disciplines. This unique monograph explores the origins, principles, and applications of perspective, guiding further scholarly study.



PAST, PRESENT, AND FUTURE

OF

VISUAL AND OPTICAL  
PERSPECTIVE

THE ART AND SCIENCE OF PERSPECTIVE  
SERIES VOLUMES

1. Past, Present, and Future of Visual and Optical Perspective
2. Dictionary of Perspective
4. Natural and Visual Perspective
6. Graphical and Mathematical Perspective
5. Simulated Perspective and Illusion
6. Instrument and New Media Perspective

Past, Present, and Future  
Of  
Visual and Optical  
Perspective

Alan Stuart Radley

THE  
ART AND SCIENCE  
OF  
PERSPECTIVE

- VOLUME ONE -

FIRST EDITION  
2026

Perspective Research Centre  
Blackpool, England

## Past, Present, and Future of Visual and Optical Perspective

By Alan Stuart Radley

Published in the UK by Alan Stuart Radley.

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### Keywords

Perspective, linear perspective, art, optics, vision, geometry, architecture, SFX, VFX, CAD, CGI, GIS, GPS, AI, 3D, 3-D, VR, AR, MR, XR, CV, 3DGS, ADAS, AGVs, CAM, CAT, CGH, CT, DEM, DSM, DTM, EDM, EM, LFC, LFD, LIDAR, LLM, MI, MRI, NeRF, OCT, OMNIMAX, PEEM, RADAR, SAR, Spatial Computing, film, metaverse, SEM, SVG, TEM, UAV, VLA, VSD, geometry, analytical geometry, projective geometry, descriptive geometry, size, distance, scale, resolution, shape, form, computer aided design, geographic information systems, virtual / augmented / mixed reality, satellite imagery, space, measurement, satellite communications, history of art, history of science, history of mathematics, technology, three-dimensional imaging, 3-D modelling, illusion, immersion, surveying, navigation, aeroplanes, stereoscopic perspective, celestial maps, maps of the universe, 1-D, 2-D, 3-D, 4-D perspective, theatre and stage design, medical imaging, mirrors, 3-D illusion, computer vision, robotic vision, LED display, LED wall, holograms, holography, digital filmmaking, special effects, computer generated imagery, drones, 3-D laser scanning, cinema, 3-D cinema, mechanical design, vision science, head-up displays, 3-D printer, holographic printer, photography, virtual production, live production, hybrid production, animation, stage lighting, fireworks, volume display, drawing, painting, binocular vision, technical drawing, eyesight, engineering drawing, mechanical drawing, machine drawing, remote sensing, photogrammetry, cartography, panoramas, topology, multiverse, Internet, world wide web, hypergram, screen, display, camera, telescope, microscope, computer, topography, digital games, IMAX, sphere theatre, television, New Media, lighting design, game design, gardens and the environment, stereography, 3-D Gaussian Splatting, archaeology, astronomy, space flight, scenography, visual perception, Euclid, Leonardo da Vinci, Leon Battista Alberti, Kim Veltman, Filippo Brunelleschi, Piero Della Francesca, Ted Nelson, Albrecht Durer.

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for

*Kim Veltman*

and

*Philip and Ellen Radley*

## BOOK SERIES

For over 500 years, perspective held a preeminent place in the Western academic tradition. Encyclopaedias and 'divisions of philosophy' held that perspective—the science of the transmission of light rays—is foundational to and substantially underpins the arts/sciences. Indeed, on the pivotal importance of perspective, Leonardo da Vinci said, "*Perspective, therefore, must be preferred to all the discourses and systems of human learning*". Today, perspective is central to key developments across a range of subjects, including *art, photography, television, cinema, cartography/maps, astronomy, topology, photogrammetry, scenography, architecture, gardens and the environment, etc.*

Unfortunately, perspective, as a distinct subject discipline, has fallen out of fashion and is no longer recognised as a keystone of progress. But it is a profoundly influential topic. Perspective is an interdisciplinary subject, with countless sources, links, pivotal theories, and elementary relations that penetrate to the core of key phenomena in the arts, sciences, and technology. As a corrective, we aim to gather, explain, and unite all knowledge on perspective through our monograph, *The Art and Science of Perspective*.

## ART AND SCIENCE OF PERSPECTIVE: VOLUME ONE

The *Past, Present and Future of Visual and Optical Perspective* samples a diverse range of perspective topics for analysis in subsequent volumes. Herein, we explore the epic story of perspective from ancient historical examples to the birth of linear perspective during the Renaissance and beyond. Far Eastern countries like India, China, and Japan are discussed in relation to the history of vision, optics and representation. However, this is not a historical but a technical-focussed series, aiming to explain *what* perspective is, *how* and *why* it is used, *where*, and with *which* perspective principles, types/forms, methods/systems, etc. Once again, this first volume serves as an introduction to perspective and is not mathematical or scientifically exhaustive.

Today, we see more types/forms and applications of perspective than ever before. Perspective instruments, such as telescopes, microscopes, cameras, and images on networked video/television, computer and mobile screens, take perspective methods to a new level of sophistication and usefulness. Ergo, modern perspective images are more detailed, colourful, distinct, wide-field, and realistic. Perspective views/images—of both still and moving kinds—are far more numerous, relevant, and readily available, and thus impactful, than ever before. In summary, the diverse principles and methods of perspective are a bedrock to the development and progress of human civilisation.

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## PREFACE

**Perspective** deals with **natural perspective**, including visual perspective, or how we see things, and **artificial perspective**, or how we represent that concept in diagrams, drawings, pictures, photographs, films, television, computers, etc. Given such a straightforward definition, one might assume that there is little to learn about perspective and label it as a standard visual method involving well-known principles. But nothing could be further from the truth. Perspective is a highly technical, kaleidoscopic, labyrinthine, and wide-ranging subject, often presented with unexplained ‘facts’, that work to confuse, perplexing mysteries, and exciting possibilities.

A myriad of books on perspective drawing, spatial representation and visual/optical methods exist. Why then attempt an ambitious new series of books on technical perspective? Hasn't everything worth saying already been related in many other works? It seems to the author, at least, that the answer is no, and for several reasons. First, we have many different kinds of perspective, and far more types than almost anyone has realised. The classic form of perspective that we learned at school is graphical/linear perspective; which asks how to draw a picture on a plane surface that represents a three-dimensional object/scene in such a way that the various portions of the picture, in their mutual relations, present the same aspect as do the corresponding visible parts (or outlines) of the object/scene. However, there are numerous other kinds of perspective, and our *Dictionary of Perspective*, which accompanies the present volume, lists 1,200 types!

Second, we have the problems of complexity and diversity, of perspective subject matter. A logical approach begins by asking: What is perspective? Unfortunately, answering this question is fraught with difficulties. Perspective turns out to be one of the most fundamental, theoretically challenging, perplexing, yet elusive subjects. But why is perspective such a challenging topic? This is partly because innumerable types/forms of optical perspective are known. We have natural/visual, mathematical, graphical, and instrument kinds of perspective, etc. Multiple perspective types/forms and phenomena complicate the identification of visual effects' root causes, keeping perspective mysterious. Evidently, the subject needs clarification.

Overall, no one has explained the notions, axioms, principles, theories and rules governing perspective types/forms (in totality), and the associated visual methods/phenomena. This shall be our task, to map the field of perspective—a rapidly evolving, and highly technical discipline that underpins fundamental topics in art, science, and technology.

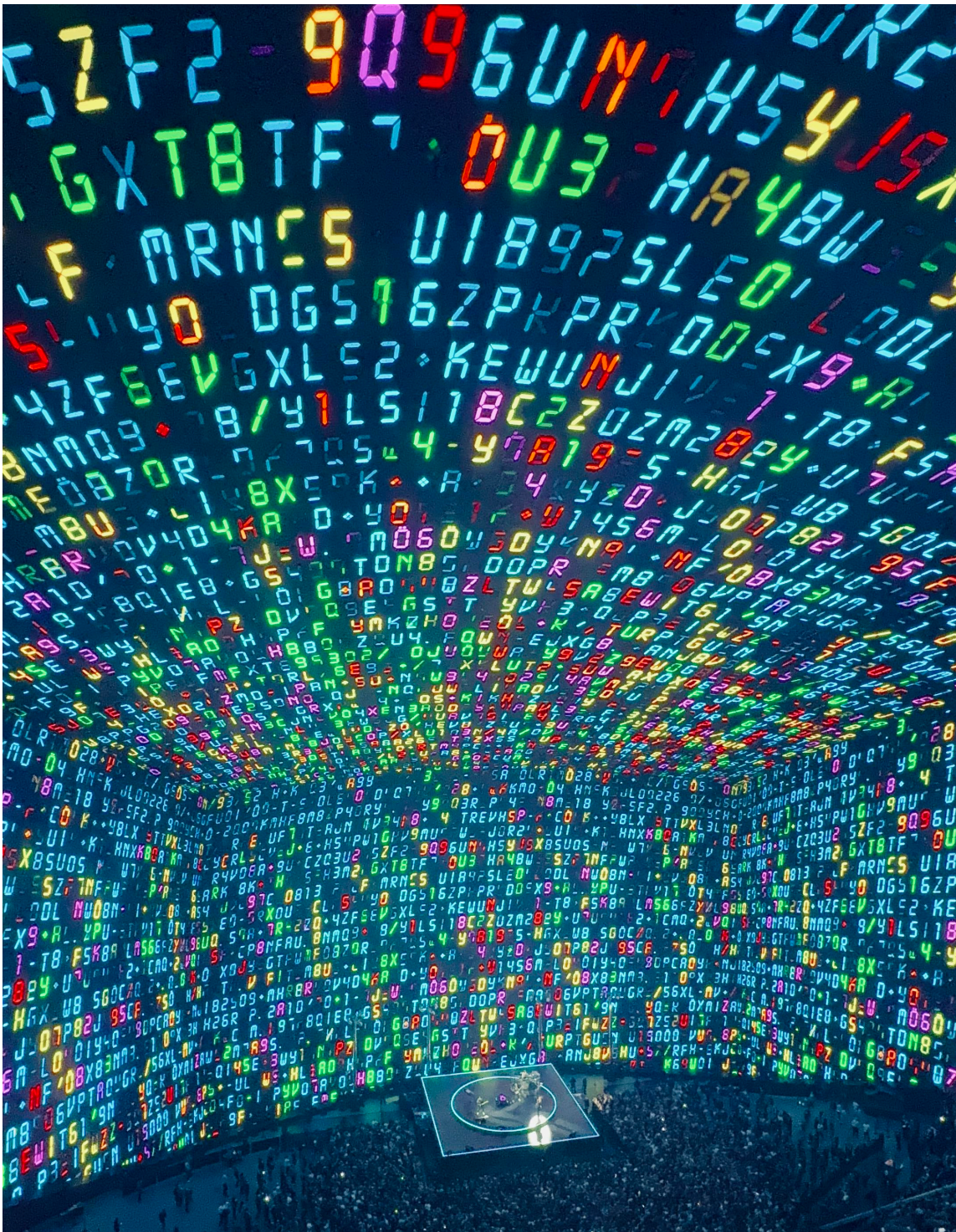


Figure 1: Sphere Theatre, Las Vegas (2023).

An 18,600-seat auditorium with interior wrap-around dome-shaped spherical LED screen of size 15,000 m<sup>2</sup> and with 16K resolution. Allows perspective image shaping that provides a 3-D experience.

# Introduction

IN A STRANGE quirk of fate, no book exists on the theoretical foundations of technical perspective; specifically to define, analyse, and unify all of the principles, types/forms, methods, instruments, systems, and applications of visual/optical perspective. Henceforth, a first goal is to gather everything known on this subject into a comprehensive multi-volume monograph on technical perspective, entitled: *The Art and Science of Perspective*. Explored therein will be the foundations of perspective in terms of elementary theory, and we shall identify all of the primary classes and the numerous sub-categories in this respect. We wish to minimise the number of primitive notions, axioms, principles, and inference rules that relate to perspective phenomena, while unifying all known theories that comprise the entire subject matter of perspective (past and present aspects).

Desired are solutions to the paradoxes that have plagued perspective theories/methods throughout time, including the debate(s) over the nature of human vision and whether perspective is an objective or subjective method. Whilst it is certainly not possible to solve all such problems in this work, we aim to comprehensively identify and describe the nature and implications of many of these same issues. We wish to spark interest in visual and optical perspective, advance the subject by popularising it, and showcase the powers and capacities of related visual, imaging, and spatial concepts.

A second goal is for the monograph to serve as a repository of all common terms, concepts, and methods used in the perspective discipline, and to operate as a trusted source of information for perspectivists, or anyone working in art, science, or technology who is dealing with, or must understand, appropriate parts of this complex field. Perspective views/images can be extraordinarily complex, comprising multiple and interrelated optical phenomena, composite, combined, mixed, and blended perspective types/forms, numerous visual layers/components, etc. Introduced is a new categorical scheme that can help mitigate complexity, enhance your understanding and real-time comprehension of perspective images, enable their efficient capture/creation/use, and expand their range of applications.

1986 - 1996  
Studies on  
Leonardo da Vinci

1994-2020  
*The Encyclopedia of  
Perspective*

Kim H. Veltman  
[1948-2020]

Professor Kim H. Veltman [1948–2020] wrote the first truly comprehensive monographs on perspective, running to some 4,000 pages across 17 volumes, providing modern-day scholars with a historical overview of perspective and a bibliography of the primary/secondary literature. However, these works avoid discussion of the key technical features and lack a comprehensive framework for visual/optical perspective. The present book series supplements the same.

The *Art and Science of Perspective* provides a central core of knowledge on visual, optical, and technical perspective for all practical purposes (ref. natural, artificial, and synthetic types). In this respect, we exclude arcane mathematical proofs and philosophical discussions from our analysis, limiting our exposition to practical topics that impact real-world perspective phenomena, methods, and applications. Our analysis is multifocal: art, science, technology, etc.

We loosely define perspective as the formation of a visual image—or a representational pattern—of a visible state of affairs present in a spatial reality (e.g., a physical, illusory, imagined space). But many forms of perspective fit this broad definition; in this monograph, we shall limit our exposition to optical perspective. Whereby optical perspective encompasses all forms of perspective that use, or purport to use, light, or electromagnetic radiation, to analyse/represent a spatial scene, including all wavelength ranges from gamma rays, x-rays, the visual spectrum, microwaves, radio, etc. Accordingly, we include the natural, artificial, and synthetic perspective types (e.g. visual, mathematical, graphical, instrument, simulated, and New Media categories). Excluded are other forms of technical perspective, such as contact perspective and symbolic perspective (ref. literal, metaphorical forms); plus purely algebraic forms of mathematical perspective; that is, mathematical images composed of letters and symbols that do not (directly) relate to visual images.

Natural Perspective  
Artificial Perspective  
Synthetic Perspective  
Mathematical  
Perspective  
Graphical Perspective  
Instrument Perspective  
Simulated Perspective  
New Media Perspective

It is noteworthy that all types of visual, optical, and technical perspective have strong links to mathematical perspective, and most are subject to the vagaries of human vision/perception. Indeed, perspective raises fundamental questions about the nature and limits of human perception/understanding of spatial reality, problems that have puzzled scholars for 2,000 years—and are still debated today. Henceforth, we shall consider human vision and visual perception, including physical/physiological/psychological optics.

Optical perspective <IMAGING CLASS> is concerned with capturing, measuring, or representing realistic views/images of dimensional space (or producing immersions into, or illusions of, spatial reality). Some forms of optical perspective employ artificial/simulated ‘light-rays’ that lie beyond the bounds of ordinary physics and/or objective reality as normally defined.

---

Kim Veltman’s works concern the history, literature, and bibliography of perspective:

1. Studies on Leonardo da Vinci 1: Linear Perspective and the Visual Dimensions of Science and Art, 1986.
2. Studies on Leonardo da Vinci 2: Continuity and Discovery in Optics and Astronomy, 1996, (8 volumes).
3. The Sources of Perspective, 1994-2020 (published as the Encyclopedia of Perspective, volumes 1, 2).
4. The Literature of Perspective, 1994-2020 (published as the Encyclopedia of Perspective, volumes 3, 4, 5, 6).
5. The Bibliography of Perspective, 1994-2020 (published as the Encyclopedia of Perspective, volumes 6, 7, 8).

Said techniques can sometimes operate on an impossibly vast or tiny visual scale, or produce images that pass straight through solid objects, etc. However, using such techniques does not necessarily make the resultant visual images any less real, accurate, or ‘visual/optical’ (ref. heavenly vista, sub-atomic ‘imaging’, medical optics, Virtual Reality, etc). In any case, light rays, visual/spatial and ‘perspectival’ thinking is/are basic to human cognition (all kinds).

We have adopted the term ‘optical’ or ‘technical perspective’ for a broader range of meanings than purely ‘optical’ phenomena, such as photography (for example). Included in that term is any systematic optical-related process that produces visual images (of any form) that concern any spatial reality (including represented/false/illusory/artificial/imaginary realities). Excluded from our analysis are several other kinds of visual perspective, including sonar (sound ‘imagery’), magnetic, mechanical, gravitational perspective(s), etc. As we shall learn, there are many different categories of optical perspective. Still, all involve spatial imaging principles that reflect aspects of scene geometry, with varying degrees of visual realism or accuracy.

Optical perspective is simultaneously both an old and a new subject discipline. It has established and well-known classes/forms such as graphical and linear perspective combined with proven theory/methods, however, many new forms of perspective are currently in development and result from inventions in the related field(s) of digital technologies and New Media. Whereby **New Media perspective** refers to the particular imaging capabilities and visual transformations a digital computer system provides. The said system typically consists of multiple networked instances of other instrument/computer perspectives.<sup>1</sup>

Examples of technologies that fit under the umbrella of New Media perspectives include: *Internet and web-based information systems, networked cameras and telescopes, Internet Of Things (IOT) frameworks, remote-sensing instruments (for example, satellites), digital television systems, smartphones, and networked devices, satellite imaging systems, GPS, plus Virtual Reality (VR), Augmented Reality (AR), Mixed Reality (MR), Artificial Intelligence (AI), and digital Metaverse systems, etc.*

In the case of a highly developed New Media perspective, images/views from one or more of the other categories of perspective, may be connected/linked together and then viewed, surveyed, modelled, ordered, constructed, matched, mixed, explored, cross-matched, etc. Ergo, a key part of our exposition is to identify, define, and analyse all of the types, features, principles, and implications of New Media perspective and the myriad of interrelations with more traditional forms of optical perspective.

---

<sup>1</sup> **New Media Perspective:** Images/views of a spatial reality as created by, or existing on, a digital/computer or new media system, by capturing, connecting/linking, ordering, constructing, matching, mixing, exploring, and cross-matching: one or multiple perspective images of a spatial reality [refers to the perspective category (method) and/or a perspective image form (outcome)].

Visual Perspective  
(1st Type)  
Optical Perspective  
Technical Perspective

#### New Media

Internet  
Robotics  
Autonomous  
Systems  
Artificial Intelligence  
Networked Systems  
Internet of Things  
Remote Sensing  
Virtual Reality  
Augmented Reality  
Mixed Reality  
Extended Reality  
Digital Metaverse  
Digital Multiverse  
Digital Filmmaking  
Virtual Production  
Computer Games  
GIS / GPS  
CGI / CAD / AI  
CV / MI / SFX / VFX

Painted / Photograph / Physical + CGI Reality  
Natural / Artificial / Synthetic Perspectives

Graphical CGI / Mixed / Synthetic / Linear / Spherical /  
Simulated / Blended / Combined Perspectives

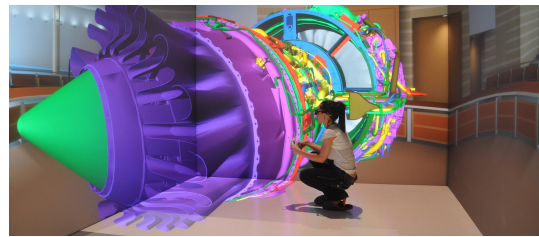
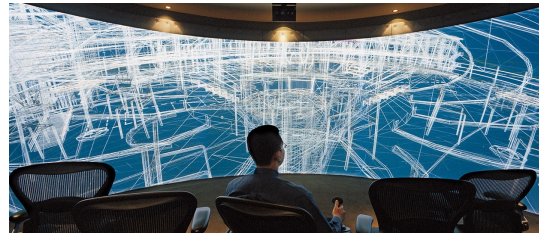
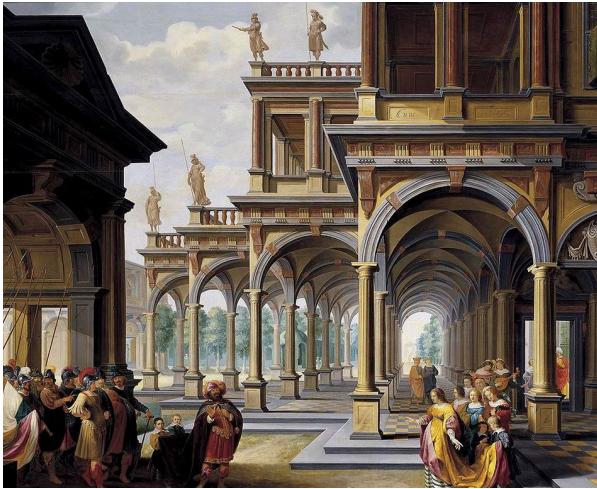


Figure 2: Artificial, natural, and synthetic perspective(s).

Perspective types often merge, or blend, on a particular occasion to produce a composite perspective system (often without the observer noticing); whereby, for example, visual, instrument, and New Media types form combined perspective images.

For an author to make any predictions regarding the future of New Media perspective is a perilous activity. New digital inventions are coming fast, furious, and everywhere. To avoid false conclusions, our focus is on the fundamental principles, methods, and functions of perspective, which can be (at least partially) foreseen ahead of technological breakthroughs.

Once again, we are gathering everything known on the subject of visual/optical/technical perspective into a monograph, entitled: *The Art and Science of Perspective*. These books will be of interest to ‘vision-based’ professionals, including *artists, photographers, filmmakers, cinematographers, architects, lighting designers, CAD engineers, VR/AR/MR plus digital metaverse content creators, 3-D/CGI/AI modellers, SFX/VFX creators, game designers, live/virtual/hybrid film production specialists*.

We shall publish the monograph in six fascicles:

1. Past, Present, and Future of Visual and Optical Perspective
2. Dictionary of Perspective (1,200 types/forms)
3. Natural and Visual Perspective
4. Graphical and Mathematical Perspective
5. Simulated Perspective and Illusion
6. Instrument and New Media Perspective

We intend to publish the volumes in numerical order. Note that the first technical volume is ‘*The Dictionary of Perspective*’, which, along with the present volume, will be published in advance of the other volumes, because the definitions, background, and introductory text they contain are essential to understanding the content of subsequent volumes. We are working hard to complete the monograph on perspective, but it is a significant undertaking, and completion of all volumes will be delayed for a short period (final goal: 2027–8).

Terminology is important. In the field of perspective, concepts often have multiple names, and a single name may refer to different or even opposite ideas.<sup>2</sup> We shall cross-reference these names and link to standard terms. Established terms are used wherever possible, but new ideas require new terms. We omitted optical/ray, and geometrical diagrams from the first two volumes, as they are included in other volumes in the series. In sum, provided is a complete survey of visual, optical, and technical perspective.

Let us now begin the epic story of perspective by considering what it actually is, how it has profoundly shaped human activities, and what it means for the development of human civilisation.

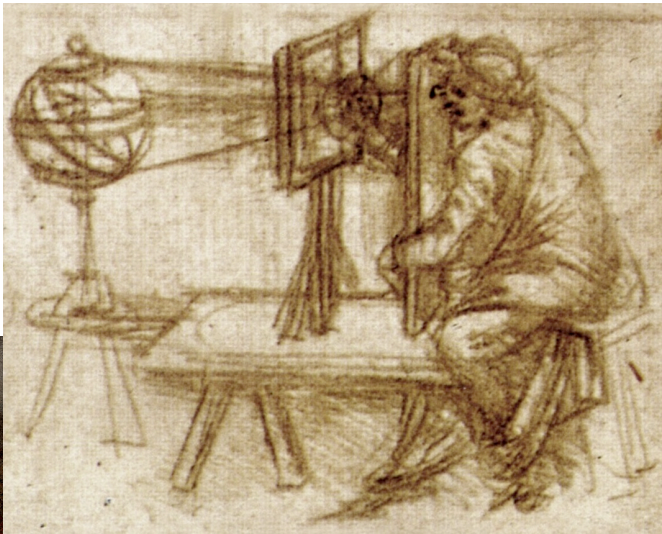
<sup>2</sup> **Linear Perspective:** Linear perspective has been referred to by at least 75 different names; most are identical in meaning, but some may refer to specific subtypes. Terms/synonyms: analytic, artificial, academic, artists, ideal, old, modern, European, basic, correct, angular (type 1), classical, albertian, quattrocento, brunelleschian, Renaissance, Italian, common, normal, horizontal, traditional, orthodox, conventional, diagonal, geometrical, practical, standard, window, one-eyed, chessboard, chequerboard, front, frontal, eye-level, central, central-point, one-point, single-point, two-point, three-point, multi-point, unlimited-point, point-projection, plane-projection, western, picture, level-plane, rectilinear, equi-rectilinear, conic, conical, pictorial, perspective of lines/outlines, pyramid of spatial recession, receding, triangular, triaxial, flat picture plane, focal, lineal, measured, pin-hole camera perspective(s).

#### Professions

Artists  
 Scientists  
 Technologists  
 Filmmakers  
 Cinematographers  
 Architects  
 Lighting Designers  
 CAD Engineers  
 VR/AR Engineers  
 Metaverse  
 Developers  
 Game Designers  
 3-D / CGI Modellers  
 SFX / VFX Creators  
 Live Film Production  
 Virtual Production  
 Hybrid Production

#### Terminology

Multiple Names  
 Multiple Meanings



## Perspectograph

Use of a glass, veil, perspective window, or perspective 'net', plus fixed eye-point, to make an accurate perspective drawing of an armillary sphere.

Leonardo da Vinci

Codex Atlanticus, c. 1478-1519

Drawing / Graphical / Visual Perspective



The Last Supper, Leonardo da Vinci, c. 1495 - 1498

# On Perspective

The art of perspective is to make what is flat appear in relief, and what is in relief flat.

Leonardo da Vinci

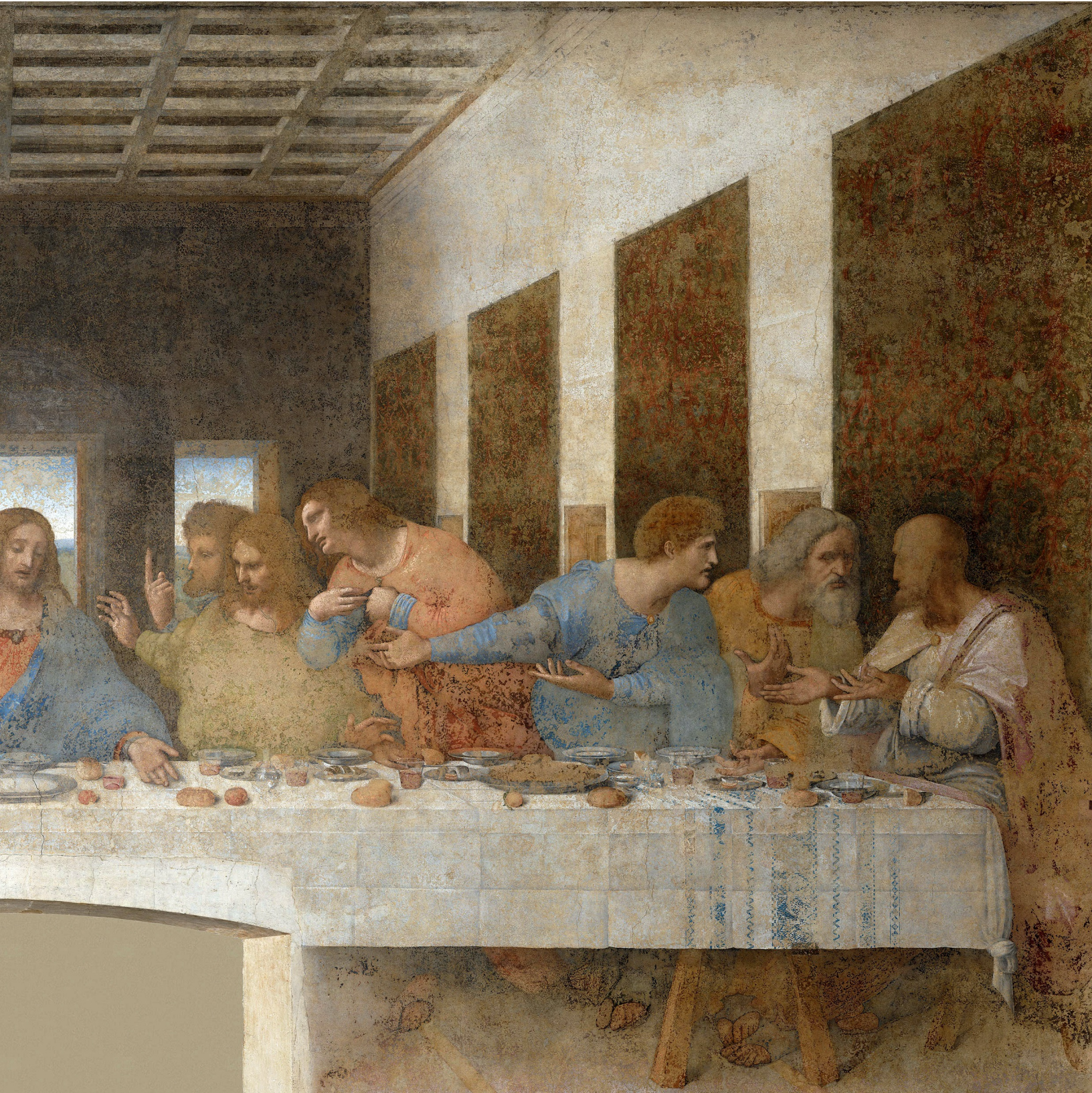




Figure 3: Graphical Perspective (paintings)

Top: Graphical / painting perspective by Canaletto, c.1733.

Bottom: Graphical / painting perspective by Dirck van Delen, c.1633.

# On Perspective

PERSPECTIVE is our chief method for visualising the world, for obtaining a systematic treatment of depth/scale, and for establishing a visual standard of truth.<sup>3</sup> It works in two directions, to record an image backwards onto a picture plane, and to project an image/light-beam/shadow forwards into physical reality—both leading to a scientific understanding of physical space. Perspective is a foundation of human analytical, imaginative, and creative potentials because it fosters mastery of vision/space/representation.

**Visual or optical perspective** concerns the changing appearance of things when observed from a particular viewpoint or series of viewpoints, especially as they extend into the third dimension or depth. A familiar form of optical perspective is **Renaissance, linear or scientific perspective**, which rationalises vision by *framing, segmenting, ordering, indexing, measuring, mapping, and gauging physical space*. Perspective is a multifaceted subject that covers a far wider range of visual phenomena than many realise, and is a key to understanding major categories of art/science/technology over the past 500 years. Related topics include *space, time, optics, human eye/vision, colour, drawing, mathematics and geometry, reality, illusion, immersion, imagination, and representation*.

Perspective is central to key developments across subjects such as *art, photography, television, cinema, cartography, astronomy, topology, photogrammetry, scenography, archaeology, architecture, gardens and the environment*. Recent developments have strong links to perspective, such as *Geographical Information Systems, Computer-Generated Imagery, Computer-Aided Design, Special Effects, Virtual/Augmented/Mixed Reality, Medical Imaging, robotic vision, drones, etc.*

Perspective emerged from pre-history as a tenuous, splintered, and often unconscious set of methods for enhancing realism in art. In the ancient world, perspective was employed as an architectural illusionary technique—producing a range of spatial effects. During the Renaissance, it was applied in a fully codified mathematical form, as the creator of **systemised dimensional spaces**. In modern times, perspective has advanced scientific theory, improved architectural and engineering accuracy, enabled remote sensing and digital communications, and underlies all images (of spatial reality).

---

<sup>3</sup> 'Perspectiva', says Durer, 'is a Latin word and means "durcheshung": a view through something [physical space]'. But perspective also refers to **perspicere** in looking directly at something or 'seeing a form clearly' with your eyes [ref. view of a spatial scene/object].

**Renaissance Perspective:** One-point perspective is an artificial and graphical perspective created on a 2-D plane that employs a central (or single) viewpoint for the depicted scene, with one primary (or central) vanishing point in the distance (for object space orthogonal lines) which is placed on the horizon line, and from which everything is set out (or converges).

**Italian Renaissance**  
1350-1550  
  
1415 - 1420  
Linear Perspective  
Filippo Brunelleschi  
[1377-1446]

**Rationalises Vision**  
Framing  
Segmenting  
Ordering  
Indexing  
Measuring  
Mapping  
Gauging

**Subjects**  
Art  
Photography  
Television  
Cinema  
Cartography  
Astronomy  
Topology  
Photogrammetry  
Scenography  
Archeology  
Architecture  
Gardens

Viewing  
Matching  
Representing  
Illusion  
Immersion

Perspective provides new powers to visualise, model, and create/apply scientific solutions to problems of unprecedented scale, scope, depth, context, detail, and accuracy. It introduced new ways of **viewing**, **matching**, **representing**, creating convincing **illusions of**, and inducing apparent **immersion in** spatial reality. Evidently, perspective lies at the epicentre of progress and is pivotal to everything humans will achieve in the future.

Drawing  
Architectural  
Engineering  
Industrial  
Map / Plan  
Machine  
Technical  
Engineering

Perspective affects appearance and representation, influencing *visual arts, sculpture, decorative arts, performing arts, and architecture*. Let us begin with making a perspective drawing or painting. For reasons of brevity, we shall exclude pleasurable drawings here; other than to say that one of the key movements in this respect was focussed on making increasingly realistic representations of physical reality. Whereby perspective obviously played an important role in the realistic depiction of spatial effects, and especially the illusion of depth [10,13,14]. Overall, by the 19th century, ever more specific branches of perspective drawing were introduced, including: *architectural, engineering, industrial, map, plan, technical drawings, etc.* These methods were codified into so-called *machine/engineering-drawing, geometrical/technical-drawing and/or mechanical-drawing*, whereby these technical methods were undoubtedly key tools that enabled the Industrial Revolution and, by extension, the Computer, Satellite Communications and Space Age(s) [10,21].

Subjects  
Optics  
Statics  
Hydrostatics  
Nautical Science  
Architecture  
Machines  
Geography  
Astronomy  
Nuclear Physics  
Chemistry  
Biology  
Chronology  
Space Flight

Perspective—in a variety of forms—is one of the fundamental techniques involved in the generation and viewing of artistic creations. However, as indicated, the applications of perspective are by no means limited to art and design. The various perspective principles, theories, types/forms, methods, and instruments have been indispensable to the development of human civilisation as it exists today. Perspective drives progress in all areas. Ergo, perspective is not merely of theoretical, aesthetic or incidental interest.

In terms of science, it is known that the development of perspective was integrally connected to the rise of instrumentation, which focused attention on proportion, scale, and, finally, quantification. In the process, perspective introduced a visual standard for scientific truth, which led to observation, experiment, measurement, and the other familiar characteristics of early modern science [10,13,14,15]. Hence, perspective introduced a method of passively recording the physical world as a practical demonstration of the philosophical distinction between **subject** and **object**.

Today, 'agentic' AI systems seek to take autonomous action in the real world. Likewise, in earlier times, perspective unlocked detailed planning/design of spatial solutions to address physical problems with accuracy and precision.

Perspective enabled systematised models to be developed on media, providing great precision and explanative power to scientific experiments [10]. Perspective theory has been explicitly employed to aid in the development of new scientific theories. In terms of the theoretical influences of perspective, we find innumerable examples throughout history, including perspective methods behind the ideas of *Euclid, Ptolemy, Copernicus, Galileo, Columbus, Darwin, Newton, and Einstein*. Henceforth, it is no exaggeration to state that the development of perspective made possible and supported the scientific culture of today.

Perspective has also influenced technological developments in two primary ways. Firstly, we have perspective instruments, manufactured according to specific theories of perspective, for the purpose of making accurate dimensional measurements of the physical world [13,15]. Perspective instruments enabled systematic mapping of distance, scale, shape, etc., thereby fostering knowledge of physical environments and associated object forms.

Concurrent with key breakthroughs in mathematics, geometry, and physics, perspective led to mastery of the physical universe, foreshadowing unprecedented innovations. Types of perspective instruments used for particular purposes include: for **navigation**—*the quadrant, cosmolabe, proportional compass, and sextant*; for **astronomy**—*astrolabes and sundials, plus telescopes/spectroscopes*; for **cartography**—*the compass, calliper and theodolite, etc.* Secondly, we have the application of perspective to practical disciplines. Subjects influenced by perspective methods include: *optics, statics, hydrostatics, nautical science, architecture, machines, geography, astronomy, nuclear physics, chemistry, biology, and chronology*.

Perspective techniques were used to produce detailed *engineering drawings*. Whereby accurately scaled and correctly proportioned drawings could be produced with views such as plan, elevation and sectional-elevation. Such drawings could then be used as blueprints for manufacture. Evidently, perspective fosters ‘systemic’, ‘scientific’, and ‘cognitive’ viewpoints. This led to new instruments, mechanisms, and machines in all areas, combined with novel associated working methods/systems. Manufacturing capability exploded as a result. Vastly improved working efficiency followed, which magnified human physical powers and enabled a wide range of automation technologies, leading to steam engines, automobiles, aeroplanes, etc. [10].

Overall, it is difficult to imagine that the explosion in science, engineering, and technology over the last 500 years could have occurred without an intimate knowledge of perspective and its various mathematical forms and practical methods. Perspective is truly a keystone of civilisation.

#### Perspectivists

Euclid  
Ptolemy  
Copernicus  
Galileo  
Columbus  
Darwin  
Newton  
Einstein

#### Navigation

Quadrant  
Octant  
Cosmolabe  
Compass  
Sextant  
Sector  
Sundial

#### Astronomy

Orary  
Celestial Globe  
Astrolabe  
Armillary Sphere  
Planisphere  
Sundial  
Telescope  
Spectroscope

#### Cartography

Staff  
Compass  
Caliper  
Theodolite  
Maps  
Terrestrial Globe

Instruments /  
Displays

Panorama  
Cyclorama  
Stereoscopy  
Magic Lantern  
Camera Obscura  
Camera Lucida

New perspectival images led to an emphasis on *illusionism* and *trompe-l'oeil* (highly realistic optical illusions), blurring the boundaries between the natural and the fictive, which inspired an extraordinary proliferation of visual images. Herein lies the true value and significance of linear or scientific perspective (graphical/mathematical form): not simply as a tool for realism, but as a catalyst to our imagination, playfulness, creativity, and freedom. Perspective amplified visual powers and boosted mental outlooks. Perspective joined **mimesis** (imitation of real) and **spatial illusion** (seeming real) together for the first time, amplifying human understanding of, and power over, physical reality.

Knowledge of perspective led to all kinds of new visual instruments/displays, including: *panoramas, cycloramas, stereographic devices, magic lanterns, the camera obscura and lucida, etc.*, and it also played a key role in the development of photographic cameras, and has been pivotal to progress in cinema/movies/television [10,13,14,15].<sup>4</sup> Different forms of perspective emphasised the plasticity of images, and hence the role of illusion and multiple truths, which may be possible not only in the imagination but also in perceiving objects in the real world. Perspective drew attention to the **perspectival nature of reality**, and the various processes—optical, perceptual, mental—that are ongoing between *viewer, object* and *image*, and further to relations between objective **truth** and subjective **illusion**.

Putting aside all technical details, people often fail to realise why perspective is such an important topic. An answer is that perspective draws attention to the distinction between **subject** and **object**, and inspires a fascination with views, which split into three directions.

- One sought accurate representation or **realism**, leading to *topographical views, geometrical and architectural drawings*—and, hence, to faithful copying of environmental appearances.
- The second type of view was aimed at **illusion/immersion**, which led to *panoramic, distorted, imaginative, and illusionistic spaces*.
- A third type of view emerged when perspective was employed to **enhance physical reality**, seen as a quest for certification of sight, measurement, and representation, leading to *accurate views, maps, and models*. In this manner, we can develop and test our theories of the real world [10,13,14,15].

Concordant with such developments has been the use of perspective to aid in the accurate analysis and understanding of views/images, specifically for mapping environments and creating new environments. Both are made possible through a host of perspective principles, methods, and instruments, such as the *sextant, compass, camera, telescope, and microscope*.

<sup>4</sup>**Magic Lantern:** An early projector developed in the 17th century using transparent images and a light source, with slides inserted upside down to correctly orient projections.

**Camera Obscura:** A natural phenomenon where light through a small hole projects an inverted image in a dark space. It also denotes a dark room or box used to project external scenes.

**Camera Lucida:** An optical device that aids artists and microscopists by projecting a superimposed image of the viewed object onto their drawing surface, enabling precise tracing.

Perspectival Nature  
of Reality

Optical Processes  
Perceptual Processes  
Mental Processes  
Truth / Illusion

Perspective Views  
Provide

Realism  
Illusion / Immersion  
Enhance Reality

Notably, many of these developments have profoundly improved human knowledge, understanding, and, ultimately, consciousness of physical reality, thereby leading to an ever-increasing ability to probe, model, control, and shape the world in which we live. Perspective has been a foundation of human imaginative and creative potentials throughout time. We humans naturally form visual, apparent three-dimensional (3-D) images of things/processes in our heads. We run little ‘movie’ scenarios using our ‘inner-eye’, whereby we convey happenings in a type of 3-D perspective view of a scene (we form ‘mental’ or ‘imaginary’ perspectives). Overall, the power of the imagination to model and shape reality is largely determined by the forms and sophistication of perspective theories/method(s)/system(s) that a particular culture has at its disposal.

By accurately **prescribing**, **indexing**, and **modelling physical reality**, perspective enabled the development and subsequent recording of accurate, systemised worlds. Ultimately, we use pen/paper or computers to record perspective images/models, thus making explicit what had previously been only mental, poorly specified, or implicit. Perspective is a 3-D experimental sandbox for the mind—allowing us to visualise all of the (spatial) possibilities!

The explicit dimensional worlds made possible using perspective methods/instruments enable new ideas, concepts, forms, and conglomerations of objects to be explored (and recorded/preserved plus shared). Some objects/processes are really existent, and some are only imaginary or preliminary plans (at a particular time). Using perspective, object and process designs were developable, testable, and composable in new ways that often could not be attempted in the real world due to a lack of possibility; either because said design breaks the rules of physics (unknowingly prior to modelling), or due to a lack of space, time, and energy, or else a lack of resources with which to explore said structural possibilities adequately. Ergo, we no longer needed to try everything out in reality. The inner world became the master and shaper of the outer.

One of the keys to progress is accurate representation, in which information from the real world is first perceived, captured, recorded, and processed before being indexed, linked, and presented for rapid access. Patently, perspective introduced new techniques of vision and representation that have enabled humans to map, model, and shape physical reality accurately. This is the well-documented **conquest of the real** [10,13,14]. However, today we have a new universe of the internet and digital media, in which inert objects all around us are suddenly waking up and becoming ‘smart’. Digital intelligence is invading everything that we do.

#### Physical Reality

Prescribe

Index

Model

#### Explicit Dimensional Worlds

Object / Process Modelling

Inner World is Master and Shaper of Outer

Drawing / Represented Reality  
Artificial Perspective(s)

Visual / Drawing / Graphical Perspective(s)

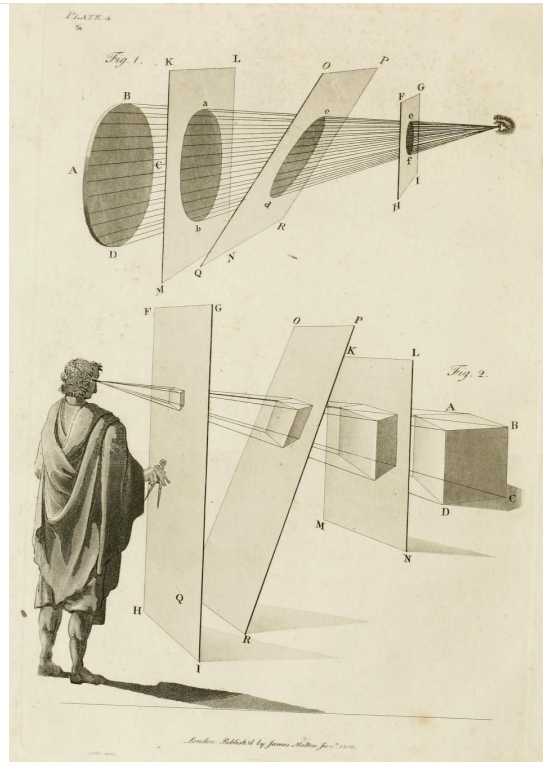
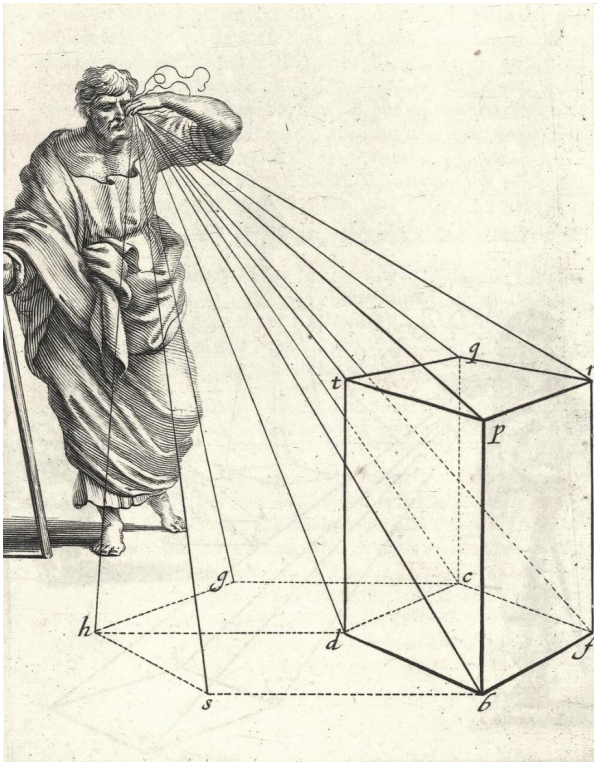


Figure 4: Visual / Graphical Perspective

Top (left): Visual perspective by J. Malton, c. 1800.  
Top (right): by A. Boss, c.1648.  
Bottom: Using a perspective instrument to capture a perspective measurement, c.1610.

Today, we live in a new universe of the internet and digital media, in which inert objects all around us are suddenly waking up and becoming ‘smart’. Regardless of whether we see the digital universe as being inside the real universe—or vice-versa—it remains the case that the various methods of perspective can help us (plus the machines/AIs) to more accurately, rapidly, and efficiently meet the six stages of representation as identified by Kim Veltman: *connecting, ordering, mimesis, matching, mixing, and exploring* (ref. *Encyclopedia of Perspective*, volumes: 1, 2).

According to Kim Veltman, in the past few decades, a new goal has emerged: **cross-matching**, which prioritises the simulated world of the digital multiverse/metaverse over the physical universe. Along these same lines, doubtless, new hybrid perspectives will be developed in the future to advance the cross-matching goal. Whereby humans and intelligent machines will together generate ever more complex, realistic, real-time, and helpful (perspective) representations of physical reality. Overall, perspective has a fundamental influence on *art, science, engineering, technology, phantasy, and illusion*, etc. And other fields such as *astronomy, architecture, navigation, surveying, map-making, etc.*, could not have developed without the **systematised visual space** introduced by the principles, theory, methods, and related instruments of perspective.

Perspective should be recognised as a primary branch of knowledge—or an academic field in its own right. Perspective has strongly influenced the development of almost every art and design movement. Perspective has also shaped the development of engineering and science from the earliest times in ancient thought to the Renaissance and modern times. And perspective has underpinned technology development and creative efforts. In terms of New Media systems, perspective theories/methods not only make the underlying communication technologies possible, but also enable efficient *capture, linking, indexing, mixing, mapping, exploring, matching, and cross-matching* of spatial views/images [10,13,14,45].

Henceforth, the eminently serviceable types/methods of perspective—are critical to progress. Perspective provides new powers to visualise, model, and create artistic, scientific, and technological solutions to problems of unprecedented **scale, scope, depth, context, detail, and accuracy**. Furthermore, developments in perspective, related viewpoints, dimensional modelling, and mapping applications will determine human destiny in the most profound ways.

#### Stages of Representation

Connecting  
Ordering  
Mimesis  
Matching  
Mixing  
Exploring  
Cross-Matching

#### Influences

Art  
Science  
Technology  
Phantasy  
Illusion  
Optics  
Drawing  
Painting  
Sculpture  
Theatre  
Scenography  
Astronomy  
Navigation  
Architecture  
Surveying  
Map-Making  
Engineering  
Mathematics  
Computing  
Communications  
Space Flight

Drawing / Represented Reality  
Artificial Perspective(s)

Visual / Drawing / Graphical / Linear / Spherical Perspective(s)

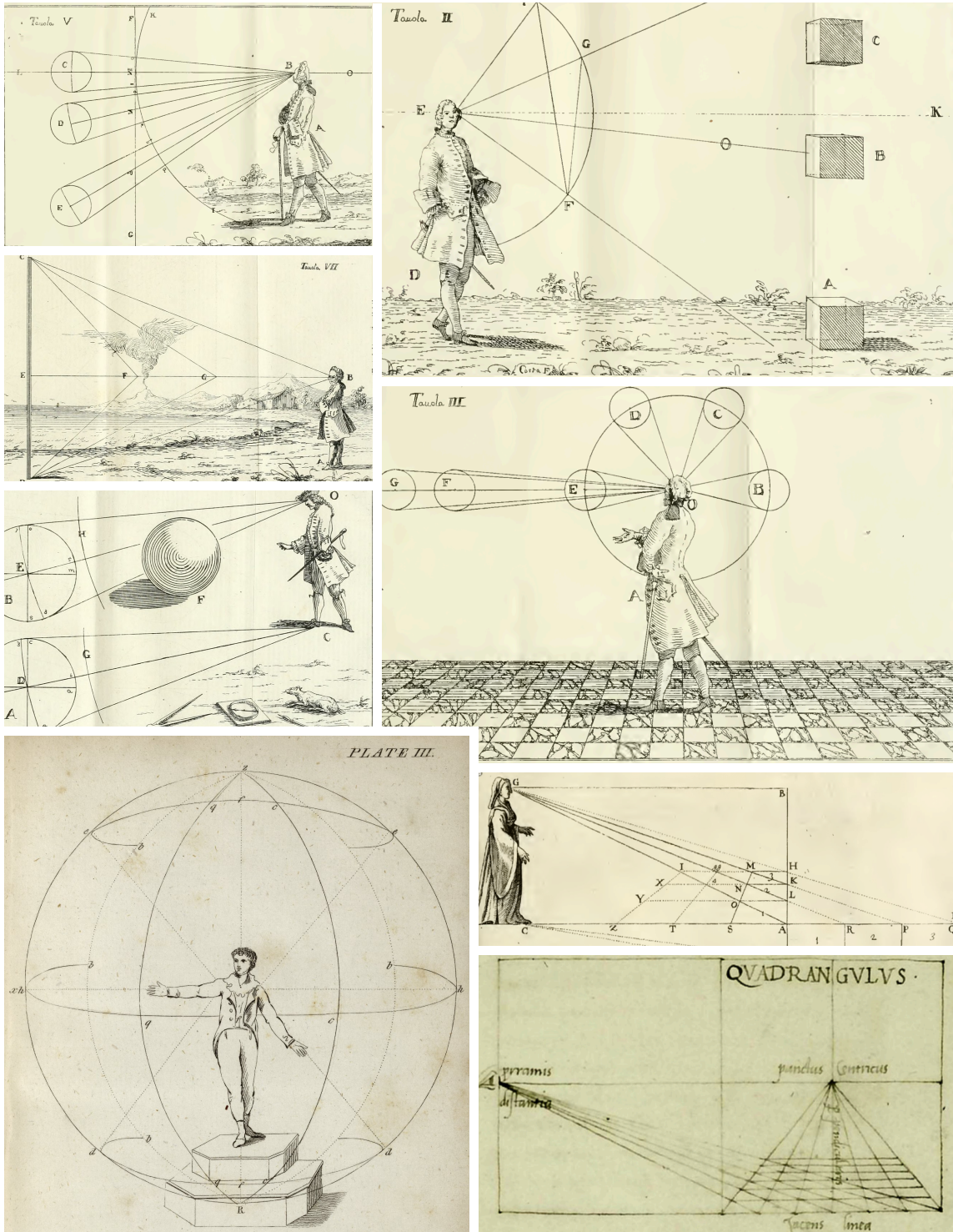


Figure 5: Visual / Graphical Perspective

Top, Middle (left, right): from *Elementi Di Prospettiva* by G. F. Costa, c.1747.

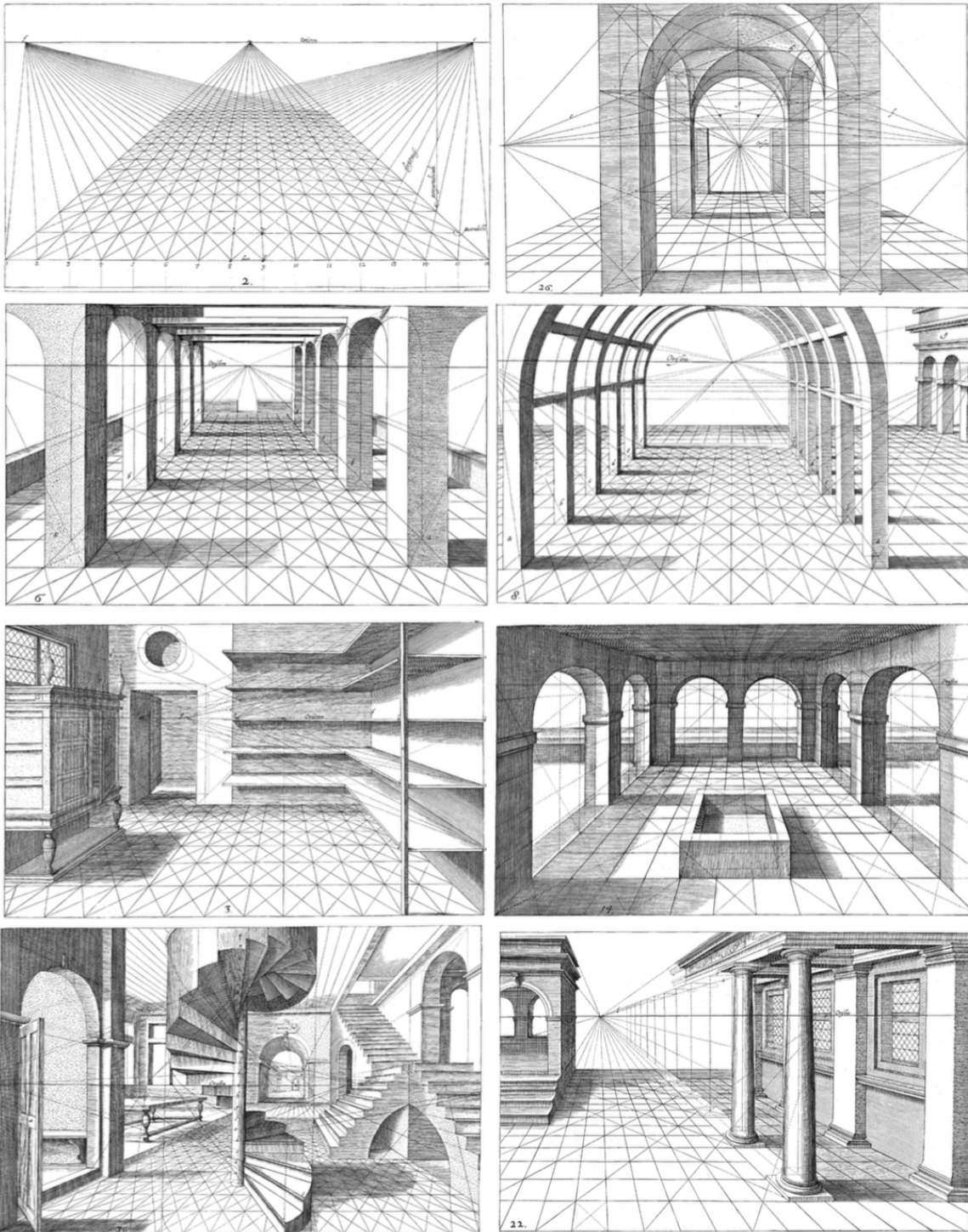
Bottom (left): Visual perspective: sphere of vision by Cage, c.1747.

Bottom (right bottom): Graphical perspective by Vignola, c.1583.

Bottom (right, bottom): by Alberti, c.1450.

Drawing / Represented Reality  
Artificial Perspective(s)

Drawing / Graphical / Linear Perspective



Linear perspective drawings by Jan Vredman De Vries, c. 1583.

Figure 6: Graphical / Mathematical Perspective

**Perspectivist**  
 Perspective Views  
 Perspective Images  
 Perspective Drawings

In summary, we suggest that perspective is evidently a cross-disciplinary and dual academic/practical subject. Where a subject is a branch of academic study with an established theoretical background, research methodology, plus groups of experts who dedicate their time to gaining an in-depth understanding of its principles, conducting experiments, researching, teaching, etc. Many years ago, a **perspectivist** referred to someone skilled in the art of making perspective views/images/drawings using correct or scientific principles. Arguably, and in this sense, today, we are all *perspectivists* who create, consume, or analyse perspective images and spatial views of one kind or another (on a daily basis). In sum, perspective qualifies as both an academic and practical subject discipline of unprecedented importance.

For some people, perspective is an established spatial representation technique primarily used in art. Ergo, one might suppose that the sources, principles, theory, and methods of perspective are well-understood today and that further research into perspective would not be necessary. However, this is not the case, as the field of technical perspective contains many unexplained facts, perplexing mysteries, and exciting possibilities. Perspective is a fast-developing field with many modern application areas that are predicated on perspective-related research activity. In truth, much is unknown, and many questions remain unaddressed. Today, the field of perspective is positively brimming over with many new theories, methods, inventions, and vital application areas, and it continues to evolve at a rapid pace. Recent applications of perspective have spurred the rise of simulations, Virtual Reality, and the metaverse, competing with the physical universe. The real and simulated worlds are now blended in our everyday experience.

**Transformative**  
 Physical Orientation  
 Mental Orientation

Perspective transforms our concepts of space, time, vision, and representation. It is key for both **physical and mental orientation**—and a tool for conceptual navigation, recording, and organisation of visual knowledge. Evidently, the principles, theory, types, methods, and applications of perspective are still being explored. And perspective has foundational links to almost every other subject discipline. Perspective is an old subject with an exciting future. No wonder that perspective, which introduced the concept of an open horizon, is such an open field. Perspective is often described as something mainly linked with the Renaissance, which continued until the 19th century and then died out. Such is not the case because perspective has continued unabated to the present. Remarkable is how the pivotal subject of perspective can be key to a vast array of scientific and technological advances, yet be almost invisible, existing in an unconscious realm of the human mind/culture (collectively).

Can we identify an underlying cause for the perceived demise of perspective?

To begin, perspective never became an independent concept and was subject to the vagaries of classification within four branches of learning: *optics, architecture, drawing, and geometry*. This had two significant consequences. First, classification changes, particularly in geometry, have shifted the definition of what constitutes perspective. In the 19th century, perspective included one, two, and three-point perspective, as well as various branches of parallel perspective. In the 20th century, the scope of the term was frequently restricted to one, two and three-point perspective, whereas all parallel versions are classed as projections. Indeed, some would see perspective merely as an example of *dilatation* (ref. cartography, globes, maps, etc), and as one of several mathematical transformations with no special role in spatial organisation. A second consequence has been no less dramatic, because perspective has been classified as work in *optics, architecture, drawing, or geometry*. Kim Veltman's *Bibliography and Encyclopaedia of Perspective* has ignored all such artificial barriers, collecting hitherto disparate materials relating to perspective [10,13].

But if perspective is a distinct field, then to which subject class does it belong? Should we ascribe it as an art, science, or else a practical discipline?

Perspective is a **science**. But it is a science that involves multiple disciplines such as *physics (space/time), optics, geometry, vision, engineering drawing, mathematics, and computing, etc*. Each area consists of both theory and practice, and our new perspective science must take everything in its stride without missing a beat (unambiguously). Desired is all of the truth, logic, and hence predictive power of true science. Perspective is also an **art**. Patently, perspective, being concerned with appearance and representation, has had a strong influence on all aspects of the *visual and graphic arts, the plastic arts, the decorative arts, the performing arts, and architecture*. Perspective is also a **technology**. Whereby optical, matching, and surveying instruments enable us to probe physical reality and obtain accurate views, images, measurements, and models. Perspective technology has been essential for the development of *photography, cinema, television, computer-aided design, virtual reality, and robotics, etc*.

Considering all these varied facets of the key discipline of perspective; we can conclude that it has no single nature (ostensibly), other than perspective concerns producing images, measurements, or creating reproductions of spatial reality. Wherever and whenever we humans view—or attempt to produce images of—spatial forms, perspective is involved. Our discussion demonstrates why perspective should not, and indeed cannot, be falsely squeezed into any established discipline.

#### Art

- Visual Arts
- Graphic Arts
- Plastic Arts
- Decorative Arts
- Scenic Arts
- Performing Arts
- Architecture

#### Science

- Physics
- Space / Time
- Optics
- Geometry
- Vision
- Engineering
- Drawing
- Mathematics
- Computing

#### Technology

- Optical Instruments
- Matching Instruments
- Surveying Instruments
- Photography
- Cinema
- Television
- Computer-Aided Design
- Virtual Reality
- Robotics
- Computer Vision
- Space Flight

Perspective stands alone, yet its chameleon-like nature directly or indirectly influences every other subject discipline! Patently, it is time for a new approach to art/science/technology that encompasses and benefits from a deep understanding of perspective. There is a need to establish perspective as a primary branch of knowledge, enabling the coherent development of subject matter, disseminating an improved understanding of basic principles/theory/methods, and fostering fundamental progress in this key area. But there is another compelling reason why perspective knowledge must be gathered and combined into a unifying subject framework, and this relates to a well-known cultural dilemma.

Perhaps one of the biggest blockages to progress is cultural, as explained by Sir C.P. Snow [1905–1980] in his 1959 book *‘The Two Cultures and Scientific Revolution’* [11]. Whereby the science and humanities have become split into ‘two cultures’, and that division has been a major handicap to both in solving the world’s problems. If Dr Snow is correct—and much evidence says that he is—then our call to establish a separate subject discipline for perspective is also correct, especially given the tremendous number of relationships and interrelations of perspective knowledge across art, science, and technology.

Perspective is a special case in this respect, because it is intricately embedded in all of the various sub-disciplines of each subject (in innumerable ways); and it is difficult to find any visual/imaging/representation topic that is not ‘perspectival’ in one way or another. Perspective is such a fundamental and profoundly influential field that it should be taught as a distinct discipline in schools, colleges, and universities. Whereby perspective is the **very definition of a cross-disciplinary or interdisciplinary academic field**, with countless sources, links, and foundational concepts/relations penetrating to the core of key phenomena in the arts, sciences, culture, and technology.

In the 20th century, perspective re-evaluated the principle of object/image correspondence, challenging its ideas by reversing transparency-opacity laws and the concepts of windows and walls. These experiments expanded the categories of correspondence to include theoretical, assumed, possible, transposed, and no direct correspondence. Experiments with alternative picture planes and New Media boosted this trend. Transformations followed between visual systems/methods.

In **art**, perspective led to *new visual methods and exploring*, in **science/engineering**, it raised questions of *truth*, and in **illusion**, questions of *real/unreal*. Scientific or linear perspective (graphical form) was a method for clearly demonstrating relationships between representations and their target objects, revealing the optical and geometrical/mathematical foundations of both.

**Cross-Disciplinary**  
Axioms / Principles  
Foundational Theory  
Sources / Links  
Concepts / Relations

**Art**  
Exploring  
New Visual Methods  
**Science /  
Engineering**  
Truth / Falsehood  
**Illusion**  
Real / Unreal

By contrast, perspective in the 20th century became a process of hiding its sources, veiling its connections with the linear perspective original, altering the principle of object/image correspondence, shifting, transforming, and denying it until it was impossible to see the source. Some have linked today's unrestricted representation capability with freedom, as proof that the spirit is not bounded, or limited by a one-to-one link with the physical world. Others have avoided the notion of correspondence, as if one could make the outside world go away, only to find themselves troubled by questions of difference, the other, and the similar [10,14,15].

Overall, there is a modern trend towards finding new ways of relating to physical reality, with an emphasis on context and re-contextualisation. In the process, perspective is found to be something more fundamental/profound than a convention, visual illusion, or a temporary fad. Philosopher Immanuel Kant [1724-1804] recognised that perspective is key for **spatial orientation**. But on the other hand, perspective is also a tool for conceptual navigation: a way of finding *where we are*, and discovering *who, what, how, and even why we are*.

How then can we adequately define perspective?

A good starting definition in the context of graphic art (pictorial/scenic forms) reads as follows:

The term 'perspective' may refer to any graphic method, geometrical or otherwise, that is concerned with conveying an impression of spatial extension into depth, whether on a flat surface or with form shallower than that represented. Perspective composition results when the artist adopts a visual approach to drawing and consequently portrays perspective phenomena such as the diminution of object size at a distance and the convergence of parallel lines in recession from the eye.

Etymology studies word origins, tracing their development, changes in meaning, and formation through borrowing and language evolution. In terms of etymology, the English word perspective derives from the Latin *perspectiva*, a complex term with a long history of diverse interpretations. Indeed, the confusion persists today because perspective means different things to different people (and in different contexts)! 'Perspectiva', says Albrecht Durer [1471-1528], 'is a Latin word and means "durcheshung": a view through something [space]'. But *perspectiva* also refers to *perspicere* in looking directly at something or seeing 'a form clearly' with your eyes [ref. visual aspect].

Remember also that, in our terms, perspective refers to **viewing, matching, representing**, or producing an **illusion** or **immersion in spatial reality**.

#### 20th Century

Tendency to Avoid / Ignore Linear Perspective  
New Belief of No Direct Correspondence Between Object / Image

#### Re-Contextualisation of Physical Reality

Spatial Orientation  
Visual Maps / Models  
Conceptual Navigation

In the 15th century, perspective also became associated with *scenographia*, or the art of *representing spatial panoramas or objects graphically on 2-D surfaces*. While the etymology of the term perspective is interesting; these various interpretations of perspective can be resolved (ostensibly) by acknowledging that there are different types of perspective; and fundamentally (at a minimum), we have **natural perspective**—or direct looking at physical reality; and **artificial perspective** (*e.g. graphical perspective*)—or representation of a spatial reality using drawing/painting methods, etc.

Today perspective, in one form or another, is key to *vision, spatial modelling, and creating appearances*. And the disparate applications of perspective theory within fields like *art, mathematics, technology, and drawing* are too numerous to list. Another issue is that multiple types of perspective tend to operate simultaneously, making it difficult to identify the root causes of specific visual effects. For example, we cannot easily separate environmental optics or *environmental perspective* from the functions of human eyesight or *visual perspective*.

How to deal with this complexity? Only by defining all classes of perspective, identifying the features of each type, before characterising the circumstances that bring each form into play. We must open our eyes to all the types and numerous applications of perspective. Unfortunately, a singular/narrow definition fails to encompass the multiple and diverse ways perspective has been employed in the past, today, and in topics such as vision, mathematics and computing.

A little over 2,000 years ago, the ancient Greeks developed the first systematic attempts at a realistic depiction of depth on a flat 2-D surface, employing key perspective phenomena. These phenomena include apparent **diminution of size** with distance (size/distance formula), apparent **diminution of form** (loss of outline detail with distance), apparent **degradation of form** (object shape distortions with viewing angle), **aspect foreshortening** (viewing direction apparent contraction of size), plus **vanishing points**, among others. However, it is believed that they failed to develop/understand/apply the basic principles/methods of linear perspective; whereby, it is assumed that all objects must be viewed from a single point of view, and further that each set of orthogonal (parallel) lines must converge to a single primary vanishing point.

The roots of linear perspective arose in the Near East, including Egypt, West Asia, the Arabian Peninsula, Africa, and the Ottoman Empire, with countries like Iraq, Yemen, and Jordan. Ergo, we are dealing with the Egyptian, Byzantine, and other empires. Regarding the role of Far Eastern countries like India, China, and Japan, less is known about the history of linear perspective.

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N.B. Foreshortening is when an object or scene's dimensions aligned along the depth direction are contracted in apparent size relative to dimensions in the orthogonal direction. A common misconception is that there is only one type of foreshortening, but in fact we have two types that often interrelate. There is **aspect foreshortening** based on projection angle, and **perspectival foreshortening** based on apparent size diminution with depth.

#### Perspective is Key to Visual Topics

- Vision
- Spatial Modelling
- Creating
- Appearances

#### Perspective Phenomena

- Diminution of Size
- Diminution of Form
- Degradation of Form
- Aspect
- Foreshortening
- Vanishing Points
- ++ more

Whilst perspective has foundations deeply rooted in the past, it remains a distinctly modern subject. Nevertheless, older principles, theories and perspective methods remain highly relevant to the contemporary world and its myriad of visual technologies. Indeed, the budding perspectivist has much to gain from a close study of the history of perspective.

The *Oxford English Dictionary (2nd Ed.)*, defines perspective as:

- The science of sight; optics.
- An optical instrument for looking through or viewing objects with; a spy-glass, magnifying-glass, telescope, etc.
- The art of delineating solid objects upon a plane surface so that the drawing produces the same impression of apparent relative positions and magnitudes, or of distance, as do the actual objects when viewed from a particular point.
- The appearance presented by visible objects, in regard to relative position, apparent distance, etc.
- The relation or proportion in which the parts of a subject are viewed by the mind; the aspect of a matter or object of thought, as perceived from a particular mental 'point of view'. Hence the point of view itself; a way of regarding (something).
- A drawing or picture in perspective; a 'view'; a picture so contrived as seemingly to enlarge or extend the actual space, as in a stage scene, or to give the effect of distance.
- A picture or figure constructed so as to produce some fantastic effect; e.g. appearing distorted or confused except from one particular point of view, or presenting totally different aspects from different points.
- A visible scene; a (real) view or prospect; esp. one extending in length away from the spectator and thus showing distance, a vista.
- A mental view, outlook, or prospect, esp. through an imagined extent of time, past or (usually) future; hence sometimes = expectation, 'look-out'.
- Drawn or viewed in accordance with the rules or principles of perspective.
- The action of looking into something, close inspection; the faculty of seeing into a thing.

Upon reading such varied and sometimes contrasting definitions, we are once again struck by the chameleon-like nature of perspective. Wherein it is linked with *optics, vision and point of view, the third dimension or depth, appearance, drawing and painting, illusion, and even mental outlook, etc.* Indeed, it would be difficult to find a subject discipline, whether artistic, scientific, technological or cultural, that has not been strongly influenced by, if not actually rests upon, perspective principles/theories/methods of one kind or another.

Patently, perspective is a multifaceted term that can portray—or instantiate—various meanings/uses!

#### Modern Subject

Perspective is by no means an old, abandoned, or dead subject. On the contrary, today, we see more types and applications of perspective than ever before.



Pseudo perspective from the Bedford Hours, a french medieval book, c. 1410-30.



## The Art and Science of Perspective

The *Art and Science of Perspective* book series is a source of deep insight on perspective. It covers **natural perspective** (how we see things) and **artificial perspective** (how we represent that concept in media).

Essential for 'vision-based' professionals: artists, photographers, filmmakers, architects, lighting designers, CAD engineers, digital content creators, 3-D/CGI/AI modellers, SFX/VFX and game designers, live/virtual/hybrid film production specialists.

