

REDEFINING ART AND DESIGN
WITHIN THE CONTEXT OF MATTE PAINTING



YEDİTEPE UNIVERSITY

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**REDEFINING ART AND DESIGN
WITHIN THE CONTEXT OF MATTE PAINTING**

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Orkun YÖNTEM

ÖZET

Geçmişteki teknik ve donanımsal gelişmeler resimlerin yapılış biçimini tekrar tekrar değiştirdi. Resimler mağara duvarlarından, tapınaklara, kiliselere, fotoğraf albümlerine, sinemaya, televizyona ve bilgisayar ekranlarına geçti. Sanatsal sunum yöntemleri sürekli gelişecek ve farklı alanların ortaya çıkmasını sağlayacaktır. Tıpkı merceğin bulunmasıyla başlayıp, günümüzde mat boyama tekniğine uzanan 500 yıllık gelişim sürecinde olduğu gibi sonraki senelerde de bu gelişimi insanlar merakla izlemeye devam edeceklerdir. Bu tezde Mat Boyama “Matte Paint” tekniğinin geçmişten günümüze olan evrimi ve hangi sanat disiplinleriyle ele alındığı, ülkemizde akademik ve çeşitli sektörlerde nasıl uygulandığı hakkındaki detaylara değinilmiştir. Giriş bölümünde “Matte Paint” tarih ve sanattaki konumu sorgulanmış olup dönemin getirdiği değişkenler irdelenmiştir. İkinci bölümde teknoloji öncesi ve sonrası “Matte Paint” kullanım şekilleri ve teknikleri detaylı biçimde incelenmiştir. Üçüncü bölümde ise tekniğin ülkemizde ve dünyada akademik ve sektörel alanda ne durumda olduğu, nasıl ve ne zamandan beri uygulandığı anlatılmıştır. Bu bilgilerin ışığında değerlendirme ve sonuç bölümünde ülkemizde ve dünyada “Matte Paint” tekniğinin geldiği nokta irdelenmiş ve tekniğin zayıf veya eksik yanları saptanarak gelecekte akademik ve sektörel alanlarda nasıl uygulanması gerektiğine dair detaylı bilgiler verilmiştir.

Anahtar Kelimeler: Matte Painting, Resim Sanatı, Dijital İllüstrasyon, Sinema Sanatı, Plastik Sanatlar, Grafik Tasarım, Matte Paint Teknikleri

SUMMARY

Past developments in technology and hardware repeatedly changed the way pictures were created. Pictures passed from cave walls to temples, churches, photo albums, movies, television, and finally, to computer screens. In the future, artistic presentation methods will continue to develop and this will ensure the emergence of different fields. Just like it happened in the 500-year development process that started with the invention of the lens and reached the matte painting technique of today, people will continue to follow these developments with curiosity in the following years. This thesis focuses on the evolution of the “Matte Painting” technique from past to present, and the art disciplines using this technique. Also, details about how the “Matte Painting” technique is implemented in the academy and different sectors in our country are mentioned. In the introduction, the place of “Matte Painting” in history and art is examined and the variables related to the period are scrutinized. In the second part, pre- and post-technology “Matte Painting” application methods and techniques are inspected in depth. In the third chapter, the state of this technique in the academy and sectoral fields, both in our country and the world, is explained, together with information about how the technique was applied and since when. In the view of this information, the evaluation and conclusion part of the thesis examines the final state of the “Matte Painting” technique in our country and in the world - weak or lacking aspects of the technique are ascertained and detailed information is presented about how the technique should be applied in the academy and sectoral areas in the future.

Keywords: Matte Painting, Painting Art, Digital Illustration, Cinema Art, Plastic Arts, Graphic Design, Matte Painting Techniques

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1. INTRODUCTION

1.1 Foreknowledge

Matte painting has been the art behind creating fantastic indoor and outdoor environments - which cannot be achieved by building sets - that provides us the feeling that non-existent worlds are real, and supply realism to the surreal landscapes we see in movies. Thanks to matte pictures, filmmakers were able to present our imagination the scenes that impressed us in our childhood, the scenes where we explored the world to its most unknown and distant corners with Indiana Jones, where we fought with the dinosaurs together with King Kong in Skull Island, and the unforgettable scenes of the very distant galaxies in Star Wars.

Matte paintings are not limited just with fantasy or science fiction. They can present realistic landscapes, cityscapes, or even a sunken Titanic ship - all as if rendered by an artist's hand. Alfred Hitchcock's - who is one of the most successful and cult directors at the beginning of matte painting in cinema - film scenes are so beautiful and natural that when watching his films, the audience does not realize that they are seeing matte paintings. Although the characters in the movies appeared like they were in a immense library or in a scene in the middle of nature, they were actually stationary in front of a two-dimensional image. The audience was fascinated and watched these scenes with pleasure over and over without questioning the reality of the environment. The directors' initial inspiration for the visual references were the classical era paintings of

famous painters. Thanks to the art of matte painting, the link between paint and canvas - which has been present since the rise of civilization - has been extended to media such as movies, TV series, games, etc.

The art of matte painting, which is a descendant of traditional painting, has evolved in time until its current modern form to turn into a field of art. The foundations of this art - which has been continuing since the 1900s - were laid in the 15th century by Brunelleschi and Leon Battista Alberti's¹ research work on optics and painting. Some techniques, which possess similarities to the art of matte painting, have been preferred to create art works in more detail and to use the right perspective, thanks to optical instruments (Camera Obscura, Camera Lucida, Peepshow, Magic Lantern) that were invented by the means of new technical developments in the 16th century and are accepted as the ancestors of modern camera and projection tools.

The art of matte painting, which emerged as a field of art from the revolutionary process sparked off by the art of photography and films in the 20th century, has become a design discipline in the recent period. The origin of matte painting art dates back to the final stages of the 19th century. The application of matte painting art in the early stages begun with silent films, then over time the technique was adopted by large masses and contributed to the advancement of large production companies. About a century ago, film studios did not have the million-dollar budgets or the resources required to shoot in exotic

¹ Leon Battista Alberti (1404-1472): He was an Italian writer, artist, architect, painter and cryptographer. He also was a specialist in the application of mathematics due to the education he received from his father since childhood. He was born in Genoa, Italy. From an early age, he began to obtain a series of knowledge that enabled him to become the representative of the Renaissance man. As a result of the foresight of his work in the literature, the series of texts that he developed became references in the following years. With his book "De Pictura", Alberti laid the foundations of the Renaissance style in painting. He also became a part of the papal court.

locations. If we look at the 'Star Wars Series' as an example - it is very hard to create a suitable stage atmosphere or scenery for a science fiction movie in such high-budget productions. When this problematic is considered; we can see that this method - which was developed for scenes that do not exist in reality, which are impossible to create and costly to shoot - enabled the emergence of the modern art of matte painting.

In older periods, all matte paintings were created by hand or were generated by the photomanipulation technique based on combining photographs. Today, with advances in computers and programming, a type of art which we now call "Digital Painting" has come forward. With the development of the digital age, more practical and less costly digital versions have taken the place of traditional techniques. The usage fields of Matte painting art have expanded with digital paintings, which supply images a much more realistic appearance as compared to traditional painting art. Matte painting pictures - which were painted on glass in the older periods - have now taken a new detailed form thanks to tablets and computer software, which can be applied more easily, and has no cost. With the advancement of technology, matte painting art evolved into a technique that can be used in advertisements, TV series and many other fields.

1.1.The Study Subject and Problematic Focused On

What is the position of the matte painting technique in art? What was the starting point of the historical process for this technique? Is the work performed with the matte painting technique in the visual effects production sector at a sufficient level?

Does this work meet expectations compared to work performed world-wide? What is the current academic state of the matte painting technique in our country? What should the educational model for the matte painting technique be in our country? What are the lackings of the technique and how can they be overcome?

1.3. Statement of the Problematic

The art of painting has evolved in technical and equipment respects since the beginning of human history, and the way paintings are made has changed repeatedly. The journey of painting begun with paintings made on cave walls, and moved to temples, churches, photographs, television and finally, to computer screens. In time, paintings were divided into categories such as 'painting, drawing, mosaic, film, computer animation, cartoon, baroque, classical, modernist' etc. based on the methods of creation and relevant forms. Some of these were accepted as art, while others were regarded as technical. What is the factor that makes something art? This question is still open to discussion. Paintings have been used over the ages sometimes as a communication tool in societies, and at times as a historical record or a promotional tool for supporting consumption. The advance of the art of cinema, which begun with the invention of the lens and the camera, also pioneered the rise of different art forms. Perhaps the foremost of these forms is the art of "Matte Painting". The urge of film producers to create realistic looking places and events that do not exist, enabled the rise of the matte painting art. With the advance of this new art, more artistic elements like composition and light started

to be used in more detail. Now directors adapt site, light and colors of the classical paintings of the period to the film frame in scenes being composed.

Film, painting and photography sustained each other on a common ground in the 20th century. It is not by chance that the films of directors like Alfred Hitchcock and David Lynch reached a superior level of artistic quality compared to other films. While directors were composing the scenes in their films, they took inspiration from old period painters to ensure resemblance to renaissance paintings or still life work. Although some assert that such compositions applied in movies are not art, there is no fundamental artistical difference between moving or stationary pictures, and this change doesn't reduce the value of the work. In film scenes, the utilization of objects, perspective, light and compositions used in a dynamic environment possess the same technical similarities as the traditional pictures chosen as references. "In the middle of the 20th century, the dominant theories basically argued for the division of paintings based on the medium in which they were created. Accordingly, painting and photography had completely different natures. In fact, as we can comprehend more easily now, photography and painting have been intertwined since long before 1839." (Hockney, 2017 p 337).

The art of "Matte Painting" has been a favored technique in the cinema, advertisement and game fields for over a century, but this technique is not known in the cinema and advertising sectors and the academy in Turkey. As a result of matte painting art being ignored in recent projects, the production quality of cinema, TV series and advertising projects has been at very low levels. In this study, the roots of the matte painting art - which is known to have been continuing for more than a hundred years - since the 15th century until today - and technical developments in the field were

inspected, the position and objectives of matte painting in art were determined, and suggestions for solutions were presented, based on interviews and evaluations conducted in the academy and related sectors.

1.4. The Importance of The Study

The art of matte painting -rooted in traditional painting- has become a discipline based on visual effects and design within the advancement process covering a century. Although contemporary sources date the rise of the matte painting art to the end of the 19th century, this art has evolved over the 500 years after the invention of the lens until today - this study examines this and underlines the importance of the subject. In this process, the impacts of the matte painting art on artistic evolvement consistent with the variables of the period were investigated.

1.5. The Objective of The Study

In the study, the position of the matte painting technique in art and various usage areas were examined - the objective was to ascertain the state of the technique in the academy in Turkey and around the world. The shortcomings of the technique were ascertained by interviews conducted with outstanding traditional and digital matte artists in the sector, and answers were provided to the question of how matte painting could be applied academically in Turkey. Considering the conclusion reached in this context, this

study is a guide document for those who follow this technique in the future.

1.6. Limitations

This study is limited with the position of matte painting in the field of art and its employment in sectoral and academic fields. The changes that matte painting has experienced since old times and the relations of the art with other art branches over time, have been limited with the sectors it is being used in, and the data obtained thanks to interviews with matte painting artists from Turkey and other countries. In view of these limitations present in the study, an exploration was conducted under the title of "Redefining Art and Design Within the Context of Matte Painting".

1.7. Study Method

This study has addressed the artists that have helped the evolution of the “Matte Painting” technique from the 15th century to the present day, and the art disciplines in which technical changes have taken place. Details related to how matte painting art is applied in academic and sectoral areas in Turkey as well as the world are discussed, and solutions are investigated by determining the shortcomings of this art.

In the introduction part, the historical process of the “Matte Painting” field and its position in art was were inspected, and the variables particular to the period were questioned. The artists who took a part in the advancement of the art were investigated,

and comprehensive information was provided on how the techniques utilized by these artists for more than a century developed over time to contribute to the sector in their era. In consideration of this information, sectoral factors (concept design, composition, color settings, ascertaining references, macro elements) that need to be recognized in the production processes of contemporary matte painting art were explained through sample projects in order to contribute to the literature.

In the second part of the study, the position of the matte painting technique in art was examined, and information about the utilization of comparable examples in many fields like stage performances, painting, perspective and entertainment over a 500-year period that begun with the development of optical devices was included in the study. In this process, important people and revolutionary inventions who contributed to the advancement of optical instruments were investigated chronologically, and correlated with the development period extending to the art of matte painting.

In the third part, the progress of the matte painting art in academic and sectoral areas in Turkey as well as the world, was explored together with the technologies it utilized and examples were given as a basis for comparison. For the adaptation of this art in our country in the best academic sense, the weaknesses of the art were determined in interviews with matte painting artists based in our country and the world, who had worked on big projects such as "Lord of the Rings, Star Wars, Game of Thrones, Arif V 216" and the like - also, important information regarding the method of application of the matte painting technique in the academy as well as the sector, and which tools should be utilized during application was included in the study.

In the light of the previously provided information, the final condition of the "Matte Painting" art in our country and in the world has been examined in the assessment and conclusion part of the study - the weak and lacking features of this art has been determined and detailed information was provided regarding how the art techniques should be applied in academic or sectoral fields in the future, as well as which tools and programs they utilize.

2. THE BIRTH OF THE MATTE PAINTING ART

2.1. The Definition of Matte Painting and the Historical Process

The matte painting technique is a painted visual representation utilized to reconstruct recorded scenes and landscapes like film, video and television productions, by exhibiting scenes that are indiscernible from the real thing, thereby creating visual fictions that are nonexistent. The foundation of matte painting art is superpositioning images, illustrations or videos in order to integrate them to the scene. Thus this technique gives filmmakers the means to present the illusion of a setting or period that doesn't exist in the shooting area. Matte painting art is inseparably involved with all the original arts, and is especially used as a technique in the cinema sector.

Even though matte painting is a new art that has just begun to develop and earn reputation, -the first digital example of matte painting is the 1990 film, Die Hard 2² in cinema- the foundations of the technique were laid in the early 1900s. Georges Méliès, a French magician and film director born on December 8, 1861, experimented with a lot of diverse film editing techniques during his career – these techniques were later known as visual effects. For this reason, he is often remembered as the "father of visual effects".

Matte paintings, costumes, visual effects and film painting are some of the other works utilized by Méliès. In the following periods, movie scenes were developed by the visual effects image expert and film producer Norman O. Dawn. The Glass Shot technique found by him entailed joining movie scenes with glass panels painted with oil paint by painters. Later on this technique began to be used in fields like photography and illustration and continued developing to reach the digital format.

Matte painting art is the basis of realistic storyboards in film. In former times movie scenes were painted by hand or models were used for this purpose - today's technology permit unbelievably realistic backgrounds to be created using various programs together. Particularly with the advances in the IT field, the art of matte painting has become the most popular technique of today's world. In a time where cameras can be used freely, the new motto of all visual effects artists is flexibility. The matte painting technique has liberated artists from limiting practices like locking the camera and letting the motion play out on a fixed canvas.

² Die Hard 2: Die Hard 2 is a 1990 dated American action-thriller movie, the second part of the Die Hard film series.



Picture 1: Titanic (1997), Example of the traditional matte painting technique.

In a period where a visual effects shoot endlessly goes back and forth between the designers and film director, it is normal for work to be edited many times from the beginning. As a consequence, matte painters felt the necessity to work in the three-dimensional world as well as the digital world.

Despite the fact that traditional matte painting continued to exist over the years - for example in 1997 Christopher Leith Evans³, painted James Cameron's rescue ship in the Titanic by hand - (Picture: 1), digital imaging technologies took over the film industry in the last 30 years. Modern digital matte paintings begun with the transformation of images into CG⁴ images, not with the application of paint to a piece of glass. Today, a

³ (Christopher Leith Evans): Born in 1954, credited as Christopher Evans or Chris Evans. He is an American artist, digital matte painter, and visual effects art director for major cinema movies. Chris Evans has contributed to movies such as Star Wars Episode VI: Return of the Jedi, The Dark Crystal, and Indiana Jones Temple of Doom, with his matte paints.

⁴ CG: (computer graphics) This term, which appeared with the emergence of computers in the 1950s, was initially used in the aircraft industry. The first software utilized for flight simulation purposes in 1951 only

digital matte painting artist is able to transform collages made from textures and reference photographs to a new matte painting. A digital matte artist is able to refine these works employing techniques like retouching and hand painting, using software such as *Adobe Photoshop* or *Autodesk Maya*⁵ to retouch and put the last touches much more easily and at low cost compared to traditional techniques. The advancement of matte painting art techniques will continue in the future. Just as traditional matte painting techniques cannot keep in step with the modern digital age, it is certain that technical novelties that will surface in the coming years will render today's matte paints impractical and out of date.

2.2. Georges Mèliès

Georges Mèliès was born in Paris, on December 8, 1861, as the son of a wealthy shoemaker. His interest and talent for art surfaced at an early age. Mèliès showed no interest in his father's profession - he was interested in the arts of painting and sculpture and was occupied in puppetry. After Mèliès completed his military service at 21, he desired to go to the "Ecole des Beaux Arts" art school in Paris - but at his father's demand, he started working on repair work in his father's factory. (David Robinson, 1993) Mèliès spent these five years in an exceedingly unhappy state. Nevertheless, the

showed texts and graphics on an oscilloscope screen, but actually it was the first real-time software (Airplane Stability and Control Analyzer). Later on, systems designed for military aviation use were the initial forebears of modern graphics systems. CG is a class of software that can be utilized also in place of 3D or 2D graphics designed on a computer. CGI (computer-generated images) are the basis for visual effects used in films.

⁵ Autodesk: Maya: Maya is a world-famous modeling and animation program by Autodesk, and is used to design 3D models and animations.

abilities he acquired during the repair work provided him a ground for pioneering in the fields of magic and film later on. In 1884 he went to London and while working there, he proceeded to improve himself in the field of art - he was influenced by the performances of famous magicians he watched here, and begun to work as a magician after his return to Paris. In the meantime, Mèliès drew cartoons for "La Griffé" under the nickname "Geo Smile", which he derived from the letters of his name. After his father quit his job, Mèliès ran the family business for some time together with his older brother. In 1888 he transferred his share to his brother to buy the Robert-Houdin Theatre, then offered for sale. Mèliès reopened this theater where he performed magic performances and also presented "Magic Lantern"⁶ shows - which is a primitive form of cinema.

⁶ Magic Lantern: This is a device that uses a gas lamp and lens to reflect pictures painted on a glass to a screen or a wall, and is considered to be the predecessor of modern projectors. In the 19th century this technique first spread to England and then to Europe. This device was improved over time and provided the means to present simple moving images by positioning floating images on top of each other. With the invention of the camera, a new age begun for the magical lantern. Now short films could be produced with landscapes or photographs of famous people. Copies of produced slides were easily obtained. With the development of the film machine, the magical lantern gradually took the backstage in history and ended on the racks of collectors.



Picture 2: Georges Méliès, “A trip to the Moon” (1902).

Méliès viewed the first cinema show performed by the Lumiere brothers⁷ in 1895 and he was quite thrilled. He wanted to buy a film-making machine (cinematograph)⁸ from the Lumiere brothers. When the Lumiere brothers refused to sell him, he purchased a similar device from the English inventor and filmmaker Robert William Paul⁹, and he started to arrange film shows in his own hall on April 4, 1896. Méliès shot near to eighty films that year - the next year he set up Europe's first film studio in Montreuil, near Paris, and begun studio shooting. (David Robinson, 1993) Méliès begun producing his films with documentaries and newsreels similar to the Lumiere brothers. Soon he became

⁷ Lumiere brothers: Auguste Marie Louis Nicolas (October 19, 1862 - April 10, 1954, France), and Louis Jean (October 5, 1864 - June 6, 1948, France) - known as the Lumière Brothers, are among the first film makers in history. They developed the cinematograph device and patented it. This device, enabled more than one person to watch a film simultaneously, unlike the kinematoscope developed by Thomas Edison. The Lumière Brothers arranged their first private cinema presentation on March 22, 1895. And their first public, paid-for audience screening was held on December 28, 1895, at the Salon Indian Du Grand Café in Paris.

⁸ Cinematograph: (Modern Greek: κίνημα kīnēma, motion and Modern Greek: γράφειν gráphe- in, meaning to write, motion writer), The device developed by Auguste and Louis Lumière for recording images and projecting them to a screen, patented in France on February 13, 1895.

⁹ Robert William Paul: (1896-1943) He was one of the British pioneers in instrument production for the film and science fields. He also was a film maker and distributor. He pioneered a series of cinematic techniques and constructed the first studio built for a specific purpose in Britain. He left the film industry entirely in 1910.

aware of the possibilities of cinema, and focused on studio work and narrative films - thus he created the tradition of narrative films.

Méliès is deemed to be the first real cinema director, with the importance he gave to staging and acting. The narrative films he produced drew great interest in his country and around the world. To thwart imitations, he opened the American branch of his own film production company "Star-Film"¹⁰ in 1903, and undertook film production as well as film distribution. In spite of the innovations Méliès brought to the cinema field, he lost his initial importance in time and could not keep his leading position in the quickly developing cinema sector. He could shoot his last few films only with the support provided by his partnership with the Pathe Brothers¹¹ in 1911. Due to difficult conditions he drifted away from cinema and opened his studio to stage shows. Méliès worked as a comedian on stage until he went bankrupt in 1923. He married one of his former actors in 1925 and opened a toy shop together with his wife.

In contrast to the Lumiere brothers, who were scientists and industrialists, and did not place sufficient importance in cinema, Georges Méliès viewed cinema as an art field, and with the many films he wrote, directed and acted in, he became the trailblazer of this art.

¹⁰ Star Film: Gaston Méliès, who was the older brother of French film maker Georges Méliès, founded the Méliès Star Film Company in Fort Lee, New Jersey (formerly the center of the film industry) in 1909. Between the years 1896 and 1913, Georges Méliès produced more than 500 films with his production company "Star Film". Méliès wrote the scripts for the films, designed the sets and costumes, and directed and performed in almost all of the films.

¹¹ Charles Pathé: The company (Pathé Brothers, 1896) he founded together with his brother Émile produced and sold phonographs as well as phonograph cylinders. During the company's operations, he installed the Kinetoscope -the imaging device that Thomas A. Edison had newly invented- in theaters around France. Using the camera developed by Pathé Frères, Louis and Auguste Lumière, he shot a great number of short films, most of them sensational crime adventures, melodramatic love stories and comic anecdotes.

2.3. George Méliès and the Art of Illusion

In the 19th century, Georges Méliès, one of the world's first productive filmmakers, developed film effects for the first time in history. He drew inspiration from vanishing and suddenly appearing image jumps that happened as a result of the coincidental malfunction and re-operation of his fixed receiver during shooting.



Picture 3: Georges Méliès, “Four Heads Are Better Than One” (1898).

In his short film “Un Homme de Têtes” (Four Heads Are Better Than One) (Picture 3) shot in 1898, Méliès had to create a matte area in the background part to ensure that his head would appear as if it had separated from his body. He utilized a black

painted glass to generate this matte area - during the shooting of the film, this black matte area obstructed the image from reaching the camera, some parts of the frame turned out to be blank due to the insufficient light in some parts of the film. Méliès rewound the film, created a opposite cover and removed the original matte part - then he darkened everything and filled in the empty parts of the film. The scenes he generated this way dazzled everyone.

Georges Méliès was the first true artist of cinema as well as the most productive technical innovator in the initial years of cinema - he also was a pioneer in the development of tools for narration and performance. He conceived the fundamental vocabulary of visual effects and constructed the first studio house shaped from glass - a prototype of the European studios of the silent era. The success of Méliès' films helped the development of an international film market and laid the foundations of the technique which became to be known as "Matte Painting" later on in the art of cinema.

2.4. Norman Dawn and the Birth of the Digital Illusion Art

Norman Dawn was born in Argentina in a railway camp, in 1884. He was the son of a photography enthusiast who pioneered railroads of America. While Dawn was working as a photographer in Los Angeles in 1905, he developed the "Glass Shot"¹² glass technique and used this for the purpose of avoiding costly retouching work.

¹² (Glass Shot) Glass technique: The glass technique -which is a matte painting technique- is the earliest known method of obtaining a matte painting. In this technique, a glass plate is positioned between the camera and the scene to be shot. Later on, a matte artist would paint a picture on the glass that obstructed



Picture 4: Norman Dawn – Glass shot technique examples.

When Dawn went to Paris in 1906, he met with the French magician George Méliès there - known as the "father of visual effects"- and started spending time with him in his studio. (The Invisible Art, 2002), In that period, Dawn learned about the double exposure¹³ (film effects implemented by stopping the camera during the occasion and

that part of the scene and substituted another image. So instead of physical construction or transporting a mountain range, the required elements were painted on the glass at the location of shooting.

¹³ Double Exposure: This technique -alternatively called by the names multiple exposure, multi exposure or double exposure- is an image generated by exposing two (or three) photography frames on top of each

restarting it after some time) and time-lapse photography techniques - inspired by these, he decided to purchase a camera and work on special film effects.



Picture 5: The matte painting scheme for the “Missions of California” (1907) film.

When Dawn returned to the United States in 1907, he began to shoot his first film and he started his film career with applying the glass shooting technique he had used as a photographer. He shot the ruined Spanish colonial areas along the California coast, using visual effects to restore them to their former glory. His milestone work "Missions of California" is the first cinema film where matte painting has been used. When Dawn returned to Hollywood in 1911, he began working as a freelance visual effects artist in one of the leading studios of the period. He continued specializing in combining real-time photographs, as well as filming effects like miniature explosions, fires, avalanches and earthquakes.

other. It literally means to expose the frame to light two times. This technique -which is conveniently applied with digital cameras and photo processing programs- brings out real talent in analog photography.

Between 1917 and 1923 Dawn directed full-length films -processed with a series of effects- for the Universal film studios. "Sinbad the Sailor" was also among these films. Dawn developed the original negative matte painting¹⁴ technique and patented it in 1918. In later years, between 1930-1940, film studios embraced the the art of matte painting as their basic technique - many of the larger studios set up their own matte painting departments. The matte painting department of the "Metro-Goldwyn-Mayer" studio¹⁵ produced a great number of paintings for "The Wizard of Oz" film in 1939. David Selznick formed an independent matte painting department at the Selznick International Pictures studio for the "Gone with the Wind" film in 1939 - nearly 100 matte photography frames were produced in this department. The matte artists painted the farmhouse Tara (Picture: 6) in the film so perfectly that it was impossible for the audience to separate the scene from the photo frame (David B Mattingly, 2010).

¹⁴ Original negative matte painting: Norman Dawn developed this method to create matte images. The technique entailed cutting a black mask or matte painting during the shooting process, and suspending it in front of the camera during real-time action shooting. After that, in the studio, the image frames would be placed on a fastened camera so that they wouldn't move due to any vibration or movement. A light source would be placed behind the lens, thus the camera would function both as a camera and a projector, and the film frame would be projected onto the surface painted by the matte artist.

¹⁵ Metro-Goldwyn-Mayer, Inc., (MGM): MGM is a media company mostly focused on the production and distribution of films and TV programmes. Metro-Goldwyn-Mayer studios became the most important movie studio in Hollywood with the opportunities it provided. Metro-Goldwyn-Mayer studios became the most important movie studio in Hollywood between the end of the silent film era and the Second World War, with the resources it provided.



Picture 6: Tara house, “Gone With The Wind” (1939)

The matte painting techniques implemented in these films helped to prevent shootings that normally would last for weeks and the related financial losses - thus these techniques became an essential part of the film industry.

3. MATTE PAINTING TECHNIQUES AND ARTISTS FROM TRADITIONAL TO DIGITAL

In this part of the study, information is presented on the lives of some artists -who practiced the art of matte painting at the start of the 20th century, pioneered in this field, and helped the art to be accepted worldwide- and the techniques they used.

3.1. Traditional Matte Painting Art Techniques and Artists

Matte paintings are quite practical applications and this visual effect film shooting technique has been developed constantly over time. Digital imaging techniques have taken the place of traditional matte painting techniques over the years. Today, matte paintings are much more complicated compared to the past, due to advanced technology. Modern matte painting artists -unlike the applications in the past- can't solely paint, so they can't apply their overall painting skills. So when we look at the past work of matte painters, many film scenes seem more like paintings. The modern audience of the matte painting technique is familiar to high resolution quality and is in need of this quality. Whereas when we look at the old films, the work looks like oil paintings coming out of the film screen. That's why films such as "Gone with the Wind, The Wizard of Oz, Citizen Kane" will continue to be the traditional pioneers of the matte painting technique, never losing their charm.



Picture 7: “Star Wars” film matte painting process example.

3.2. Traditional Matte Painting Artists

3.2.1. Walter Percy Day (1878-1965)

British painter and film pioneer Walter Percy Day is one of the most important figures in the advancement period for matte painting and special photographic effects - from the silent film period of the early twenties up to the technographic period of the fifties.

British-born Walter Percy Day (1878-1965) initially was an orientalist painter in Tunisia before he began his career as a matte painting artist in France and England. Percy Day lived for a few years in the Orientalist artists community in Tunisia and charmed people with his oil paintings. (Susan Day, 2009) After his thirties, Day's stepson Peter

Ellenshaw joined him as an apprentice and begun working in the matte painting art field. Day was generally known as "Pop" or "Poppa" in the British film industry due to his being a father.



Picture 8 : Walter Percy Day, “Tunis la Blanche” (1908), oil painting on canvas.

In 1919, Day was hired by the "Ideal Films" company in Borehamwood, near Elstree. Here he mastered visual effects techniques, and then glass shots as well as the Hall process¹⁶. (The Invisible Art, 2002) The visual effects generated by Day enabled

¹⁶ Hall Process: This technique was patented in 1921 by Walter G. Hall, an English-born set designer working in Hollywood. Assembled images were prepared by painting, cutting and mounting small-scale perspective pictures on the composition board, and painting the face-beveled edges of the panel between the set and the camera in the front. This technique had an advantage compared to the glass technique, where

directors to enlarge their repertoire and reduce their film production costs. In 1922, Percy Day enlivened the film industry by introducing the glass shot method to the French cinema. In later years he worked in France's highly fertile silent film industry. In the following period, as the film industry faced financial problems, Percy Day started to seek new techniques.



Picture 9: “The Life and Death of Colonel Blimp” (1943), Matte painting work.

Percy Day chose to apply the matte painting technique instead of glass painting in order to avoid the costs and delays that caused production to stop on the set.

paintings done in the open air were affected by the weather conditions: paintings done in the fully equipped studios in the Hall process did not face problems like weather conditions or did not require set construction.

The utilization of the matte painting technique reduced the costs and saved time. Matte painting was applied on-site with masking in order for the painted surface to be added later on as a separate exposure. Matte image combination was widely used in the international film industry in the coming years.

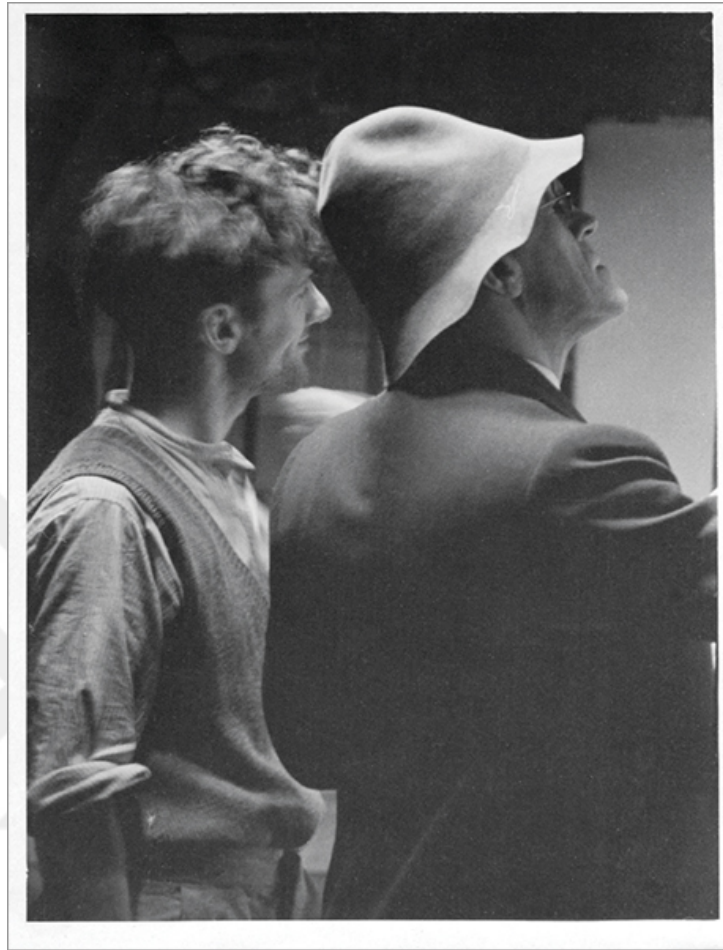


Picture 10: Pop Day matte painting work – the striking bell from the “Black Narcissus” (1947) film.

Walter Percy Day retired at the age of seventy-six in 1954, but he continued to provide consultancy to film studios. Percy Day was a respected artist whose work was on exhibit at the Royal Academy of London. In later years he focused on personal painting work - his efforts in 1954 earned him a royal gold medal (Susan Day, 2009).

3.2.2. Peter Ellenshaw (1913-2007)

British-born artist Ellenshaw met with the matte painting technique began in 1934 when he was 21 years old, and Walter Percy Day moved to the street opposite the Ellenshaw family house. Ellenshaw desired to be an artist and showed samples of his work to Percy Day hoping to get encouragement and advice from him. On that day, Percy Day liked Ellenshaw's work and proposed him the job of assistant matte painter. That day, Day appreciated Peter Ellenshaw's work and offered him a job as an assistant matte painter. (Figure 11) Ellenshaw's mother worked as a housekeeper at Pop Day's house, and in time the two fell in love and got married. (Harrison Ellenshaw, 2013) Ellenshaw worked in her stepfather's studio for 10 years and then continued on by himself. He produced a great number of matte paintings during his initial years at the “Walt Disney” film production company in England. Some of those are: “Treasure Island” (1950), “The Story of Robin Hood” (1952), “The Sword and the Rose” (1953) and “Rob Roy, Highland Rogue” (1954) (David B Mattingly, 2010).



Picture 11: Peter Ellenshaw working with Percy “Pop”.

Among these works, “The Sword and the Rose” was the peak point of Ellenshaw's energy and productivity. He was an extremely hard-working and quick artist - he had succeeded in finishing 62 very detailed matte paints in 27 weeks. Ellenshaw had a practical touch and distinctive style compared to other matte artists (Joe Fordham, 2016).

An unknown matte painter had written about Ellenshaw in his personal notes as: “Ellenshaw was one of the grand artists I’ve had the privilege to watch. At the time that I met him, I was the matte painting artist for “The Black Hole” film at Disney, and

Ellenshaw was the production designer. During breaks I would sit in his office in the Disney Movie Studio and watch as he painted his works. His technique entailed keeping the picture as disorganized as possible until the last minute when he turned his attention to all the finer details. Then, in a very short time, he would paint the final details, combine all the pieces together and obtain an absolutely real image. When his paintings were examined from at close range they would appear as complicated, undetailed and abstract surfaces - but when the pictures were viewed from a distance, they would present realistic, detailed compositions.” (Richard Rickitt 2000).



Picture 12: Peter Ellenshaw working on a matte painting.

Ellenshaw's relationship with Walt Disney had grown stronger when Ellenshaw's family moved to California. In a short span of time, he formed the matte painting

department of the “Walt Disney” studios and produced matte paintings for the “20,000 Leagues Under the Sea” movie. Ellenshaw won various awards for his outstanding matte paintings. (David B Mattingly, 2010) He won the 'Academy Award for Best Special Visual Effects' for his work in “Mary Poppins”’s musical film, “Bedknobs and Broomsticks” (1971). He was also repeatedly nominated for the Academy Awards for the visual effects he produced in the “The Island at the Top of the World” (1974) and “The Black Hole” (1979) films. Ellenshaw also won the 'Best Art Direction' award for Stanley Kubrick's “Spartacus” (1960) film (Picture 13).



Picture 13: Stanley Kubrick, “Spartacus” (1960), matte painting by Peter Ellenshaw.

Ellenshaw retired from his work in Disney in 1979, but he returned years later to contribute to several matte paintings for the production of the 1990 film "Dick Tracy." Peter Ellenshaw always preserved his passion for painting during his retirement days. He produced a great number of works with Disney themes as well as on different subjects. In

1993, he was officially given the title a 'Disney Legend' at a ceremony presided over by Michael Eisner and Roy E.

3.2.3. Albert Whitlock (1915-1999)

Whitlock was born in London in 1915, and he turned out to be one of the most talented matte artists in film history, with the works he contributed to over six hundred films and television shows. Whitlock's career began at the age of 14 in London in 1929, undertaking small jobs at the “Gaumont Studios”. In later years, he begun working on signs and captions in studios, and later on, thanks to his artistic talents, he started making natural paintings, which elevated him to the position of a matte painting artist. Whitlock worked with the masters of the matte painting, W. Percy Day and Peter Ellenshaw during his apprenticeship. His first solo glass shot is a ballroom scene which appeared in the movie "Bad Lord Byron" (1949).



Picture 14: Albert Whitlock in his office at the Universal studios, “Earthquake” (1974).

Whitlock moved to the United States in 1954, where he worked as a matte painting artist with Peter Ellenshaw at Walt Disney Studios. In 1961, Whitlock got an offer to lead the matte painting department at the Universal Studios, and left Disney. He got famous for his ability to handle seemingly impossible shots and he was in much demand by the studios.



Picture 15: Albert Whitlock standing in front of the matte painting for “The History of the World: Part 1” (1981) film directed by Mel Brooks.

To give an example, Robert Wise agreed to direct “The Hindenburg” (1975) film only with the condition that there be a contract stating Whitlock's responsibility for the visual effects. Wise wanted Whitlock to visually recreate the image of the giant zeppelin

unaided, because Albert Whitlock was a matte painting artist who focused on details and worked cleanly. While working, Whitlock he used a mirror to check his painting - since the mirror reverses the image, he could check for perspective errors. This way he added a new approach to painting. (Picture 16) Today, digital artists make a similar check for perspective errors by inverting their compositions horizontally while working on the image.

Whitlock finalized most of his matte paintings in less than a day, like a modern Monet. When examined more closely, his paintings looked very scattered and superficial - but after taking a few steps back and looking again, they would give a completely photographic impression. One of his spectacular gifts was his ability to capture the impact of the scene without showing the finer details. One of his most famous quotes is “Paint is the effect of light, not the object itself.” (David B Mattingly, 2010).



Picture 16: Albert Whitlock, Alfred Hitchcock, “The Birds” (1963).

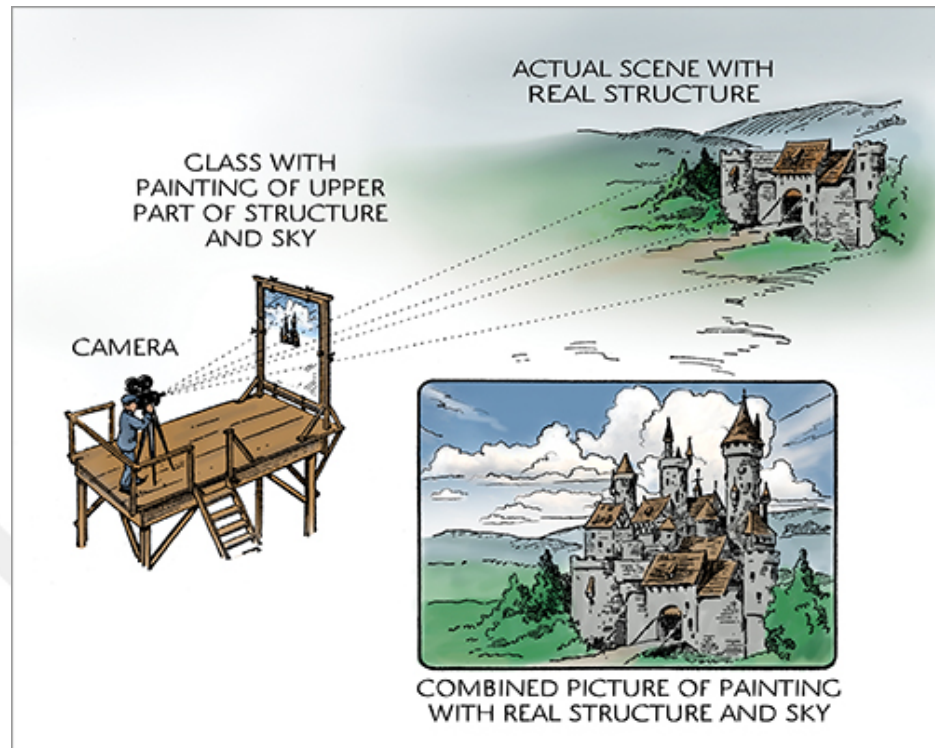
Whitlock continued his relationship with Alfred Hitchcock throughout his working life and played an important role in the production of Alfred Hitchcock's early classics including "The Birds" (1963), "Marnie" (1964), "Torn Curtain" (1966) and "Frenzy" (1972). He won consecutive Oscars for "Earthquake" (1974) and "The Hindenburg" (1975) films. Whitlock retired from his work at Universal Studios in 1985, but continued to work in film productions for several years more. His career lasted more than fifty years, and was marked with hundreds of films and television shows, two Oscars and an Emmy Award - he was one of the most respected matte artists in the cinema industry (Petesmatteshot, 2018).

3.3 Traditional Matte Painting Techniques

The desire of people's imagination for the nonexistent, unforeseeable or unaccessible has pushed the film industry to produce grandiose and fabulous scenes since its early days. In circumstances where the background scenes -which are among the factors that convince the audience about the genuineness of such scenes- couldn't be provided by constructing large sets due to financial impossibilities, these scenes had to be deftly painted so that they wouldn't be noticed when the whole film was being watched. The techniques used to generate these visual illusions before the digital age are considered in this section.

3.3.1. (Glass Shot) Glass Technique

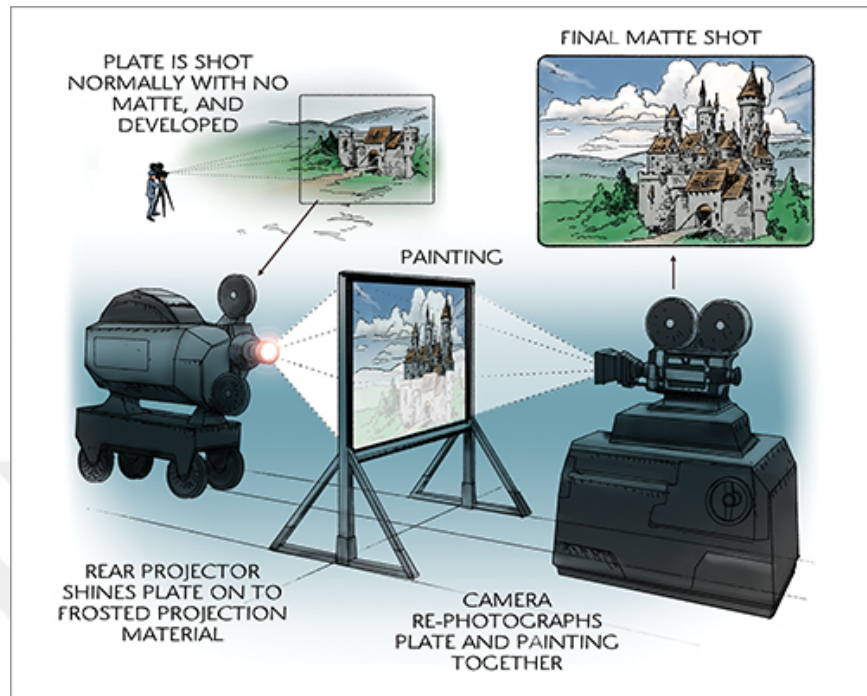
The Glass Shot is one of the oldest techniques for matte paintings - it entails positioning a glass plate between the camera and the scene desired to be shot. Then an artist paints a picture on the glass which blocks and takes the place of that part of the scene. So, the components required for the film were painted on the glass where the scene was, instead of constructing a set or carrying a mountain range as the decor. Besides the advantages of this technique, there were also some serious drawbacks (David B Mattingly, 2010). The artist and the cameraman were at the mercy of variable weather conditions, abrupt winds, and the changes in light throughout the day. Also, even if the actors and the director were ready for shooting the film, it was necessary to wait for the matte painting artist to complete the painting. As a consequence, the matte painter was generally under pressure, since it wasn't easy for the matte artist to generate the painting quickly - everyone would be waiting for the matte artist to finish so that they could do their job.



Picture 17: The configuration scheme for glass painting.

3.3.2 Matte Painting With Projection

The second technique for matte paintings is the technique of projecting from the back. This technique enables the director to shoot the plate normally, irrespective of the painting process, and add the painting later. Initially the film is shot normally, then the reel and chosen frame are positioned on the projector at the back. (David B Mattingly, 2010)

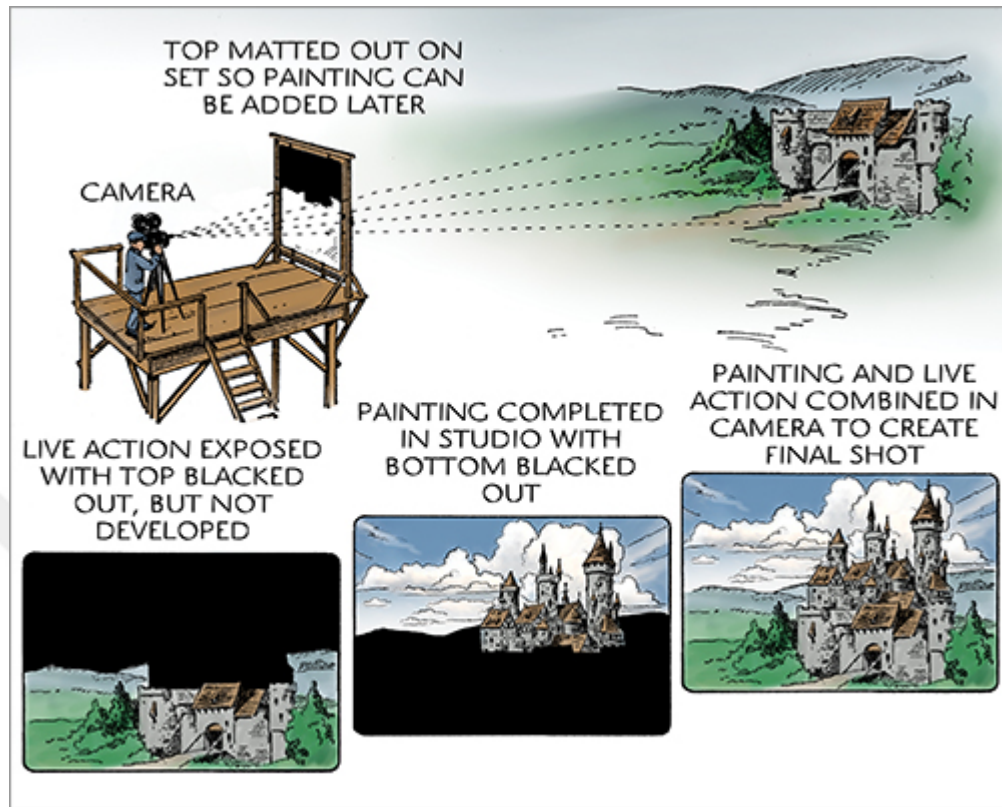


Picture 18: An image about the apparatus for matte painting with projection.

Then, a glass plate -in a framed stand setup- is placed in front of the camera, and the paper that will be painted is placed on it, and the painting is made. The painting is brought to the front and the parts where it has to cover the real image are adjusted carefully. The accordance of the light placed on the projector lens in the back together with the painting and the shooting frame is ensured. After the projector in the back and the front camera are carefully synchronized, the scene is recorded again, thus the undesired parts of the real image are covered by the painting, and a new image is generated as a result.

3.3.3 Original Negative Painting

This technique for generating matte paintings was developed by Norman Dawn. The shooting phase of this technique entailed positioning a glass -masked by the previously prepared, darkened matte painting silhouette- on a camera which was fixed so that any vibrations or movements would be prevented during real-time shooting. Later on, in the studio stage, a light would be placed behind the lens - this light acted simultaneously as a camera and a projector, so that the film frame would be projected to the surface painted by the matte artist. The artist first starts by masking the silhouette of the matte painting. Then the masked portion would be placed around the darkened areas where the film was exposed, and the viewer would view the final version of the unified work as a whole scene. (David B Mattingly, 2010) Then tests would be conducted to ensure a perfect rapport between the painting and the footage from the shooting, this would be followed by a second exposure to add the painted part to the film.



Picture 19: An image from the Original Negative matte painting mechanism.

The biggest benefit of this technique compared to other techniques was that the scene could be shot when the production was ready. Whereas in other techniques, the matte painting artist had to finish the painting in the determined area first - in the negative painting technique this was not required. After the film was shot, the matte artist would decide when the painting step would be executed.

3.4 Introduction to the Art of Digital Matte Painting

3.4.1. The Development of the Art of Digital Matte Painting and Its Place In History

When we inspect the field of matte painting -which is known as a technique in general- since the 15th century- we can observe that it is actually a branch of art. Matte painting art enables film makers to generate the illusion of an environment that is nonexistent or isn't possible to shoot on film for financial or technical reasons. Before the digital era, matte painting artists would paint on large sheets of glass in order to combine them with real-time shootings.



Picture 20 : Matte painting example from the “Wizard Of Oz” (1939) film.

The first known example of a matte painting utilized in a film is Norman Dawn's "Missions Of California" film shot in 1907, which used the glass painting technique. Although most of the film audience was not aware that these visual effects were employed, film studios heavily relied on matte paintings in the 1930s and 40s. In the way paved by Norman Dawn, most of the big film studios begun to form special matte departments - in this period the studios commissioned matte paintings for cult films like "The Wizard of Oz" (1939), "Gone With the Wind" (1939) and "Citizen Kane" (1941).

In the late 1960s and early 1970s, matte painting art fell from grace and many film studios closed their matte painting departments. George Lucas revitalized interest in matte painting art with the coming out of his first movie, "Star Wars: Episode IV – A New Hope". Lucas' "Industrial Light & Magic"¹⁷ company opened a new era in the visual effects field by adapting old matte painting techniques to the modern age, and financing and supporting the digital techniques used today.

¹⁷ (Industrial Light & Magic) ILM: This is an American film visual effects company founded by George Lucas in May 1975. It is a division of Lucas Film, the film production company that also Lucas founded - when he started producing the Star Wars film.



Picture 21: “Star Wars The Empire Strikes Back” (1980), the matte painting work of Ralph McQuarrie.

By the mid-80s, computer software had sufficiently advanced to allow matte paintings to be generated digitally. The first digital matte shot was produced by Chris Evans - it was the animation of a knight leaping from the stained glass of a church window, featured in the 1985 film “Young Sherlock Holmes”. As computer graphic animation techniques were applied in films, the foundations of digital matte painting art were laid in the movie industry.



Picture 22: “Young Sherlock Holmes” (1985), matte painting work by Chris Evans.

3.4.1.1 The Combination of Traditional and Digital Paintings

By the nineties, digital matte painting techniques gradually started to replace traditional matte painting techniques. The first digital embedding of a traditional matte painting in a live action scene was realized by the Industrial Light & Magic company for the film "Die Hard 2" (1990).

According to the Bruce Walters' account, who was the supervisor of the matte painting department at Industrial Light & Magic¹⁸, the company wanted a shot where the

¹⁸ (Industrial Light & Magic) ILM: This is an American film visual effects company founded by George Lucas in May 1975. It is a division of Lucas Film, the film production company that also Lucas founded - when he started producing the Star Wars film.

frame slowly moved away from the airport scene at the end of the film. One of the initial solutions discussed with Walters was to go to the airport and take a few shots. Walters thought this approach was too expensive since it would cost \$40,000 per night just to park there for each plane. It would also cost \$250,000 or more to get the crew, the lights, the licence, as well as to make the planes to move and position them in the required angles. So they decided to work on the scene as a matte painting.

As the production process of the movie continued, John Knoll (who was the creator of Adobe Photoshop program) was working in the camera department of the Industrial Light & Magic company - he proposed a program in which images could be processed via channels. At that time, no one understood what Knoll was talking about. Later on, John and his brother Thomas Knoll started working on Macintosh computers to process the scenes of film via this program (Photoshop) that they developed together.



Picture 23: “Die Hard 2” (1990), Yusei Uesugi matte painting work.

In time, the Industrial Light & Magic company organized around large graphics computers. Many Macintosh computers were placed into the studio and a new Macintosh department was formed. Strict practices and sanctions were enforced by the studio in order to prevent the leakage of information about these new systems and techniques.

The computer used for the “Die Hard 2” matte painting had a hard drive with only 80 or 160 MB of storage capacity - not a single digital image could fit in these hard drives. The production company Industrial Light & Magic had gathered together dozens of hard drives in order to attain sufficient space for storing the matte painting image. After this problem was solved, the matte painting artist Yusei Uesugi finished the matte painting scenes for the film and took photographs of the painting in parts. Uesugi was the

first to think that photo manipulation and color editing for the images taken could be done digitally in Photoshop - and he also carried out his idea.

In order to assist Uesugi in his five-week work on producing the matte painting scenes, Paul Huston constructed some scaled models of the planes and then arranged them at the angles they were seen in the shot. This is a significant detail, because as can be guessed, if the model planes aren't positioned exactly at the correct angles, the actors moving in the painting will spill outside the scene in the matte area. Uesugi generated a matte painting area, taking into consideration that the actors should be shot at a certain angle with the correct perspective to match the scene being painted (Ian Failes, 2020).

Traditional matte paintings were still being used in the 90s - however “Die Hard 2” (1990) was the first film to utilize a traditional matte painting photographed and computer scanned together with digitally combined live action footage. It was made for the final scene of the film which took place on an airport runway. Nowadays paint and brush have been replaced by digital images created by using photographic references, three dimensional models, and drawing tablets. Matte painters enable their digitally created collages and paintings to come to life by combining them in 3D environments generated on the computer.

Although paints and brushes are seldom used for matte paintings in modern films, digital techniques are still often utilized in film and advertisements. The stunning landscapes in films like the “Lord of The Rings” trilogy, “Black Panther” (2018) and television series like “Game of Thrones” (2011-2019) were generated with digital matte paintings. In older times, a small number of matte painting artists were able to work on a

film - now dozens of digital matte painters can work on big-budget films. Digital matte paintings are now being used in low-budget movies, television series and commercials. The processes and tools have changed, but the objective of creating the ideal environment designed by the film makers in a lifelike and impeccable manner is still the same.

3.4.2 Digital Matte Painting Artists

3.4.2.1 Yanick Dusseaul (Dusso)

Yanick Dusseault is a well-known name in the visual effects (Visual FX) world. Dusseault has worked on high-budget projects for more than 25 years at the Industrial Light & Magic, Lucasfilm and Weta Digital companies. He has an outstanding reputation as an art director who can efficiently materialize a director's vision. Dusseault became a sought-after name for producers after his work with directors like Spielberg, George Lucas, and Peter Jackson.



Picture 24: “Star Wars: Episode III – Revenge of the Sith” (2005), Matte painting example.

In later years Dusseault worked as a Senior Matte Artist on the film "Lord of the Rings" in New Zealand. He won many awards including the VES award for "Outstanding Created Environment in a Photoreal Feature" on "Star Wars: The Force Awakens in 2015" as well as the “Outstanding Matte Painting in a Motion Picture” in 2004 for his work on "Pirates of the Caribbean". He was also in the Oscar winning VFX team for "What Dreams May Come" in 1999.



Picture 25: “Star Wars: Episode III – Revenge of the Sith” (2005), Matte painting example.

Dusseault was part of a team that was able to inspire his passion for visual effects, and together they succeeded in great projects. He joined the Raynault VFX team as a creative partner in early 2018. Dusseault, together with the experienced team at Raynault VFX, took on many different roles including art direction, concept art and digital matte art.

3.4.2.2 Dylan Cole

Dylan Cole is a leading matte painter and concept artist who specializes in film, television and video games. At a young age Cole was drawing Southern California natives, themes related to space and alien worlds - this passion provided a foundation for the creation of his first book, “The Otherworldly Adventures of Tyler Washburn.” Cole graduated with a degree in fine arts from UCLA (The University of California, Los Angeles), and then he began to use his painting skills on computers and contributed with his art to more than sixty films. His noteworthy works include senior matte painting art on the film “The Lord of the Rings: Return of the King” (2003), concept art direction on the film “Avatar” (2009) and production design direction on the film “Maleficent” (2014).



Picture 26: “Lord Of The Rings: The Return Of The King” (2003), Matte painting example.



Picture 27: “Lord Of The Rings: The Return Of The King” (2003), Matte painting example.

Cole is the co-producer and designer of the film “Avatar” (2009) as well as the three other upcoming films in the series. He continues to organize workshops at events and schools around the world, in addition to giving a series of DVD lessons at the Gnomon online visual effects workshop.

3.4.2.3 David Gibbons

David Gibbons is an experienced visual effects artist who has become specialized in digital matte paintings as well as concept designs for films,

commercials, video games and television. After graduating with a Bachelor of Fine Arts in London, Gibbons, undertook his first project working in a small team under Angus Bickerton for the “My House in Umbria” film at the Twickenham Film Studios.

After twenty years of freelance work, Gibbons has collaborated with famous studios around the world such as MPC London, The Mill London / NYC, Passion Pictures, Absolute Post, Jim Henson's Creature Shop, Fluid Pictures, Cinesite, BaseBlack and Lip-sync Post - and provided technical support to them.



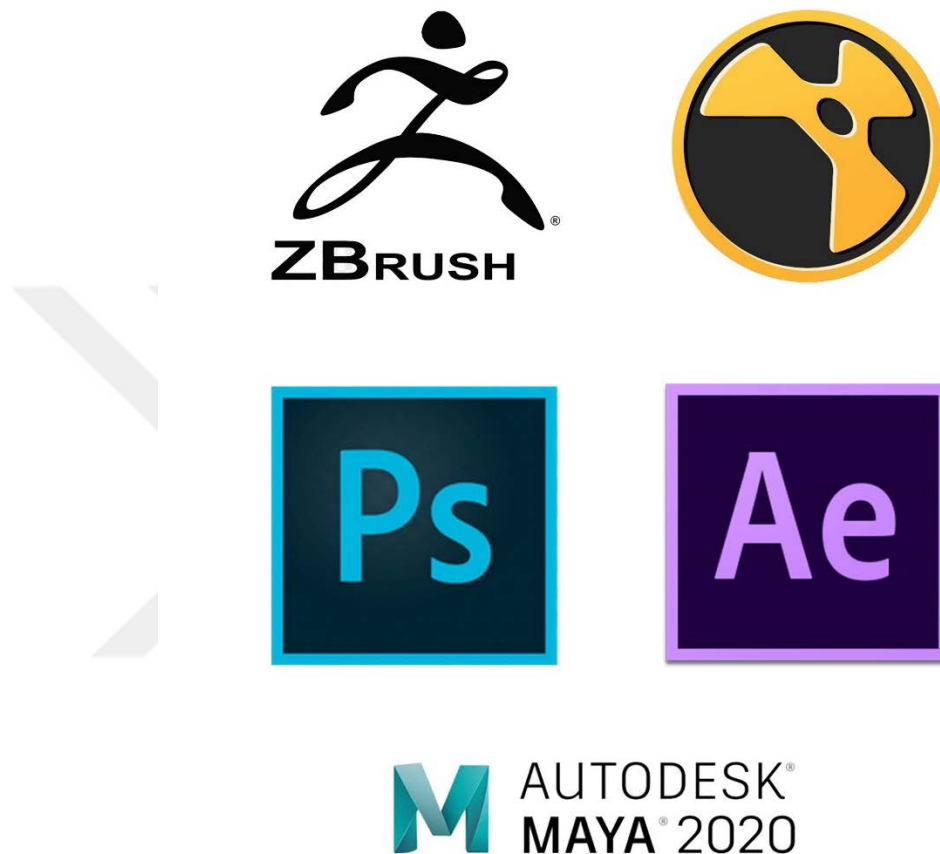
Picture 28: “Harry Potter and the Half-Blood Prince” (2009), Matte painting example.

Today, Gibbons still is working with leading international directors and post production facilities for generating digital matte images and concepts to be used in films, TV and print. He has contributed matte painting works to important movies including “Game of Thrones”, “The Luminaries” (2020), “Ripper Street” (2012), “Harry Potter series” and “Sweeney Todd: The Demon Barber of Fleet Street” (2007).

In the next part we will examine digital image processing software widely used by matte painting artists -who have worked in important productions and positions in the field-, like Photoshop, Maya, Nuke, Zbrush etc.

3.4.3 Digital Image Processing Software

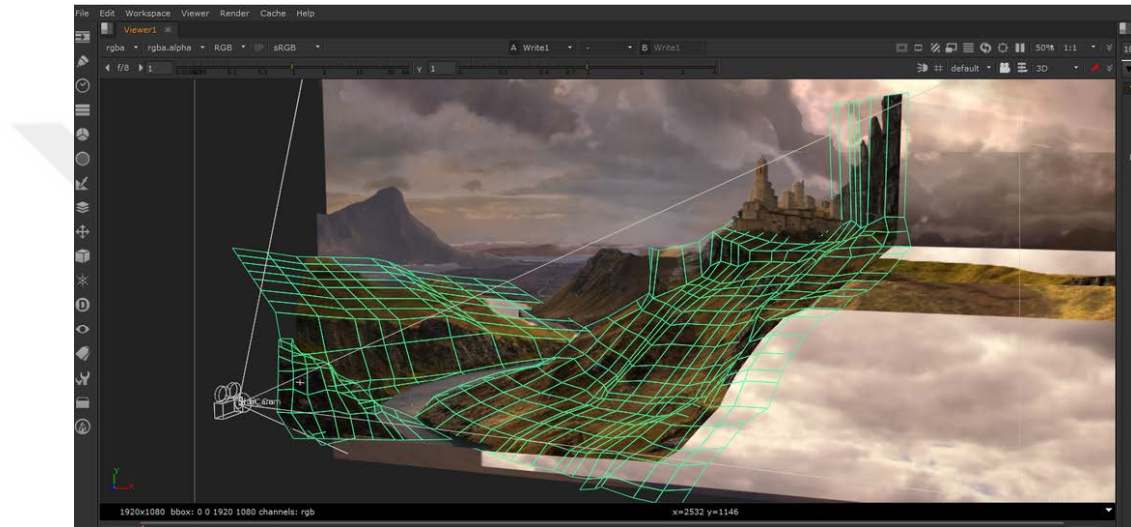
Image processing is work done on the computer in order to change the digital image data and process the image in the electronic environment by using computer algorithms according to a specific objective. As can be guessed from the name, the digital imaging process entails working with image structures determined by numbers. Digital image processing has many advantages compared to analog image processing. In digital image processing, the number of algorithms that can be used to process the target is more. Also it is much more easier to solve problems like image distortion or noise increase. Digitization is not limited to two-dimensional (2D) images, new three-dimensional (3D) image processing technologies have also begun to be used in the design process.



Picture 29: Digital graphics programs for utilization in matte painting.

It is necessary to try digital tools that will streamline work processes in order to understand how the design procedure can be improved or to learn how wide a range of skills is desired. Software like 'Photoshop' can be used to generate a war diorama or a landscape image. The Houdini FX software can be utilized to use visual elements like clouds, smoke and flames. Generally visual effects artists

undertake this kind of work - for personal work, finishing touches can be added by such software. The Zbrush / Mudbox software can be used for organic structures and the Nuke software can be employed to take your work to the next step.



Picture 30: An example Camera Projection work generated in the Maya software.

Matte painting is a visual effects (Vfx) technique used world-wide. Like many other forms of traditional art, the art of matte painting has now a firm place in digital software. Film studios can now produce matte art more rapidly, easily and cost-effectively compared to old techniques, thanks to custom matte painting software.

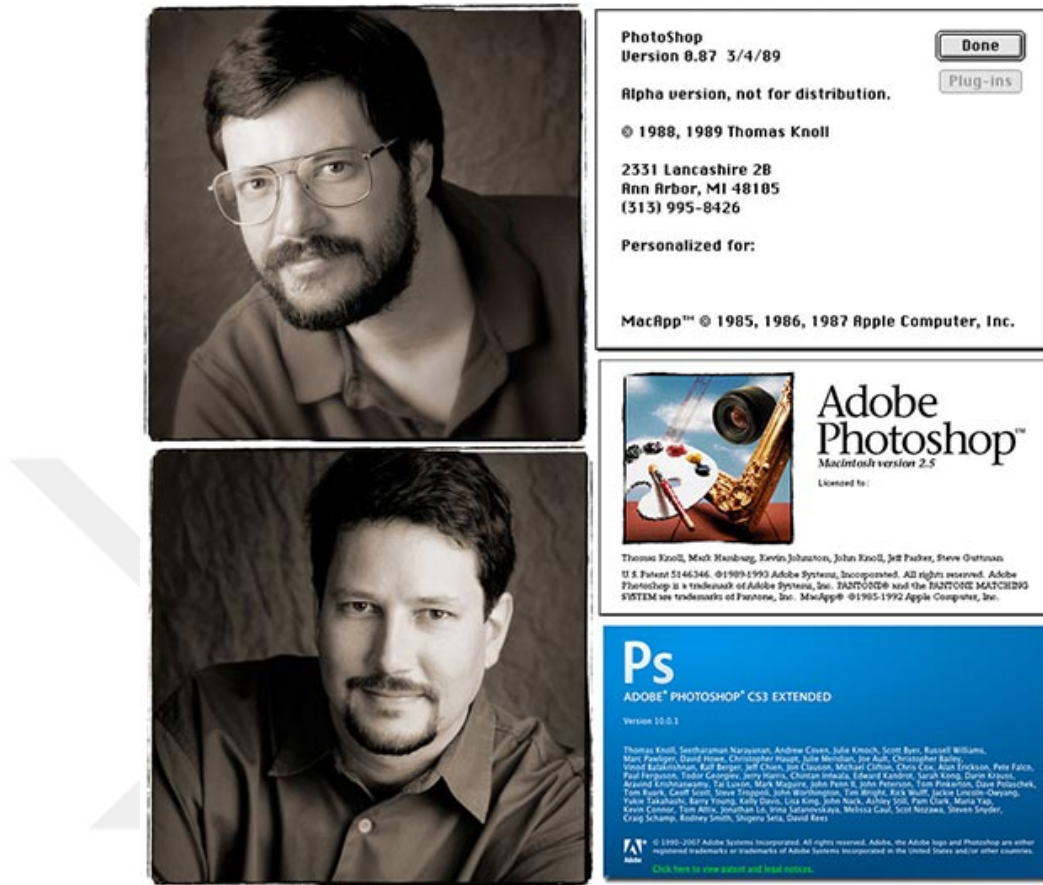
3.4.3.1 Adobe Photoshop

Photoshop is a graphics software with a highly developed, top-end image editor for processing images - it is used for generating images as well as processing existing images. Photoshop has an extremely wide spectrum of uses. Adobe Photoshop enables users to perform many tasks -depending on the imagination of the user- like working with colors and effects, photomontage, retouching, repairing, collage, photo merging, HDR and creating panoramic images. The number of these processes change in accordance with the creativity of the user, competence regarding the software and the experience. To use Adobe Photoshop effectively and efficiently, it is required to know the functions of the software, to know its operation logic, and to be able to use the shortcuts and menus effectively.



Picture 31: A photo manipulation example generated in the Photoshop software.

Adobe Photoshop is a software that began to be developed in 1987 by two brothers (John and Thomas Knoll) who were working on animation and visual effects. The first version of Adobe Photoshop -which has many versions that are in use now- was named Display. Adobe Photoshop was founded on the photography knowledge that the two brothers learned from their father. Adobe Photoshop 1.0 was released in February 1990, after 10 months of development. Each new version of the Adobe Photoshop software improves itself in every respect and it is still the most used image processing software today.



Picture 32: John and Thomas Knoll, developers of the Photoshop software.

3.4.3.2 The Foundry Nuke

The Foundry Nuke node-based software by the London-based The Foundry company, is the most common software used by compositing artists. Nuke is favored by many post production companies, especially in our country. The Nuke software is used for visual effects production to be utilized in films, commercials and television. Nuke is used by the best visual effects artists in the field for big

blockbuster movies - the software smoothly processes pixels to generate perfect film-quality results that are both creative and satisfactory.



Picture 33: A matte painting example in the Nuke software for “Game of Thrones” .

Nuke is a flexible software in many aspects. It provides the easiest way to track and transfer data over different tools and software. Thanks to the excellent flexibility of the Nuke software, it fits without trouble into the pipeline of any program. It can work well with other software such as “Maya, Mari, Modo and Houdini” and can read many different file formats. So many companies around the world prefer to use the Nuke software. At the moment, the After Effect software is used more widely in our country - however it is certain that in time the Nuke program will replace After Effects and other software.

3.4.3.3 Autodesk Maya

The famous modeling and animation Maya software developed by Autodesk aims to assist the creation of 3D models and animations. Maya is one of the most widely used 3D programs in the film and television sector - it is being used more widely as computer games are developed. The Maya software owes its popularity basically to its wide spectrum of capabilities, its intuitive interface, and the openness of its developers. Almost every section of Maya can be edited by users through MEL scripts or by creating plugins.



Picture 34: A matte painting example in the Autodesk Maya software for “Inception” (2010).

One of the greatest strengths of the Maya software is its animation feature. Maya provides SVG file support, which makes it easier to work with vector-based 2D design applications. The Maya software focuses on animation and presents solutions in many areas. Maya is the leading choice of professionals working in the design, visual effects and processing fields. This software enjoys great support in the software sector, but it is also used in the education sector since it gives students and teachers the opportunity to use the full version free of charge for 3 years.

3.4.3.4 Adobe After Effects

After Effects is a video composition and post-production software released by Adobe. In general, Adobe After Effects is used in motion graphics production - it uses layer logic like non-linear video production programs Shake and Combustion. Each element added to the project like a video, photo, vector graphic or music belongs to a separate layer and is able to interact with other layers.



Picture 35: A matte painting example generated in the After Effects software.

By means of the motion tools of After Effects, users can prepare images that can be utilized in addition to the film. The software has a continuously expanding user base as well as customer support - since it is quite compatible with many Adobe publishing software that are widely used in the field, like Photoshop, Flash, Premiere and Encore. The After Effects software, in addition to its existing effects and filters, can be enriched by utilizing third-party software and plugins - there is a vast amount of resources on the Internet for the software, most of it for free.

3.4.3.5 Z Brush

ZBrush is a sophisticated 3D model creation software. ZBrush differentiates itself from similar software with its ability to digitally apply sculpture disciplines on the computer. Designers can find all the tools that sculptors require in the ZBrush software. Designers can convert their designs without any limitations using tools to work on the virtual clay ball created in the software. ZBrush sets itself apart from other 3D modeling programs with these features. Artists can create more organic and elaborated models using ZBrush, and they can also complete their designs much more quickly compared to other software like Maya or 3DS Max.



Picture 36: A matte painting example generated in the Zbrush software.

Before software like ZBrush were available, artists were required to use complex software. With ZBrush, modelling is more practical and designers can apply their talents more easily. In older times, modeling programs utilized procedures and objects made working difficult or even impossible - whereas ZBrush offers designers a paradigm taken from traditional sculpting. At present Zbrush is the preferred choice of designers working with artistic infrastructure and manual skills.

3.5 Digital Matte Painting Art Techniques and Implementation Processes

The arrival of digital imaging rendered traditional techniques unusable. In the past, matte painting was limited to the technology at that time - most techniques consisted of only a few components: generally these were layers and images.

Nowadays most matte painting works are generated with the Photoshop software - they include sophisticated composition techniques that aren't possible to achieve without using a computer.



Picture 37: Digital matte painting example from the “Blade Runner 2049” (2017) film.

In a digital composition, it's very easy to obtain a shot including hundreds of different elements. Two-dimensional works of art can be combined with three-dimensional geometry in order to change the perspective and move objects. But we have

to remember that a camera, a piece of glass or the newest composition software on the most advanced computer system isn't sufficient to obtain a matte shot - the starting point of the process is the skills of the artist who creates the illusion.

3.5.1 Photomanipulation and the Digital Matte Painting Technique

One of the biggest benefits of the digital matte painting technique compared to traditional methods is digital image processing software. This software enables designers to generate matte paintings quickly either by drawing on a graphics tablet (Picture: 33) from scratch if needed, by manipulating pixel-based images and photographs transferred to digital media with each other. Generally, the opportunities offered by graphic tablets and image processing programs facilitate the digital matte painting process.



Picture 38: Wacom Cintiq Pro drawing tablet.

For example, in the process of creating a concept it is possible to combine different parts of a setup -that is wanted to be applied on the work- in order to show them as a part of a whole. The significant factors to be considered here are the processing of the images to be used in accordance with fundamental rules such as depth, perspective, light-shadow - depending on the composition of the images. Only by this means a realistic effect be attained.

3.5.2 Animation Techniques

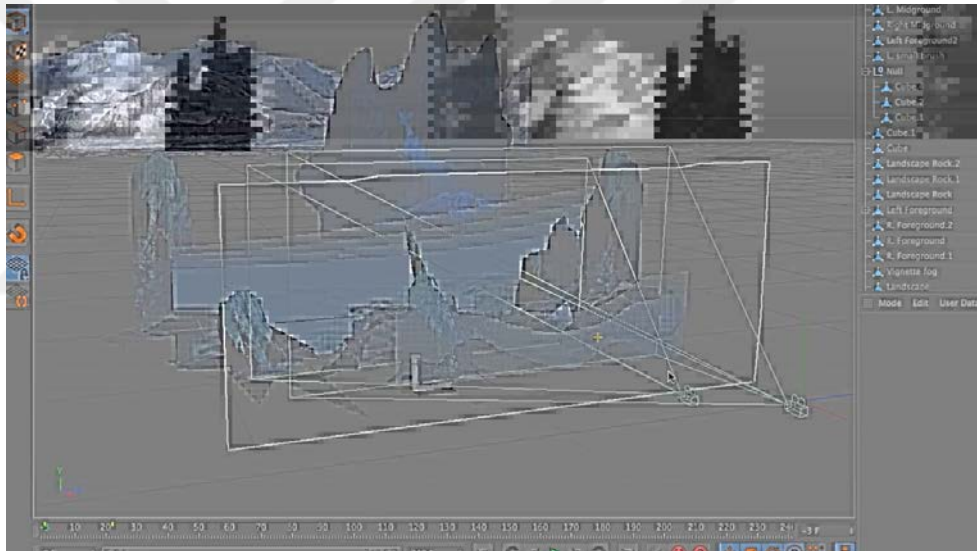
Matte paintings can be used in two dimensions, as well as video and animated images nowadays. After the work of art is processed in the photo

manipulation and digital painting steps, it is separated in principal layers and animated in video processing software like After Effects, Premiere etc. This final step is called the animation process. Animation is implemented with a method similar to what is used in animated films. The fundamental objective here is to process the scene generated with the matte painting technique to give the impression of a living place. The two-dimensional matte painting work generated in the digital environment can be separated in layers based on the elements it contains -in a way to give the feeling of depth-, and then saved as a video to be used. If necessary, three-dimensional modeling is performed - the layers can also be used by being coated on these models. If needed, three-dimensional modeling is done; layers can also be used by coating these models.



Picture 39: Matte painting example made with Photoshop and After Effects software.

In the matte painting work in the provided example (Picture 35), the animation procedure was performed by using the Cinema 4D software (3D-based image generation program) - for this, layers were created with geometric angles, and depth was added by coating 3D models with these layers. The main purpose of using 3D models is to ensure that layers -which are essentially two-dimensional- appear more voluminous. Consequently, when the generated work is viewed from a certain frame, the feeling of depth can be given.



Picture 40: A Camera Projection example made in the Cinema 4D software.

3.5.3 The Processes of Composition and Concept Creation

Initially, before starting to work on a matte painting, determining a subject is required. Compositions created for a definite subjects are more successful compared to experimental studies, and also it enables to plan the work process. For

example, if the composition to be created is in the past, sites and buildings belonging to the desired time period can be inspected and added to the composition in a suitable way. This enables the designers to give the feeling of realism required in matte paintings. If a futuristic or fantastic composition is needed, again the concept can be designed to give a realistic and true-life feeling.



Picture 41: Example of an inspiration board containing Matte Painting processes.

Conceptual design has emerged with the advancement of visual art products like computer games and films. A concept designer is an artist who essentially designs an idea, subject, tool, character, scene-site and generates visual materials according to the desired technique. The characters and sites in the games as well as everything else belonging to the game world are designed by concept designers. So

it is clear that, planning and preparing drafts for a concept design is essential before work on the matte painting is begun.

3.5.4 Matte Painting Production Processes

Saving time in the production stage obviously reduces costs. Nowadays, making a mistake during production doesn't require all the work done until then to be thrown away - as compared with production by traditional methods. Processes like landscape elements and the views of the creative artist can easily change in modern technology. It is possible to summarize the basic things that should be applied before beginning matte painting in 4 steps.

1. Conceptual Design and Implementation: This is the stage where the artist can be creative, combine elements of the imagination with real elements - where potential inspiration comes from photographs of real places or illustrations. Analysis of some scene factors like atmosphere and expectation is quite essential at this stage.

2. Finding references: Many matte painters create and continuously update their own image archive - seeking suitable places for the project, immortalizing them with digital camera or smartphone photographs. It is not a coincidence that these artists are photography enthusiasts and have received training in this field. Gathering reference data is a basic step of the process.

3. Addition of macro elements: At this step it is preferable to begin from the background elements like the sky and then integrate the closest elements gradually. Depth of field (lights, shadows, brightness) etc. is quite important at this stage. The closest elements possess more detail compared to the distant ones.

4. Color correction: Color correction is made during the application phase, in the Photoshop software. Consequently, the correction can also be made at the combining stage with the required software (Nuke is among the best software in this field). (Nuts, 2017)

Considering this information, let us design an example scenario for a post-apocalyptic world. We can acquire a video frame from a previously shot scene for the project to be designed or we can utilize a stock photo with the desired atmosphere. Let us begin with a 3840 x 2160 pixel canvas in Photoshop. Generally, visual effects studios work with a predetermined final resolution. So, the size that will determine the image depends on the medium that the matte painting is created

in. A small trick that matte painters often resort to is to work at 150% or 200% of the final size. So when the final image is reduced in size, the flaws in the painted work can be minimised.



Picture 42: A pre-design image example for a design with Matte Painting processes.

Let us begin the example project with a video introduction scene shot in Cappadocia. In the frame, two characters on their horses are advancing on the path towards the center of the frame. (Picture: 42) This is the activity area of the characters in the video, so the conceptual work should be weaved in the fixed inactive areas that stay out of this area. The sky is flat and clear with no depth - and the environment is a virgin space without details, that does not give the feeling of the post-apocalypse. Since these areas are fixed, the work should generally be concentrated in these areas.

To add perspective to the empty area in the sky, some mountain ranges can be added using images found on the Internet. Try this both by photo manipulation as well as painting. The perspective grids in the Photoshop software can be used in order to improve the positioning and obtain a more exact result. For there to be a particular light source, a lens flare will be added to the image with the help of a Photoshop brush - so the light values in the front and back will be drawn closer to each other. To add silhouettes to the mountains in the ideal way, a feeling of depth will be created by painting fog with a brush.



Picture 43: The initial image for a design work with Matte Painting processes.

As can be seen in (Picture 41), there is a lack of harmony between the added mountain ranges and the original Cappadocia terrain in the front - with respect to contrast and light values. Color and contrast will be arranged to ensure that the common images are compatible with the scene. Generally, one can start adding different objects and light plays to enrich the area, after a balance and a feeling of naturalness is reached between the two pictures.



Picture 44: Example of a design work with Matte Painting processes.

In accordance with the post-apocalyptic world scenario, a derelict warehouse as well as old and tattered objects will be placed in the frame. Before these images are placed, one should make sure that there are no recognizable landmarks or brands belonging to our times - or if they are present, they should be manipulated effectively. In the next step, these objects will be edited to fit in the scene. Objects added to either side

beyond the active area will add a feeling of true-life and dynamism to the environment.

Object adding shouldn't be overdone and the objects chosen should be simple and

harmonious with the environment. Exaggerated and unconnected objects that are too

heavy for the scene can damage the perception of reality in the audience. It should be

remembered that the most successful matte painting is a work that can't be recognized as

a drawing, which raises no doubts about its authenticity. In order to increase the harmony

of the objects added to the terrain with the environment and to prevent them from sticking

out, materials like bushes, stones and soil that can be acquired from the original

vegetation can be adapted to the surroundings of the objects with photo manipulation.

After the objects are placed, Curves and Color Balance in the color and light balance

settings will be used in order to ensure that the atmosphere and environment in the scene

is harmonious. After this step, the objects will be painted with the dust and rust brushes

that can be found on the Internet in order to ensure the adaptation of the objects to the

environment.



Picture 45: Example of a design work with Matte Painting processes.

In the next scene, the two characters in the action area have come nearer to the camera area and are standing still. Since the surrounding frame in the scene is more narrow, the lights of the elements placed at a wide angle should be reviewed again - considering the perspective and the atmosphere of the scene. When adapting the materials in the scene to the new established camera frame, it is important to ensure that the placed objects are in harmony with the previous scene and don't damage the perception of reality in the scene.

While creating the details of the environment, in order to obtain a more realistic result, it is better to use details so small as to be unnoticeable and to use less photos. Each image added to the scene should match each other as well as the basic objects and the

color grading. You should think about the the hue and light saturation based on the scene. It would be wise to ask outside people to have a look at your work at certain stages. This is the best way to assist you in determining problems you can't notice, and in this way you will reach a higher level in your work.



Picture 46: Example of a design work with Matte Painting processes.

In the last frame (Picture 46), it can be seen that the camera has taken a close-up shot of the female character. The image of the derelict warehouse can be seen with more detail in this scene compared to the initial wide angle images - so the harmony of the placed warehouse with the environment and the perspective should be correctly processed from the first step. For the placed elements to be harmonious with the environment, the

plants and stones on the Cappadocia image should be used along with the warehouse. In this way, environmental completeness from the point of the viewer can be ensured.

Matte painting is a concealed art - if it is done properly, the eye will not notice it: the main objective of matte painting is for the viewer to not distinguish it. Despite the awareness of the modern audience regarding visual effects paintings, the reality of the scenes surprises us anyway. Today's audience not only looks at the story and the music when watching a movie, but also inspects the visual effects in the movie. A lot of work is put in visual effects for movies and plays by many talented people - in spite of the fact that the tricks of these effects are known, matte painting remains a magical art for the audience.

4. THE CONCEPT OF PERSPECTIVE AND THE ART OF ILLUSION

Even if one is a talented artist or an illustrator who can produce detailed works with success, the completed works will not have a solid foundation unless perspective rules are followed in the painting. Nowadays, with the increased number of digital mediums, artists resort to using stock photos while painting, and preparing compositions based on collages. However, perspectives attained by using stock images are limited by the image itself, so perspective problems in compositions produced from these images can become quite complicated. Moreover, many art students today can't learn the real rules of linear perspective since they work in 3D environments. Even if the work produced contains 3D, understanding the rules of perspective gives the designer much more control when creating traditional or digital paintings. The rules of perspective are the indispensable building blocks of a matte painting artist.

4.1. A Short History of Perspective

Until the Renaissance period, artists had become aware of the perspective concept thanks to the work of their predecessors. Artists had found different ways to create depth in a painting, before linear perspective was discovered and efficient utilization of convergence points or the horizon was learned - however these methods were too theoretical and impractical in application. One of the initial techniques was to place

objects close to the viewer lower in the composition - the objects more distant to the viewer would be placed higher. Another technique was the superposition of figures - since any figure that prevented a figure from being seen was positioned in front of that figure. Linear perspective was not found until the early 1400s. The discovery of linear perspective is attributed to the architect Filippo Brunelleschi (1377–1446), who designed the dome of the Duomo in Florence. Filippo Brunelleschi came up with a system that explains how objects become smaller according to their position and their distance to the viewer's eye.

The first book written on the subject of linear perspective is Leon Battista Alberti's 'De Pictura', which was published in 1435. The measurement system in Alberti utilized in his paintings has revolutionized how artists combine paintings, presenting a concept where a background or a scene is created for each painting. Alberti drew a distant mesh in order to scale objects in the painting and provide a reference for them. The most perfect example where this system of measurement has been applied is the Pietro Perugino fresco (wall painting) besides the Sistine Chapel called "Consegna delle chiavi". Its grids are directly visible in the Piazza Square, as Alberti proposes in his book. (Picture 47)



Picture 47: Early period perspective painting made by Pietro Perugino.

In later periods, knowledge about perspective advanced rapidly, with artists handling more complex perspective issues. Research on the art of perspective reached its peak with Giovanni Battista Piranesi. In his 'The Prisons (1745)' series Piranesi carried the art of perspective to extraordinary levels.

4.2. Filippo Brunelleschi (1377-1446)

Filippo Brunelleschi was born in Florence, Italy. As a child, Brunelleschi was apprenticed to a jeweler. At the time, young people who desired to be artists first started working in the jewellery field - Brunelleschi began working in Pistoia

with a jeweler, and encountered optical instruments for the first time there. Renaissance historian Vincent Ilardi writes that jewelers in Tuscany worked like modern opticians during the 14th and 15th centuries. Brunelleschi utilized the optical knowledge he gained in jewelry in his architectural works. He also used the optical knowledge he acquired in jewelry also in his architectural works. In time, Brunelleschi became a key figure in the field of architecture - he is regarded as the first modern engineer, planner and construction supervisor in history.

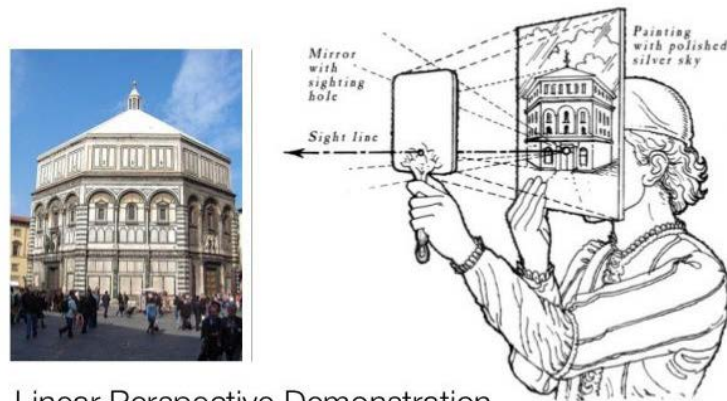


Picture 48: Italy: The “Santa Maria Del Fiore” fresco.

Brunelleschi devised the system of drawing using perspective -as is as known and is still in use today- in the early 15th century. The most remarkable

point in Brunelleschi's description of perspective paintings is that he made them with impressive visual illusions, not with mathematical presentations.

Antonio di Tuccio Manetti, who wrote the biography of Filippo Brunelleschi in the 1480s, mentions that two of Brunelleschi's very admired drawings were made in perspective. One is the sight of the Vecchio Palace from the square, and the second is the Florence Baptistery. These two drawings are regarded to be among the most significant works of perspective in history.



Linear Perspective Demonstration

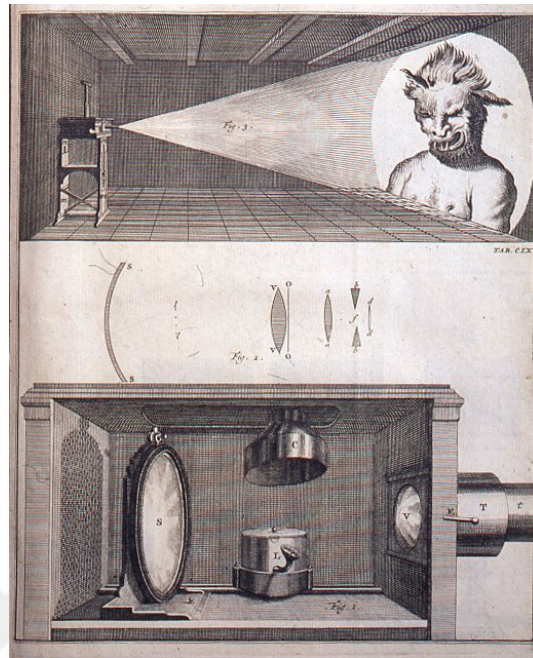
The first Baptistery panel was constructed with a hole drilled through the vanishing point. Brunelleschi intended that it be observed by the viewer holding the unpainted back of the picture against his/her eye with one hand, and a mirror in the other hand facing and reflecting the painted side.

Picture 49: Linear perspective example of the Florence cathedral by Brunelleschi.

The first experiment related to perspective in history was conducted by Brunelleschi, from the main entrance of the Florence cathedral towards the baptistery, by the aid of a rudimentary version of an instrument that would later be called the peepshow.

Brunelleschi was holding the picture of the baptistery he had drawn in one hand, and a mirror in his other hand. He was looking at the baptistery from the unpainted back of the picture that he was holding towards the baptistery, through a small hole he had drilled in a part of the picture - called the "vanishing point". Brunelleschi would hold the mirror up to the picture and view his drawing through the hole - then he would move the mirror away and look at the baptistery again. So Brunelleschi was comparing his drawing with the real image of the building with the assistance the mirror - this enabled him to capture the perfect perspective. Maybe looking at the painting with one eye didn't occur to anyone before Brunelleschi (Hockney, 2016).

As a result of this, the audience would feel as if the real scene was enacting before their eyes - as Manetti bore witness to: *"Brunelleschi applied polished silver instead of painting the sky, so the moving reflections of the real clouds could be seen over the Baptistery painting."* (Hockney, 2016) So we understand that Brunelleschi was trying to reproduce an intensely persuasive copy of reality. This experience was like watching a movie in the 15th century. This experience was like watching a film in the 15th century.



Picture 50: Willems Gravesande's “Magic Lantern” example.

We have no record from that period about Brunelleschi how made his paintings. The Florentine architect Filaret (c. 1400 -1469), who was his contemporary, claimed that Brunelleschi was using mirrors. According to Filaret, “*Brunelleschi only looked in a flat mirror and drew what he observed. Because it would also offer the benefit of reflecting a definite image to the panel with the help of a concave mirror or lens.*” (Hockney, 2016) This type of reflection could also be produced with a magnifying glass, a demonstration lens or even a lensless pinhole camera. It is very likely that Brunelleschi painted the Baptistery using a mirror or lens.

At that period, there was no real difference between the sciences and the arts. Nobody had yet seen a photograph but the creation of a reflection or an image based on nature aroused widespread interest. Naturally, artists were interested in many ways of representing the world. In this case, the main point is that Brunelleschi displayed a three-dimensional scene exactly like the way that optical instruments would have done. After that point, other artists also started to work in that way. The long interaction between paintings and optics started with Brunelleschi and proceeded until the discovery of photography exactly four centuries later.

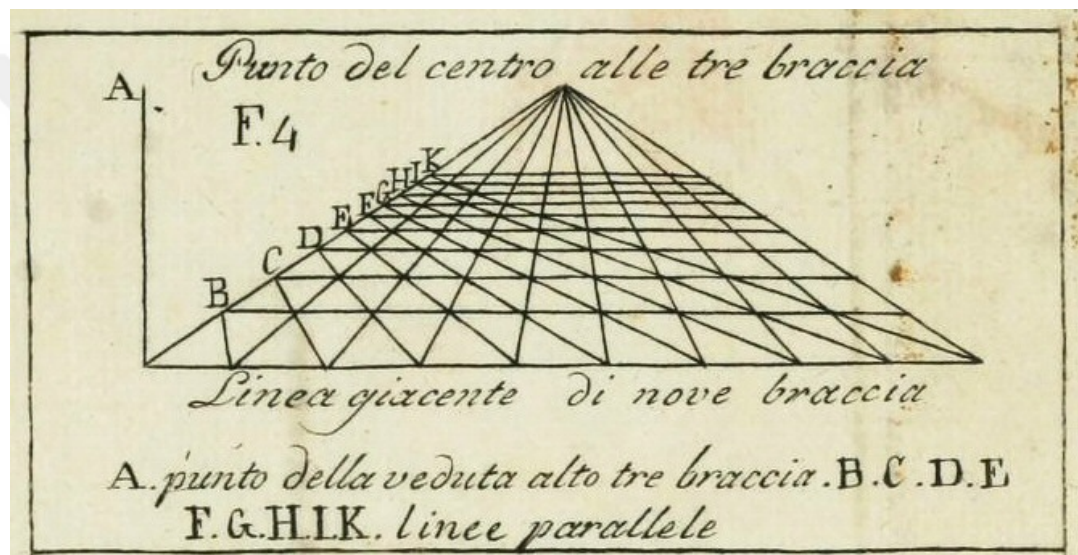
4.3. Leone Battista Alberti (1404-1472)

Leone Battista Alberti (or Leon Battista Alberti) (1404-1472) was an Italian painter, poet, linguist, philosopher, cryptologist, musician, architect and one of the pioneers of the renaissance movement.

Due to the close relationship Alberti established with the sculptor Donatello and the architect Brunelleschi in Florence, he systematized the perspective concept in painting. In 1436, in his book "*De pictura*" (On Painting), which is regarded as the first scientific study of perspective in history, Alberti detailed for the first time, the rules for rendering a three-dimensional image on a two-dimensional plate or wall surface. The book had a first-hand and deep effect on the Italian art of painting and relief¹⁹. This book

¹⁹ Relief: This is a French word. It is the general name given to artistic works made by creating a depression or elevation on a surface. This method is also called embossing. Relief works are created by redimensioning historical structures or human figures. Art works formed in this way gain meaning and artistic value.

enabled the emergence of the Renaissance style - spacious, geometric, orderly and based on perfect perspective. In time, painters like Piero Della Francesca and Leonardo da Vinci further developed Alberti's work. In the point-projection perspective field, Alberti's principles are still the foundation stone (Turkish and World Celebrities, 1983).



Picture 51: Graphic drawing that shows the vanishing point in the 1804 edition of De Pictura.

4.3.1. De Pictura

Della Pittura²⁰ (On Painting), the first reliable work on Early Renaissance paintings, was written in 1435 in Latin, and translated into Italian the next year. The book

²⁰ Della Pittura (1452, Ten Books on Architecture): It was the first architectural research in the Renaissance period, inspired by the architecture of the Roman architect and engineer Vitruvius (46-30 BCE). It was

has three chapters detailing theories on linear perspective, theory of human proportions, and composition and use of color. Also, the suitability of the painter's style and the beauty of nature was also taken in consideration. Alberti defined painting as "*the projection of lines and colors onto a surface*" and he also insisted that artists should have a certain amount of general knowledge, in addition to poetry and rhetoric, in order to be able to handle their subjects in the proper manner. This approach to painting was quite innovative, and also focused more on practical instructions for the artist, according to writings in 1390 by Cennino Cennini (active c.1398). On the contrary, Alberti elevated art beyond a simple craft to a science. This is in character with Alberti's burgeoning humanistic approach to art, which he expressed as the ideal uomo universale²¹ (Renaissance man). "*Nothing can make me more happier than when I can turn mathematical investigations and proofs into useful applications, especially by drawing from mathematics the principles of picture perspective and some surprising propositions regarding the motion of weights.*" (Leon Battista Alberti 1435).

translated to the Italian, French, Spanish and English languages in the eighteenth century. The research covered a wide spectrum of topics, from history to urban planning and engineering to the philosophy of beauty. 'De re aedificatoria' was a large and expensive book, and it was not fully published until 1485 - after that date, it became an important guide for architects. Alberti declared that the book was written "not only for artisans, but also for everyone interested in the noble arts." The first Italian edition of the book was published in 1546, and the standard Italian edition by Cosimo Bartoli was published in 1550. With this book, Alberti circulated the theories and ideals of the Florentine Renaissance to the rest of Italy. Pope Nicholas V, to whom Alberti had dedicated the work, was dreaming of rebuilding Rome, but he managed to realize only a portion of his visionary plans.

²¹ (uomo universale): Renaissance man, (Universal man) also called 'Uomo Universale', an ideal which was developed from the concept expressed by one of its most accomplished representatives in Renaissance Italy, "Leon Battista Alberti (1404–72): "a man can do anything he wants." This ideal was the embodiment of the basic principles of Renaissance humanism, which placed man at the center of the universe, and regarded humans as possessing an unlimited capacity for development - so advocating the idea that humans should strive to embrace all knowledge and develop their capacities as fully as possible.

Along with Alberti's comprehensive explanations on perspective, his theoretical advice regarding how to paint also defined the relevant criteria for evaluating a painting or other works of art. (Anthony Grafton, 2000) The basic ideas expressed by Alberti were drawing contours, creating compositions and using color. According to him, a harmonious combination of even these limited factors would lead to a satisfactory result. To achieve this, Alberti advised painters to persevere in drawing from nature.

Alberti, supplied a secure foundation for post-classical developments in European architecture - with the objectives he strived for in his architectural designs, with the literary explanations of his ideas. When we also consider his other literary works, especially his research on sculpture and painting - his contribution to the Renaissance period in Florence and other places is immense.

4.4. Masaccio (1401-1428)

One of the first outstanding painters of the Italian Renaissance movement, Masaccio was born in Florence, San Giovanni Valdarno, in 1401. His real name is Tommaso di Ser Giovanni, and he managed to squeeze in great works in his very short life. It is thought that Masaccio took his first painting education from Masolino da Panicale. Masaccio continued Giotto's art with strong emotions, simple compositions, and his mastery in handling volumes. The innovations Masaccio brought regarding the utilization of scientific perspective established an introduction to modern realistic painting. His humanistic drawings carried unexampled aesthetic value.

Masaccio came to Florence and started to work as an apprentice in the workshop of the painter Bicci di Lorenzo²² and later on in 1422, he joined the painters' guild. With his arresting unique style, Masaccio had a very different touch compared to the masters of painting in the 14th century. Masaccio was greatly influenced by Brunelleschi -who was an architect working in Florence at that period- and also by the sculptor Donatello. He adopted Brunelleschi's knowledge regarding scientific ratios and this information helped him in using scientific perspective. Masaccio learned the classical ancient Greek and Roman arts from Donatello and under their influence, he moved away from the Gothic painting style, which was very popular at that time. Masaccio employed a scientific perspective in his drawings; over time, as he pulled away from the Gothic style, he turned to the realistic style. (Giorgio Vasari, 2013) He gave up placing an emphasis on ornaments and details, and paid attention to the principles of simplicity and integrity in his paintings. Instead of utilizing flat surfaces, Masaccio created a painting style that created the illusion of three-dimensionality by providing a more realistic and more natural appearance. Masaccio, together with Brunelleschi and Donatello, ranked among the founding artists of the Renaissance style painting.

Michelangelo, Raphael and Leonardo da Vinci continued the school that Masaccio created and started their work initially by copying his frescoes. Leonardo da Vinci expresses the innovation that Masaccio introduced in his writings with these words:

“After Giotto, for more than a century, art declined again; because painters had started

²² Bicci di Lorenzo: (1373-1452) He was an Italian painter and sculptor based in Florence. Lorenzo was born in 1373 in Florence. He was the son of the painter Lorenzo di Bicci, and he worked in his workshop. Lorenzo married in 1418, in 1424 he entered in the Painters' Guild in Florence. His son Neri di Bicci was also a painter and he took over the family workshop. Bicci di Lorenzo died in 1452 in Florence, he is buried in the Church of Santa Maria del Carmine.

to copy Giotto's works. Then came the Florentine Tommaso (Masaccio). With the perfection of his works in the field of painting, he proved that those who do not take nature -the leading teacher of all masters- as an example, are endeavoring to make art in vain.” (Giorgio Vasari, 2013).



Picture 52: Masaccio, Tax Money, 1427, fresco.

Masaccio's contemporaries had very rapidly realized the importance of his contribution to the advancement of painting in Italy. Masaccio -through the physical concreteness of his forms and the precise perspective of the space surrounding them- elevated the humanity in his paintings to a new level. He became a pioneer that Florentine artists followed even after generations passed - with Masaccio, the art of painting pulled away from archaism²³ and imitation of past works.

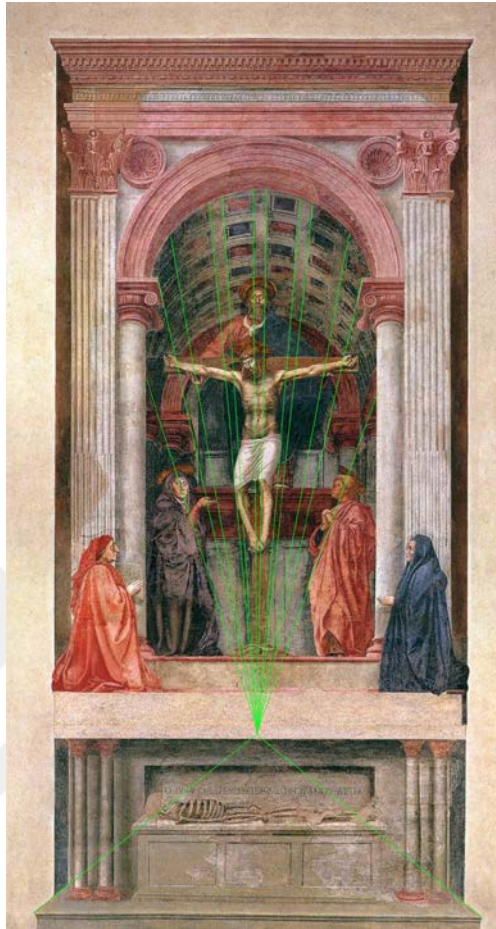
²³ Archaism: The term archaism, which is used in all branches of art, means to make an attempt to return to the early periods of that branch of art - after a stage of maturity is reached in that art. Or this term can refer

4.4.1 Holy Trinity Fresco

The Holy Trinity fresco²⁴ is the first example of the proper use of the one-point (linear) perspective technique. This fresco is on the inner left wall of the Church of Santa Maria Novella in Florence. It's dimensions are 667 cm x 317 cm. When looked closely at this perspective diagram of the painting, the orthogonals can be seen at the edges of the ceiling vault. Since Masaccio paints from a low perspective, as if looking at Jesus, orthogonals appear on the ceiling - and if all orthogonals are followed, it will be spotted that it is on the ledge where the donors are kneeling, at the vanishing point.

to the method of applying and imitating a feature -that belongs to an older age regarding form, structure and style- in new works.

²⁴ Fresco: This is a painting technique where the paint is applied to the wet plaster surface similar to the watercolor technique. When this feature is considered, it can be seen that many examples named as frescoes in art history publications are in fact not related to this technique. Because the paint on the fresco is applied while the plaster layer on the wall is still wet, the paintings made with this technique are called fresco, which means "fresh" in Italian (Fresque in French). On occasion a kind of imitation fresco is applied on a dry plaster floor, which is called "fresco secco" (fresco without water). Real fresco (buon fresco), has been used widely in Italy since the 13th century - it reached its most perfect form in the 16th century and continued until the present day.

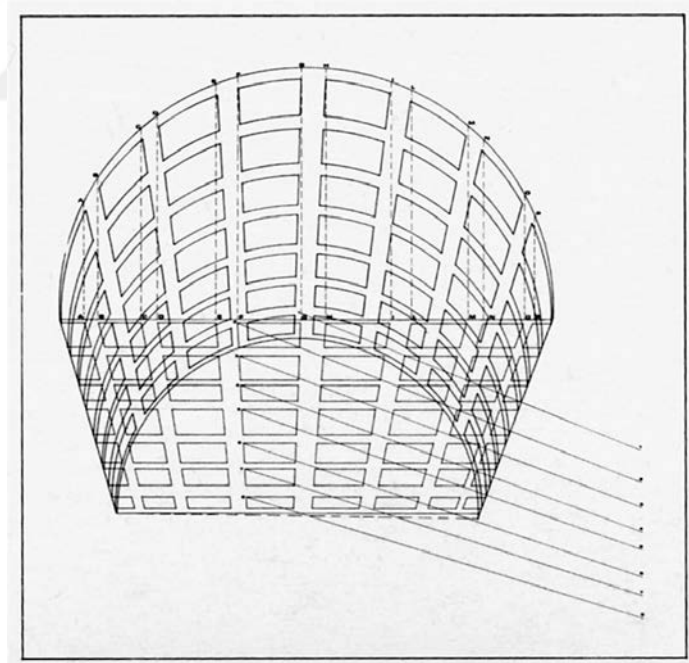


Picture 53: Masaccio, The Holy Trinity fresco, 1427.

Masaccio executed the linear perspective projection very well, taking into consideration the stunning three-dimensional effect of the painting. He died at a young age, after a few months of the completion of the Holy Trinity Fresco. In the Holy Trinity fresco, Masaccio created a systematic environment by using the escape lines to create a powerful three-dimensional effect, to form the volume strongly with light and shadow. The Holy Trinity fresco is not just a painting, it has the form of a place where the figures walk around, and when people looked at this fresco, they felt like they were

inside the church. What makes this feeling most striking is the barrel vault drawn from perspective. With this fresco, Masaccio established the concept of architectural perspective in the art of painting.

Masaccio's contemporaries were fascinated by the tangible realism of this fresco - as did Vasari²⁵, who lived more than a hundred years later. Vasari wrote that *“Apart from the figures, the most beautiful thing is a barrel-shaped vault, drawn in perspective and divided into squares filled with rosettes, shortened at the front, and made smaller so that the wall appears to have been drilled”* (Patrick De Rynck, 2016).



²⁵ Vasari: (1511, 1574), He was an Italian painter, writer, historian and architect. In addition to being famous for his writings regarding the biographies of Italian artists, Vasari is also the founder of art historiography. The term Renaissance was first used by Vasari in his work *Vite*, a collection of biographies about the lives of artists, published in 1550. This book is regarded as the first work in the art history field.

Picture 54: Masaccio, vault perspective drawing for the Holy Trinity Fresco.

One of the other striking things about this fresco is the use of classical forms in architecture (ancient Greek and Roman). Masaccio utilized many techniques seen in Ancient Roman architecture, and he was also assisted by the great Renaissance architect Brunelleschi.

The Architectural Elements of the Holy Trinity

Coffers: the indented squares present on the ceiling.

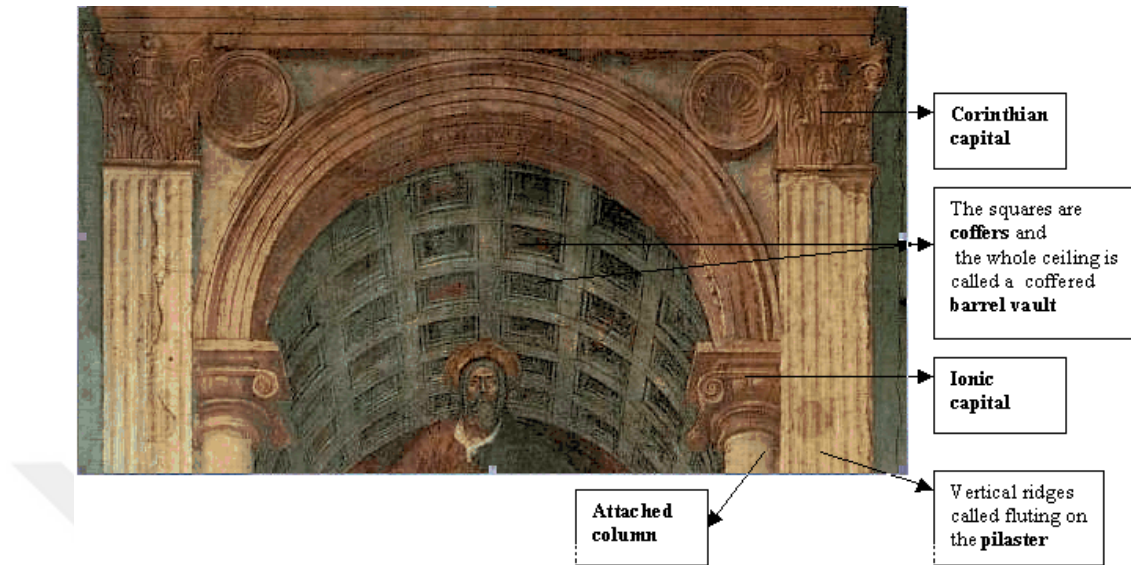
Column: a round and supporting element used in architecture. An attached column is present in this fresco by Masaccio.

Pilasters: shallow and flattened out columns which are attached to a wall. They are purely decorative and have no supportive function.

Barrel Vault: vault means ceiling. A barrel vault is a ceiling that has the form of a round arch.

Ionic and Corinthian Capitals: a capital describes the decorated top part of a column or pilaster. An Ionic capital has the shape of a scroll (similar to the ones seen on the attached columns in the painting). A Corinthian capital has leaf shapes.

Fluting: the vertical and indented lines or grooves that are used to decorate the pilasters in the painting. Fluting can also be applied on a column.



Picture 55: Masaccio, Holy Trinity Fresco - architectural elements labeled in detail.

4.5. Perspective Types Used in Matte Painting

4.5.1. Atmospheric Perspective

Atmospheric perspective refers to how objects look from a distance and how the appearance of distant objects are affected by the atmosphere. Atmospheric perspective is based on the differences between dark and light color values as they move from the foreground to the background. Atmospheric perspective is at play when an object is seen with less clarity and color saturation after the object is moved away to a certain distance from the viewer. As objects are moving away from you towards the horizon, the difference in light values gets less. As objects move from you towards the horizon, the

difference in light values diminishes and the most distant objects turn into silhouettes with lesser detail.



Picture 56: “Warcraft the Movie” - utilization of atmospheric perspective in matte painting.

This happens because as you move away from an object, the atmosphere between you and that object increases. Air has density, therefore as the distance between you and an object gets more, more air is perceived and the object gets less visible. When the sky is viewed from above, it is often seen as dark blue due to insufficient air. When you look at the the sky on the horizon from hundreds of miles away, it seems much more paler and hazy.

In humid air this effect is observed more as compared to dry air. Dry air is more transparent than humid air. Consider how far one can see in a desert as opposed to a rainforest. In most cases, there is moisture in air, and this can be seen in works made with

an atmospheric perspective. For this reason it is necessary to enhance the atmospheric perspective in order to gain additional depth in “*matte paintings*”.

4.5.2. Distance and Saturation

Colors of objects that are viewed from a distance get mixed up with some of the colors of the atmosphere, and therefore lose they lose their original color saturation and take on the saturation of the atmosphere. For designers working in grayscale, more distant objects gradually lose the hue of the atmosphere. If worked in grayscale, objects farther away will slowly lose the hue of the atmosphere.



Picture 57: Example image for atmospheric perspective.

4.5.3. Contrast and Distance

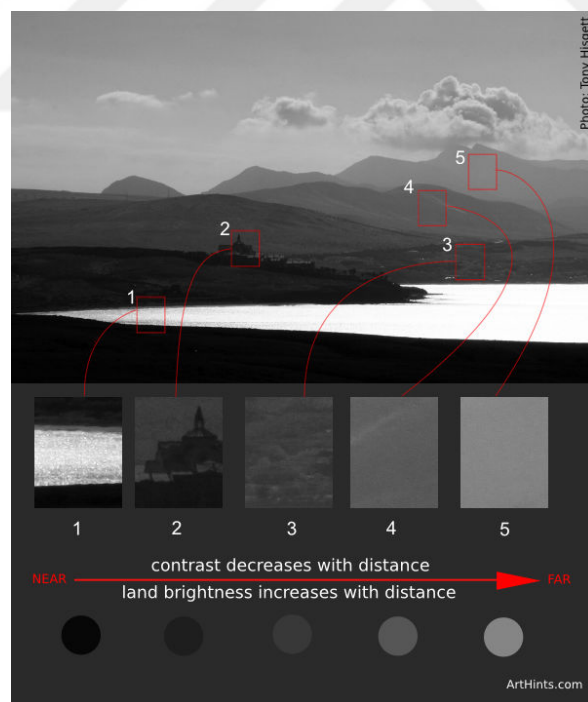
It is more hard to see/resolve small details in distant objects, even with binoculars, due to diminished saturation and contrast. Low contrast means there is not a big difference between the brightest and darkest parts. Low contrast does not mean the image is blurred.



Picture 58: Example image for atmospheric perspective.

4.5.4. Brightness and Distance

As the distance between the viewer and the mountain increases, the contrast between the mountain and the background decreases. As a mountain gets more distant, the details of the mountain decrease. As an object fades away in the distance and gets closer to the background color, the color of the object becomes less saturated. When objects are viewed at increasing distances, the color change effect is more marked. Dark tones change the most with atmospheric perspective.



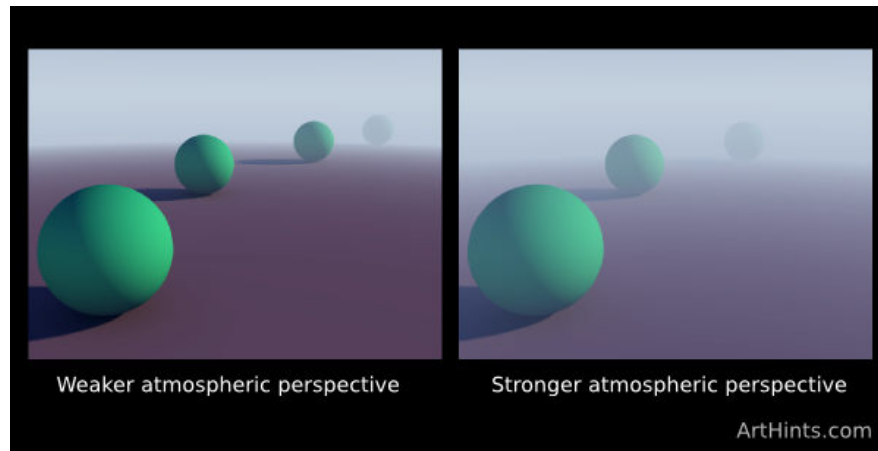
Picture 59: Example image for atmospheric perspective.

4.5.5. Atmospheric Perspective According to Night and Weather Conditions

Atmospheric perspective can be observed in night conditions. In this long exposure of the city, aerial perspective can be identified in the upper half of the frame. (Picture 54) When the atmospheric perspective effect is more intense (as with dense fog or pollution), the distance required for objects to take on the color and value of the atmosphere decreases. That is to say, gradually more closer objects are affected by the density effect of atmospheric haze (Picture 55).



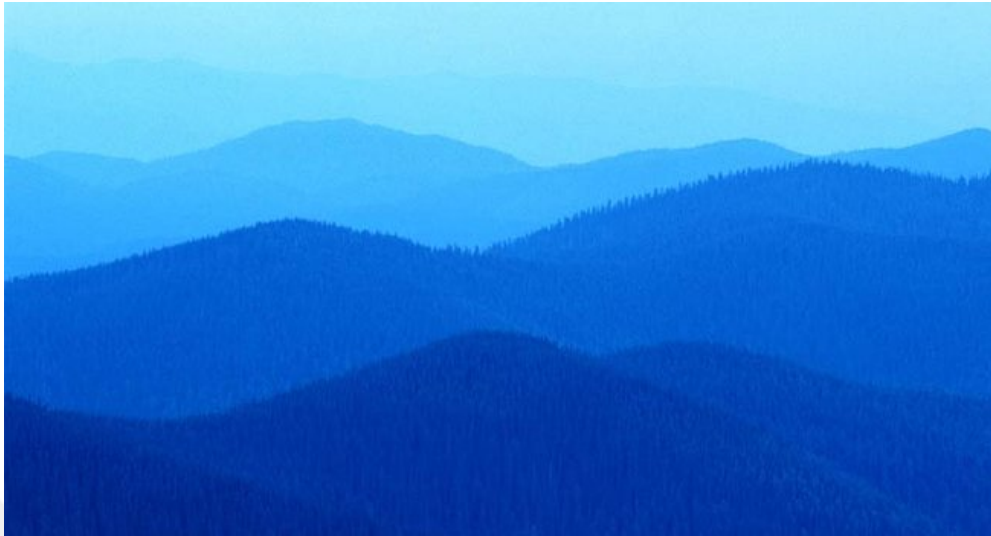
Picture 60: City image - atmospheric perspective example.



Picture 61: Atmospheric perspective scheme based on weather conditions.

4.5.6. Color Perspective

As the light value changes and objects move away from us, colors change - this is called color perspective. As the atmosphere gathers the excess color in the sky, the objects in nature come across as being withdrawn into the background. In general this color is blue, so in most instances the foreground colors are more vibrant compared to the background. However at sunset, the situation is exactly the opposite. Because the sky is warm at sunset and the light coming from behind is cool, objects in the background are more vivid compared to objects in the foreground.



Picture 62: Color perspective example image.

Colors can be generally divided into warm and cool colors. Warm colors such as red and yellow create a feeling of being pushed forward, on the other hand cool colors like blue appear as being pulled back. Spatial expressions like close and distant can be formed by changing colors and contrasts, by using the visual and psychological attributes that these colors transmit to people.

An example regarding the utilization of color perspective in matte painting is the movie "Star Wars: The Force Awakens (2015)". It is obvious that the color perspective rule has been used in this movie. The objects in the darkest tones can be seen in the foreground, the mountain ranges in the background gather the color in the sky, so they give the impression of being pushed back. This produces a sense of depth in the composition. Objects that are nearer to the audience in the front can be seen to have warmer tones (the orange clothes of the people in the front look

more vibrant), while the objects in the background are blurred since they are colder. (Picture 63)

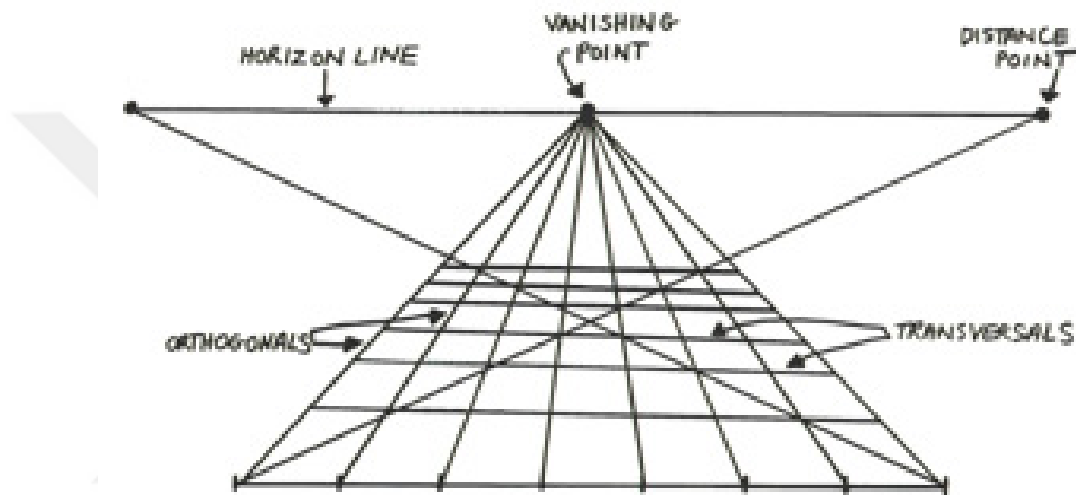


Picture 63: “Star Wars: The Force Awakens” (2015), Matte painting example.

4.5.7. Linear Perspective

Linear perspective is the name used for buildings, objects, digital objects, and all attributes in the world constructed by humans. Since the Renaissance period, the majority of painters have wanted the paintings they painted on a flat surface to appear as if they possessed three dimensions, with depth and breadth, just like in the real world. It is known that the inventor of the linear perspective was the architect Brunelleschi. It can be

said that some of the works of Donatello, who was a contemporary of Massacio and Brunelleschi, were also effective in the development of an understanding regarding linear perspective.



Picture 64: Linear perspective graphic.

In order to use linear perspective, first of all, the scene's horizon line has to be determined, and then a perspective grid has to be created as a guideline for painting objects. There are three basic elements required when creating a picture or drawing utilizing linear perspective in our work: the orthogonals (also known as parallel lines), the vanishing point, and the horizon line. If any of these elements are lacking, the created illusion of depth will be feeble. This information can be utilized to adapt the composition of a work of art to your works, similar to how the human eye perceives the environment.

The key point of this technique is founded on the principle that objects closer to our eye appear larger, and objects more distant appear smaller.



Picture 65: Matte painting for the “Outlander” (2008) film - Linear perspective utilization.

An artist that desires to attain more advanced drawing skills has to apply the three main forms of linear perspective effectively. The most significant question here is: Which form of perspective should I utilize for my work?

4.5.8. One-Point Perspective

One-point perspective is a type of linear perspective drawing that utilizes just one vanishing point in order to create an illusion of depth in the artist's drawing. There is a vanishing point located only on the drawing plane and all orthogonal lines converge at this point. It is utilized when it is required to create a single central focal point in the drawings or to obtain a direct view from the front edge.

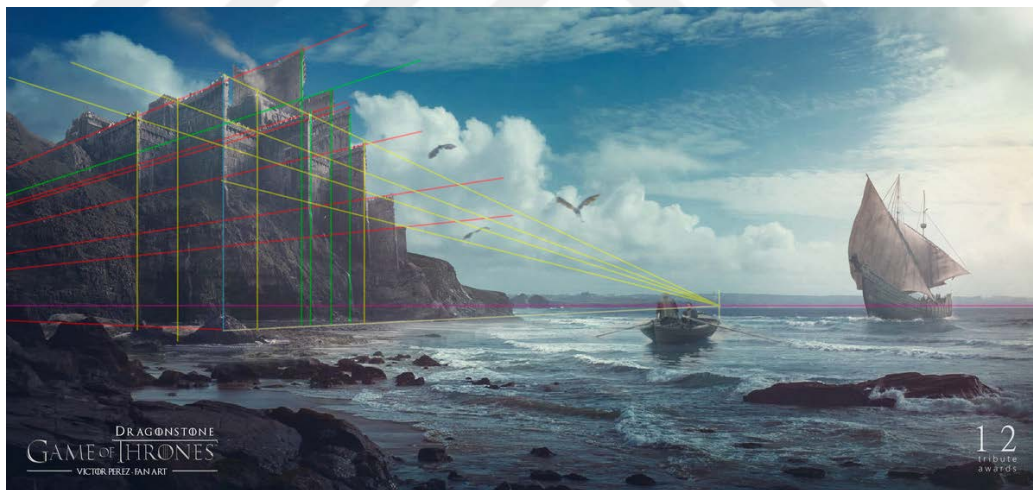


Picture 66: “Ciudad” film, matte painting.

If the works at hand require you to draw geometric objects that are facing you directly, one-point perspective should be utilized. In addition to the above, other uses for the one-point perspective can be exemplified as streets, railways or city drawings created from a front central perspective.

4.5.9. Two-Point Perspective

Two-point perspective (or angular perspective) has two vanishing points on the horizon line - these aren't required to be on the drawing plane. The objective of the two-point perspective is to show any depth or height. Two-point perspective is a convenient method for the artist who wants to apply a systematic and realistic method in drawings.



Picture 67: “Game of Thrones” series, matte painting example.

The most prevalent examples of such perspectives are those which underscore a single dominant object or points out to the corner view of an interior space. In the matte painting example from “Game of Thrones” (Picture: 67), one side of the castle flows to

the left side, while the other side vanishes to the right side - creating two distinct vanishing points. This scene is a good example according to the rules of two-point perspective.

4.5.10. Three-Point Perspective

An artist can create the illusion of height in a work by adding a third vanishing point to the top or bottom of the drawing. This is the difference of the three-point perspective from the two-point perspective. In the three-point perspective discipline, objects are seen from their peak points due to the very low horizon line. This perspective type can also be described as the point of view of a bird or plane passing over a city. The three-point perspective offers more dynamic scenes, owing to all three spatial directions approaching their vanishing points and creating more diagonals in the scene.

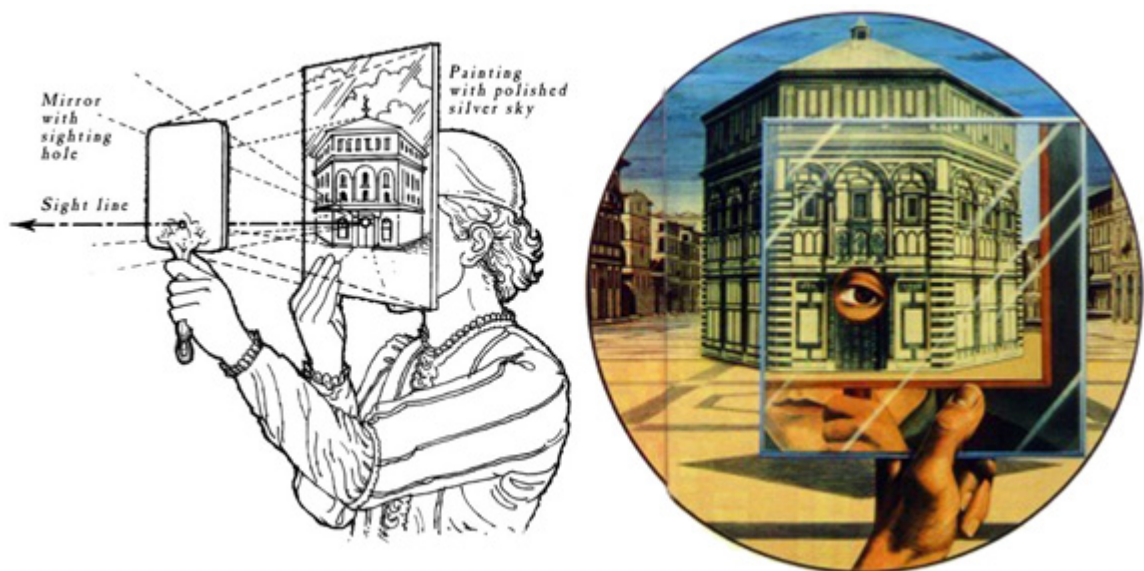


Picture 68: “Star Craft” (2010), matte painting example.

4.6 The Place of the Art of Illusion in Art

4.6.1 The Renaissance and the Art of Illusion

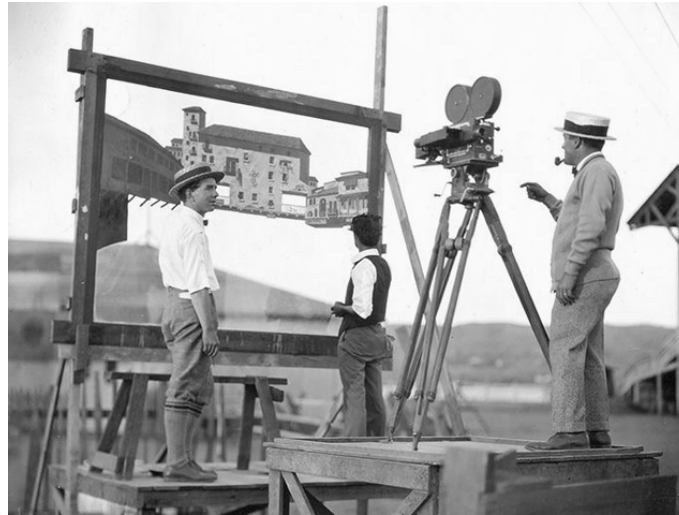
The advancement of the film industry, which continued with the invention of the printing press in the 15th century and the photograph in the 19th century, provided a new perspective to cinema and an evolutionary process occurred with the impetus of the devices invented. Recent technology has managed to reach huge masses, and now it is a daily routine for people to take still or moving pictures and share them rapidly via social media tools (Twitter, Instagram, Whatsapp).



Picture 69: Filippo Brunelleschi's experiment on linear perspective.

This technological process started with the invention of linear perspective by the Florentine architect Filippo Brunelleschi in 1413. Brunelleschi was the first person to determine the rules of perspective as we know today. Brunelleschi also invented optical instruments like the dark camera - which is the ancestor of the modern camera. This term originates from the name "Camera Obscura", which means dark room in Latin - because when a hole is drilled in the wall in a dark room, such an effect is created. Brunelleschi's first painting to define an optical reality was for the Baptistery of San Giovanni in Florence.

The experiment in the baptistery was comparable to the Peep Show technique, only Brunelleschi made a portable version of it without utilizing a box. Brunelleschi, in order to experience the illusion, held the approximately 30 centimeters wide picture at his eye level, and the picture had enlarged -in the opposite direction from which he was looking- via the lentil-sized hole on the wooden board. While Brunelleschi was looking inside through a hole in the back of the painting, he had held a mirror in front of the image and in this way, he was able to see the reflection of the painting. So he could see the real scene live. (Picture: 69)



Picture 70: A film set where the Glass Shot technique is being applied.

Instead of painting the sky, Brunelleschi had utilized a polished silver plate to project real clouds -which were in motion- over the baptistery painting. This technique is actually a movie dating to the beginning of the 15th century. It can be said that the same technique is the forerunner of the technique of painting glass -glass shot-, which was developed in 1905 by the filmmaker Norman Dawn. In the glass painting technique, the decor would be painted directly on the glass, and a transition would be left to the area where the live-action footage was being shot - live images would continue to flow on the empty side of the glass. These two techniques show considerable resemblance in terms of process and implementation.

Motion pictures were first seen at fairs in the early 17th century as a type of entertainment presented together with optical illusion devices like the Magic Lantern. The oldest known Peepshow device was the model developed in 1437 by Leon Battista Alberti. These devices were also known as “weird chests” in the Ottoman culture.

Moreover, they had versions made of paper that could be opened and folded and that had depth. In the following years, these techniques set the stage for the emergence of silent films - and with the appearance of motion pictures, they became quite widely known, owing to artists like Georges Méliès and Charlie Chaplin. Cinema has now pervaded all the world and has turned into an art that is accepted by everyone. In the middle of the 20th century, these optical techniques carried on developing swiftly - and the creation of more artistic and pictorial frames were enabled with elements like depth of focus, composition and light in films. As for the 20th and 21st centuries - film, painting and photography nourished each other based on a common ground. Abstractions were done in images by utilizing elements like painting and photography, and as a result, the scenes in the films of directors like Alfred Hitchcock and David Lynch reached an artistic quality resembling Renaissance paintings or still-life photographs. The reason why the directors of the old period are still watchable is that, in each scene, the light, composition and perspectives were carefully worked on as if they were painting. Most of the cult movies that made themselves a place in memories, benefited from the perfect frames of famous artists. Essentially, there is no apparent difference between painting and film, other than whether if they are moving or immobile. Still, David Hockney says that: "You can move the painting into your own time; however, the movie imposes its own time on you. If someone says, "Come to my home to see the world's best movie," you can answer "another day", because it will take much of your time. But a painting doesn't do that." (Hockney 2016).

The painting being moving or immobile did not cause a basic difference or devalue it in the artistic sense. As a matter of fact, the frames, angles and compositions used in the film were transferred to the films with the same similarities compared to the reference pictures. In the movies, they looked like moving, live versions of the paintings made by the artist.



Picture 71: “Shirley: Visions of Reality” (2013), Gustav Deutsch movie, Edward Hopper.

Filmmakers have generally mentioned work of arts as being an inspiration regarding their production and design plans, or as being an homage to the artist. Sometimes a filmmaker has built the whole look of his film around a work of art - the whole setup -beginning from the framing to the perspective, colors and lights- has been shaped based a single picture.



Picture 72: Comparision between the “Melancholia” (2011) film and the Ophelia painting by Sir John Everett.

The art world is full of references and inspired work. With various works of art, many different works are coming to light. The similarity between the depressive protagonist swimming in the river in *Melancholia* -played by Kirsten Dunst- and Ophelia's suicide is not coincidental at all.

It is unavoidable that the world of painting will continue to change, as it happened in the past periods. Just as pictures made in the past seem behind the times when we look at them now, current works will look outdated to people in the future. Nowadays, digital works have unlimited creative potential. In the middle of the 20th century, the prevailing theories essentially argued for the categorization of paintings based on the medium in which they were made. According to this approach, painting and photography had completely different natures. But in fact, photography and painting have been interconnected since long before 1839, as we can now comprehend more easily. In the past, advances in the technical and hardware fields have repeatedly changed the way pictures have been made and the way they are seen. Pictures have moved from caves to temples, then to churches, to photo albums, to the cinema, to television and finally to computer screens. Countless methods have been devised for making paintings: starting with applying the pigment with a stick or finger on the surface, until the stage of making paintings on the computer screen has been reached. (Hockney, 201 p. 337).

8.2. The Place of Optic Devices in the Art of Illusion

It is mentioned that in the 5th century BC, a Chinese philosopher named 'Mozi' recorded the creation of an image via light passing through a small hole into a dark room. This dark room was called as "collection place" or the "locked treasure room". The same effect is also discussed in the "Problems" book by the Greek philosopher Aristotle. In later years, 750 years before Niepce²⁶, Alhazen was another famous optician who was investigating the magic of the image. The renowned Islamic optician Alhazen lived between 965 and 1030 AD - he was first scientist to develop the most rudimentary camera, the "Dark Box". Alhazen utilized this device for the purpose of studying the rays of the sun during a medieval solar eclipse. This natural optical phenomenon of the "dark room" later paved the way for what is known as the "Camera Obscura" (in Latin) or the "pinhole image".

"Reading stones" were invented between the 11th and 13th centuries - these were crude lenses made by cutting a glass ball in half, flat on one side and convex on the other side. These "reading stones" lenses are comparable to the lenses used in modern spectacles. In later years, in the second half of the 13th century, reading stones were improved and they became widespread in northern Italy. With the Renaissance, as these optical instruments became more advanced, artists started to utilize a wide range of optical instruments for transferring images between surfaces. Some of these optical

²⁶ Joseph Nicéphore Niépce: (b. 7 March 1765 – d. 5 July 1833) French inventor. He took the first photograph in history in 1826. Niepce used the black box in order to project the image to a special lead-tin alloy plate. This plate was coated with a light-sensitive substance called bitumen. It was necessary to wait 8 hours for the image to form, which was slightly blurry.

instruments enabled artists to make direct copies, while other instruments permitted them to copy designs on different scales. As a matter of fact, in 1525 Albrecht Dürer published a thesis about an evaluation that included a demonstration of a set of drawing frames and perspective machines.

In the book 'Secret Knowledge: Rediscovering the Lost Techniques of the Old Masters', British artist and art historian David Hockney presents evidence that, hyperrealists such as Caravaggio, Velazquez, and Da Vinci utilized optical lenses and 'Camera Obscura' when creating their masterpieces. In interviews he gave, Hockney states that he is not claiming that the old masters cheated, and that the usage of these devices by the artists doesn't mean that they were not master artists - he is only pointing out that they elevated their paintings to a higher level with the assistance of these optical devices.

4.6.2 The Historical Process of Camera Obscura

Optical games have fascinated humans throughout history: lenses, lights, shadows, or rather stimulants that help us in perceiving reality from a different perspective. The Camera Obscura -which is regarded as the ancestor of the camera and the foundation of the cinema art- was being used by painters centuries before photography was invented. Camera Obscura has a magical sounding name, but it has a simple working principle. It is a darkroom shaped box with a small hole on the front side. The first historical camera experiments of transmitting images through the hole were

carried out in dark rooms that had a small hole drilled in one of its walls. In later years, the room was turned into a large, portable box - in time, these boxes transformed into small boxes that could be carried under one's arm. This mechanism is called "camera obscura", which means 'dark room' in Latin. The term "camera obscura" was first used by German astronomer Johannes Kepler in 1604. In the 5th century BC, Chinese philosopher Mozi was the first person to record the phenomena of light beams -reflected from objects- producing an inverted image when they pass through a small hole.



Picture 73: Johannes Vermeer: “Girl with a Red Hat”, (1665–1666), oil painting on canvas.

The discovery and development of the camera obscura was situated at the meeting point of astronomy, perspective, optics, philosophy, magic, and art. In the beginning, philosophers and inventors were interested in the device as well as scientists - in the 1600s artists also began to utilize it extensively as a tool.

In the 16th century, artists wanted to realistically reflect the landscapes, forms and objects they saw. Before the invention of the camera, artists utilized the "Camera Obscura" to reflect the image correctly in perspective, and thus aided the progress of the mechanism. In the 16th century, artists had no tools other than their eyesight and the principal drawing tools they utilized. In 1568, Daniele Barbaro began proposing to artists that they use the "Camera Obscura" to solve the problem of depth in their nature paintings (Nimet, 2006 p3).



Picture 74: Carel Fabritius, “A View of Delft”, (1652), oil painting on canvas.

Especially in the 17th and 18th centuries, we can see the "Camera Obscura" features in the works of many artists like Jan Vermeer, Canaletto, Carel Fabritius, Guiseppe Maria Crespi and Reynolds. On the basis of features such as the light originating from a single source, the use of perspective, clarity and the correct use of shadows - solid evidence has been determined regarding the use of “Camera Obscura” in the works of the artists. When the 1652 dated painting "A View of Delft, with a Musical Instrument Seller's Stall" by Carel Fabritius -who was a gifted student of Rembrandt- is inspected, it is considered that this realistic view was obtained with a 14mm Camera Obscura. In another example, in the artist Vermeer's "Girl with a Red Hat" painting (Picture 73), the area around the hat is blurred. This painting is considered to be the first blurred image in the history of art.

4.6.3 The Usages of the Camera Obscura in the Renaissance Period

Despite the fact that Camera Obscura was well-known in Europe, it would take a long time before it turned into a tool used by everyone. Information regarding the theoretical method and application areas of the Camera Obscura was first printed in the 15th century, by Cesare Cesariano and then by Reiner Frisius. And the first image of the pinhole camera was published in the book “De Radio Astronomica et Geometrica” dated 1545, by the astronomer Gemma Frisius. The Camera Obscura was used for the first time in a practical approach with the double-sided convex lenses developed by the physicist Girolamo Cardano. With this development, it was possible to obtain a more clearer image compared to previous versions. In his book "Subtitle", which was published in 1550, Cardano noted that the image was even better than normal when a pair of thin-sided lenses -which can be considered the first version of modern lenses- were fitted to the front of the Camera Obscura. Concurrently, Leonardo da Vinci was encouraging painters to use the the Camera Obscura, in order to reduce errors made in proportion and perspective while working on close-up drawings of objects. In that period, it seemed quite reasonable to people that painters would use a Camera Obscura to achieve things the naked eye could not do by itself.

The assertion that live projections were utilized in order to render more detailed artworks led Hockney to define Renaissance art as part of film history. In 2001 Hockney argued that, in older times artists who wanted to create better works utilized tools that would make their work easier, and optical devices showed considerable advances at that time.

Hockney claimed that painters attempted to copy three-dimensional reality to a two-dimensional surface. When they realized that the Camera Obscura was able to accomplish this, they installed such devices in their studios. Thus they were able to follow their patterns and ensure that the perspectives and proportions were correct. Things that were previously impossible, like elaborate fabric patterns falling into tablecloth folds and fixed point reflections, were no longer a problem with the usage of these devices.



Picture 75: Image from David Hockney's 'Secret Knowledge' BBC documentary.

Hockney put together a studio to demonstrate this, where he created a similar setup to how this technique was applied to paintings in the past. Hockney's objective was to construct an image utilizing lenses, mirrors and curtains. He built a scene in which Caravaggio plays an actor in a disguise that resembles the composition in Bacchus. (Picture 75) When the composition was completed, the artist would go into the dark room

("Camera Obscura" in Latin) -which was behind the curtain- in which the actor's image was reflected on the canvas, and begin to sketch.



Picture 76: Image from David Hockney's 'Secret Knowledge' BBC documentary.

Until that point this image was just a projection, but after that, the illusion reached an extraordinary level when the actor was asked to move. In the 15th century, people were astonished by the image reflected -and moving- from inside the Camera Obscura. Even if people logically knew that the source of the light was outside, they were surprised to see this flat image move in a realistic way.

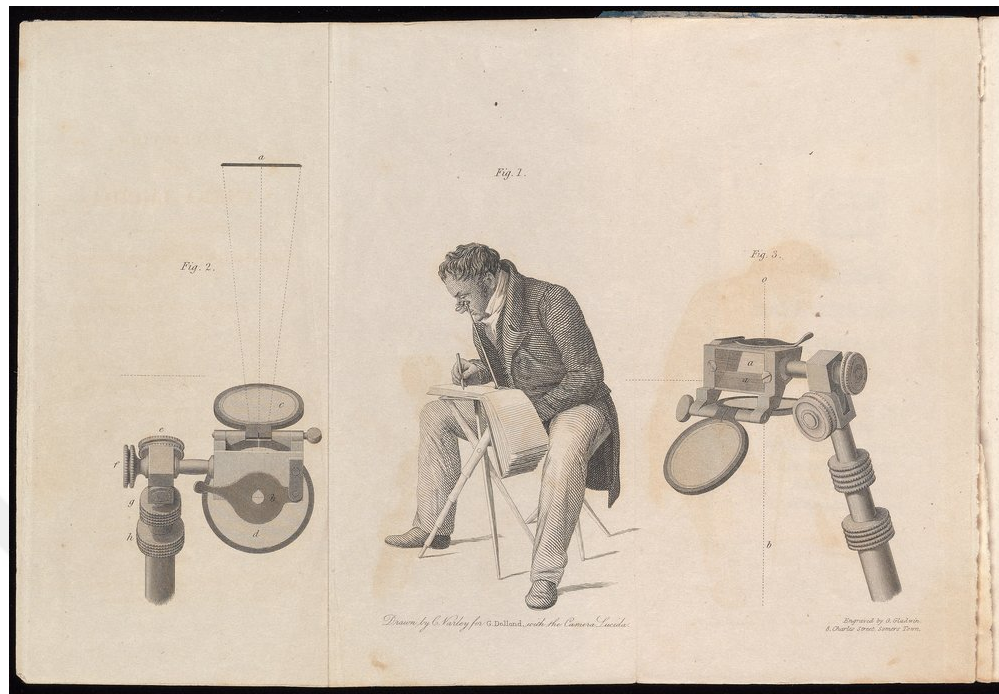
Hockney was the first person to declare that Michelangelo and Caravaggio (1573-1610) used optics in their work. Caravaggio was known for working in dark places and

cellars, but we have no notes or documents in our hands about his specific work methods. Other painters have also used optical devices in their work, however Caravaggio and Vermeer placed their utilization of optics at the center of how they viewed the world. That is the reason why the field of optics attained great importance in art in the 17th century. The Camera Obscura resembles a kind of a theater stage. The audience is experiencing a theater stage where live people are being projected from the nonvisible bright rooms in the theater. This experience was also similar to modern cinema art.

4.6.4 Camera Lucida

In times before photography was invented, people depicted scenes from life using different techniques and tools. Camera Lucida²⁷ was the last step in the long pursuit for techniques regarding automatic drawing from the Renaissance period up to the 1800s. How were scientists, archaeologists, and painters documenting their discoveries in old times? In a period when drawing was the only method to transmit visual information, artists and scientists utilized Camera Lucida to accurately draw everything from animal specimens to undiscovered historical ruins.

²⁷ Camera Lucida: The prism situated on the top of the device enables an artist to view the object and the drawing surface at the same time - so it is possible to reproduce the perspective accurately. If needed, lenses can be utilized to refocus the image. Camera Lucida was developed by William Hyde Wollaston in 1807, but the device was first described in 1611 by the astronomer Johannes Kepler.



Picture 77²⁸: George Dollond, the original manufacturer of Sir William Hyde Wollaston's Camera Lucida.

Right after the discovery of linear perspective, artists utilized various mechanized methods (Camera Obscura, Camera Lucida, and Magic Lantern) etc. to draw based on life. Lenses, various mechanisms, and instruments like the Camera Obscura provided great convenience to the scientists and artists of the period. By the 1800s, Camera Lucida transformed into a more portable and easy-to-use tool compared to past versions - the

²⁸ Sir William Hyde Wollaston was born on 6 August 1766, East Dereham, Norfolk, England, and died 22 December 1828, London. He was an English scientist who first developed powder metallurgy techniques for the purpose of producing and marketing pure and malleable platinum. Wollaston also made significant discoveries in many areas of science and discovered elements. In addition to his studies in chemistry, he also made substantial contributions to the fields of botany, mechanics, electrochemistry, astronomy, crystallography, physiology, and optics - he also invented scientific instruments. Wollaston patented a new form of spectacle glass (1804) and the Camera Lucida (1806), and also published a book detailing his design (1807). In 1809 Wollaston invented the reflective protractor, an instrument that correctly gives the angles between the faces of crystals.

device was patented by Sir William Hyde Wollaston in 1806, (Picture: 70) and thus elevated the world of drawing to a new era.

By the mid-1800s, the Camera Lucida device had spread to almost all of Europe. Camera Lucida was a supportive mechanism for artists which enabled accurate and error-free drawing. When this device was used, both the scene and the drawing surface would be seen simultaneously, like in a photographic double exposure. Thus the artist would be able to copy the key points of the scene to the drawing surface - this would facilitate in determining the perspective correctly. According to the Hockney-Falco claim, many of the most popular drawings of the 19th century, like the Neoclassical portraits of Jean-Auguste-Dominique, were made utilizing this device. Hockney points out to the perfect details in Jean-Dominique Ingres's Mrs. Charles Badham drawing of 1816 (Picture: 71).



Picture 78²⁹: Mrs. Charles Badham - Camera Lucida drawing by Jean Auguste Dominique Ingres.

²⁹ According to Hockney-Falco's claims, Ingres utilized Camera Lucida to make his fabulous pencil portraits. Part of the proof regarding this assertion is in the drawing itself. The rapid but confident strokes

David Hockney had spotted a discrepancy in Ingres' work: He mentions how delicately and precisely the facial details in the drawing were worked on, and also he underscores how the subject's arm and the folds of the dress were drawn swiftly and faultlessly, with almost no effort. Hockney believed that Ingres utilized a "Camera Lucida" while making many of these drawings (Hockney 2001).

In later years, after William Hyde Wollaston took out a patent for Camera Lucida, artist-scientist Varley developed his own version of the device in 1809 and named it as the Patent Graphic Telescope (PGT). Patented in 1811, the PGT was not a particularly convenient "Camera Lucida" - the device was cumbersome and heavy, and also a strong, steady table was required to stabilize it. When we look at the modern versions of Camera Lucida, we can see that streamlined versions of the device are sold over the Internet. One of them is called NeoLucida, it is a 21st century version of the Camera Lucida. It has become a functional alternative that is easily transportable for artists, scientists and designers who want to draw.

on the suit are perceptible. When an image is traced, loose but exact lines are formed, it is difficult to make these only with the eyes.



Picture 79: An example image for NeoLucida and its usage.

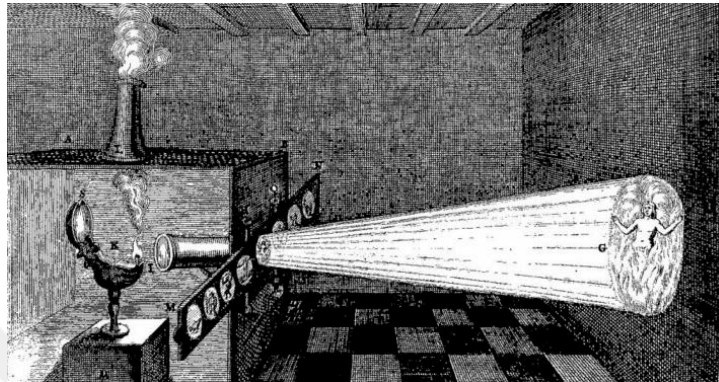
The assertion that live projections were utilized to make works of art in the past has led to the radical re-definition of Renaissance art as part of film history. This process, extending from the Camera Obscura to the moving image, will continue to develop for many years to come.

4.6.5 Magic Lantern

The Magic Lantern³⁰ with the Latin name "Lantern Magica" was the precursor of both the slide machine and the cinema projector. The Magic Lantern was invented by Christiaan Huygens -a Dutch scientist- in the 1600s. The 1646 edition of "Athanasius Kircher's *Ars Magna Lucis et Umbrae*" describes a rudimentary projection system with a

³⁰ Magic Lantern: The Magic Lantern was developed in 1600 by a Dutch scientist, Christiaan Huygens. It can be described as the ancestor -the oldest form- of the slide projectors that are in use today. The first Magic Lantern was lit with candles. The name Magic Lantern was given by the first audiences which saw the mysterious silhouettes of demons and angels reflected on the wall.

focusing lens together with a concave mirror -which has text or images painted on it- that reflects sunlight.



Picture 80: The materials used for illumination in the Magic Lantern.

4.6.6 Projectors and Illumination

In the approximately first 200 years of the Magic Lantern history, the only available sources of light were oil lamps and candles. Problems such as low light output, image brightness and loss of clarity caused problems like inadequate reflection for more distant audiences. In the 19th century, as related technology advanced, better and more powerful light sources finally became available.

Kerosene lamps replaced the old-time oil lamps, and also their burner designs were improved - ultimately much more powerful light sources were developed and this considerably changed the work space of the "Magic Lantern". In the Victorian era, both

the Limelight³¹ and the Arc Lamp³² made it possible to project images with brightness and clarity levels never achieved before. Consequently, slide shows for very large audiences became practical. Projectors equipped with such illuminators were able to superimpose images at nearly any speed and brightness level, and at the same time provide detailed images.



Picture 81: The materials used for the illumination of the Magic Lantern.

³¹ Limelight: This is a type of stage lighting that was once utilized in theaters and music halls. Intense illumination is generated when an oxyhydrogen flame is channeled into a cylinder of quicklime (calcium oxide) - this can be heated to 2.572 °C (4.662 °F) before it melts.

³² Arc Lamp: This is a gas discharge lamp that generates light by applying an electrical potential to ionized xenon gas possessing high density. The xenon arc lamp, which produces a bright white color resembling to daylight, is often used in cinema display devices.

4.6.7 Slide Usage in Magic Lanterns

Most handmade slides were fit in wooden frames which had round or square openings for drawn pictures. The slide figures were painted with black paint, but soon, transparent colors began to be used since the light transmittance of the black paint was not good. Black paint was generally used as a background to prevent unnecessary light - so figures, borders or frames could be projected freely. Most slides were made with a clear coat of lacquer - in time, protective glass began to be used to protect the painted layer. The first slides were usually delivered in a wooden frame.



Picture 82: Slide example for hand painted magic lantern dating to the 19.th century,
Vesuvius volcano before and after the eruption.

The material was fragile and often the slides had to be transported, so poplar wood - which was light because of its rigidity- was often used for framing. The wooden material enabled new glass slides to be put in place of the broken glass slides. After 1820, the manufacture of hand-painted printed slides began, often making use of decalcomania transfers. Many manufactured slides were made from strips of glass that had several images on them and they were surrounded by a glued strips of paper. In the 18th century, the lantern turned into a form of entertainment and spread all around Europe. At that period, the "magic lantern" was a device used intensively by commercial photographers, traveling entertainers, missionaries, and middle-class amateur users.

The magic lantern also was widely used as a main attraction in other forms of entertainment like stereographic displays, magic tricks, theatrical performances and vaudeville performances. This device also functioned as a popular instrument for classes and public lectures. The magic lantern is an important precursor to the motion picture - it enabled a smooth transition on the path to the fast ascendance of cinema in the early twentieth century. Despite its competition with roll films, cinema and 35 mm slides over the years, the magic lantern remained in use until the middle of the 20th century.

5. PROPOSALS FOR SOLUTIONS FOR THE ACADEMY AND THE SECTOR

5.1. Interviews With Matte Painting Artists From Turkey and Other Countries

Matte painters are the creative and talented people that are the driving force in the generation of photo-realistic landscapes as well as interiors and exteriors that is not possible to realize on an actual set. Matte painters are the digital magicians in the film, game, advertisement and art industries - they present the audiences of these industries a sense of reality in which they can imagine themselves, and open the doors to worlds that don't exist or which they can't go in their real lives. Matte painters have been the secret heroes behind many unforgettable movies, where we flew over the roofs with “Mary Poppins”, rode a Luck Dragon in “Neverending Story”, had cheerful times in our childhood with “Indiana Jones” and many more.

Such enthralling works of art would not have been possible if it were not for the extensive imagination of matte painting artists and their ability to work under challenging conditions. Because matte painting is a digital art that requires technical equipment, a solid artistic background as well as dedication. Today, although the art of matte painting is mostly focused on digital processes compared to its old examples, the utilized concepts are still the same. Working on big-budget films as a visual effects artist is a job full with challenges as well as unique opportunities regarding combining technology with creativity. Things that matte painters -who are thinking of entering this sector, but do not

know where to start from- should know are collected under this title. This study focused on matte artists who have undertaken work in the industry's leading productions (The Hobbit, Batman, 300, Sin City, Game of Thrones) etc. In interviews made with matte artists, the place of the matte painting technique in visual arts, which tools and programs they use, and problems in both sectoral and academic fields were determined - and the resultant study took on the characteristics of a guide for young matte painting artists.

5.1.1. Onur Can Çaylı

- For those who don't know, can you tell us a bit what your job title is, and what kind of work do you do?

I work as a 3D concept artist and an art director in the sector.

- How did you begin to work in this field, and what were the factors that influenced your work specialization?

I was introduced to computer programs when I was studying in the graphic design department. Later on, I got a MFA (Massachusetts College Fine Art and Design) in VFX and had the opportunity to learn more programs. My infrastructure in the field of drawing and my build-up in 3D perception played an active role in 3D concept development. I also worked in the sector projects that enabled me to develop these skills.



Picture 83: Onur Can Çaylı, “Game of Thrones” character design example.

- How would you define the Matte Painting technique in the visual arts field?

It is a field that requires the effective use of many disciplines together. While you need to take design as a basis, you also need to blend knowledge about light with creativity. The most important thing is that you need to develop an original style of approach to the field.

- How did you learn this technique - did you train yourself, or did you receive academic training somewhere?

I learned everything about it from the Internet -where I learned everything else- and I am trying to develop it by allocating the required time.

- Which techniques and tools do you use in your work?

Maya, Zbrush, Substance painter, Arnold and Redshift Render motors, Photoshop and Nuke.

- In your opinion, what are the differences between traditional Matte Painting and digital Matte Painting applications? Can you share with us the advantages and disadvantages that you see?

I have not worked on traditional matte painting, but as far as I have studied, it requires material knowledge and one should also know realistic painting in the classical sense. The advantages of it are that it always arouses respect and creates a ageless style. In digital matte painting, one can progress faster by using photos, but you are completely limited with what technology presents you. As technology advances, your work will seem outdated compared to new works. But an original work surely never gets old.

- In the transition process from traditional media to digital media, what changes happened in the Matte Painting art? How do they affect the art audience?

The perception of depth has increased, of course - now one can create camera movements more freely. Details like smoke, water, dust and soil, which we call particle effects, can now appear more multi-layered in our works. Of course, one can break free

from the limits imposed by traditional materials and complete a job faster with the opportunities offered by many programs.

But on the other hand, this causes mass production and many jobs to resemble each other. After all, in traditional art, all artists have a clear method and style. This creates schools. For example, the matte painting style of a company called MPC (Moving Picture Company) has become a school.



Picture 84: Onur Can Çaylı, “Game of Thrones” (2011- 2019) character design example.

-We can see that in recent times graphic designers are using matte paintings much more. What are the positive and negative effects of this?

I think it has no negative effects. The more people there are who engage in creative work, the more colorful the world becomes. I wish everyone would be occupied

with such things, even as a hobby. No matter what background you come from, you will have something to contribute to the sector.

- What can you say about the artistic value of the works designed in the digital environment today compared with the matte paintings made before the digital technique was present?

Making a comment on this becomes more complicated if the artistic value serves a commercial purpose. In any case, works with higher artistic value can be neglected for commercial purposes. Digitization has sped up this process even more. I don't think there is that much difference between the traditional and digital techniques if a sectoral work achieves its objective and gains the admiration of the masses. Entering into a discussion about which work is more valuable corresponds to the same approach as measuring their value based on their commercial success. When people like a style, does it gain value? That is also open to discussion.

So, to summarize, I think it is meaningless to compare artistic value with works that have sectoral objectives. I think, being in the act of making art is the most precious thing. To tell the truth, art criticism is not a field that I have knowledge of.

-Do you think the ongoing association between traditional techniques and digital techniques should be regarded as two interchangeable opposites in a cause and

effect relationship, or should this be viewed as different techniques supporting each other?

I observe that traditional artists learn digital techniques much more faster. I think the principles of the traditional techniques always stay the same, but the platforms change. In my opinion it is more enjoyable to work with materials - I can't find similar enjoyment in anything else. But the requests of the industry are channeling people to digital. However, these techniques still continue in very original works and in old school approaches who don't want the tradition to disappear. For example, in stop motion animations...

You watch these works with respect and always thinks in a corner of your mind, how patiently they do this job, always. I think the keyword in traditional is traditional. The traditional influences digital and technology, and they in turn influence the traditional. It has come until the present day in such an organic structure.



Picture 85: Onur Can Çaylı, “The Amazing Spider Man” (2012) city design.

- Can you share your predictions for the future of matte painting in the academic and sectoral fields?

Since application of this technique requires one to have knowledge in both practical and theoretical fields, -for example in universities- it may require support regarding art history and progressing via analyzing traditional works. The analysis of these traditional works rescues artists from the insensitivity of the sector and makes them authentic. But we definitely need to take part in sectoral projects also, so that we can learn the technology and understand the requirements of the current film industry.



Picture 86: Onur Can Çaylı, “Stranger Things” 3D character design example.

- What would you recommend to our young friends who are interested in the art of Matte Painting?

Patience is required in this type of work, as it is required in everything. To be authentic, they should visit many museums, travel, read books and follow the works of other artists. They can join forums, post their work and receive the feedback of other people who work and endeavor to progress in this field. It is important to keep in touch with other artists. For example, they might try fishing to become more patient. :)

5.1.2. Eren Arık

- For those who don't know, can you tell us a bit what your job title is, and what kind of work do you do?

Briefly, the title of digital artist will be the most correct definition, since my work includes 2D (illustration, matte painting) and 3D production.

- How did you begin to work in this field, and what were the factors that influenced your work specialization?

Previously, I had undertaken work using traditional techniques (oil painting, charcoal, original print, etc.). I did research on techniques related to some digital paintings that I saw on the Internet and met with tablet technology. I started to transfer

my traditional skills to digital media, and in the meanwhile, I continued to improve myself by studying the masters extensively. The biggest driving force in my specialization was that I love to paint, and also I practiced a lot.



Picture 87: Eren Arık, “Arif V 216” (2018), Matte Painting example.

- How would you define the Matte Painting technique in the visual arts field?

The matte painting technique is what we can call concealed magic in cinema. Because when the technique is applied well, the audience finds itself in that world without even noticing it. In order to use this technique, one needs to have knowledge of light, color and atmosphere. So this technique has an important place in digital arts, especially for the art of cinema.

- How did you learn this technique - did you train yourself, or did you receive academic training somewhere?

The matte painting technique today actually entails a combination of photography and 3D techniques. I developed myself over the years by learning digital techniques, photo collage and 3D techniques. Unfortunately, there isn't any academic education in this field in Turkey.

- Which techniques and tools do you use in your work?

I am continuing to work with computers, tablets as well as 2D and 3D programs (like Photoshop, Cinema 4D) in the production process. As I mentioned, technically, I work using the collage technique. I find the necessary reference photos and produce collages so that the results look realistic.



Picture 88: Eren Arık, Matte Painting example.

- In the transition process from traditional media to digital media, what changes happened in the Matte Painting art? How do they affect the art audience?

Personally I think that quality has increased with the development of technology. Because the objective in matte painting is to achieve realism. The eye shouldn't notice the art behind the screen. Hand painting used in ancient techniques can't provide the entire realism of the photograph. Modern photo collage techniques have reached a higher level compared to old techniques.

- We can see that in recent times graphic designers are using matte paintings much more. What are the positive and negative effects of this?

I think differently. Because a graphic artist can produce a photo collage. However -depending on the scene required (for example, a postapocalyptic hangar) in matte painting- it is required to be a painter in order to create the desired designs and to ensure these designs -and photographs- adhere to the rules of light, perspective and color. If the person we call a graphic designer is in command of all these rules, he can be successful in matte painting.

- What can you say about the artistic value of the works designed in the digital environment today compared with the matte paintings made before the digital technique was present?

In terms of artistic value, I can't see any difference between the matte painting works done in the past and today. To give an example, there is no artistic difference between a very old matte painting and the Lord of the Rings matte paintings.

- Do you think the ongoing association between traditional techniques and digital techniques should be regarded as two interchangeable opposites in a cause and effect relationship, or should this be viewed as different techniques supporting each other?

The ancestor of digital techniques is the traditional approach. (Colour, light, form... etc.). These skills need to be developed first, and then one should use them in digital painting. In other words, one should start with charcoal and then move on to digital. In this respect, digital techniques are nourished by traditional techniques. They are not opposite, on the contrary, they should be carried out together.

- Can you share your predictions for the future of matte painting in the academic and sectoral fields?

I hope departments will open in this field in Turkey. We need personnel with advanced skills in the field of matte painting to be involved in the developing cinema sector. This profession will continue to advance in parallel with the cinema industry (including the advertising sector).

- What would you recommend to our young friends who are interested in the art of Matte Painting?

First of all, develop your traditional techniques. As I mentioned, digital techniques are nourished by the traditional ones. Then switch to digital techniques and do a lot of practice. If you are interested in matte painting, learn to use a software like Photoshop, where you can create photo collages - and then again, do lots of practice.



Picture 89: Eren Arık, “Arif V 216” (2018) Matte Painting example.

5.1.3. Çağlar Özen

- For those who don't know, can you tell us a bit what your job title is, and what kind of work do you do?

For the past 11 years, my job title in my profession has changed a little over time - so, to sum up, I can name 3 titles such as 3D Artist/Matte Painter and Concept Artist. At

the moment, I am working as an Art Director in a foreign game company. On the other hand, my relationship with the film industry has not completely finished, and I am still actively working on cinema projects as a Matte Painter.

- How did you begin to work in this field, and what were the factors that influenced your work specialization?

Initially I begun to work as a Junior Artist on small-scale advertising projects. Over time, the scope of the projects I was working in expanded. I found the chance to work with many talented people over the years. I can say that the primary basis for my self-development in general was my curiosity to learn as well as opportunities to obtain various information from people I knew.

- How would you define the Matte Painting technique in the visual arts field?

In my opinion, Matte Painting is basically a composition work. In essence, when producing work in this field, aesthetic concerns are not that much important. The focus is more on solving problems in accordance with requirements. So occasionally, if the needs dictate such a requirement, work can be requested or needed that goes beyond normal specifications or traditional rules, such as a picture with a distorted perspective, the real distance or the proportional relationship in the picture not being taken into account, or the picture having a more exaggerated texture than ideal. As long as the composition in the final film frame appeals to the audience as expected, the problem is solved - at times, this

working method can be unfamiliar to the artist, compared to the usual visual arts methods.



Picture 90: Çağlar Özen, Matte Painting example.

- How did you learn this technique - did you train yourself, or did you receive academic training somewhere?

I can say that, over time, I developed this technique on my own. The only painting education I received was in the Ada Sanat – Memet Güreli Painting Academy, which I attended between the years 2003-2004. After I started working in the film industry, I tried to reflect everything I knew and had learned in my work, by using them in one way or the other.

- Which techniques and tools do you use in your work?

In general, I didn't face a limiting issue in a technical or software sense. Over the years I spent my time trying to learn all the techniques and tools required by the companies I worked for, and the projects I participated in. Since depending on the conditions you can work with a large team, especially in feature film projects - whatever the team uses for production or how the methods you will employ will help the team most, the techniques and tools utilized may change a little more every day - as you have to support the people around you in some function.

- In your opinion, what are the differences between traditional Matte Painting and digital Matte Painting applications? Can you share with us the advantages and disadvantages that you see?

To tell the truth, the first production with traditional matte painting that I can remember is the old Star Wars movies, the old trilogy - probably this is the best known work. If the resources of that time would have allowed it and the paintings would have been generated digitally, the final result would have been neither better nor worse. Because this production had already reached the best quality that was possible for its time.

Compared to previous years, such projects are more mass-produced - and also, as people see visual materials over and over again as the years pass, they can observe these materials better, so in my personal opinion, a cycle has developed based on the need for better quality materials to be produced in every new project. To give an example, it

wasn't possible to see a South African tiger much in past years, now one can see them in many documentary channels and on the Internet. In the past, it was not very possible to tell the difference between any digitally made tiger and the real one. But now, almost everyone -even if they don't watch the related visuals all the time- knows what this animal should look like, how it walks - and they can notice if certain gestures and facial expressions of the tiger are more realistic or not. So, even if the tools utilized for producing the visuals didn't develop at all technologically, the quality of the work done could be obliged to change according to the overall requirements.

- In the transition process from traditional media to digital media, what changes happened in the Matte Painting art? How do they affect the art audience?

Of course, like in every profession, the cinema industry also enjoyed the opportunities that the digital age offered. We can say that this process pushed the Matte Painting field towards a more complex and more technical direction. In the traditional period, artistic skills were prevalent in the Matte Painting field - today, working in this field requires more mathematics, computer and technic skills, and this transformation is still continuing. I can say that, as a consequence of the new requirements, the produced visuals offer a more believable and realistic imagery to the audience, and this in turn, makes watching movies more appealing for them.

- We can see that in recent times graphic designers are using matte paintings much more. What are the positive and negative effects of this?

In my personal opinion, completing a basic painting training for Matte Painting is a good beginning in the path of becoming a good Matte Painter. But this doesn't indicate that people who have studied graphic design will be unqualified for this job. Since Matte Painting is fundamentally a composition work, and graphic design education essentially provides training regarding composition, people inclined to self-improvement can learn the rest of the skills themselves. Nevertheless, an ideal form of education for the matte painting field should offer a general Visual Effects training in addition to basic painting education, and knowledge regarding basic photography and digital arts.

- What can you say about the artistic value of the works designed in the digital environment today compared with the matte paintings made before the digital technique was present?

My thoughts on this subject can found right or wrong according to different persons. However, in my opinion, in the films and similar projects we take work on, clients or employers want a design -in a matte painting work- that will fill or support the material they have in their hands. I use the word design here, because the product that is expected to be produced has to realized in compliance with various rules. If they wanted me to reflect my personal feelings in the work, then I would find it possible to talk about artistic values here. However, no one would easily agree to pay you so that you can reflect your feelings in a project. For example, there were no such concerns for the matte paintings that George Lucas painted with traditional methods in his garage, many years ago. If you do the similar yourself with your own decision today, whether digitally or

with old-school methods, the artistic value of your matte painting work will not be very different in either method.

- Do you think the ongoing association between traditional techniques and digital techniques should be regarded as two interchangeable opposites in a cause and effect relationship, or should this be viewed as different techniques supporting each other?

In my opinion, digital painting techniques should not be viewed as conflicting with the old methods. Although the utilized techniques have changed in the last 45 years, we can observe that the essence of the work undertaken hasn't changed much. To give an example from practice: various designs that were once painted on glass panels would create a realistic effect on camera when they were placed at different distances from each other and viewed that way.

And in the most familiar technique applied today, various designs are made by painting on digital solid planes -which you can regard like glass panels- using the same logic in 3D space geometry. So, the work done is essentially the same, but the generation process has been shortened. Of course this causes the work done to become cheaper and simplified by shortening the production process on an industrial scale - but of course, that is a different discussion topic.

- Can you share your predictions for the future of matte painting in the academic and sectoral fields?

In my opinion, matte painting will always remain one of the most basic needs in film making. But of course, this is not a production field that every movie film requires. For example, since the cinema sector in underdeveloped countries consists only of low-budget comedy films, such a sector may not always need matte painters. When we look at the future of the sector, proper employment in this field can only be achieved through the development of a country's economy and the production of more challenging films.



Picture 91: Çağlar Özen, Matte Painting example.

- What would you recommend to our young friends who are interested in the art of Matte Painting?

For young people who want to work as matte painters and want to undertake this professionally, I would suggest that, in addition to acquiring basic painting knowledge, they should also be interested in photography. If you understand how the image is reflected inside the camera, you can better know what you need to paint in a movie frame. Apart from these, no matter what medium an artist uses, he should work composition, even if with a pen and notebook. Of course, understanding the concept of composition is connected to understanding the language of the figures. In addition to these, another of the most important issues -and something that is also valid for all painters- is that, being in command regarding the behavior of light will carry the artist -in any event- to his desired objectives in time.



Picture 92: Çağlar Özen, KFC Supercharger 3D application example.

5.1.4. Nick Catell

-Would you please explain a little what is your occupation and what is your professional title? For people who do not know anything about your occupation.

I'm a visual effects artist working at Weta Digital in New Zealand Aotearoa. My professional title is 'Lead Matte Painter'. I provide digital environments for feature films, and you will have seen my work in many popular movies.

-How did you start to work in your field and what are the factors which helped you to specialize?

I started as a concept artist for video games, and eventually moved into television and feature film. A good eye, and the ability to paint a drawing well. An ongoing interest in how stuff works - especially visual things, light and atmosphere. Technical aptitude and an affinity for computers, software and problem solving. A wide ranging interest in art, history, film, literature and media.



Picture 93: Nick Catell, “The Hobbit” Matte Painting example.

-How would you describe the Matte Painting technique in visual arts?

Matte painting is one of the very oldest visual effects techniques. Originally a matte artist would paint on glass to match an existing location or set: to extend, augment, replace or add things that would be too expensive or impractical to build or shoot for real. Nowadays we achieve the same result, but work digitally using a variety of software, but applying the same mindset and philosophy to take a live-action scene, and replace the green screen with compelling and invisible illusions.

-How did you learn this technique, did you learn it yourself, or did you get educated academically, and if so where?

I trained in the UK as a fine artist, and this gave me a solid foundation in visual language and communication. The techniques I use professionally I learned almost entirely as I went, first Photoshop and a little Lightwave, then more and varied programs and complex techniques.

-In your work, what are the methods and tools that you utilize?

Too much to go into here, but briefly: Our job is to provide synthetic environments (cities, jungles, mountains, space, deserts, ruins) and set-extensions (adding to an existing live-action scene to remove equipment and/or green screen). We use whichever programs get the job done for a given task. It varies. Every day I use Nuke,

Maya, Clarisse, Photoshop, Houdini. Frequently I use ZBrush, Mari, Reality Capture, PhotoScan, Terragen, World Machine, as well as the Internet, Google Earth, GIS and other mapping software, and a whole bunch of proprietary secret software that varies from company to company.

-How would you describe the differences between traditional Matte Painting and digital Matte Painting? Would you like to share the advantages and the disadvantages of these with us?

Traditional is less flexible, and requires decisions to be made beforehand. This is both an advantage and a disadvantage, since the tendency to tinker and change to the detriment of the work is minimised. Traditional is also limited in terms of camera movement that can be achieved. This limits possibilities but also obligates the film-makers to deploy matte painting appropriately. Digital is more flexible in terms of responding to changes, and in terms of the range of camera motion. Really though, the success or failure of a matte painting is more dependent on whether it's well-executed and used appropriately, than on the method. There is no reason why a top-quality glass painting couldn't be used in a contemporary feature film right now. Done well, the audience would never know they were being fooled.

- How do you think that Matte Painting has changed in the process of the transition from traditional to digital? And what are the effects on the art viewers?

Regardless of whether traditional or digital, if it's done well, the viewers will not realise they are looking at a fake.

-In recent times, it is observed that matte paintings are used much more by graphic designers. What do you think about the positive and negative effects of this?

'Matte painting' is a specific technical term that refers to an image that appears in a shot in film, television or ride. Though the techniques used to create it might be the same, a photoreal image of an environment used in other contexts is an illustration, not a matte painting.

-What could you say about the artistic value of works designed in the digital environment as compared to matte paintings made before the digital technique was developed?

'Artistic value' isn't really relevant to matte painting in context, whether traditional or digital. While a great deal of artistry is brought to bear on their creation, they are applied arts, work-for-hire, and their purpose is to fill a hole in a movie.

The artistic value -if any- is that of the movie as a whole, not it's visual effects. That said, there is now a market for what remains of the traditional matte paintings, since they are physical objects and there is a demand for them - but interestingly only for those that have some inherent aesthetic appeal. I'm sure there are hundreds of 'top-up' or set extension mattes that no one will ever want to hang on their wall. Certainly the old-

school matte painters wouldn't hesitate to scrape off the work to reuse the glass for another shot.



Picture 94: Nick Catell, “The Hobbit” Matte Painting example.

-Do you think that the ongoing association of traditional and digital techniques should be seen as two opposites in the cause-effect relationship, or should it be considered as the mutual support of different techniques?

It's a continuum. We use whatever techniques best serve the work at hand, and best help us deliver it according to the brief, on time and on budget. 50 years ago we would have been pasting photo blow-ups onto glass and painting over them. 20 years ago we were photo-bashing in Photoshop and projecting onto cards in Maya.

Now we build a procedural terrain based on DEM data in Houdini, scatter Speedtree assets onto the terrain, light it with a synthetic sky IBL generated in Terragen, render in Clarisse, and composite in Nuke. Albert Whitlock, Peter Ellenshaw or Percy Day would also be using cutting-edge technology if they were working today.

-What are your suggestions for the young people who are interested in Matte Painting art?

Get a copy of 'The Invisible Art' Read it a lot. Check out sites like this:

<http://nzpetesmatteshot.blogspot.com/?m=1> Develop your knowledge of the greats, of history and also of what's going on now. 'Matte Painting' per se is slowly fading away as it becomes easier for anyone to produce feature-quality imagery at home with off-the-shelf software. If you want to work in visual effects making environments: skill-up on the techniques and software used to create environments. Get the PLE versions of programs like Clarisse, Nuke, Houdini... work it out! Do some concept art for a cool environment, and make it! There's so many resources out there that the only limitation, the only excuse not to, is you.



Picture 95: Nick Catell, "Batman Vs Superman" Matte Painting example.

Make mistakes, own them, learn from them. Don't be afraid to be wrong. Keep asking questions. If you really want to do it, you will find a way. If you're good, have a bit of talent and a lot of dedication, persistence and determination, you will make it. Also range widely in your interests. Don't just consume pop culture, delve deep into history, art, literature, sciences and humanities.

5.1.5.Romain Bayle

-Would you please explain a little what is your occupation and what is your professional title? For people who do not know anything about your occupation.

I'm freelance senior matte painter and concept artist. I've been in the movie industry for more than 20 years. As a matte painter from almost the beginning of my career, I worked on more than 80 shows, from very small budget movies to very huge ones, but the pleasure of creation is the same. I received a VES award for the work on Changelling. I art directed the creation of Los Angeles in the 20s. Fun work! Now I'm specialized in offsite work from my home studio in Canada.

-How did you start to work in your field and what are the factors which helped you to specialize?

I started matte paintings while on Spy kids. We needed to create some backgrounds, so I painted some versions to get approval from the client. And without

knowing what was matte painting. I later did a few more! I specialized in matte painting because it brings painting, 3D and compositing together to create images. I found it was much more fun to use all the tools available rather than just one.



Picture 96: Romain Bayle, “Resident Evil Retribution” Matte Painting example.

-How would you describe the Matte Painting technique in visual arts?

Digital matte painting is all about creating a seamless transition into a live action plate in a way that is undetectable with digitally generated elements and a highly trained eye to add photorealistic touches.

-How did you learn this technique, did you learn it yourself, or did you get educated academically, and if so where?

I learned it by myself, coming from traditional arts helped a lot, as well as photography and 3D.

-In your work, what are the methods and tools that you utilize?

My workflow is very simple. The plate is used as a reference for color and light, then the digital matte painting is heavily based on paint with CGI elements integration and photos to blend it perfectly. I use Photoshop, XSI, Blender and Nuke. Photoshop is where everything happens before being extracted in layers to go in Nuke as a flat digital matte painting, 2.5D or 3D reprojected onto geometry, depending on the camera move.

-How would you describe the differences between traditional Matte Painting and Digital Matte Painting? Would you like to share the advantages and the disadvantages of these with us?

Traditional matte painting simply doesn't exist anymore. I totally respect what has been done and honestly I would have loved doing traditional mattes! But it changed so much since these days, it's all done on computer now. It's faster, modifications can be done much more easily. And most of the time the digital matte painting is projected back onto Geo to be animated in a 3D space.



Picture 97: Romain Bayle, “300: Rise Of An Empire” Matte Painting example.

- How do you think that Matte Painting has changed in the process of the transition from traditional to digital? And what are the effects on the art viewers?

Digital matte painting is a very powerful tool to help pushing the shot even further to the realistic world. It helps creating director's vision of impossible world or more simply it helps the process of shooting in specific environment that could be hard to find in real life. Digital matte painting changed a lot the same way shooting movies changed. We have much more control now in every step. So directors can fine tune their shows exactly as they want. All this to create awesome visuals in movies.

-In recent times, it is observed that matte paintings are used much more by graphic designers. What do you think about the positive and negative effects of this?

I'm not aware that digital matte painting is used much more by graphic designers. It lives in movies, commercial, video clips... Sometimes in printed adds, so maybe that's where it's used by graphic designers. The digital matte painting can be seen an illustration and can be representing whatever we want, so why not use it in many scenarios.



Picture 98: Romain Bayle, “Sin City” Matte Painting example.

-What could you say about the artistic value of works designed in the digital environment as compared to matte paintings made before the digital technique was developed?

That's a hard one...Sometime I feel like things are overdone compared to shows with traditional mattes. Back in the days, a matte painting was carefully and slowly painted to be part of the film, now it's getting more and more technical, maybe less artistic in a sense. And we want huge camera moves to reveal gigantic scenery. I still prefer a static frame showing a beautiful painting with tons of mood!

-Do you think that the ongoing association of traditional and digital techniques should be seen as two opposites in the cause-effect relationship, or should it be considered as the mutual support of different techniques?

As I said before, it's getting more and more technical, we're probably losing too much of the artistry in the process. But a good matte painter will blend the technical part and the creative part in an image, and that's the beauty of digital matte painting. Both are needed to succeed.



Picture 99: Romain Bayle, “Outlander” Matte Painting example.

-What do you think about the future of the Matte Painting in academic and sectoral aspects?

If it's well taught it can be very helpful for the industry to get more artists, but matte painting is a long and slow process to learn. A matte painter needs to know traditional painting, understand colors and light. 3D is also a needed tool (from modeling to rendering), the painter needs to understand movie creation. And finally Comp is another must in the tool box, so it's a lot to master.

-What are your suggestions for the young people who are interested in Matte Painting art?

Work, work, and work more :) The more shows you do, the better you know. And working on personal creations is very important, that's how you'll try many many

different ways to do things until you find your own workflow. And it helps building a more diverse portfolio. A lot is needed to become a professional matte painter but at the end you're creating movie magic! So keep painting!

5.1.6. Stefan Bjørnfort fort Bernsherer

- Would you please explain a little what is your occupation and what is your professional title? For people who do not know anything about your occupation.

Right now I work as an environment artist, so I produce environments, either in 3D or 2D. But for now I mainly do 2D matte paintings, that means I paint or photobash background or elements needed in Photoshop.

-How did you start to work in your field and what are the factors which helped you to specialize?

I switched from compositing to matte painting, where I took some courses on CGMA, to help me specialize in matte painting.

-How would you describe the Matte Painting technique in visual arts?

There are many techniques, but the main one is painting / photobashing in Photoshop and then setting up projections in either Maya or Nuke onto 3D geometry to get the parallax and make it into a video.



Picture 100: Stefan Bjørnfort Bernscherer, “HellBoy” Matte Painting example.

-How did you learn this technique, did you learn it yourself, or did you get educated academically, and if so where?

I already knew quite a lot about setting up projections, 3D and compositing in general, since my original background before I did compositing was a 3D generalist, a education I took at a craftsmanship school back in Denmark. But I had to take some courses to be able to make the switch to matte painting, so I took introduction to matte painting on CGMA and advanced matte painting.

-In your work, what are the methods and tools that you utilize?

As a matte painter, you have a wide range of tools, spanning from 3D software to whatever you need to get the job done, to create just that thing you need. My toolset, ranges from Adobe Photoshop, Maya, Worldmachine, Zbrush, Mari, Nuke, Gaea and Vray as a render engine.

-How would you describe the differences between traditional Matte Painting and Digital Matte Painting? Would you like to share the advantages and the disadvantages of these with us?

As I have never done any traditional matte painting, I can't really speak about that, it was before my time. But one of the advantages of digital matte painting is that you can easily fix issues, and undo things.

-How do you think that Matte Painting has changed in the process of the transition from traditional to digital? And what are the effects on the art viewers?

It has changed, in that form, that anybody that has access to Photoshop can learn it, where in the old days you needed to have someone to teach you about painting and the different paints, brushes. I don't think it has changed that much for the viewer. The effects in movies in general looks better and better, and the same is true for the matte paintings, but that is just because of the technological advances.

-In recent times, it is observed that matte paintings are used much more by graphic designers. What do you think about the positive and negative effects of this?

I haven't noticed it more than usual. But I don't think it has a negative effect, as it is two different mediums, moving pictures and games vs graphic design.

-What could you say about the artistic value of works designed in the digital environment as compared to matte paintings made before the digital technique was developed?

You had to be a way better artist back in the day. I am still amazed every time I see some of the old matte paintings from movies. You really needed to know what you were doing, and have a good core toolset and understanding of light color and perspective. Where nowadays we have some tools to help us with that.

5.1.7. Jeff Bedrick

-Would you please explain a little what is your occupation and what is your professional title? For people who do not know anything about your occupation.

After many years in fine art, illustration, graphic design, animation, VFX, and game design, I currently do all these things on occasion. However, I have two staff job titles at the moment: Instructor of Digital Matte Painting at a major San Francisco art college, and Designer at a large marketing agency specializing in mobile ads.

-How did you start to work in your field and what are the factors which helped you to specialize?

In my early career, I was creating original paintings in traditional media for galleries and print publications. Many twists and turns over the years in many different directions of visual art, all of which are now a part of my repertoire. Matte painting is only one of many of these skills. So, the honest answer is that, I never strove to specialize. Instead, I continually acquired a wider assortment of skills and experience for increased versatility.

-How would you describe the Matte Painting technique in visual arts?

I teach a 15 week course that attempts to answer this question. In a nutshell, matte painting as it is currently used is a specialized form of digital illustration that requires the ability to paint realistically, and integrate photographic or cinematic elements seamlessly.

-How did you learn this technique, did you learn it yourself, or did you get educated academically, and if so where?

I was a fairly accomplished traditional illustrator who had started using Photoshop for my illustration work in addition to traditional media when DreamWorks accepted my application to come on board as a digital matte painter during the production of Shrek 2.

There, I hit the ground running and learned much more about the technicalities of the matte painting production pipeline in a major CGI animation studio.

-How do you think that Matte Painting has changed in the process of the transition from traditional to digital? And what are the effects on the art viewers?

Like the previous question, the digital process is much more efficient. Matte painting is called “The Invisible Art” because it should not be detected by the audience when it is done well. Digital techniques make this much easier.

-In recent times, it is observed that matte paintings are used much more by graphic designers. What do you think about the positive and negative effects of this?

Matte paintings are created for use on screen in films, so I’m not sure I understand why or how graphic designers would use them when their work typically focuses on logo design and print page layouts. I suppose it’s possible that a graphic designer might “borrow” a digital matte painting image as a background or inset in a page design as if it were just another stock photo, but I’m not sure if that’s what you mean.



Picture 101: Jeff Bedrick, “Shrek 2” 3D Matte Painting example.

-What could you say about the artistic value of works designed in the digital environment as compared to matte paintings made before the digital technique was developed?

Some people may be of the opinion that a work created in traditional media has greater artistic value than a work created in digital media. That’s fine, but it depends on how you are defining value. If it does the job of creating a convincing scene on film, then that’s the purpose for which it was created. Digitally created work is used almost exclusively these days for that purpose, for reasons stated previously. However, an original, hand-painted matte painting on glass or other surface is a tangible artifact that will probably have greater collectible value in a gallery, even though that wasn’t its

original purpose. As to the question of whether there is an intrinsic difference in artistic quality between traditional and digital, I'd say that the only answer to that depends on the skill of the artist in either medium.

-Do you think that the ongoing association of traditional and digital techniques should be seen as two opposites in the cause-effect relationship, or should it be considered as the mutual support of different techniques?

No. Would you say that an electric guitar is the opposite of an acoustic guitar? Of course not. One evolved from the other. There's no competition between them. However, in the case of matte painting, digital tools have pretty much completely displaced traditional techniques for all the reasons I mentioned.

-What do you think about the future of the Matte Painting in academic and sectoral aspects?

As an instructor of matte painting, I don't expect it to go away any time soon. However as tools and techniques advance, matte painting will encompass a broader set of skills including compositing, animation, match moving, camera projection, as well as new tools and techniques still on the horizon.



Picture 102: Jeff Bedrick, “Shrek 2” 3D Matte Painting example.

-What are your suggestions for the young people who are interested in Matte Painting art?

Let go of any preconceptions you may have about what you think matte painting is (or once was), and expose yourself to the reality of how it is practiced these days. If it is then still of interest, then spend as much time as possible developing your realistic digital illustration skills. That is 99% of good matte painting. The other 1% is some technical knowledge about formatting your work so that it can be seamlessly composited with other elements in a shot.

6. MATTE PAINTING ART IN THE ACADEMIC FIELD IN TURKEY AND THE WORLD

In our current time period, digital matte painters have been involved in a new adaptation process together with the emergence of revolutionary and different tools and software. Just as traditional matte painting techniques have been replaced by digital methods over the years in the past, digital paintings generated with "2D" two-dimensional methods have gradually started to be replaced by "3D" three-dimensional digital software. Tools that can now process "3D" three-dimensional objects have begun to be added in pixel-based two-dimensional applications like Photoshop. Applications such as Photoshop together with applications like Cinema 4D or Vue have made the use of digital matte paintings more interesting and more fertile. In today's industry, a single artist can create a concept artwork, develop a scene and animate it in a three-dimensional environment. The art of matte painting -which minimizes costs and provides a realistic visual illusion, and dispenses with the need for for plateaus and agencies where dozens of designers work- has been used for years throughout the world, but still has not found the sectoral and academic value it deserves in today's Turkey.

Nowadays, one of the most important factors in the film industry's inability to go beyond a certain concept is that visual effects and related productions are far behind the world. One of the biggest reasons for this is that the art of matte painting cannot find a place for itself academically. As a result, our country cannot gain educated and aware matte painting artists. This part of the thesis includes opinions and ideas about how the

art of matte painting is in the sectoral and educational fields in our country, and how it can be integrated.

6.1 The Place of Matte Painting Art in the Sector and in Education in Turkey

Matte Painting -which is a branch of painting- is a multidisciplinary art form that has contributed to the development of many art branches, especially the cinema sector, photography and graphic arts, which have seen many changes in their development process of more than a hundred years.

Although matte painting art has developed from the end of the 19th century to the present day within the framework of the global film industry, the value of this art hasn't been appreciated in our country due to material, technical and academic impossibilities. Talented artists have started to work with big production companies abroad, due to the lack of production and training opportunities in the cinema and advertising industry. This has led to the lagging behind of the labor force regarding technical and hardware education in our country. Although the art of matte painting is very widespread around the world, in our country, many production companies have begun to use the techniques of this art in their infrastructure with recent investments made in this technology. The art of matte painting is now in demand in TV series, movies and commercials, but it has not found a place for itself academically in our country. Since the field of education regarding this subject is very limited and not at an academic level, work undertaken in the sector pass through the master-apprentice relationship or via the hands of a very few

number of matte painting artists who have developed themselves. This situation also creates concerns regarding the development of the art, both as an art field as well as sectorally - in "cinema, television, advertising, etc.". Successful works have been undertaken in the field of visual effects in Turkey in recent years, but it is a fact that there will be a need for professionally trained and well-equipped artists in the future. The way to achieve this is to determine the place of matte painting art in education and art.

6.1.1. What Type of Skills and Education is Needed?

The most important element within the scope of matte painting education in our country is to teach the traditional drawing discipline and the basics of painting. The artist's mastery of drawing principles, beginning from knowledge regarding light and perspective rules, plays an important role in this process. Before moving on to detailed topics, the artist must learn to draw basic three-dimensional geometric objects, and comprehend how these objects will be placed in the space, in the early stages of education.

It takes a certain process and time for a matte painter to bring his skills to the highest level. The artist's undertaking outdoor painting (plein air³³) for landscape paintings will both help him test his skills, and using techniques such as watercolor and acrylic in an environment where light conditions change rapidly will be valuable

³³ Plein air (Outdoor Painting): In French: En plein air - outdoors. In a narrow sense, landscape painting done directly in nature, outside of closed spaces such as the painter's workshop. In a broad sense, the intense feeling of open air in landscape paintings.

practices for his work in digital environments. In real life, there are no color selection tools and ready-made color palettes as they exist in digital programs. For this reason, the artist will have to rely on his visual knowledge and develop it in exercises performed with traditional methods. While the artist examines nature and structures, he will also be able to read and understand the old masters, and with the training he receives from competent academicians, the artist will be able to lay the foundation for more knowledgeable and aware studies regarding his work. After basic art education, a matte painter must have knowledge of different fields such as photography, photo manipulation, use of 3D software, and graphic design. The art of matte painting, which has been constantly advancing since the beginning of cinema, will create many different techniques with the progress of technology. For this reason, it is essential to adapt the education curricula of the departments -opened under the name of matte painting- to the development of technology and innovations in art. After completing basic art education, the artist's digital painting skills should be focused on. A matte painting artist must follow technological developments and all new software. Manipulated photographs and digital paintings will be processed to create realistic backgrounds, and they will come to life in virtual environments with the assistance of computer graphics software. In order to realize these, the artist will need to be able to utilize a wide spectrum software and have an artistic background.

The matte painting artist will require 3D skills in addition to 2D skills, and has to be familiar with modeling software commonly used in the sector like 3DS Max and Maya. The artist also should be able to use the Nuke program, which is an assembly tool

that has begun to be widely utilized in the sector for 2.5D³⁴ (parallax) environments. This software is be utilized when adding camera movement to the completed matte image and also placing the final composition on a 3D model. Using the programs listed here effectively will ensure that you have more information on matte painting works, and also be one of the sought-after artists in the sector. The matte painting artist works in many business lines in a multidisciplinary work range, including "concept design, illustration, 3D space design, animation, etc.". Today's Matte Painting artists use different digital matte painting techniques while creating digital matte paintings, from hand-crafted artwork to manipulating photographs. As can be understood, the process of a matte painter developing himself and establishing a presence in the sector is challenging and labor-intensive. The best way of carrying on this process will be by determining the place of the matte painting art in academic art schools in Turkey.

6.1.2. Planning of the Academic Education Process

In Turkey there are very limited academic education programs focused on matte painting art, but there no academic departments in this field. To overcome this problem, a curriculum was prepared that contains all information that will help Digital Matte Artists

³⁴ 2.5D Animation: Two-and-a-half dimensional animation (2.5D) is the technical term used to define the technique that aims to make a 2D space or image appear with 3D attributes. Animators achieve this appearance by manipulating the scenes strategically with tools like layering, shading, perspective adjustments, and transformation.

in their training as required. To give an example, Adobe Photoshop is the principal software used among matte painting programs.

However, the prepared curriculum doesn't only have the objective to show how this software works. The contents of the curriculum are designed to teach students the techniques and procedures regarding projects used in real production environments. The content you will see in this section is designed to offer students the opportunity to learn the art of matte painting thoroughly and develop their skills to reach a professional level. Depending on the differing expertise of artists, matte painters are divided into categories within the sector. Some matte painters can specialize on 2D, 2.5D or 3D disciplines in the prepared training program. The education curriculum required to train well-equipped Turkish matte painters in the future was prepared in this section. You can examine the prepared work in detail.

VFX

Digital Matte Picture I

Digital Visual Effects Draft - Semester: x

Credits:

Course Format: 15 weeks

Prerequisite:

6.1.3. Digital Visual Effects Mission

The primary mission of the education program is to offer students an exhaustive artistic and technical education, and prepare them for artistic creation and production in the visual effects field. The program aims to promote critical thinking, collaboration and professionalism among the participants. By means of an innovative teaching system, partnerships on the local and international levels as well as high standards of academic excellence, the visual effects education program intends to create a strong basis for the long-term success of students in the film and television industries.

6.1.4. The Objective of the Course

In this course, students will become acquainted with the art and science of digital matte painting. Traditional and digital matte painting art will be reviewed and a general overview will be presented. Students will utilize digital tools in order to create matte images that fit the atmosphere and lighting of the film footage. The course will underscore the utilization of digital painting and photomontage techniques in generating matte images that are fit to use as background plates in the film making process.

6.1.5. Instructional Learning Outcomes

- Students that complete this course successfully will be able to plan and design digital matte paintings matching with live action footage.
- Ability to create customised digital images by using photographs and digital painting techniques.

- Combining digital paintings with photographic images.
- Analyzing and creatively resolving composition and lighting problems related to creating and painting digital matte images.
- Reviewing when and where digital subjects are used effectively in film making.
- Carrying out digital painting tasks efficiently in a specific time frame.
- To be able to work cooperatively for group projects within the production hierarchy.

6.1.6. Course Content:

1st Week:

- Introduction to matte painting for film projects.
- Study and analysis of successful matte pictures in film making.
- Introduction to digital painting tools (brushes, layers and blending modes).
- Assignment 1: Layered painting.

2nd Week:

- Color theory for digital matte images (visual perception and computer color models).
- Color selection and understanding color saturation in the real world.
- Perception of life by the human eye via photography.
- Digital painting techniques (color blending and brush control, form and volume generation).
- Assignment 2: Color mixing and painting techniques.

3rd Week:

- Color theory: similar and complementary colors, color matching and simultaneous contrast.
- Inspection and evaluation of surface properties (matte and glossy surfaces).
- Assignment 3: Still life painting.

4th Week:

- Inspection and evaluation of surface properties (translucent, transparent and metallic surfaces).
- Digital painting and lighting work (creating mood via lighting).

5th Week:

- Perspective correction and painting techniques in matte painting: one-point air, two-point ground level and three-point building.
- Assignment 4: Photo collage and color composition (converting day into night).

6th Week:

- Photo adjustments for day and night.

-

7th Week:

- Composition and design in matte painting.
- Rule of thirds, golden ratio, contrast and focal points.

8th Week:

- Determining and solving problems regarding contrast, color balance and resolution.
- Painting realistic details: dust, dirt, scratches.

9th Week:

- Criticism and assessment regarding the work done in the previous week.
- Assignment 6: Painting a landscape.

10th Week:

- Criticism and assessment regarding the painting made in the previous week.
- Assignment 7: Expanding a background plate (expanding a plate utilizing image and photo elements).

11th Week:

- Term Group Project: Creating a comprehensive visual effects shot.

12th Week:

- 14th Week: Term Group Project: Project review and criticism for the 1st week.
- 15th Week: Term Group Project: Project review and criticism for the 2nd week.
- Term Group Project: Project presentation and review.

Evaluation Profile

Class Attendance: 10%

Perfect: A + 95-100 A 90-94 A- 85-89

Good: B + 80-84 B 75-79 B- 70-74

Average: C + 65-69 C 60-64 C- 55-59

Minimum Pass: D 50-54

Fail: F 0-49

Assignment 1: 5%

Assignment 2: 5%

Assignment 3: 10%

Assignment 4: 20%

Assignment 5: 5%

Assignment 6: 5%

Assignment 7: 10%

Term Project: 30%

Total: 100%

6.2. The Place of Matte Painting Art in the Sector and in Education in the World

With the fast development of digital technology in the new century, the art of painting has gained a new appearance. The entertainment and movie industry has left the traditional art of matte painting behind, and allowed the era of digital visual effects to arise. In these times of the digital era, traditional methods have lost their validity in the sectoral and academic fields. With advances in digital technology, many different learning paths have been established. Today, technology has made information accessible and transferable for people in different cultures without discrimination. And, thanks to digital technologies, education has now reached many parts of the world, and has become an irreplaceable part of all humanity. Digital artists who want to educate themselves via the digitalized education system can take a step towards a digital matte painting career by attending the design programs of various universities or a certificate program of an advanced online course through their country of residence.

In the current period, newly trained artists are now learning to integrate 3D computer concepts and 2D images to the same environment, within the curriculum of universities. With the emergence of various software like "Autodesk Maya", the animation and visual effects industry has made great advances in a short time. With the rise of practical software that reduces workload and cost as well as the fast development of technology, online courses, certificate programs and prestigious visual effects schools have opened in many countries around the world. Artist candidates graduating from these programs continue to further both their careers and the prestige of the school they have studied at, with their contributions in world-class productions and the awards they have received.

6.2.1. Certificate Programs and Online Schools

The art of matte painting, which was once utilized and learned only on movie sets, is now used as a specific design language by many artists. Before the digital age, there was no academy or establishment that provided training to a matte painting artist. A matte painting artist who wanted to find a place in the sector had to continue learning in a master-apprentice relationship, in addition to acquiring a solid artistic background. The educational process of matte painting was challenging, and there were not many employees in the sector.

In today's world, being a Matte Painting artist is now much easier and inexpensive with the development of digital technologies. Artist candidates can enroll in visual effects courses or in the undergraduate programs of important academies online, from their homes, and have the chance to receive training from matte painting artists who are famous in the sector. These educations are accessible online, with students from all over the world, in small classes (maximum 5 students). These personalized trainings offer a huge advantage for aspiring artists by allowing them to communicate with artists from major studios, regardless of their geographic location. The content of these courses teaches working with various aspects of the filmmaking process and combining different techniques, while at the same time aiming to develop the artist's industry standard software skills. The software included in the industry's leading online courses and their curriculum are listed below.

Software: Maya, Nuke, Photoshop, Houdini, Substance Painter, Unity, Toon Boom Harmony, and Unreal Engine 4.

Online Schools: CG Specturum, Gnomon, CG Mastery, Animation Mentor.

6.2.2 Visual Effects Schools

There are various visual effects academies who have gained prestige with their alumni and competent instructors around the world. In the world of education, student candidates can make wrong choices while researching a school, being influenced by advertising campaigns or alumni references on social media. To offer a solution to this

situation, The Rookies (35) Awards, which have been continuing since 2010, are being held so that non-professional artists can make a name for themselves. The Rookies is an institution that organizes competitions in many branches like animation, visual effects and illustration. Young artists participating in the competitions provide prestige to the school they are affiliated with as well as to their own careers. Today, art students can now choose the schools that have the most suitable criteria according to the student and school performances, based on the evaluations made by the juries on The Rookies website.

Visual effects academies include 30,000 square meters of computer labs, virtual reality labs, plateaus, art classes and greenbox studios. Tools used in film industries such as digital SLR³⁵ cameras, 4K cameras, cranes, and stage lights are available within the schools for their students to use.

6.2.3. Outstanding Visual Effects Schools

Some of the best schools and studios teaching around the world are listed below. A certain artistic competence is required to be admitted to the programs of the schools on this list. These schools are prestigious schools that have trained the leading artists of the sector, providing the students with the highest quality education.

³⁵ Digital SLR: DSLR (Digital single-lens reflex) is the name given to digital cameras which has changeable lenses, and which was redefined with the addition of the "D" -which stands for digitalization- before the old SLR cameras. DSLR cameras are cameras made with digital transformation and development that allow everyone to take more professional photos. In this way, non-professionals were also provided with higher quality images.

6.2.3.1. Gnomon

Gnomon was launched by visual effects artists, with support from renowned companies, in order to help meet the demand for well-trained creative talent in the growing digital entertainment industry. Gnomon has been training the world's best-equipped digital artists for two decades. There are various educational curricula for helping students reach their goals in the sector, according to their abilities. The institution offers rich education options via both undergraduate and vocational certificate programs, special courses for high school students and more than 100 individual courses to enable students to take part in different branches of the sector. Graduates are involved in blockbuster movies and computer games. Gnomon has partnerships with film and video game studios around the world, so that students can jump-start their professional careers.

Gnomon's training utilizes the most up-to-date software, hardware and techniques deployed in the production of visual effects. The trainings are given by the industry's leading professional visual effects artists. Gnomon carries the technical and production environment present in film and game studios into the school, thus helping students grasp the seriousness and work responsibility dominant in the visual effects sector.

6.2.3.2. Think Tank Training Centre

Founded in Vancouver in 2005, the Think Tank Training Center is a school that specializes in the latest software, techniques and technologies used by visual effects artists working in the film and video game industries. In 2018, Think Tank was ranked #1 in Canada and #4 worldwide regarding Game Development. The school is ranked 2nd in Canada and 3rd in the world in the field of Visual Effects. Think Tank's campus has unmatched mentoring programs aimed at providing prospective artists with experience in the visual effects industry.

The trainers at the Think Tank Training Center are world-renowned professionals with industry experience. In a sector where software and techniques are constantly developing, the school keeps itself up-to-date. The school's visual effects and game design programs use the latest software and techniques in order to meet the needs of the film, television and game industries. There are computer workshops, drawing and sculpture workshops, and game rooms on campus for students to socialize. There is also a large selection of reading material, including comics.

6.2.3.3. Lost Boys | School of Visual Effects

Lost Boys, an internationally famous visual effects school for 20 years, has specialized programs as well as diploma and certificate programs. The school's curriculum includes content like visual effects, information regarding lighting and image compositing. Students who graduate from the school have a 99% employment rate in their business careers.

Graduates can take part in projects such as high-end movies and computer games. The school also provides career training in high-quality visual effects and animation productions. One of the biggest advantages of the Lost Boys school is their offering students with a working environment that provides seriousness on par with the sector in their own studios. Through different projects, students are encouraged to find new solutions to the problems they encounter, and to learn continuously throughout the education process. The aim of these programs is to enable graduating students to achieve the highest level of mastery within a one-year period. The core of the curriculum includes project-based learning, simulating production models, creating portfolio content for the students' career, and adapting to individual educational goals. The school has full-time professional teaching staff in order to help students reach their high potential.

6.3. Career Opportunities After Education

When we look at the visual effects schools evaluated in general: they continue to support students who have successfully received education from leading artists and are entitled to graduate, in the field of career after academic education. Schools act as intermediary institutions for the agencies and companies they have contracted with, such as “Dreamworks, Marvel, Industrial Light & Magic, Walt Disney Animation Studios, Blizzard Entertainment³⁶ etc” so that students can work in the field they are suitable for according to their qualifications.

³⁶ Blizzard Entertainment: This is a California-based company that develops computer games. After launching the strategy game Warcraft in 1994, they became a world famous game company. Thanks

7. CONCLUSION AND EVALUATION

The year 1907 is an unforgettable year for the film and visual effects industry. Norman Dawn made his first attempt at matte painting on glass in his movie "Missions of California", and this monumental technique has been called "Matte Painting" ever since. As a result of chronological research, the roots of this technique has been determined to date back to the 15th century. The Matte Painting technique started with the invention of perspective, and over the centuries, took its modern form by developing with the help of optical devices like "camera obscura, camera lucida, magic lantern, peep-show" used for the entertainment and art sector.

The similarities between the first period examples of matte painting art and its modern uses in the last century and the mediums in which they are used -in terms of "theatre, stage shows, slide shows, painting art"-, largely overlap with today's modern cinema and painting art. Using what we learned here, we determined the place of matte painting in art, and its development process. In recent periods, matte painting, which is a multidisciplinary art discipline, has been used in many different disciplines such as advertising, illustration, concept design, architecture - in addition to the cinema sector. With the development of computer graphics software, the cinema and entertainment industry has left the traditional art of matte painting and reached the age of digital visual effects. In the early stages of the art, cinema was a technique learned through the master-apprentice relationship - nowadays, thanks modern technical facilities, academic

to the Diablo, StarCraft, Warcraft games and their sequels, they gained a large fan base in the fields of single-player and multiplayer video games.

institutions and certificate programs, cinema has begun to reach the artistic value it deserves, albeit a little, around the world. The art of matte painting, which has been used since the end of the 19th century, started to be used in our country in the early 2000s. Matte painting in Turkey is still in a very weak position when we look at the projects done around the world - due to the fact that competent artists cannot be trained with current academic and equipment deficiencies. There is a clear artistic quality difference between the productions made abroad and in our country in the matte painting, advertisement, game and cinema sector.

Although the art of matte painting is not very common in today's Turkey when compared to the rest of the world, it has recently begun to be used in the infrastructure of many production and film companies. The examples of Matte Painting in TV series, movies and commercials are increasing day by day, but this technique has not found a place for itself academically in our country. Since there is no specific training field or academy on this subject, work carried out in the sector are generally undertaken by a very small number of Matte painting artists who have developed themselves. This situation is causing concern in terms of development of the matte painting art field, as well as large sectors like TV series and advertising. Successful works have been undertaken in the field of visual effects in Turkey in recent years, but it is a fact that there will be a need for professionally trained and well-equipped artists in the future. The way to achieve this is to determine the place of matte painting art in education and art.

8. PROPOSALS

The art of matte painting, which has developed since the beginning of the art of painting and cinema and has reached the present day, is now used in many business areas with the development of technology "visual effects, advertisements, painting, cinema, etc." The art of matte painting, unfortunately, has been mostly ignored in our country when compared to the rest of the world. The art of matte painting promises hope for the future with recent series, cinema and advertisement works. Although the first digital matte painting example in Turkey was applied in the science fiction comedy G.O.R.A film made in 2004, it started to be applied in advertisements, movies and TV series over time - but productions and artistic applications couldn't gain sufficient momentum due to technical and academic impossibilities. One of the main problems in the development of matte painting art in Turkey is the education factor. We should aim that this art, which still does not receive the necessary attention in the infrastructure of the fine arts universities in our country, find a place in the education programs of fields such as painting, graphics, photography and sculpture. And there is a need for a training program suitable for the compartmentalisation of the technique in an individually planned way. The training programs of well-established academies and courses that have made a name in this field around the world should be examined, and their future adaptation to our country should be evaluated in detail. We should aim to contribute to the development of the department by enabling trained students to undertake research in these educational institutions so that they can become competent in the department as academicians. Universities should cooperate with the leading companies of the sector, and aim to

support the artists after the education process, so that students can build their careers after their education.

When we look at the world, we can see that the art of matte painting has been the mainstay of cinema, advertising, animation and many other industries for more than a hundred years. Unfortunately this technique has not yet received the full value it deserves in our country - in this study, in line with interviews made with local and foreign artists, ideas and suggestions were presented on how to adapt the art of matte painting to our country academically. In accordance with the information obtained, the place of matte painting techniques in art have been determined and added to the literature in order to contribute to the development of artists, students and academicians interested in this art.

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Appendix A: Matte Painting Application Examples in Turkey



Picture 103: Hüseyin Yıldız, “G.O.R.A.” Matte Painting example.



Picture 104: Hüseyin Yıldız, “G.O.R.A.” Matte Painting example.



Picture 105: Hüseyin Yıldız, 'Prometheus Descending' 2014



Picture 106: Eren Arık, 'Arif V 216' 2018



Picture 107: Eren Arık, 'Arif V 216' 2018.



Picture 108: Digiflame, 'THE MAGNIFICENT CENTURY' 2012.