MAIN AUDIOVISUAL ISSUES

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IMAGINATION

Professor Stanisław Wieczorek

Imagination, according to encyclopaedic definition, is images of objects and situations evoked in consciousness, without the influence of external stimuli. Reconstructive imagination is founded mainly on memor y processes. Creative imagination in the case of individual has not been defined. It is believed that it builds on knowledge, previous fantasies and experience. It is not known, what it exactly is.

Psychologists call it the ability to process and enrich traces of experience, create repre sentations of unfamiliar so far objects, situations and events. There is also the definition of creative imagination as fantasy. Artistic creation does not come out of nothing. In visual arts imagination is the primar y driver of activity. One who has vivid imagination, is capable of dreaming.

The grand sculptor Michelangelo Buonarotti used to believe in existence of the shape of the work concealed in a block of marble. He had imagination, he was able to see the figure of David. It is not enough to see, to see. So, what is imagination? French philosopher Gaston Bachelard wrote about this: "One always wants imagination to be considered an ability to produce images, but it rather is the ability to deform images provided by perception, and especially the ability to free us from original images by transforming them.

Without these transformations – the unexpected binding of images – there is no imagination, no process of imagining. If some image viewed at any given time does not evoke an absent image, if some random image does not evoke excess of side images – an explosion of images – there is no imagination, there only is perception or reminder of perception – the memory of things already known, habits of shapes and colours. Therefore the fundamental word corresponding to the concept of imagination is not image, but the act of imagining." In this statement Bachelard clearly contrasted and distinguished between imagination and perception, to the detriment of the latter. From my experience I draw a belief that perception is very important in creative processes, but I agree that in a creative act imagination comes first. This Andre Breton's quote is dear to me: "imagination is not an inherent human gift but an object of conquest. It is a tool of knowledge and a still-explored land. It is the fundament of art, which in turn is one of its cognitive tools. It is not, however, a part of art, it is a power-generating mechanism."

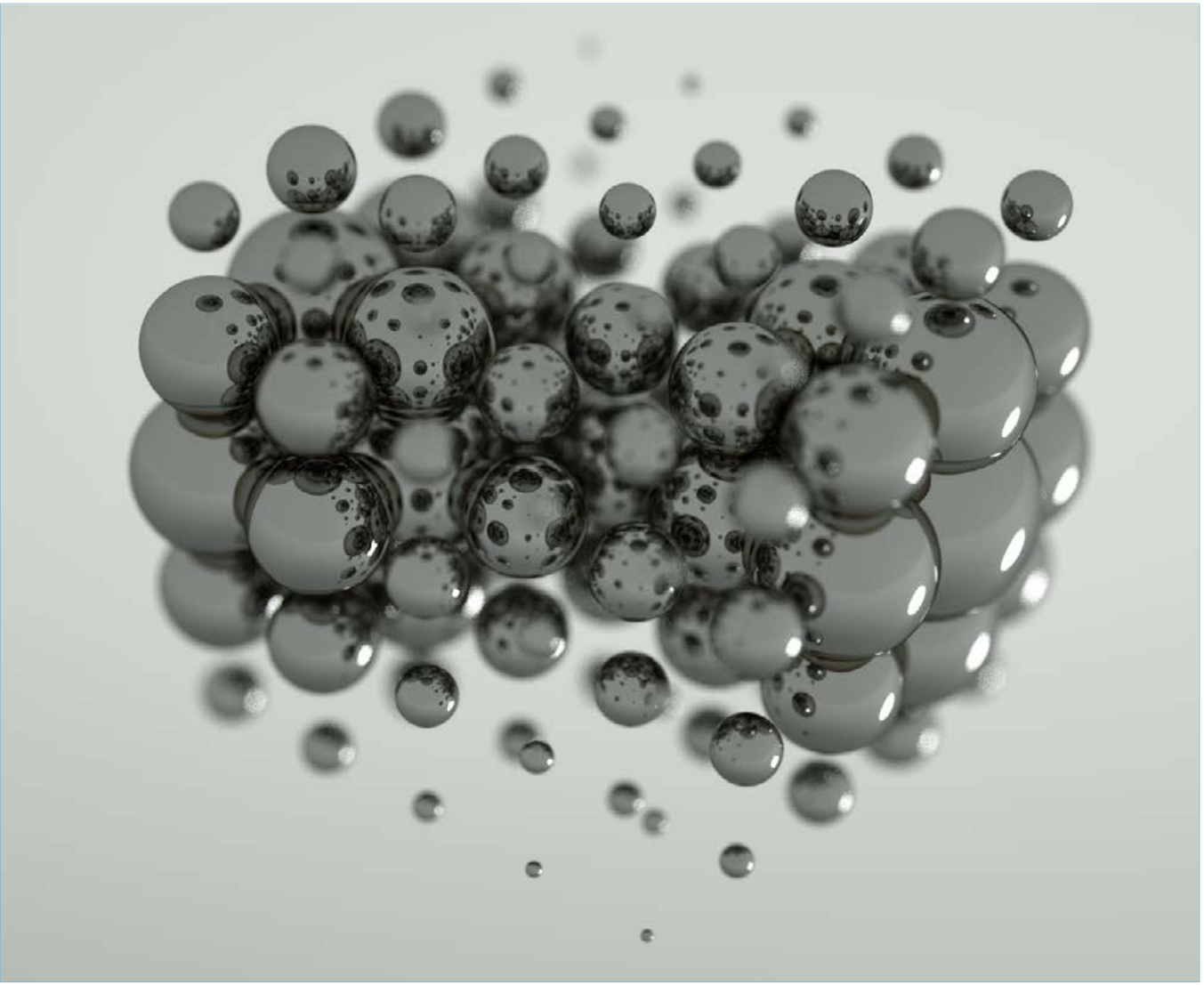
The statements cited above are consistent with my experience, but neither exhaust, nor fully answer the question. For a few thousand years humanity has developed communication systems which served as a foundation for dialogue. Ability to build temples or tombs, sculpting or painting, can be seen with one's own eyes. Egyptian pyramids, statues of ancient Greece or frescoes in Pompeii impress, and imagination fails when we try to answer how they were created or built. The equestrian statue of Marcus Aurelius in Rome up until today is an unequalled model. But I cannot tell whether a photograph of the statue, or a video, can substitute for a oneon- one encounter with this work of art. I was lucky enough to see in Palmyra a fragment of a sculpture attributed to Phidias and I stood there speechless. I have never seen such a beautiful tunic carved in marble. I desired to touch it, I asked the hosts for permission and I was happy, as only feeling of this piece of marble completed me, as the recipient, fully with the work of the great sculptor. Such instances cannot occur in modern museums anymore. Works of art are protected from devastation with thick armoured windows. The viewer is divided from an object by a fenced space, crowds of visitors make it impossible to contemplate. I am always tired and frustrated. Purchased albums, videos, slides or multimedia promotional sets are just commodities. Certainly the latest technology, digital image or sound, are not the media capable of replacing a personal encounter with sculpture or painting. Even the most perfect reproduction of Leonardo da Vinci's Mona Lisa cannot substitute for the spirit of the painting. Unfortunately, unmediated contact with the piece is given to only a few.

It is quite the other way around with art created using modern media. In my opinion, the first instance of such art was photography, then film, and now we are dealing with a real invasion of new disciplines of art founded on digital media. What are digital media and what is the role of imagination? One of the most important features of digital media is the possibility to manipulate the sources and that information can be filtered, improved, changed. Because sources are not based on materiality, but on subject-matter, limitations are dependent on logic. Sculptor working on a piece of stone has to have instinctive eye--hand coordination. "Digital chisel" will polish numerically defined stone, not marking it. Such an act rules out any intuition, the need of good eye and smooth hand. Here rather the software developer has to have imagination; a computer creates images not using traditional tools. Computers have revolutionised graphic design, animation, film.

Digital print gradually eliminates traditional techniques. It is universal, easy to use, what removes any barriers, including unfortunately the barrier of value. So far, imagination is replaced by computer software, thinking is limited to ability to compile.

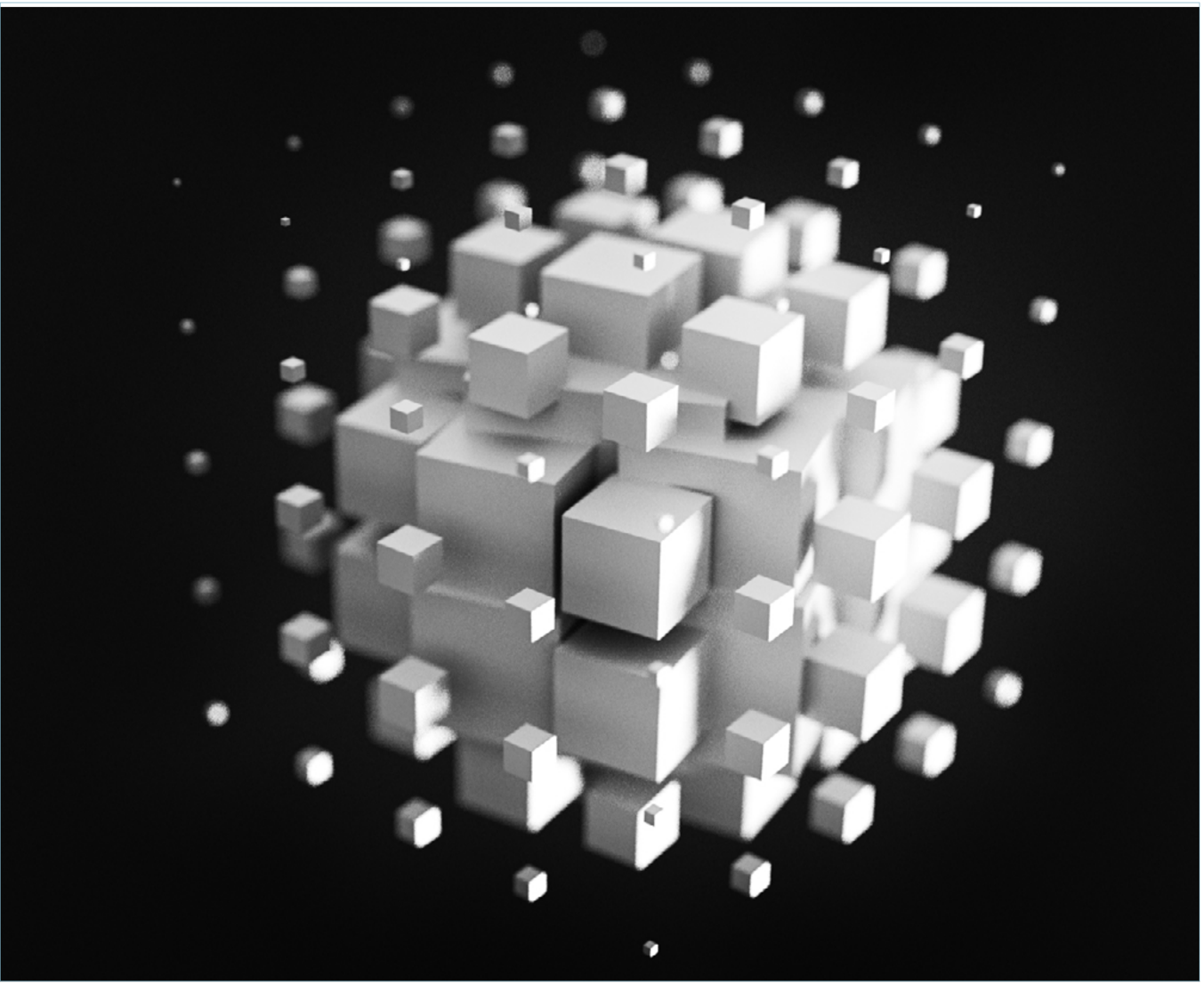
But I am an optimist, in a short time art will surprise us, as there in no progress in real art.

Jabłonna, 25 February 2007



Paradigms

We perceive the world through paradigms. We recognise what we already know. We select keys for the unknown. We customise incomplete contours to make them conform to our knowledge and sensitivity. We present entirely new experiences through negation, asunimaginable happiness, unspeakable pain, a breathtaking view, indescribable tragedies. Subsequent events of similar types are...?



Words

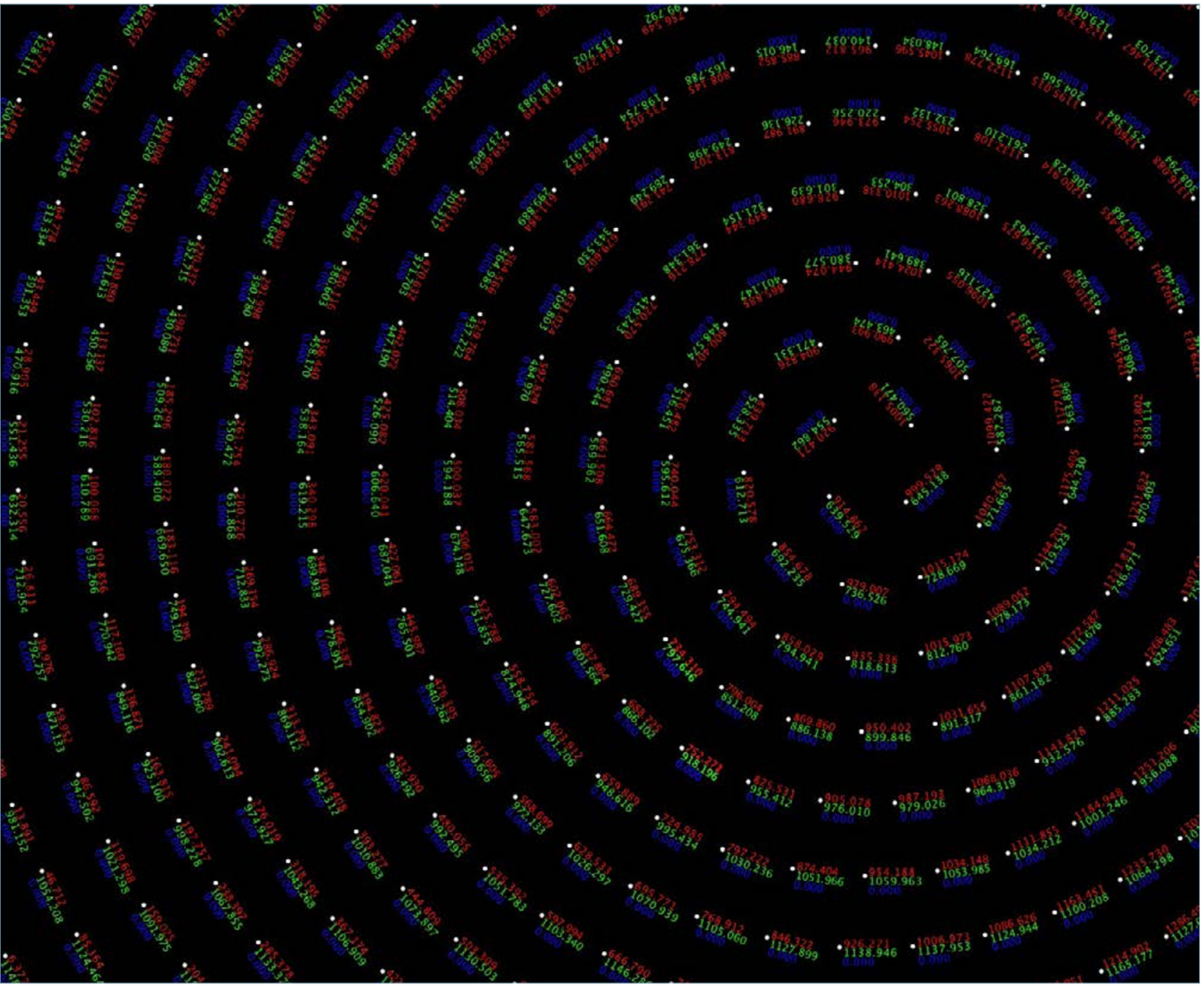
We describe what we can name. We recall a walk through a meadow. We notice and remember what we can name. The meadow was green, abundant with herbs and insects. The more words we know, the fuller and more precise our description. The grass was growing, mainly fescue and ryegrass. Bees were buzzing, flies were humming, a bumblebee was whizzing. Language establishes a community and makes sharing experiences possible. It prepares us to compare the new with the known, even if we do not experience it ourselves. Names that apply to various situations deprive a description of a lot of individuality. A simplistically described event may provide a paradigm for many different experiences.





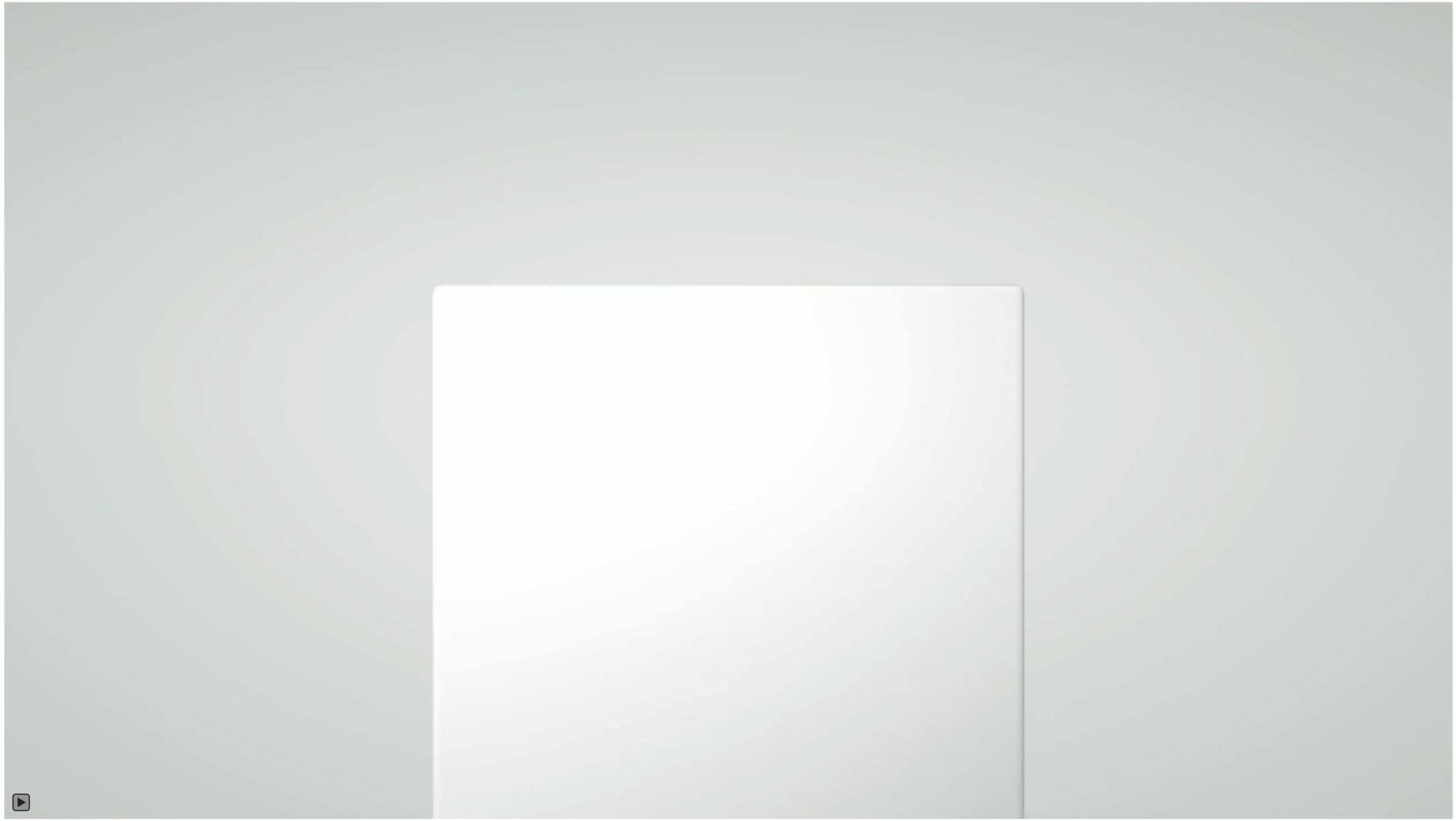
Structure and Meaning

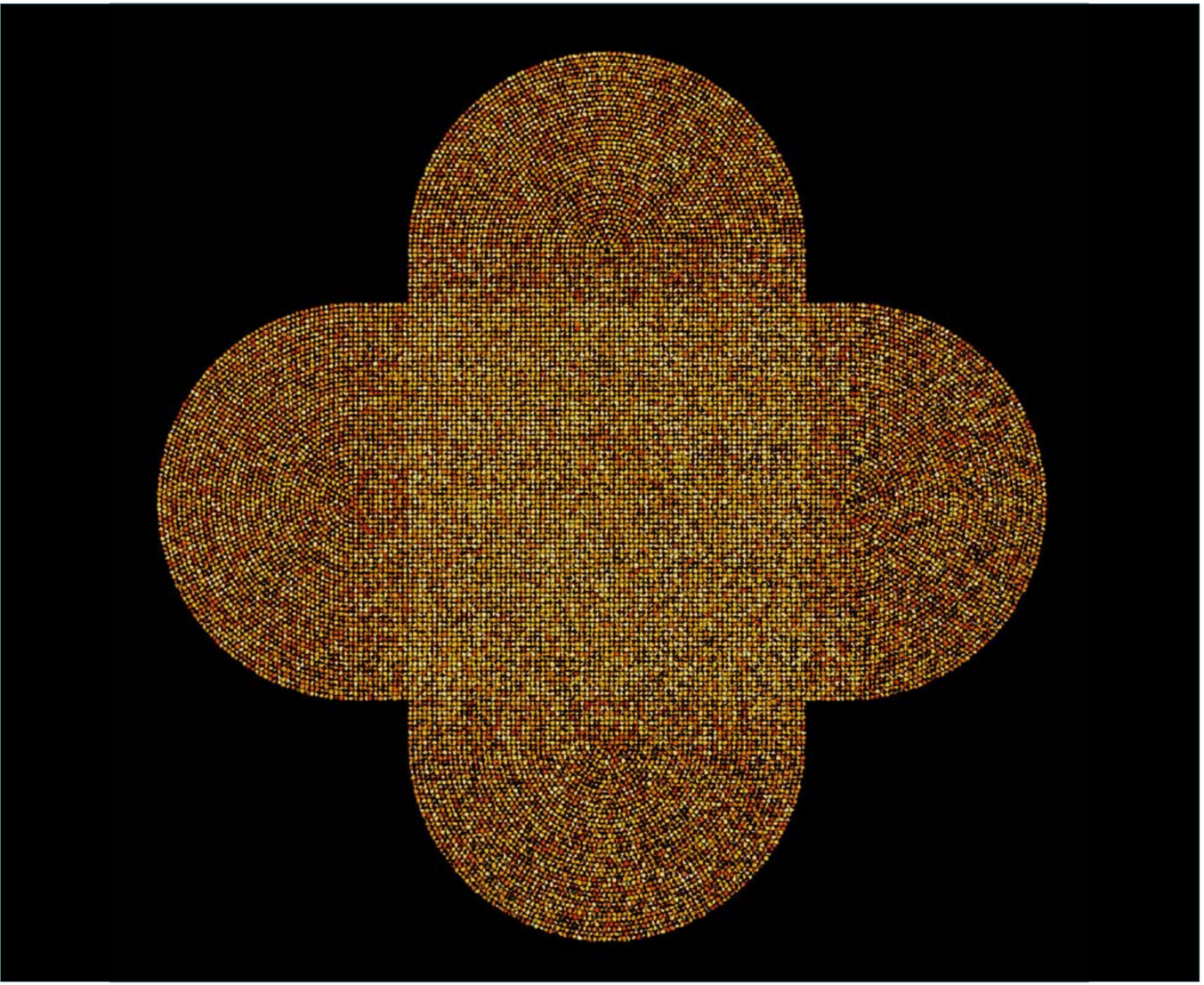
We recall images, scents and impressions through associations and descriptions. We recognise the meanings of words by associating them with situations in which they were used. We tie words into sentences, attributing them with a more precise meaning by using them jointly with others. Sentences form descriptions. We learn these new combinations, recognise their paradigms. We learn new names when we come across them where words we already know appear. Known words gain new meanings when we find them in familiar combinations where we never saw them before. We learn new structures seeing words we know in new combinations.



Analogy and Abstractedness

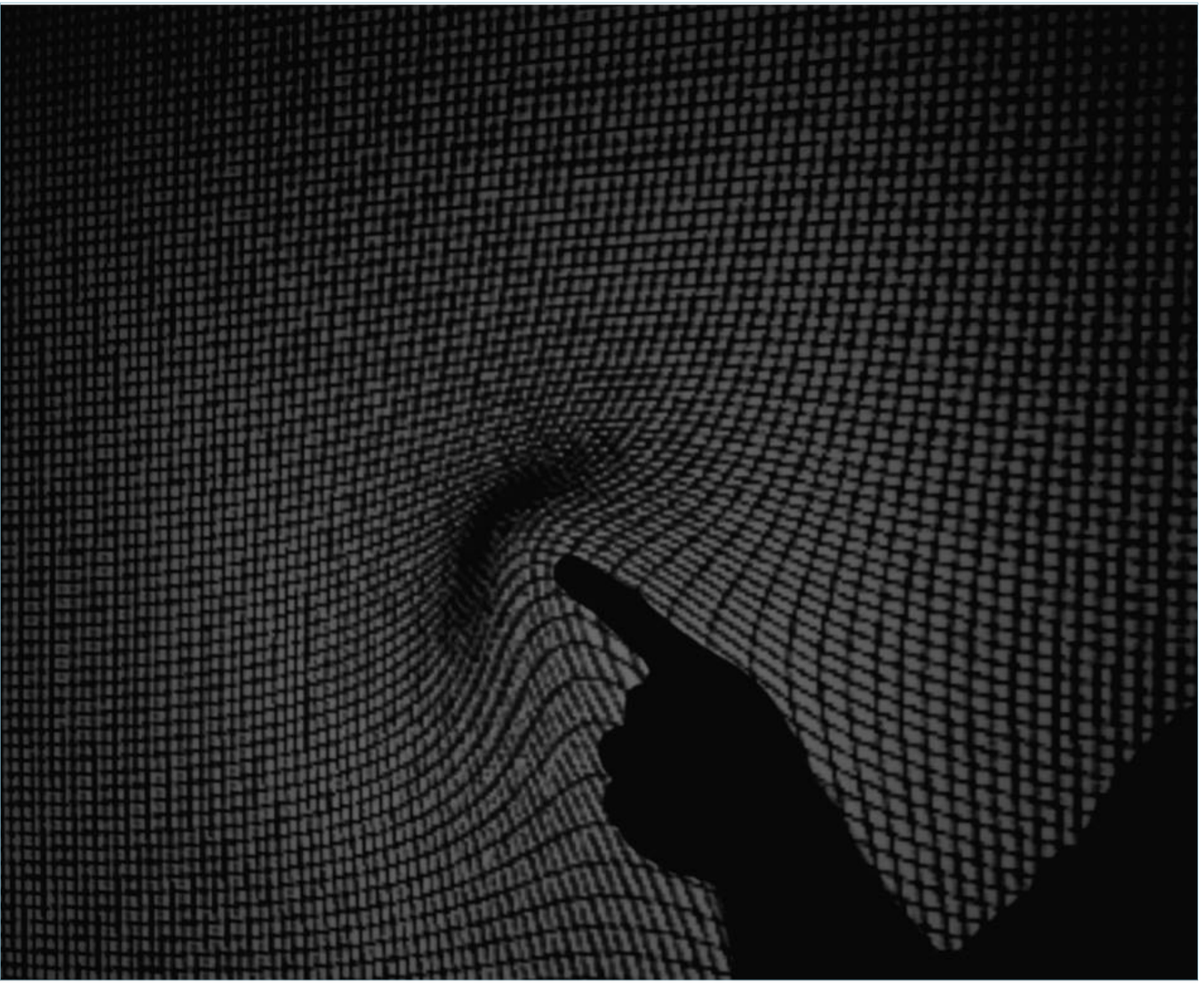
We can use language because we know how to compare and differentiate. Younger people have less experience, therefore they find more things new. They learn paradigms, names, meanings and contexts. Older people compare the new with what they have either already experienced or learned. They attribute names to differentiating features, combine and change contexts. We combine the phenomena we compare giving them a joint name. Our sensitivity enables us to differentiate. Our sagacity enables us to combine what is similar. We see objects of the same colour that we can name. We abstract colour as a feature these objects share. Observing many objects of the same colour that we do not know, we look for the name of that colour.





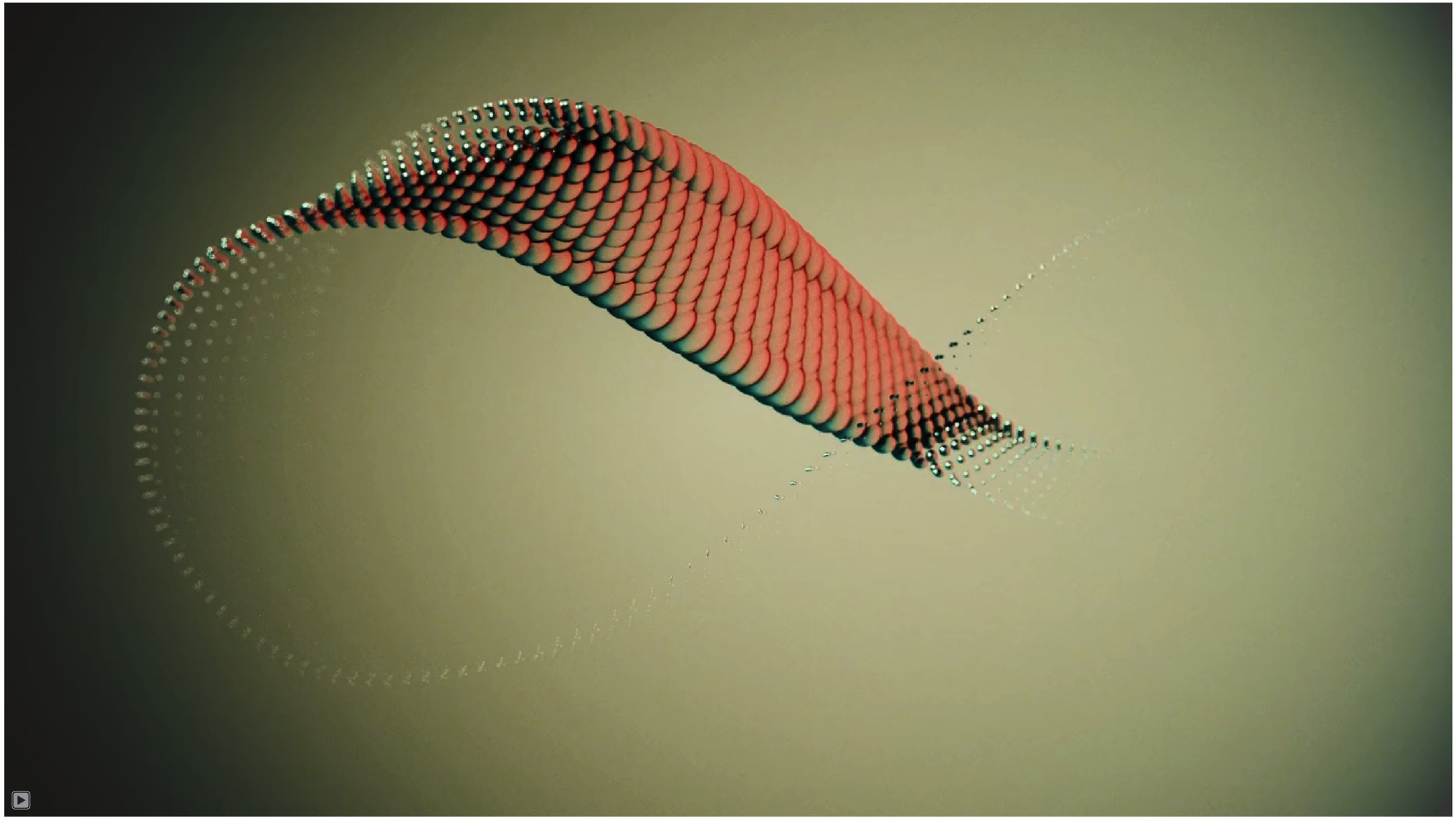
Symbols

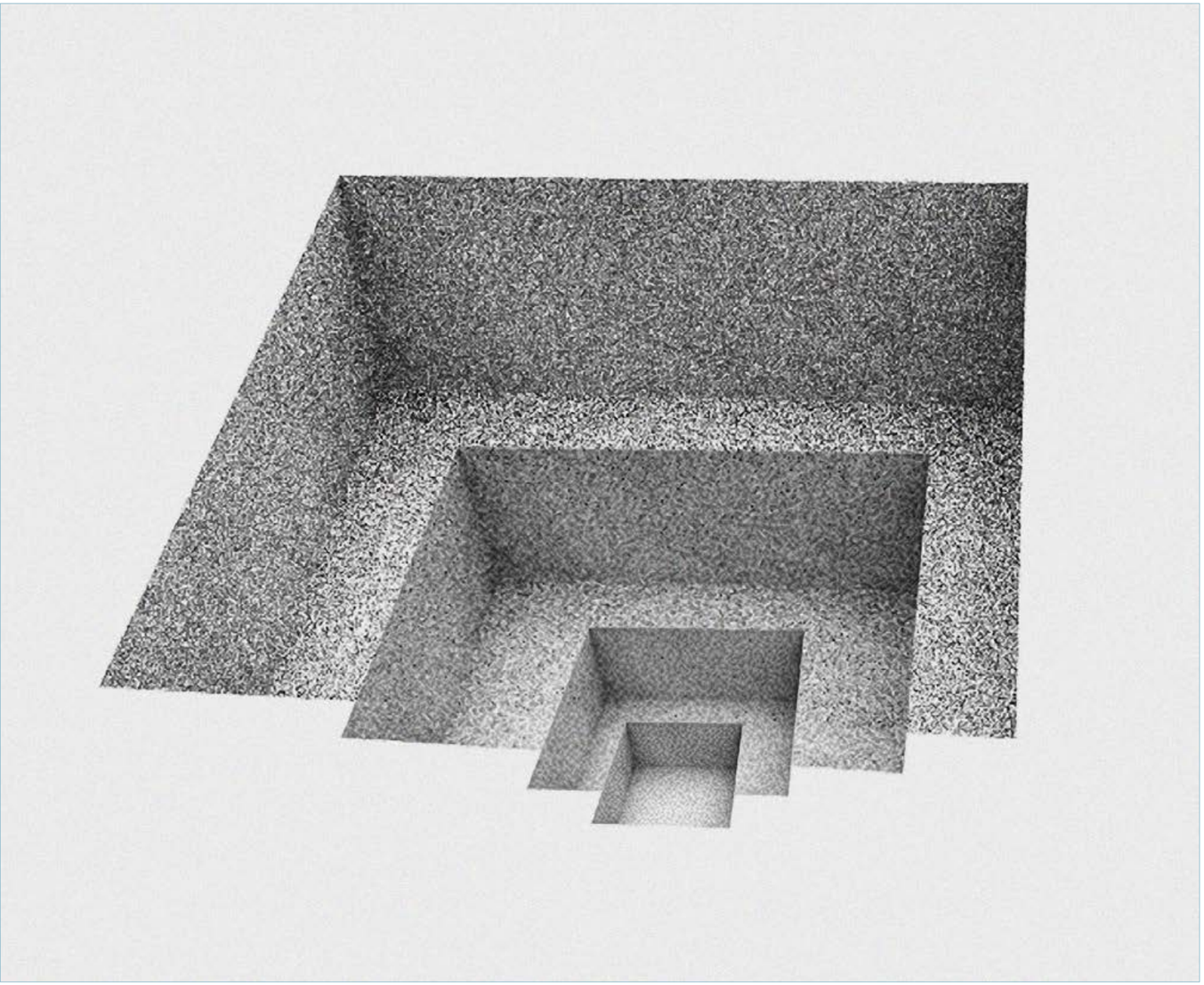
Symbols, or arbitrary designates of content and feelings, resemble names. Some symbols seem to be universally legible, others have a meaning only for few. Those who have mastered the language of symbols seem to see the reality they are meant to represent. Others recognise a reappearing sign without associating any hidden meaning. Incomprehension does not deject them, albeit they may find it irritating.



Artists

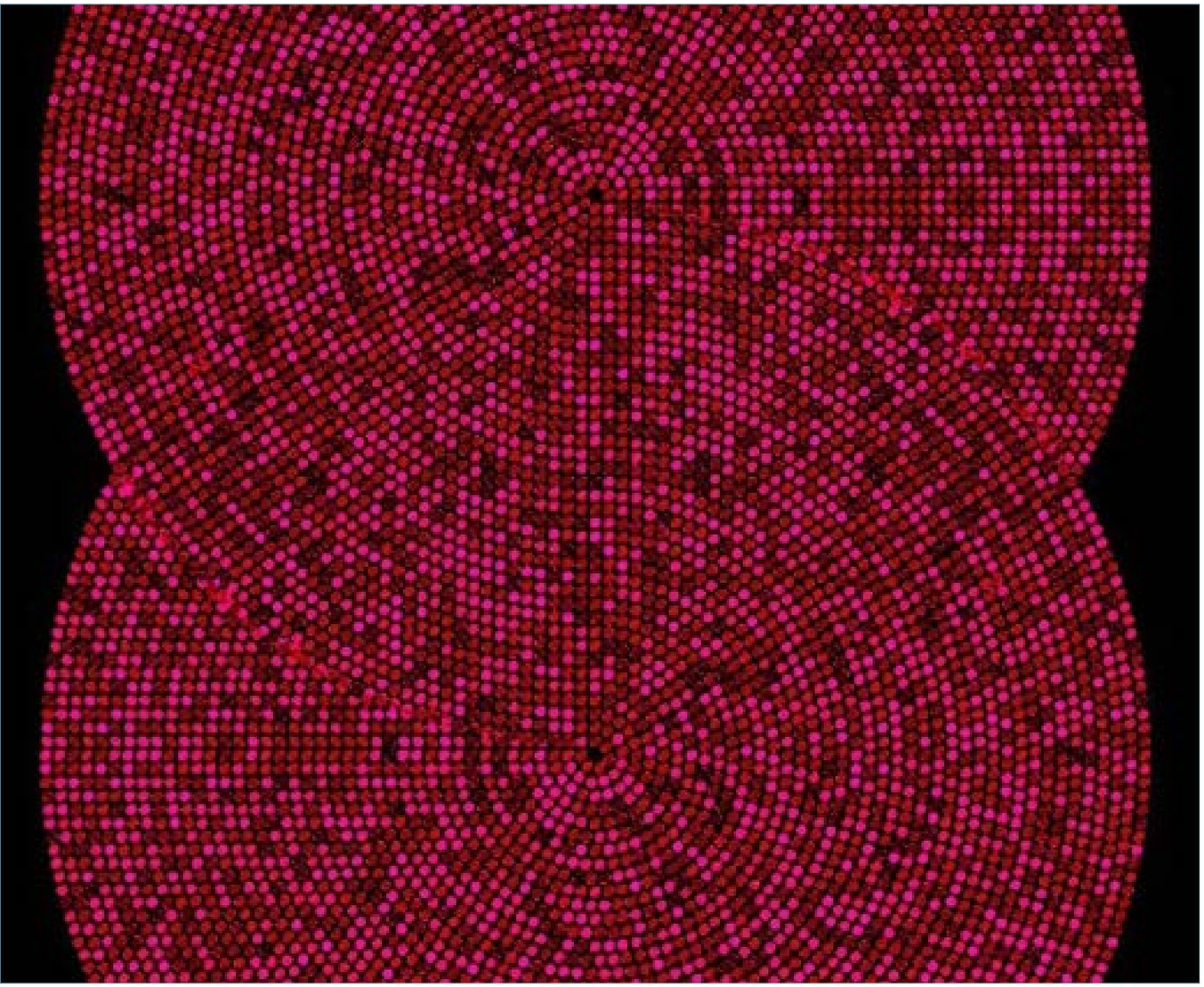
Some individuals are particularly sensitive and sagacious, capable of recognising subtle differences and making connections that are not so obvious. Their craft enables them to convey new meaning, combine known symbols and create new ones.





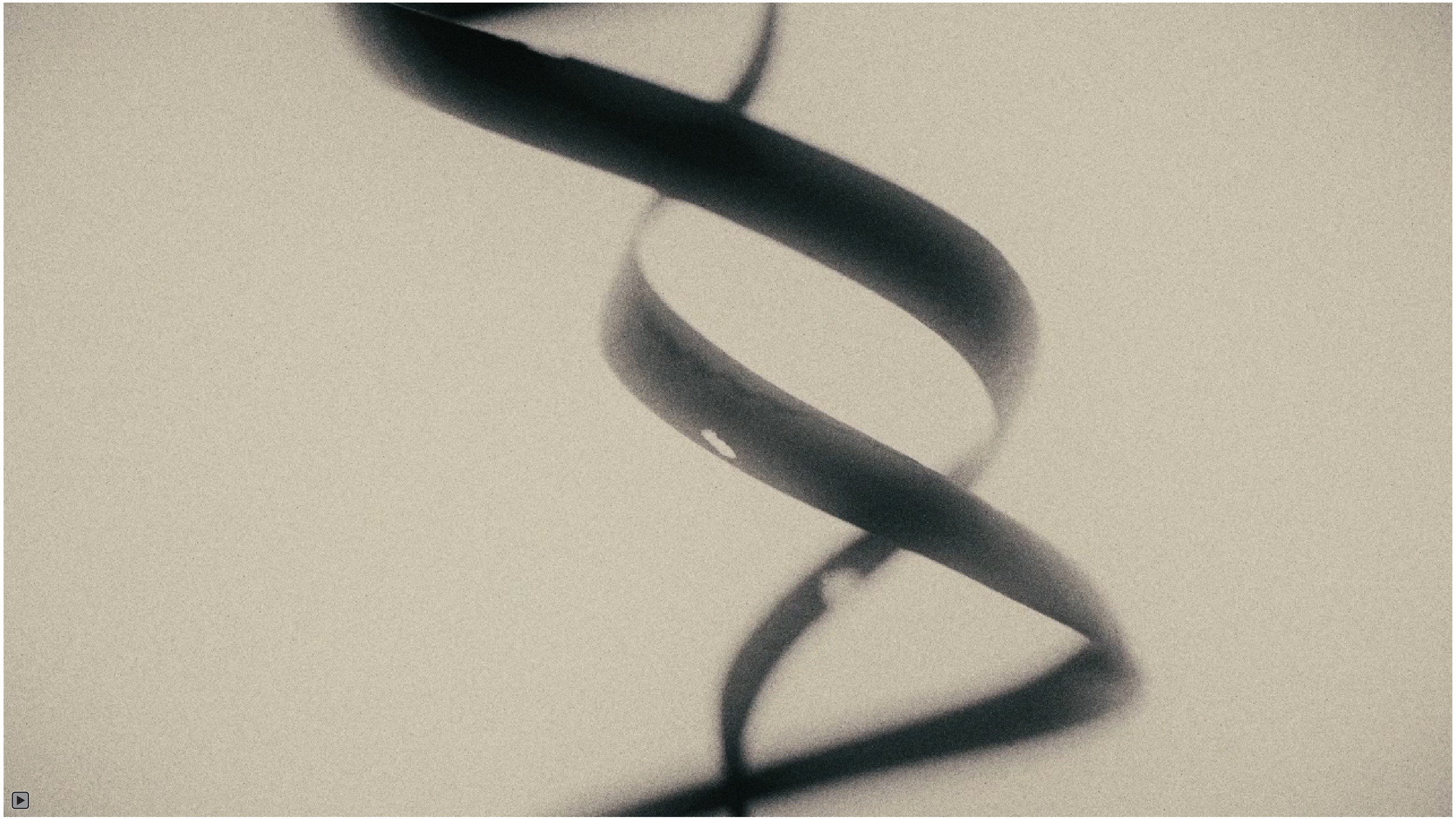
Space

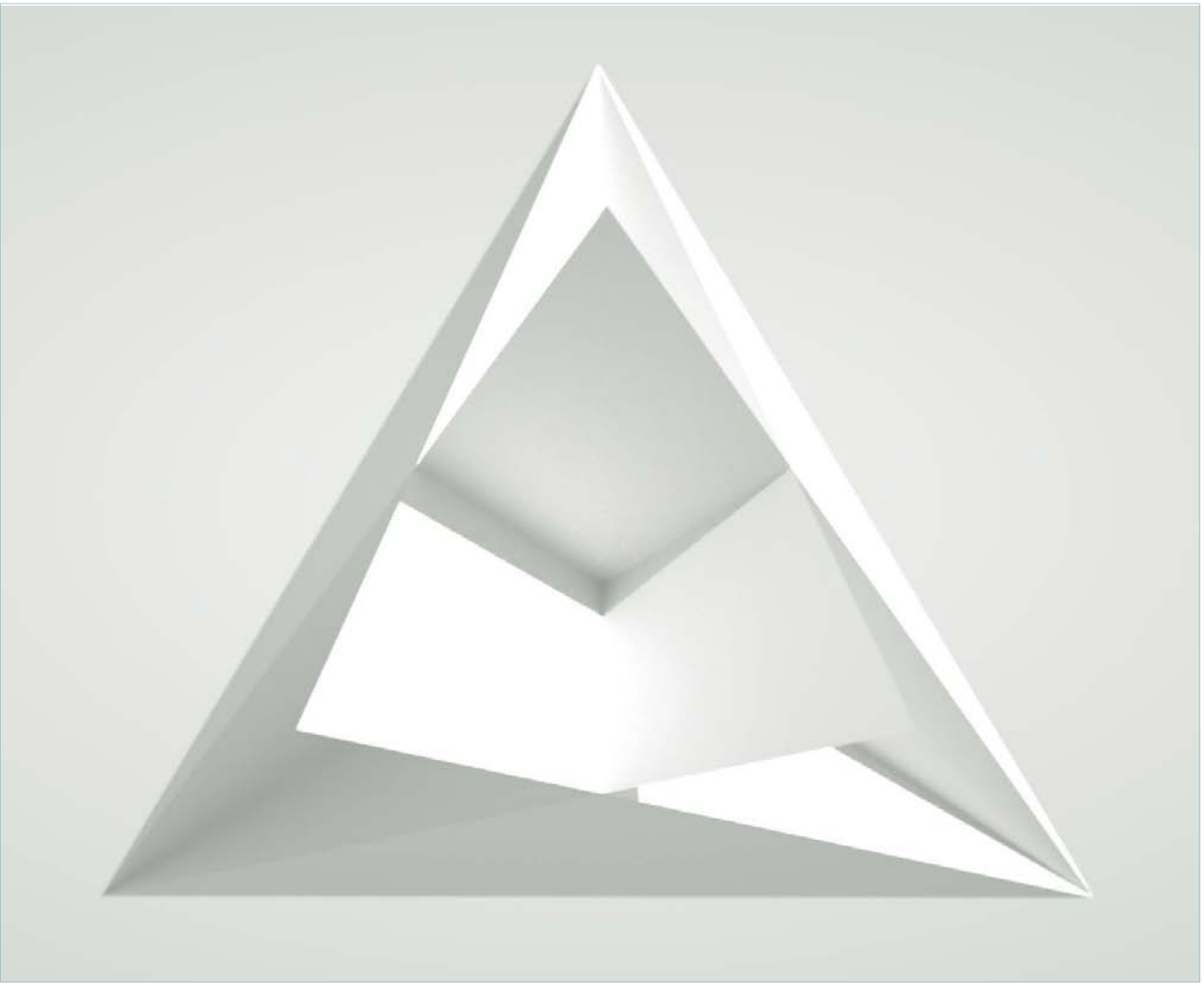
We speak of space, the place where we are, the scene where we transform the old and where the new occurs. We speak also of other spaces - spiritual, emotional. We describe the proximity of points and the proximity of thoughts, and the proximity of people, and the proximity of feelings. We speak of points in space, of objects, of how they are situated regarding each other, of order. Finally, we describe methods by which we want to present these spaces, reduce them, or give them new meanings. A smooth and extended space, dissected and divided by planes that do not leave any permanent traces, made up of grains of points but indivisible into those points, is described by its properties, with the help of concepts we can reduce no further. Firstly, we refer to an experience that is named in the language we have known since childhood. We see the surface of the earth and water, the line of vision reinforced by an outstretched hand, and the line of the horizon that is there, but unreachable. We find rhythm and symmetry. We see a symmetrical plane slicing space into twin halves. We can mark a symmetry axis on this plane, like a crease on a folded page. Another line on the same page forming a new plane symmetry with the axis gives four right angles.



Distance

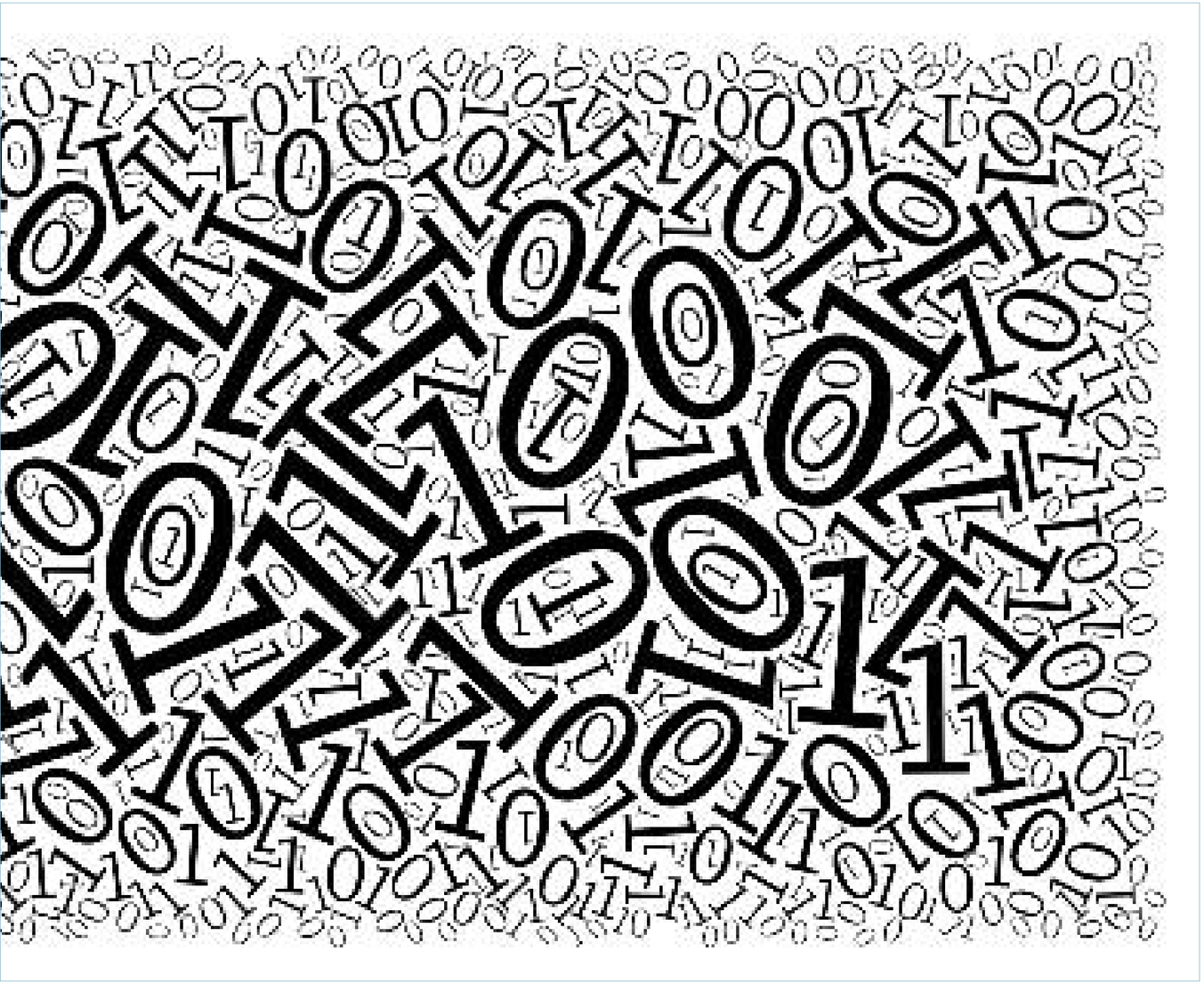
What is this straight line that symmetry in space gives us? What are these symmetries and the duality of the world that suggests them? We say that everything is situated in the same way and at the same distances on both sides.Our experience of the straight line is the following. We make a few steps in a straight line, stop, and make a few more steps. If we do this in one straight line, we cannot shorten such a walk. If we walk along several straight lines, we can.We recognise a straight line by the length of he walk along it, by measuring the distance from its beginning to end. When we walk back along a straight line, we make just as many steps as we did in the opposite direction. It is impossible to move ahead without taking a step. We associate distance with plane, not with time. After all, we can shorten the time it takes us to reach our destination by walking off course, leaving the straight line to get a horse. Walking back may take longer if we are tired, or shorter if we run downhill.Given distance in space, we can speak of straight lines, intervals, circles and balls, triangles, angles and geometry on the whole. Distance is a number connecting two points in space. Although we can say a lot without overtly referring to the value of that number, stating only that it is either equal or greater than other distances, we have to be aware we know and understand the numbers describing distance well. We have to know what positive numbers are and how to add them, what zero is and what makes it so special. We can speak of distance as a nonnegative number using only three features: the equality of to and fro, the inability of taking a shortcut and making the journey more interesting, and the immobility - or equality of the beginning and end of the walk when the distance is not positive. If we accept that, we will see planes in which straight lines and circles look completely different, unlike the straight lines of spruce trees or circles on water. Considering, however, that a straight line is made up of places we can visit in one trip without taking a roundabout way and a circle represents places that are equally distant from the centre, then the various shapes of straight lines and circles will reflect various ways of travelling.





Dimension

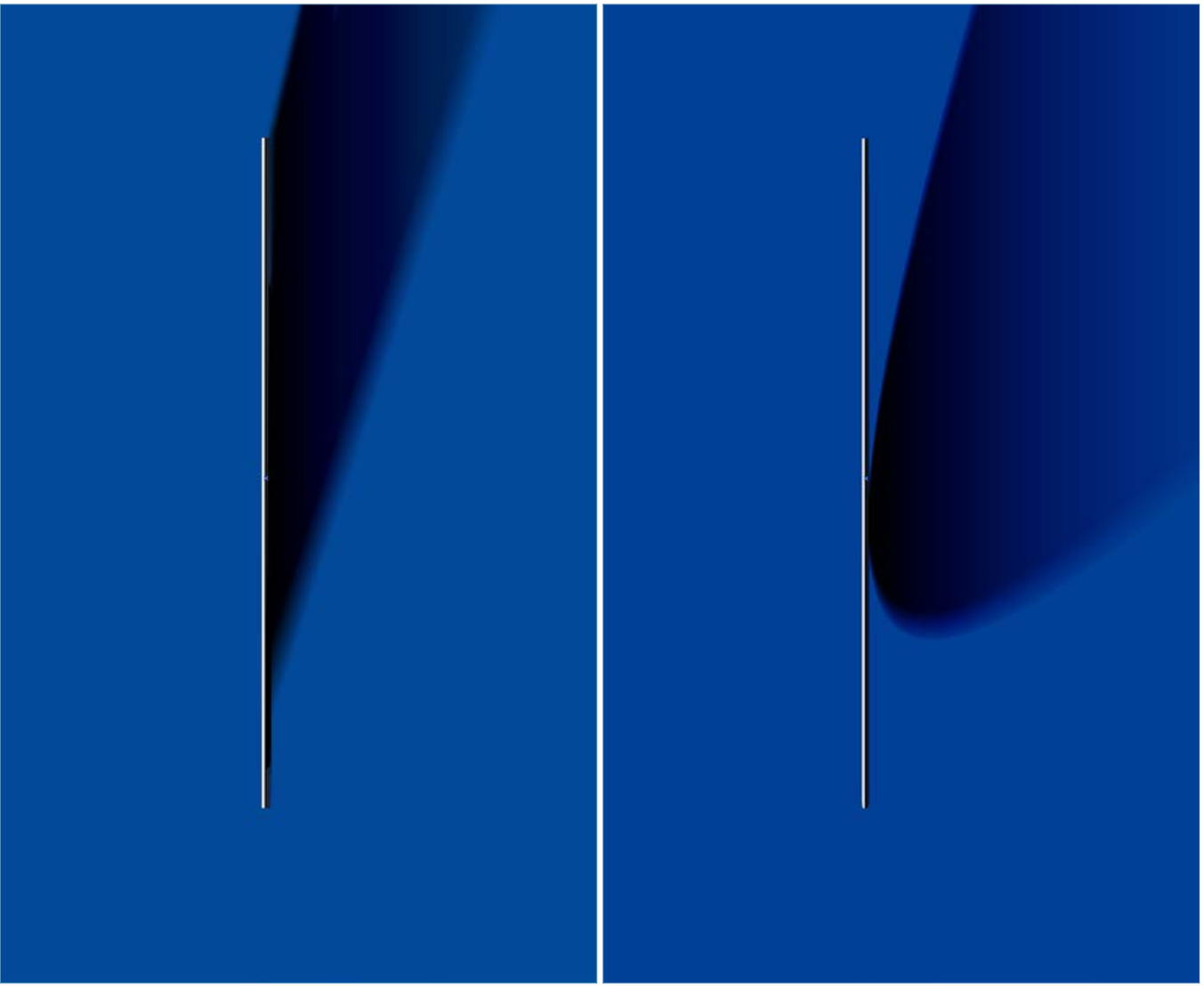
A picture is the reduction of space to a plane. We say that space is three-dimensional, a plane is two-dimensional, and a straight line has one dimension. We also say that things should be seen in many planes, or that someone has one-dimensional views. We know how to specify dimensions in other situations. A piece of string coiled into a spiral still has only one dimension, a piece of paper rolled into a cylinder remains two-dimensional. Even a circle that describes a two-dimensional disk of which it is the edge has one dimension. A bowl of spaghetti is full of one-dimensional objects. A balloon or a car tyre tube enclose a threedimensional space, yet remain two-dimensional themselves. One could say that something two-dimensional can be the border of something three-dimensional, and something onedimensional can be the border of something two-dimensional. That does not, however, catch the essence. In a non-wrapped space where straight lines connecting random points can be drawn, the number of independent directions may define dimension. Direction is a common feature of mutually parallel lines. Directions will be interdependent if we can walk along subsequent lines with these directions and return to the point of departure. We will find two and more independent directions on a given plane. There are many ways of finding an independent direction to any one we choose. Any three directions on one plane will be mutually dependent. We can walk along a triangle if the directions are different. We can also go in one direction, make a few steps in place and walk back along our tracks if the first and third directions are the same. A straight line has one independent direction - the very direction of that straight line. We can find three in space, but we cannot find four. If space is a bit wrapped, we can move our eyes closer so as to make it seem almost flat and then look for independent directions. There is also another method. We take a bag of spherical or cubical beads and lay them on the figure that we want to measure. We count how many beads we need. We then take a bag of smaller beads, with half the diameter, let us say. We cover the figure with them. We count the beads. Twice as many are needed for the interval than before. Four times as many are needed for a square, and eight times as many for a cube. Then we take still smaller beads and count them. We look which power of scaling down the diameter is responsible for increasing the number of beads. It is the first power for the interval, the second power for the square, and the third power for the cube. There are figures the dimensions of which are not integers. This sometimes happens when we systematically add or remove ever smaller, similar pieces.



Numbers

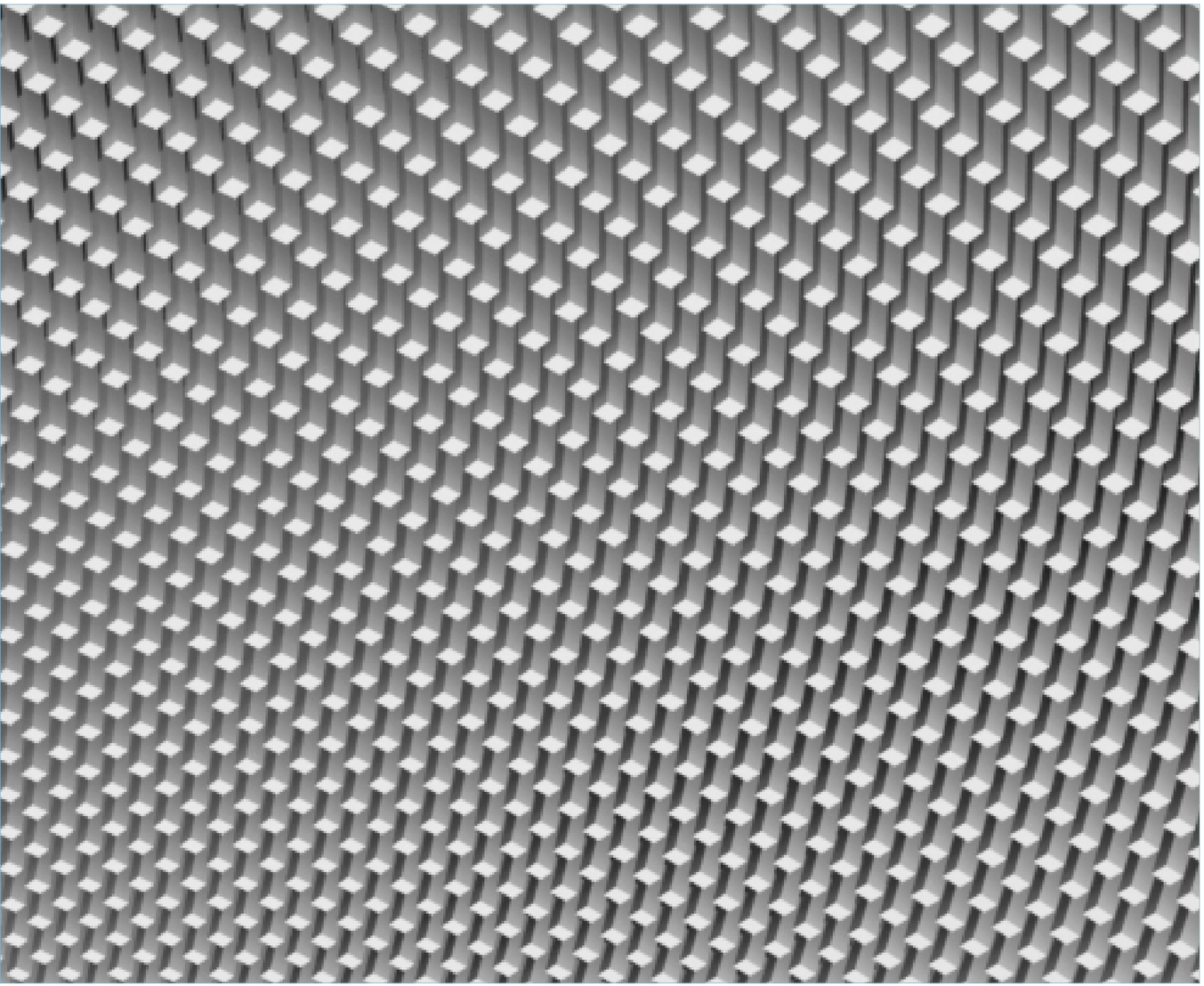
Numbers are a derivative of memory. I have as much as I had before. Is this all I had? Comparing amounts by collecting abacuses or cutting notches lies at the foundation of numbers. We count by placing our hands on objects, and simultaneously on tokens. We can also recite counting rhymes. All this serves the purpose of establishing the state of one's possession, perhaps a shortage or a surplus even. Only combining tokens, that is adding and carrying out other operations on tokens or their symbols, introduces numbers as a common feature of sets of the same size, which is established by calculation. These are cardinal numbers, described by cardinal numerals. Ordinal numbers are derived from counting rhymes, recitations where one sound precedes another in a fixed order. Given addition and the simplification of multiple addition, or multiplication, we can try to subtract and divide to guess what should be added or multiplied in order to obtain a specific sum or product. New numbers can also be introduced, symbolic operations which create arithmetic and algebra can be employed in order to subtract and divide. We can then return to the operations and derive those features that can be expressed without referring to the specific properties of numbers obtained by counting objects. We skip the problems with units or the incom parability of values of various types. It turns out that it is possible to add angles in a plane or hours on a clock, and adding a fixed element does not lead us beyond the domain restricted at the very start. Using our ability to divide, we can associate numbers with distances on a straight line adding a return sign, or the position before setting off for a walk. We could also try to apply all four mathematical operations on the plane, which can be done, or in space, which is possible only with addition and subtraction because two points in space cannot be divided in such a way as to obtain a point in space that would be their quotient.





Theorems

Mathematicians say: We define certain concepts that we have intuitions about from other areas. We strip them of everything that is redundant, but preserve what is significant. They say: These concepts are defined by the following properties. They say: We are dealing with universally acknowledged principles of inference. We are now deriving ever more new properties of concepts. We will compare these concepts with the ones we already know and with mathematical concepts that have been investigated since long. If we do not forget ourselves in our work, at the end of the road we might try to understand how these new properties relate to the initial intuitions. If not, we can only hope that that we have succeeded in getting to the heart of the matter and that in a different situation in future it will turn out that a lot can already be said about it. This time, maybe the intuitions were wrong, or the concepts inauspiciously chosen or the problem was either indescribable by this method or irresolvable.



Mathematics

Mathematics is the art of seeking, creating and describing paradigms. These paradigms appear on many planes. There are references to everyday dependencies, others require keeping previously introduced meanings in mind. Initially, mathematicians counted and measured. Then they studied numbers and figures. They took up operations on those objects, and soon afterward began treating operations as objects. Finally, they began seeking limitations to the applied methods and describing these methods as they had previously described numbers and figures. The creation of new structures does not relieve one of the responsibility of returning back to the foundations, asking questions about the sense of concepts used. Here are some of them: Identity: the same thing - something else, same - different, but also equal - unequal. Comparisons: smaller - bigger, or, more precisely: what is the difference. Location: same place - next to - elsewhere, but also closer - farther. We ask: What does comparing mean, what can be compared, how can it be investigated, what words should be used to express equality? Which features facilitate comparisons, and which stand in the way? What else can we sensibly do, and what will lead us to absurdity?

Such is the mathematician's workshop, such are his tools and craft. Just as a chisel, acid and paint, engraving techniques, light, texture and colour are the graphic artist's workshop. Mathematics, graphic arts and other areas deal with the world that surrounds us. Sometimes they are useful and help us fulfil entirely different tasks. Sometimes they delight us. A mathematician perfects his workshop, prepares his tools, and investigates the world. He sometimes creates new things or makes new discoveries. He often errs.



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Introduction

Sensory perception has become a subject of research in many fields of empirical studies, experimental psychology, neurophysiology, anatomy, biology and physics. What is more, since the appearance of the computer analogy – in regard to the functioning of the human mind – we observe the development of formal methods for modeling sensory perception through digital simulation. In all these areas perception is treated as a process of recognition of reality that surrounds us and the desire to read as well as describe its constituents.

Sensory data, which is analyzed in the course of acts of perception, manifested to us in the arrangement of complex sensations, which include information provided by various senses: visual information, tactile, auditory and olfactory. Such 'information packs', containing instructions describing the environment we interact with, gain spatial and temporal location during the cognitive process. Although we are able to separate the transmitted perceptual data, the actual interpretation is all-embracing, because the sensory world is a synthesis of various experiences. For example, the very same thing that we see we can also touch, or recognize as a source of noise or aroma. We already have some relatable experience in relation to most phenomena that we interact with and therefore compile incoming information flow with some "experience packages".

For example, the current subject of a very active discourse is understanding of the process according to which our minds test different hypotheses, and at which point the process becomes disabled deciding our senses provided enough "clear" information. These are complex and multi-layered polysensorical phenomena. All these processes – as further described in this paper – are significantly impacted by various factors of subjective character, such as emotional states or even anatomical issues. Also, to a certain degree, they may be related to our memory.

The fundamental nature of issues related to our perception is the reason that, since the Renaissance (if not much earlier) these issues were the subject of extensive research of numerous artists - painters focusing on issues of perspective and illusion, sculptors dealing with spatial form, architects, poets and so on.

Phenomena related to our perception of reality became even more complex and difficult to understand nowadays. Rapid development of technology and our consciousness immersing ever deeper into the tissue of virtual entropy lead to emergence of new branches of contemporary art and artistic mindsets focused almost exclusively on these phenomena.

Artists gradually immerse in the multilayered reality trying to understand the workings of our perception in this expansive and rapidly evolving environment. According to what Jean Baudrillard formulated in his philosophical treatise "Simulacra and Simulation" along with the development of sign systems the boundary between the real world and its representation gradually blurred, leading to the emancipation of hyperreality. Indeed, after more than thirty years after Baudrillard's work was published, we take this statement for granted, with the treatise having a strong impact on intellectual circles, in particular artistic ones. Over the last two decades there have been numerous projects focused exclusively on the issue of virtuality and the perception of reality that surrounds us. Many projects aimed to aesthetecize real objects and even fragments of urban space with prominent use of an artistic creation technique called video mapping. Similar exploration took place in other artistic areas. By these I mean all sorts of forms of audiovisual installations using interactive systems and other intermedia activities with virtual reality (VR) and augmented reality (AR) at the forefront, also including light installations and generative art. Artists creating such artforms explore difficult issues related to the functioning and understanding of the processes of sensory perception. Some of them focus solely on the illusion of creating attractive video mapping illusions, such as displaying plant motifs on the facades of buildings. In this group there are also artists who inspired by their curiosity and intellectual acumen create works merging together two worlds – the world of art and the world of science. In these projects their authors highlight multi-faceted issues, such as the phenomenon of depth perception and spatial presence experience which was investigated by some modern philosophers and became the subject of many empirical hypotheses – many of them still remain difficult to address.

In this paper we concentrate on the abovementioned creative approaches. It presents artists who in their artistic activities investigate and try to understand the problems of perception and ownership of objects, events and processes that surround us. These artists use light and space in their activities, and are searching for an answer to the fundamental question of how images are created in our minds. They shape their artwork in a way that allows to make contact and interact with individual viewers. The aim is to make people aware of their own role in experiencing of the reality around and point to the fact that perception is never objective or imaprtial. Looking at these issues from the perspective of contemporary art we notice a wide range of different interdisciplinary art practices. This paper takes a closer look at a few selected artworks which perfectly fit into the context of our discourse. It also touches upon selected theoretical considerations presented by Umberto Eco and Jean Baudrillard. Furthermore, artistic realizations by Olafur Eliasson, Richard Mosse (Enclave project and Light Barrier light installation) and the latest work of Banksy are presented. These are followed by a look at video mapping installations of the members of the recently dissolved European group AntiVJ. The author also focuses on one of his own artistic projects – Optikon.

Light and our senses

In order to describe the light science uses optical radiation, which is a radiation described by the laws of geometrical and wave optics. It is generally assumed that optical radiation comprises a range of electromagnetic waves with a length from 10nm to 1mm, which is divided into three spectrums – infrared, visible light and ultraviolet. All of these spectrums can be observed and measured in reference to the same laws of physics. In short, the invisible light is the same as visible. The only difference is the fact that human eye is unable to perceive it. For example, near infrared is lower than the limit of our visibility (hence in military terminology infrared is referred to as black light). Far infrared, on the other hand, is used in thermovision imaging and allows to record thermal radiation emitted by physical bodies (eg. by humans). Furthermore, there is visible light, commonly referred to as the portion of electromagnetic radiation that is received by the retina of our eyes. It is understood that the limits for our perception are a maximum of 380-780nm, although it turns out that many of us see an even narrower range. Therefore, the range is frequently shortened to 400-700nm (with longest waves reduced). The precise range of electromagnetic wavelengths is not possible to deduce since eye of every single person has a slightly different sensitivity. With dispersion of white light we can observe separate colours, ie. visual impressions caused by an electromagnetic wave with a specified length. In brief, the waves are perceived by our eyes and the signal goes to the brain where information regarding given colour is generated. We split white light into individual colours using a prism. When light falls on an object this phenomenon is called absorption. In short, it is a process of absorption of electromagnetic waves energy by a given substance. Let us take a closer look at the process of colour perception, taking into account the cultural context. As we know, European civilization breaks down the colour spectrum, assigning names to different wavelengths, which are expressed in nanometers (nm). One nanometer is one billionth of a meter or one millionth of a millimeter. If the interval between waves is in the area of 700nm we see red colour. In contrast, the wavelengths of about 400nm are perceived as blue. See table below for approximate ranges for specific colours. One would assume that the spectrum has been divided into wavelengths and is therefore a point of reference to assign given names. We know, however, that the colours have been named on the basis of visual experience, which was subsequently subject to scientific analysis and, as a result, wavelengths were assigned to given colours. Thus, the continuum is cut into selected parts in such a manner that the wavelengths (for example 520-565nm) are a cultural unit, which has been assigned a given name. In fact, part of this spectrum has already been carved out of perceptual reality based on biological survival and has been given the name of green.

red	~ 635-770
orange	~ 590-635
yellow	~ 565-590
green	~ 520-565
cyan	~ 500-520
blue	~ 450-500
indigo	~ 430-450
purple	~ 380-430

A specific colour – treated as sensory inputs – can be defined semantically as a cultural unit, not only because it can be defined with wavelengths, but because it is culturally recognizable as a position in the colour space, and hence in this context it can be distinguished from other colours. This colour can not be distinguished from another without placing it in a semiotic field, just as one can not understand a man, if the man is not put in a proper semantic reference frame.

In "A Theory of Semiotics" Umberto Eco draws attention to an interesting paradox, illustrating the phenomenon of 'fragmentation of semantic fields'. Inuit tribes separated their continuum of experience associated with snow into four cultural entities.

This is due to the fact that omnipresence of snow in their daily lives meant that over the centuries four states of snow had emerged and four different names were assigned to it. We, however – living in different environment – do not need such precise descriptions for this concept and use one word only.

It is interesting to notice that a different culture divided the same continuum of meaning in a different way. Such events are not uncommon and very easy to find, with multiple examples available. Part of the spectrum labeled as "blue" is represented in Russian as two different cultural units that correspond to the words "goluboj" and "sinij". In his work Umberto Eco provides further interesting examples recalling names assigned to colours by Aulus Gellius in his Noctes Atticae in the middle of the second century AD (ii. 26). For example, Gellius associated the term "rufus", which could be translated as red, with that of fire, blood, gold and sapphire. He decided that "xantos" (gold colour) was a variant of red, something similar to "kirros" (reconstructed by classical philology as a yellow-orange). What is more, for Gelluis an equivalent of red is "flavus" (we associate it with gold, grain and water in the river Tiber), as well as "fulvus" (which is usually the colour of a lion's mane). Gellius, however, considers eagles, topaz, sand and gold as "fulva", while "flavus" is for Gellius "a mixture of red, green and white" equated in turn with the colour of the sea and olive tree branches. Finally, Gellius notes that Virgil, describing "greenish" horse colour, uses the term "caerulus", which is commonly identified with the colour of the sea. This extraordinary confusion stems not only from the fact that colour perception of Aulus Gellius is different from ours, but also from the fact that in the Latin culture of second century AD there were alternative chromatic fields influenced by other cultures. This is how Umberto Eco interprets Aulus Gellius' embarassment and his inability to organize the data that the Latin author and grammarian drew from the works of writers of different eras. The actual experience that Gellius was able to attain carefully watching the sky, the sea and the horse was exposed to distortion under the influence of other meanings coming from other cultures.

It can be concluded that from a semiotic point of view a given culture is inhabited by contradictory semantic fields, and that two or more fields can coexist under the imposition of different cultural patterns.

Examination of 'vague' concepts by semantic systems requires great caution. First of all, semantic system units should be examined in their entire ambiguity, which means they have to be treated as a sort of semantic clouds susceptible to various deformations, impositions, mergers and elusiveness. Therefore, the whole semantic system seems to lose its crystalline structure that a large majority of optimistic theories is trying to assign. Such discrepancy is very important, because many dimensions of creating signs together with changes and interpretation of codes – including visual ones that are the subject of this paper – rely on this system.

One can not ignore the processes happening in the mind of the person interpreting the contents

of any image or form of expression. What allows us to read the overlapping semantic fields in a way that is proper for us? This question is the most difficult among many appearing in this work and as such will remain unanswered. It is extremely intriguing how much space opens up to artists who, through various formal actions, subtly move these semantic fields in relation to one another – especially if we reduce our exploration area to reading visual signs and their interpretable meanings as they are generated during creation of an image.
When it comes to connotations of meaning some images may transfer these connotations from different semantic axes, some of which can be contradictory or even posess mutually exclusive vectors. The decision to interpret a particular image following one available axes is – to put it simply – motivated by situational and contextual factors. This is a process of sensory perception, which is responsible for "recognition" as well as interpretation of sensory data accompanied by the assignment of semiotic fields to the data with the fields being representatives of a particular subject or the property of this subject.

Semiotic fields

It is very difficult to define the tasks that the codes perform at the elementary level. The code itself is not a firm structure that underlies the complexity of each semiotic process and its associations. Codes evolve with the passage of time, along with cultural changes as well as under the influence of multiple other factors. In „A Theory of Semiotics" Umberto Eco uses the metaphor of the box of marbles to explain this phenomenon.
"Let us go back to the metaphor of the box of marbles. If the marbles, when free, represent a model of an informational source with high entropy, a system is a rule which magnetizes the marbles acording to a combination of mutual attractions and repulsions on the same plane. The code which, on the other hand, couples different systems is a biplanar rule establishing new attractions and repulsions between items from different planes. In other words, every item in the code maintains a double set of relations, a systematic one with all the items of its own plane (content or expression) and a signifying one with one or more items from the correlated plane.
Now, to maintain that there exists a structure of the Human Mind or a sort of ontological system of Essences, on which signification and communication rely, means that the magnetization is iherent in the marbles as a "property". If, on the other hand, the code is a social convention, the magnetization is a transitory (that is, a historical) condition of the marbles box." [1]
As mentioned earlier with the examples of the interpretation of colours in different cultures, when we read a given code with our mind we encounter a very complex and dynamically changing structure. The same phenomena and colour continuum are interpreted in a different way and various, sometimes proliferating, semiotic fields are assigned to them. That is why Umberto Eco describes the embarrassment of Aulus Gellius and his inability to sort out conflicting data resulting from various simultaneously operating chromatic fields. Aulus Gellius' experience was determined due to conflicting meanings migrating from other cultures. As a result of this phenomenon, semiotic fields overlapped and underwent different interactive processes.
The awareness of actual transgression of semiotic field, however, is always accompanied by some idea of its potential fixedness. Trying to understand this phenomenon, we can not forget that the subject of perception (individual human being) is equipped with consciousness, intentionality and imagination. Each of the abovementioned factors is involved in the process of interpretation of meanings. Semiotic field is a rapidly evolving and blurry cloud susceptible to cultural influences, the passage of time, or even areas of interest of the person reading the code and intentions guiding this particular individual – all reflecting our current cognitive abilities and circumstances related to location of the perceived object and observer

1 *Umberto Eco, A Theory of Semiotics. Bloomington: Indiana University Press, 1976, p. 126.*

in space.All the sensory impulses that we receive are usually deformed by our expectations, needs, feelings and psychological defense mechanisms triggered by the subconscious. Content is altered during the process of sensory perception and sometimes distorted influenced by the constructs of our very creative imagination.

Imagination

Today's psychologists agree on two assumptions. First one states that our imagination is the primary mental mechanism for generating visual images when the subject is not perceived by our senses. The second one says that our neuroanatomical visual pathways, which are responsible for visual perception, are also extensively used in imaginative processes. Both aim to understand what imagination is. Each perspective reveals a slightly different aspect of this fascinating process. When we look at an object, we can move perceived situation to another context with the use of our imagination. It frequently takes place when we are dealing with some sort of illusion. Imagination allows us to read various complex situations arranged by artists. There is a significant potential in this universe of fiction that gives paintings and objects unexpected associations and attributes. For example, creating a painting we can generate semantic connotations through its form where the image sends the recipient to specific semiotic fields. For example, this is why an abstract painting may refer to a mountain landscape. Examples of such paintings are called Allusive abstractions. Let us have a look at take some of the painting of the Swiss artist Paul Klee. His works often refer to poetry, music (music notation elements) and dreams. His art is primarily based on the use of geometry to bring the created image to the symbol, rhythm and character. In many of Klee's paintings the line between figuration and abstraction is blurred. His artworks often deal with allusive abstraction; wavy lines limiting individual strands of colour suggest a sea or a river, the square is a house, while the circle is the moon or the sun, and so on. It resulted from the artist's peculiar understanding of the essence of creation as well as the purpose of art and its relationship to nature. „Art is a simile of the Creation. Each work of art is an example, just as the terrestial is an example of the cosmic." writes Klee in „Creative Credo"[2]. "Art transcends beyond the object, beyond the real and the imaginary. Art plays an unknowing game with ultimate things and yet achieves them!"[3]

It is with imagination we interpret many signs, giving them new meanings. Imagination takes active part in the process of reading but also brings anxiety because it co-directs the message. It generates reference which in some cases can act as disinformation. To put it more simply – the recipient will see something that is not there.

A similar situation was utilized for one of my projects – Optikon. It is amazing to what legths we employ our senses trying to interpret the images that are formed through optical illusions if we focus our attention on a piece of glass surface of an ovoid shape. Imagination becomes a tool in the creative process – based on impressions of our experience it allows to create other ideas that do not have their counterparts in any of the sensations, but are rather initiated by them. This process is triggered only when the image does not carry explicit semiotic connotations. Such mechanisms allow you to create the message in an unusual way. In the case of visual imaging it is frequently very difficult to separate sensations from imagination since they practically occur simultaneously in a continuous stream of consciousness we experience. For example here in a sleep our dreams produce impressions isolated from sensory perception. Therefore, the spark of imagination is possible only when the image provides selected and sublime bits of information, which then in alternative way stimulate the

2 quoted from Theories of Modern Art: A Source Book by Artists and Critics, Herschel Brown Chipp nd Peter Selz, University of California Press, 1968, p. 186.

3 quoted from Theories of Modern Art: A Source Book by Artists and Critics, Herschel Brown Chipp nd Peter Selz, University of California Press, 1968, p. 187.

mind of the recipient. They subtly suggest something that will initiate further process of testing various hypotheses in our mind or creating new content with our imagination. In the second case, each recipient's imagination becomes the creator of the piece of art for with the artists simply providing the framework. This framework requires a peculiar kind of sensitivity since one needs to have a lot of experience in working with images in order to avoid connotations of the meaning.

Seeing yourself sensing

Olafur Eliasson says "seeing yourself sensing". Perception of surrounding space and nature is the focus of the Danish-Icelandic artist's work. In his Berlin studio he works collaboratively with various specialists in the fields of mathematics, physics, electronics, engineering and lighting. Together they split light, create prisms and conduct physical experiments. They employ light, wind, water, fog and ice in their subsequent artistic projects. They create parallel spaces using a sequence of mirror reflections. They travel the world observing nature and then try to recreate the pieces of their experiences in a new context.

Eliasson's main area of interest is the phenomenon of perception – especially the perception of colour. The artist is particularly intrigued by the dependencies that exist between light and colour. His projects very often engage the viewer to make him aware of his own role in experiencing the reality around him, and prompt the viewer to recognize his experience as a unique and unforgettable one. "How can we read the relationship between our body and the surrounding space? Does the act of taking a step forward have any meaning?" asks Eliasson



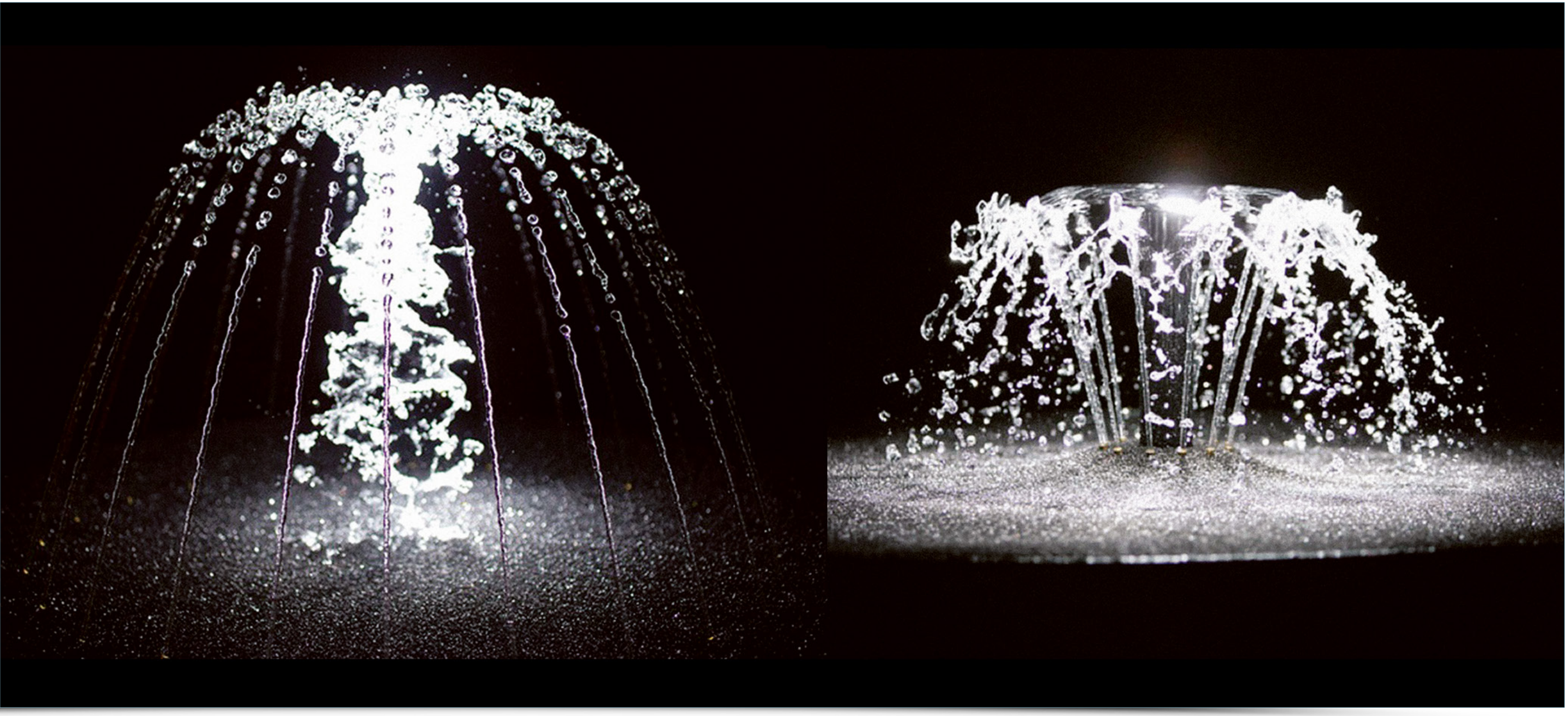
"The Weather Project" at Tate Modern Gallery, Olafur Eliasson, 2013 (London)

provocatively. The artist graduated from the Royal Academy of Fine Arts in Copenhagen. He represented Denmark at the 50th Venice Biennale in 2003, and a year later presented his famous The Weather Project at Tate Modern Gallery. This monumental light installation, installed in Turbine Hall of Tate Modern, represented a gigantic sun built from a system of lights and mirrors. The form and scale of the installation influenced anyone within its range. Hundreds of lamps radiating with a special tonality of yellow light were suspended very high in the hall creating a huge glowing semi-circular disc. Special humidifiers were used to produce a fine mist floating in the air. The key element of the whole installation was a giant mirror that covered the ceiling of the hall. The light reflected in the mirror gave the semi-circular disc full solar shape, which underwent a slight transformation whenever a viewer changed the position. Such approach not only enriched the picturesque effect of the installation, but also made the whole installation a part of the spatial field experience. Subtly changing angles and lights made the radiating disc appear more natural in the eyes of a moving viewer. The installation interaced with the audience in a very sublime way mainly playing with the viewers' perception of space and colour. In The Weather Project Eliasson took advantage of a phenomenon of illusion, namely the illusions regarding property of an object, in this case of an artificial sun. When I visited Tate Modern and entered Turbine Hall the first thing I wanted to do after I saw a huge solar disc was to lie down on the floor and relax. Yellow light filled the huge hall and many visitors actually responded to the installation in a similar fashion. Some Londoners were lying on the floor and relaxing for some time, staring at the hypnotic simulation of the solar disc. The same phenomenon happens when we look at the sun in the sky. In the process of perception we do not relate to the real things, but their subjective phenomena. Eliasson led our senses into the state in which the distinction between what is real and what is apparent becomes problematic. How do we know material things exist, since we respond directly to sensory data only. The viewers may answer this question themselves inspired by situations created by the artist. Experimenting with our senses Eliasson makes us look differently on the phenomena we come in contact with on an every day basis. Arrangement of simple sensory situations in an attempt to interpret them is one of the most prominent foundations of Eliasson's art.

Another important project created by Eliasson is a series of interventions in the landscape entitled Green River. The artist introduced a sickly fluorescent green dye to selected rivers



"Green River" project by Olaffur Eliasson, 2000 (Stockholm)



"Model for a timeless garden" project by Olaffur Eliasson, 2011, PinchukArtCentre (Kiev)

in Iceland which completely changed the appearance of the water in an evironmentally safe manner. The experiment was later repeated in Moss, Bremen, Los Angeles, Stockholm and Tokyo. In turning the river green Eliasson establishes a dialogue with the cityspaces and their inhabitants altering their everyday landscape. The colour of the dye is so intense that its introduction becomes very distinct and easy to observe from large distances. Space undergoes transformation. By implementing a robust dye in the tissue of our environment Eliasson draws our attention to the fact that even this very space has its own dimensions and that both city and nature have their own rhythm and time, and that both the river stream as well as the city's inhabitants are a part of it.

As part of his exhibition at the Louisiana Museum of Modern Art in Denmark, the artist decided to fill an entire wing of the museum with stones, which surrounded with white walls created a surreal rocky landscape with a stream of water winding through the interior. The exhibition is a part of a larger series entitled Riverbed, which is an imitation of the natural landscape confined within the walls of one of the most important modernist buildings in Denmark.

Visitors can take a walk along the rocky terrain, which unfolds throughout the south wing of the gallery sweeping through various rooms. A narrow path leading through the museum space was filled with water to recreate a stream flowing at the bottom of a dried-up riverbed.

One of Olaffur Eliasson's projects dedicated to public space was created in Poland. A few years ago, the National Audiovisual Institute and the Museum of Modern Art in Warsaw announced a closed competition for the artistic design of the pavilion, which was to be erected in the square at the intersection of Karowa Street and Krakowskie Przedmieście. Olafur Eliasson won the competition and as a result the square welcomed an installation with geometric design, modern synthetic form and distinctive red-and-white colours.

Inside the pavillion, mounted on steel pillars of the object, were mirrored surfaces refracting light and the immediate surroundings. A viewer standing inside felt as if a fragment of the surrounding urban space multiplied endlessly – like in a kaleidoscope. The inner space of the pavilion was also lit by reflected light. This sophisticated art installation remained in the square until the end of December 2011.

Another interesting projects created by Eliason are light installations that utilize strobe lights and water fountains the artist had been working on since 1996. The projects were intended for selected galleries. One of the installations, Model for a timeless garden (PinchukArtCentre, Kiev, 2011), consisted of as many as 27 fountains arranged next to each other. In a specially prepared room visitors could see cascades of water. Professional lighting was replaced with a flashing strobe light. Our perception is accustomed to the notion of water as a substance taking shapes characteristic for a fluid. It turns out, however, that a simple disruption of time-space continuum with strobe lights allows us to look at water in a completely different way, as a series of successive images. In this unusual bright light the fountains look like ephemeral sculptures of fascinating and enigmatic abstract built. Because of time continuity interruption, we are able to observe water in the first stage of the process of sensory perception where sensory data is registered by our visual organs. We are able to admire the shapes and forms taken by water in a completely different way, as if we were looking at something else. Water is – just like the air we breathe – a substance we rely on at every step of our lives.

Flickering forms of the liquid create glass-like sculptures, idiosyncracies – a theater that will stay etched in the memory. The design of this work shows unparalleled lightness, originality and some kind of subversiveness.

Another artist that managed to attain an unprecedented and sophisticated aesthetic value with the use of a simple procedure associated with light is an Irish photographer Richard Mosse.

Mosse has exhibited his work The Enclave at the Venice Biennale in 2013. This very sophisticated aesthetically project utilized photography of the areas dominated by armed rebels in the eastern part of the Republic of Congo. The imagery of places and people were made unreal by Mosse who technologically altered the images. A special Aerochrome film reel that Kodak produced for the needs of the US Army registers an invisible spectrum of infrared light, and was originally designed for camouflage detection, but also had a tremendous impact on the aesthetics of photographed reality. The film reel converted the green colour of vegetation and army uniforms to magenta. The resulting imagery shows fascinating and impressive results. Aerochrome allowed to expose something otherwise hidden in this absorbing story about the unusually harsh reality of people living in the Republic of Congo. Purposefully quixotic imagery allows the viewer to respond with greater depth and take another look at the grim situation of the people living in a country torn by poverty and armed conflicts. Beautiful landscapes and nature contrast with armed militants in the photos. After a while an armed boy aims his AK-47

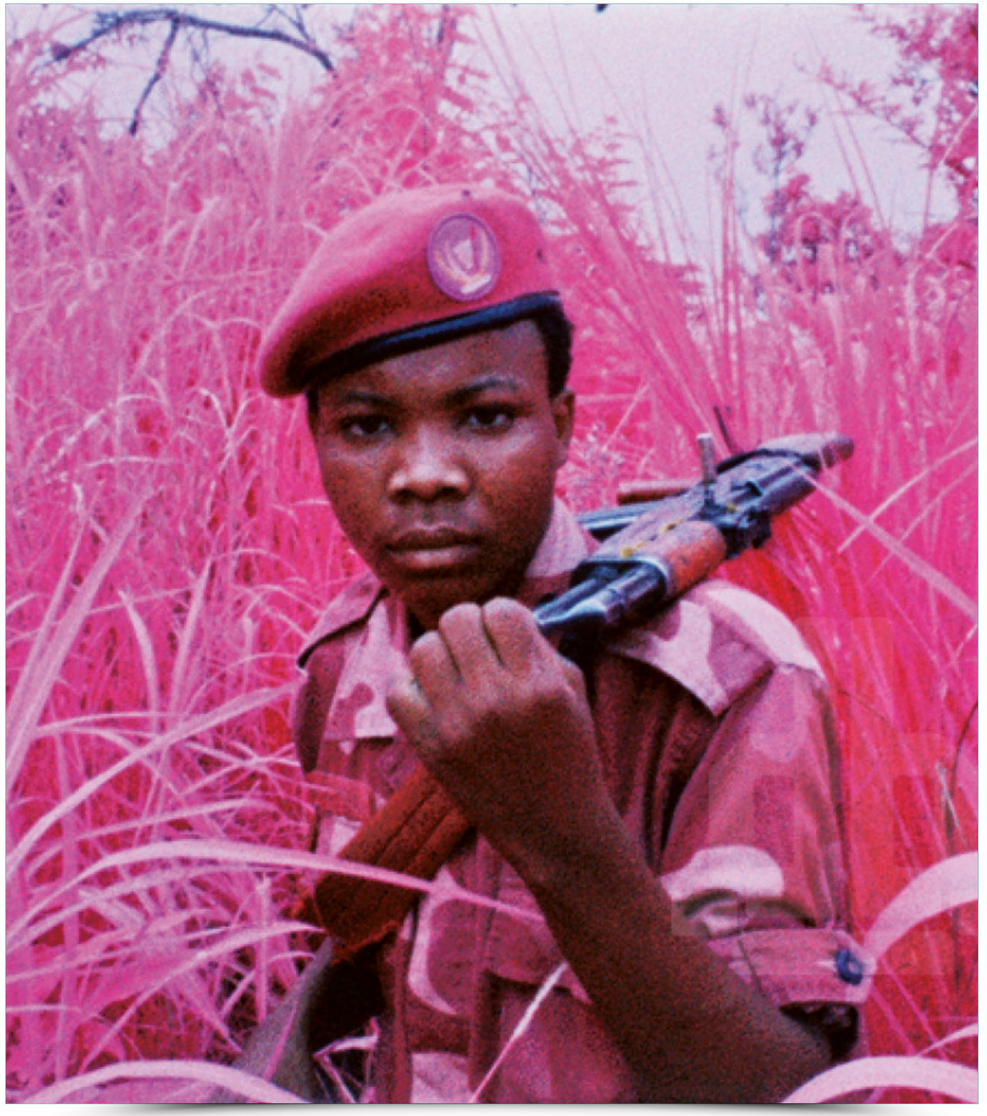


"The Enclave" by Richard Mosse, originally presented in the Irish Pavilion at the 2013 Venice Biennale

at the photographer, threatening him and forbidding hin to take photographs. Unreal colour palette allows the viewers to employ a completely different interpretative framework for the images.

Light Barrier by Kimchi and Chips creative team is another interesting project that can not be excluded from the pages of this paper. This light installation allows the viewer to observe extraordinary spatial images formed as a result of refraction and reflection of light with the use of reflective surfaces arranged in series. The installation consists of hundreds of mirrors reflecting light emitted through projection. The convex mirrors materialize glowing rays in space as 3-dimensional geometries and shapes. In contrast to the holographic techniques or water screens, Light Barrier produces spatial painting reflections, forming images somehow suspended in space and scattered in misty glow after a short while. Duplication of reflected image generates additional ligthing effects producing some sort of echo – a kaleidoscopic repetition of spatial projection. The whole installation has a huge impact on viewer's perception providing him with extraordinary aesthetic experiences. Kimchi and Chips art studio (Elliot Woods and Mimi Son) was awarded with the Honorary Mention at this year's Ars Elecronica Festival in Linz (2015) and comissioned by FutureEverything and supported by British Council (2014). Creative Applications Network recognized the installation as "No. 1 most memorable project of 2014". Light Barrier also won Spatial Media Art Award at Media Architecture Biennale in 2014.

The way in which Kimchi and Chips explores issues of space and light with Light Barrier is very interesting while the artwork itself immediately captivates with its artistic quality. The installation shows great potential and will likely inspire many artists. Conceptually it addresses very fundamental issues such as the structure of matter, its relationship with the energy and the transmission of digital objects into the real space surrounding us. The artists attempt to understand the surrounding reality and immersive experiences as well as the phenomenon of being in another space. The very aesthetics of the artwork is very poetic and captivating. So much that for a moment the viewer becomes a part of the luminous landscape generated before his eyes. This is where the artists really succeed. The spatial light-drawn images have been repeatedly multiplied through reflections, mirroring and other optical phenomena arising simultaneously on the convex curves of the installation's mirrors.



"The Enclave" by Richard Mosse, originally presented in the Irish Pavilion at the 2013 Venice Biennale



"Light Barrier" project by Kimchi and Chips, 2015, Ars Electronica festival (Linz)

Objects become screens

When we take a look at the problems of perception from the perspective of activity of contemporary visual artists, we notice a wide panorama of interdisciplinary actions with a creative technique of light and space output known as video mapping (also known as projection mapping, or simply mapping) being an important element of this landscape. Video mapping is a rapidly growing intermedia discipline, in which visual productions are often accompanied by frequently improvised musical arrangements. The technique originates from VJing (the term Visual Jockey harks back to DJ) which is a way to improvise images, especially those created with light projection and usually occurs simultaneously and in relation with sound. In its current shape mapping is a kind of VJing hybrid enriched with Virtual Reality experience and strong inclinations towards presenting art in public spaces (as in the case of Krzysztof Wodiczko's artistic output). It is easy to notice that mapping in the form of monumental architectural projections wants to intervene in public space and therefore requires a particular understanding of this very space. Some digital tools used for mapping were originally designed for VJing and later on upgraded with additional features, allowing customization of screened masks to fit irregular surfaces of illuminated objects (eg. Resolume Arena). As a result of this merger, a new art form came to life and gained great popularity. Mapping screenings are designed as monumental light installations and projections. Their aim is to reveal the relationship between the composition of the digital display and the real world. During the screening, viewers are subjected to spatial illusion. This illusory experience assigns different context to fixed elements of reality. Illusion is an important component of mapping, providing a strong stimulus to the perception of the viewers making them believe that the laws of physics that determine their daily lives simply disappear for a moment. If the projection is professionally prepared the image merges with the part of surrounding physical reality of the viewers and interacts with it. The viewers' senses 'feel' that this is only an illusion, but their minds subconsciously attribute reality frame to the whole process. This is because viewers experiencing this performance of 'light, space and image' actually want to submit to the illusion. They allow their senses to interpret animation displayed on a facade as being an extension of architecture. This new hypersurface is perceived by their senses as something belonging to reality. Video and spatial forms become immersive. Also, due to its monumental scale, mapping provides exciting opportunities to intervene in the cityscape. Mapping projects are various sorts of installations frequently inspired by light, space and architecture. Mapping itself a relatively young form of art – largely related to the dissemination of specific technological advancements such as very strong multimedia projectors and relatively fast computers that allow flawless image processing in real time. Undoubtedly, mapping technology has opened up new areas for action both in decorative art and pure art. Mapping is used to create numerous projects in public spaces and public galleries. A specially designed visualisation is displayed on the facade of a building or any other object of architecture emphasizing its features and makes it possible to impose some kind of light coating on the structure, providing the object with alternative connotations of meaning, changing the way the object is perceived. Typically, artists prepare their projections in such a manner that the viewers observe some sort of transformation of a selected building or object. Spectators watch the event from a particular point of view and clearly defined perspective, and the objects are perceived under particular lighting conditions. All of these aspects have to be taken into considerataion by a video mapping artist during preparations for the show. Therefore, precise dimensions of the mesh that will adapt to the object as well as technical aspects of artwork are crucial to create the illusion. They make the displayed image



"Paleodictyon" audiovisual installation by Simon Geilfus, Yannick Jacquet and Thomas Vaquié / AntiVJ, 2012, Centre Pompidou (Metz)

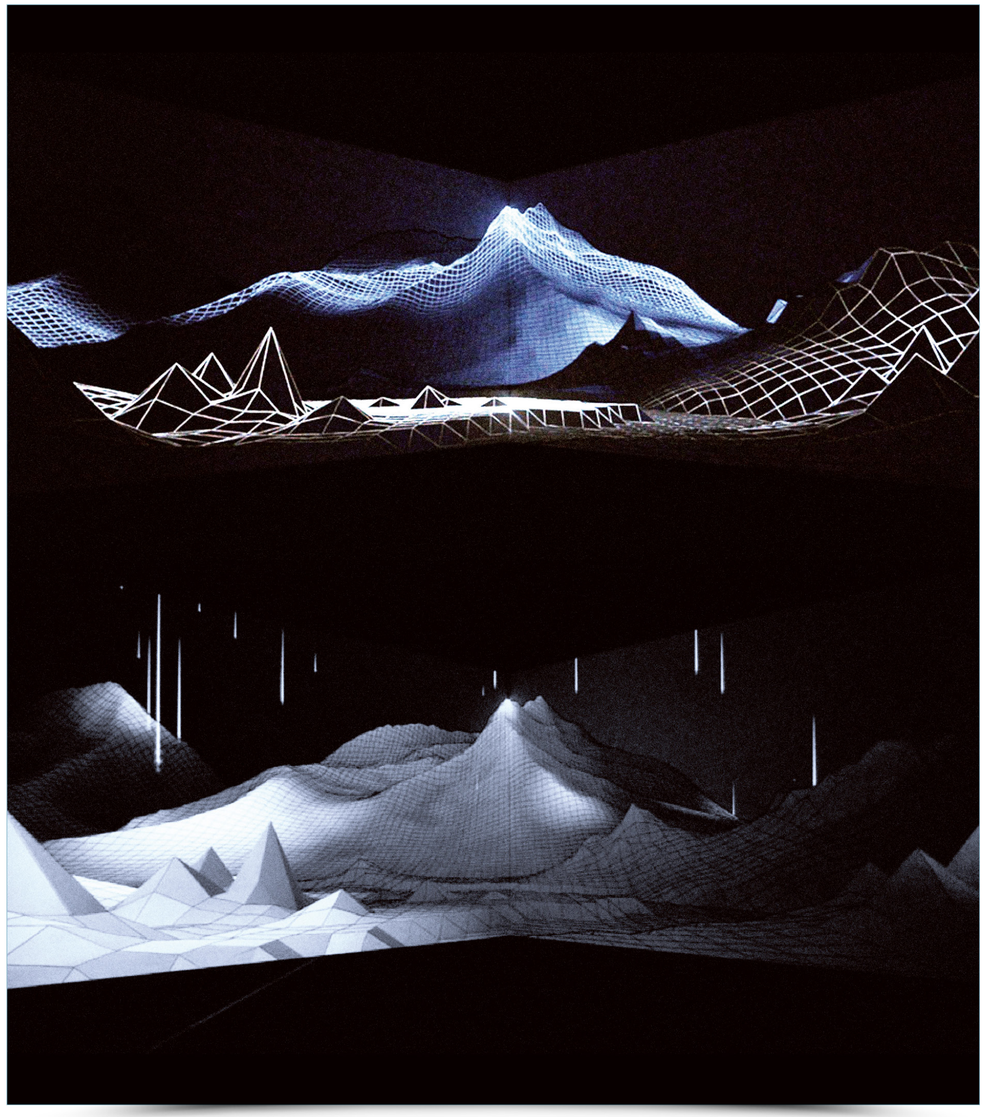
merge with illuminated structure. A very important factor that needs to be taken into account is the distortion of perspective that can visibly deform the image during monumental architectural projection. The final result – what the spectators see and how real it becomes for each particular viewer – also depends on the power of lighting and technical features of projection equipment such as high resolution support. In addition, the same screening may manifest itself differently for many viewers watching the show from different locations. Some shadows, less than perfect bits of image or underexposure can effectively destroy the whole picture. The viewer may focus on different aspects of perceived presentation, but should always be led into illusion. He needs to submit to illusion, the things he sees, for a while. For this reason technology plays an important part in the whole process.Based on the manner and accuracy of images appearing before our eyes we are able to discern what they are in reality and also how real they are. Creators of various simulators, engineers and artists working with VR, as well as the creators of popular computer games are perfectly aware of this dependency. As we know, we form our perceptive judments mainly on the basis of perceptive data (sensory data). Whenever we perceive an object, its image, what we see, is based on information received and generated in our minds. The data that we receive at any point in the process of sensory perception is very rich. Therefore, only part of it is selected and formed into a belief (perceptual judgment) that 'this building changes colours'.The conceptual component of represented content enables to treat certain data as the subject of property and other data as the features of this subject. We express this structure in perceptual judgment assigning colours to the object. The conceptual component of perception also lets us understand what we experience perceptually, in other words it makes us confront with our other knowledge. In this way, our sensory perception gets into interaction with the area of thinking and knowledge – our cogito. Thus, viewed objects become screens and light emitting displays become substance in our minds. A few years ago AntiVJ group created Paleodictyon project – a monumental screening, which was displayed at the Pompidou Center Metz. The building designed by Shigeru Ban has a distinct organic shape. The project developed in collaboration with Yannick Jacquet and Thomas Vaquié was a dynamically changing fractal structure displayed on a tapering dome of the building. The visualization was generated in real time using customized software written by AntiVJ lead artist and programmer, Simon Geilfus.All the elements of this very complex project have been



"Paleodictyon" by Simon Geilfus, Yannick Jacquet and Thomas Vaquié / AntiVJ, 2012, Centre Pompidou (Metz)

carefully designed and prepared by the team. Fractal pattern that artists displayed on the dome of the museum, was inspired by organic life – cultures of ocean inhabiting bacteria and microbes known as Paleodictyon Nodosum. According to the authors, they found a striking similarity between the behavior and activity of microbial life and the aesthetics of Shigeru Ban's architecture. The image designed especially for the projection was in constant correlation with its sound domain. Repeated smooth pulsation of the visualization highlighted organic form of the building's architecture, transforming it into some sort of biological being. In this case the symbiosis of form and light was an example of generative mapping during which the image is created in real time through earlier established algorithms.AnitVJ software featured some randomness, allowing visual structure to evolve within a certain random parameter. This created a kind of loop between the real space and illusory being. The resulting composition was shaped only in its ncessary outline, since all the visual elements were in constant interaction throughout the screening. This approach transformed a static building into a dynamic audiovisual form. Sophisticated work aesthetics and precise lighting of the archtecture made the installation highly esteemed among fans of video-mapping worldwide and one of the flagship projects of AntiVJ. Another project of this group is a light installation Eyjafjallajokull designed by Joanie Lemercier and presented during the onedotzero festival in London. A drawing was screened on a broken screen, consisting of two walls and part of the floor. As a result of such action it created a hybrid of light and the drawn line. The composition presented the titular volcano, and was inspired by its actual eruption in 2010, which nearly paralyzed air traffic across Europe. For this reason, one of the artists had to spend more time at the airport. A visualization prepared in 3D technology was imposed on the drawing with subtly animated fields of light penetrating it. The result is a beautiful visual composition of sublime form and unprecedented spatial depth. Lights, dimming gently to the music, illuminate slightly polygonal shapes that fill the room, reminiscent of a meteor shower in slow motion. Selected fragments of landscape drawn on the wall light up gently only to smoothly fade after a while. The created landscape evokes illusion of spatial depth among viewers.

My friend, artist and cultural manager, Weronika Lewandowska has been associated with the VJ scene in Poland for many years now. She has participated in numerous events connected with the movement and was the first one to organize share, which is part of the international



"Eyjafjallajökull" audiovisual installation by joanie lemercier / AntiVJ, 2010, Onedotzero festival (London)

initiative share global (share.dj). Weronika and Mateusz Pirecki organized Share Poland in Katowice. The artist also collaborated with Konrad Zduniak on BYOB (Bring Your Own Beamer) event in Warsaw, which the author of this paper had the pleasure to be a part of. Recordings from these events are available on Vimeo and BYOB blog[1]. Both events are non-institutional initiatives, rooted in DIY aesthetics.

Weronika had the opportunity to meet AntiVJ artists during Live Performers Meeting. According to the artist the work of AntiVJ can be described as a new kinetic art, oscillating between research on perception and the search for innovative forms of aesthetic "AntiVJ actually does not deal with VJing, commonly referred to as real time activities with the use of a VJ-dedicated software uploading video samples and modifying them according to the available effects and functions. Anti VJs extensively coded light situation in which the algorithm co-creates some aleatoric, fluctuating form determined by parameters of structure and space. The superimposed effect transforms visual significance of the objects and opens their structure altering the objects in real time. Our perceptual orientation is distorted and followed by the suspension of disbelief that favors the experience of immersion and creation of illusion. AntiVJ is certainly one of the first and most important groups that has incorporated into its activities broad and interdisciplinary study of screens as well as light mapping of the objects, embedding them in relation to scientific knowledge, history of art, light and 3D design. Their projects can be called a new kinetic art, expanding research on perception in the fields of art and technology. Currently, activities of individual members of the group are heading more and more towards the production of virtual reality, except the fact that this virtuality was manifested in their earlier projects and attempts to reveal alternative structure of existing material forms with the use of spatial images. With these activities they changed the art of VJing developing stage design and video mapping, proposing a whole new dimension of light activities in real time."

One of projections shows by AntiVJ could be seen in Centennial Hall in Wrocław, Poland. It was the culmination of events organized at Discovery Center, an interactive museum that operates in Centennial Hall. The artists spend many weeks on preparations for the show in order to perfectly fit the dome of Centennial Hall and emphasize unique architecture of the building as best as they could.

1 Vimeo: https://vimeo.com/weronikamlewandowska, BYOB blog: http://byobwarszawa.tumblr.com.

To implement videomapping projects artists need proper digital tools. Mapping requires high precision during the process of lighting images on selected spatial forms, especially when specific visual elements need to be customized to fit parts of the surrounding objects, such as windows, ledges, columns and various ornaments but also any other irregular shapes, which will serve as screens. In order to mold with the objects the images need to become their part, as a result creating coherent visual whole with a given object. Otherwise, there is no illusion, and thus the spectators' perception will not become subject to trickery. As a matter of fact, the name of the technique originates from this very precise method of applying an image to the illuminated object. A similar process takes place during applying textures on virtual objects in three-dimensional graphics. For their video projections artists use software such as Resolume Arena, MadMapper and many other online tools (frequently available for free) that allow to effectively prepare the show. One of them is VVVV – a modular software with powerful capabilities, operating only on PCs.

The light output of light projector measured in ANSI-lumens is of key importance, especially during the implementation of monumental projections on the facade of a building.

An average projector used for presentations held in conference halls has the light output of 3000 ANSI-lumens. The ones used for videomapping projections have an average light output of 20 000 ANSI-lumens and are much larger. One of the producers is a Japanese company Panasonic. The projectors are very expensive. Price of a single device with lens reaches approximately 70 000 PLN and may even be higher depending on image quality, supported resolution and durability of the device. Therefore, people responsible for organization of mapping shows frequently hire mapping companies with the necessary equipment to significantly lower the cost of service. Rental costs of a professional projector with technical supervision are approximately 5000 PLN per night and include installation and dismantling of the equipment as well as one screening test carried out several days before the show.

Mapping begins with a performance map which is adapted to the irregular shape of a selected area. The map should include all striking architectural elements. Visualizations can be viewed on bridges, buildings, monuments or cars – there are no boundaries as to the shape or size. The only limitation is imagination of an artist and possible obstacles placed between the light source and the subject. These unwanted elements can obscure the illuminated object (these include trees, shrubs, lanterns, etc.) or even prevent full coverage image of the facade from

a suitable distance (eg. other buildings). These small things often have a very decisive influence on the whole event. Mapping is used for artistic as well as commercial purposes. Large public events frequently need more than one projector, sometimes they even require a dozen units. A few years ago Czech mapping group The Macula took part in one of the biggest events in the history of mapping projection: Palace of Parliament in Bucharest was covered with the image coming from 104 projectors.

Nowadays mapping has become almost mandatory and often the most spectacular show at all the major festivals and other large events related to light and image, not limiting itself to outdoor screenings only and having expecially strong presence at the events where new media art plays leading role. Video mapping projections gather large audience since the emotions accompanying the shows are very powerful and extraordinary.

Apart from technology, a very important issue is related to the formulation of artistic expression. Apart from great ideas and talent there is a need for general awareness of what types of visual perception tricks the audience will be most susceptible to. Needed skills include some working experience with digital image in space, video footage post production and knowledge of effects achieved by imposing visualization on a wall, as well as awareness of the factors that either affect our perception with high efficiency or escape the audience's attention due to accumulation of many effects and technological limitations. These are often difficult choices, since projections appearing on uneven surfaces are not as pronounced as those screened on smooth white screens. As we know, paint covering facade is rarely snow white, and thus a large part of light is absorbed when reflected from such surface. Facades of buildings are exposed to long term weather conditions, so they usually are dilapidated and dirty, not to mention off-white colours belowed by architects cooperating with housing associations and various developers. A skillful use of the audiences susceptibility to a variety of experiences related to the perception of space during projections is another very important aspect of video mapping development.

Music is an access code

The things that affect our sensory apparatus – and therefore are the root of our perceptual states – are called the objects of sensory perception. Not every object which we consider as a physical one can be an object of perceptual sensory references. For example, elementary particles due to their small size will not become the immediate focus of our perceptual activity - leaving aside the unclear question whether they are certain fixed 'things' and not just some sort of interacting force fields. Objects of perception can not be too large as well. If we imagine the cosmos, we see it as a kind of continuum but still as some kind of a physical object. However, it is not an object we are capable to apprehend via sensory observation.

This also applies to objects such as magnetic fields and atmosphere. Our sensory perception is a differently occuring synthesis and objectification of one's sensations (sensory data) happening every single time. It is very strongly determined by factors derived from our memory reproduction. These factors are combined in the process of perception with the sensory complex currently existing in our consciousness. For example, in order to recognize currently experienced sensations of green, shape, roughness, as the perceptual properties of the object composed of limbs, branches and leaves, we need an automated memory reproduction, which

involves assigning to experience previously acquired concepts and formulations. Reference of a sensory complex to a specific object is called the function of thinking. A good example would be an evening walk in a forest when we can only see the silhouette of a person among the trees. Because of minimal lighting we briefly look at the shape, but our mind tells us that these are just some branches, because we are in an actual forest and can not hear any sounds characteristic of the activity of another human being.

Sensory perception is the primary mechanism for any immediacy: we remember something that was once perceived, expect something that will be perceived, we also imagine what might be perceived with our imagination.

The same applies to awareness of the image and the sign. However, the information describing the image does not need to be explicitly linked to the perceived model. It may be something completely different – an operational construct belonging to a different order. It may represent a kind of transmission uninvolved in any purpose of sense as if appearing as an after-effect. Information can generate the sense that almost immediately disappears, or it can deliberately destroy meaning and significance.

Following the above let us imagine a situation where image and sign have been consciously designed in such a way as to evade the sphere of meaning. This is a contraimplosive process of preventing every content, every event, every purpose – the ability to read any complexity. There is no specific purposefulness attached to an image. Its purpose is neither a reflection of a particular item nor reference to some general semantic field. Its veracity lies in the fact that it is a simulation model, carrier of a visual code so vague that one can only find mutual spaces of overlapping semantic fields.

Such a mechanism was implemented in one of my projects carried out over the past few years. Optikony (Opticons) are a visual artwork created by transforming the 3D shapes of a glassy form. They are transparent forms of ovoid and organic shapes that generated numerous optical illusions, and caustics during their transformation. The design process of these blocks assumed keeping as much distance in relation to the specific connotations and interpretations as possible. The aim of indefiniteness of shape was to stratify the mechanism for reading the form and associating it with a specific semiotic field. The shapes were all meant to float in zero gravity until the particular moment selected by a musician. Music was an access code for this



"Opticon VI" by Roch Forowicz, created in cooperation with Jarek Grzesica, 2014 (video link: https://vimeo.com/87282539)

project assigning meaning to the objects and guiding viewers on the right path of interpretation. Each of the six Opticons was placed in a specific sound environment that gave the Opticons unique context. Music started the process of emancipation of one of many possible decodings. Of course, it is necessary to take into account the interpretational circumstances, conditioned by what the audience of Opticons knows about encoded meanings, and how the audience's imagination, visual and sound sensibility influence the whole process. However, the entire project oscillates around the idea of transgression of semiotic fields and their joint interactions. Three great composers involved in contemporary music were invited to cooperate during the project – Edward Sielicki, Jaroslaw Grzesica and Hubert Napiórski. Each of them, in a unique way, gave selected Opticons extraordinary semiotic inclination. Using their own sensibility and talent musicians influenced the process of sensory perception of the project by the audience. Describing his work on composing music for Optikon II, V and VI Jarek Grzesica writes "For me, a single form of Optikon, and the entire project understood as a series has become a space for experimenting with abstraction."

Optikon is primarily abstract as a shape, then there is association with something entirely foreign, even despite the fact that with formulating associations this shape ceases to be an abstraction. Optikon is not reminiscent of any known creature or shape. So much that I am personally unable to describe it to other people and make them understand what I mean. Forms such as drop, refraction or alien come to my mind. I interpret Optikon as a biological – and therefore living – organism, while in reality it is an abstraction – we do not know what we see unless there are tools to anchor this shape in some area of meaning. To my surprise, sound becomes the perfect tool to do so.

Sound layer that I create is abstract and completely devoid of meaning, although it still may inspire visually. However, the encounter of these two abstract forms of vision and sound creates meaning and this is what makes the project brilliant. My impression is that we come to the 'resonance' of two abstract forms, creating compositions read by the viewer."

Hubert Napiórski is the author of musical composition to Optikon IV. The musician reveals his working approach explaining: "When Roch offered me cooperation on Optikon series I immediately thought about the way music exists as a background in social consciousness. It always seemed to me that building a relationship with an audience is hindered by approved



"Opticon IV" by Roch Forowicz, created in cooperation with Hubert Napiórski, 2014 (video link: https://vimeo.com/83926243)

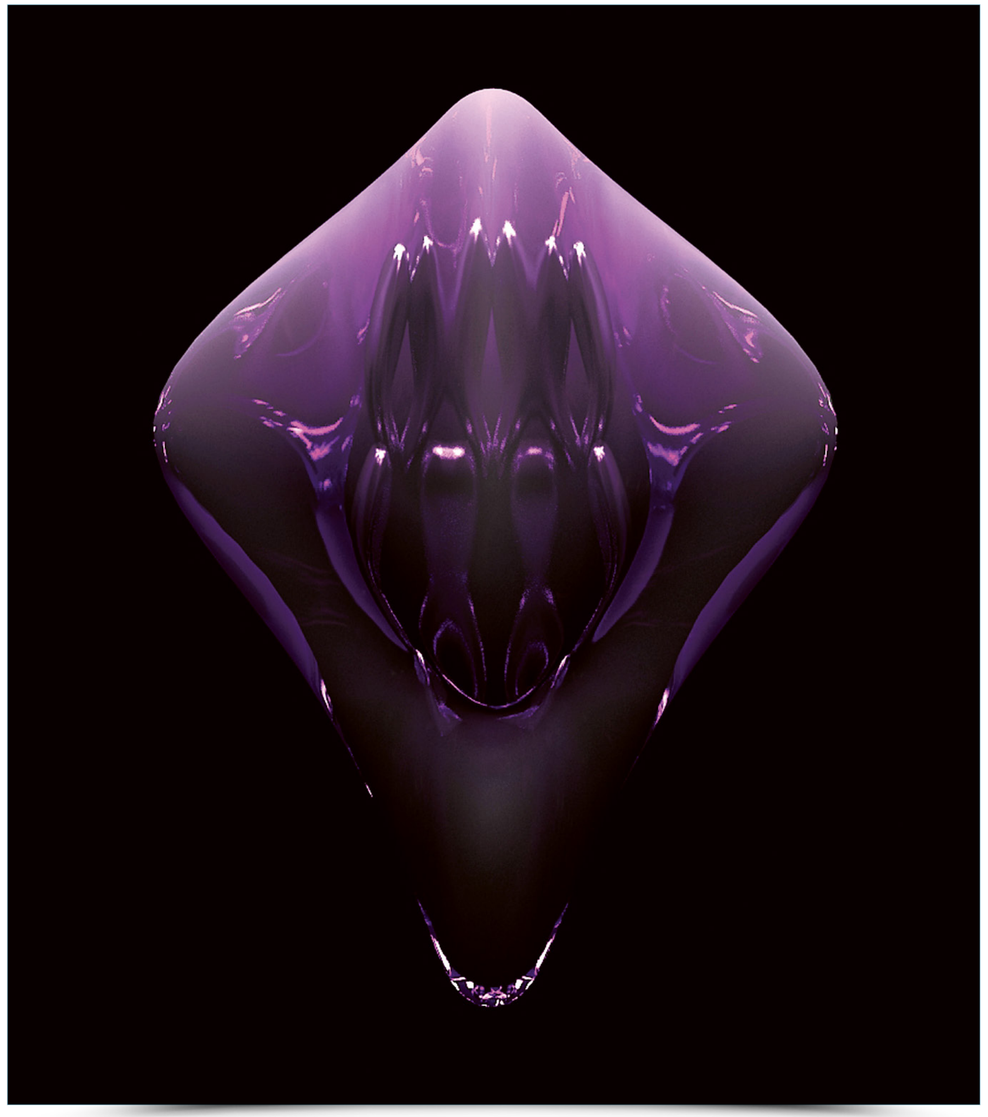
schemes of reception, some sort of cultural education as well as many other issues. All these factors resonate and heavily influence what may ensue.

I have long been interested in the critical approach to visual culture which is nothing more than manipulation operating with an illusion of expression and all its derivatives. As visual artists we can use image to reveal part of what is hidden underneath this specific type of delusion.

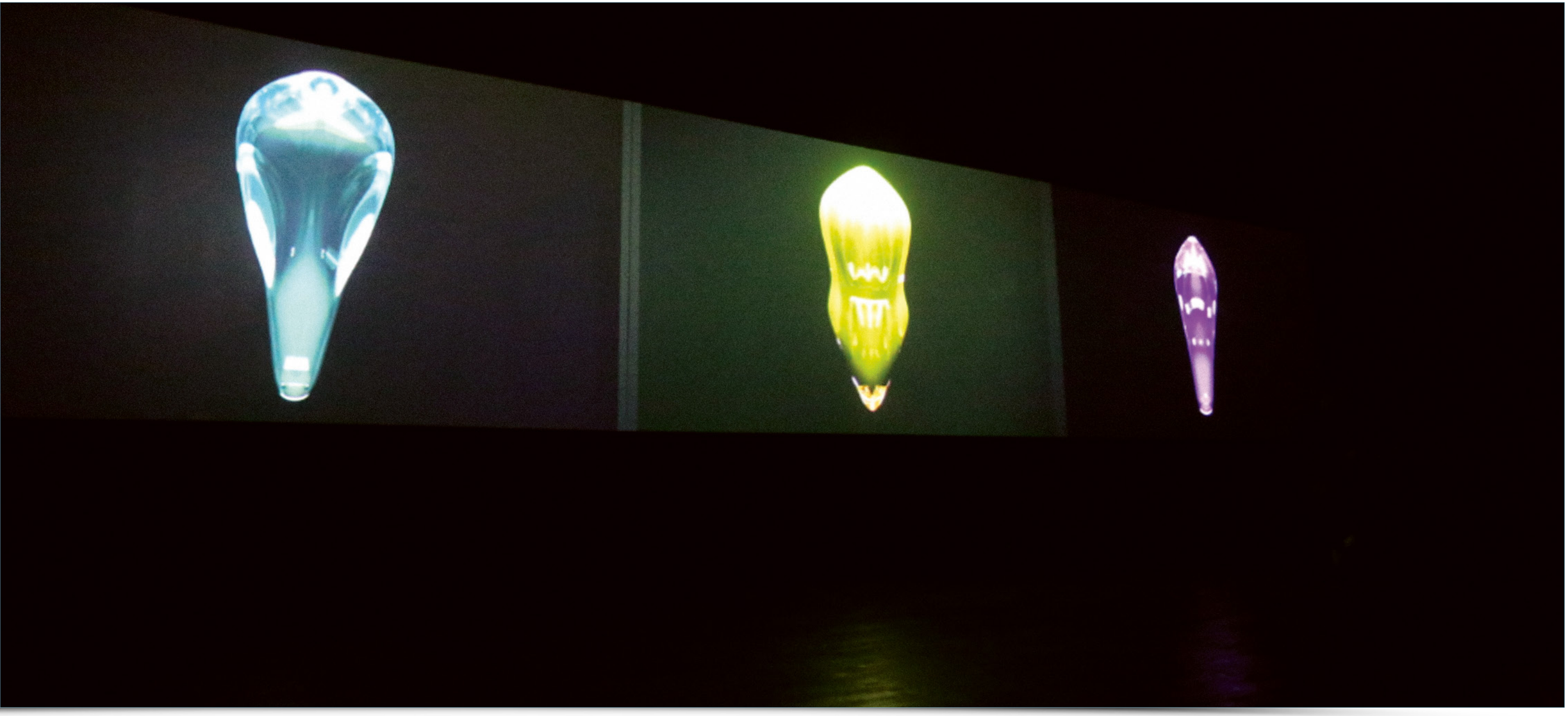
I tried to discover a subliminal value of what is part of the whole with my music. I thought of drone ambient (music) frame as a kind of musical situationism that does not impose itself, makes you think and gives the narrative with its abstract shell producing a cloud of something that is so deeply rooted in the world around us that we completely overlook it."

Edward Sielicki says "Opticon, a radiant form brought to life with the help of a computer can become a substitute for living matter, its symbol, when accompanied by sound. Opticon is an ever changing separate being and sound is a very important component accompanying its metamorphosis. The pace of this metamorphosis is dependent on the type of sound. More angular rhythm based sounds evoke its shape-up phase, while mellow sounds, posessing a non-metamorphic quality themselves, shape-up Opticon to an amorphous form in a more incessant way. To put it simply, Opticon dances and expands depending on a given type of sound. Another important aspect is tone quality, as it can interact with the natural colour of Opticon in a straightforward manner (clear, bright image of Opticon together with harmonic highs). Harmonic compliance of the sound is another way that can affect Opticon's softness, ie. a 'nicer' sound harmonizes with a more clear image, while the 'rough' one will go along with more solid, bulky look. In this example the notion of chroma seems to closely relate to both image and sound." Simulacra (the term used by Jean Baudrillard in his 1981 treatise "Simulacra and Simulation") are signs that have no original to refer to, simulating or copying fragments of our reality, sometimes generating their own one. As a matter of fact, subsequent Opticons are simularca – illusory creations generated with the help of professional industrial tools, enabling accurate simulation of the laws of physics. Music gives them indeterminate depth, hypersurface for the composers to lead the audience.

From a technical standpoint the process of generating glassy solids was very time-consuming. The process needed advanced tools for three-dimensional graphics. Rendering allowed to analyze and simulate optical phenomena such as the formation of reflections and



"Opticon I" by Roch Forowicz, created in cooperation with Edward Sielicki, 2012 (video link: https://vimeo.com/64949254)



"Triptych of Opticons" by Roch Forowicz, created in cooperation with artist and composer Jarek Grzesica (2015) WRO Biennale Test Exposure, Wroclaw

hyper caustic surfaces. Many complex calculations were required to create an aesthetically convincing simluation, including tracking of potential photon movement in a glass structure. For this purpose, the artist employed a very precise simulation technique modelling realistic distribution of light, which for the purpose of rendering generates and utilizes data structure with information about the distribution of light in a three-dimensional scene. This method allows to track rays and subsequently implement more and more complicated instances that may appear on the way between the virtual light source, glassy solids and observer's POV. The easiest way would be to simulate the specular reflection (mirroring). The most difficult way is to calculate multiple diffuse reflection and indirect illumination of the scattering surface. This is performed with several millions of photons emitted from a light source. Rendering engine calculates their interactions with three-dimensional scene using conventional ray tracing methods. Virtual photons penetrating through the glassy surface are refracted and dispersed. The first phenomenon is the change in direction of propagation of an electromagnetic wave due to a change of its speed when it is sent to a glassy medium. The second refers to various phenomena which occur when a wave encounters an obstacle and also the way it is dispersed in a glassy medium, and in some cases how this illuminates this object. Photon mapping allows the professional to visualize the light reflected from the specular surface, passing through the lens, prisms and other elements. As a result, these calculations produce visualizations of Opticons. Images that do not implode without music due to the large number of divergent meanings and associations. In this case there is no significant relationship between information inflation and transgression of semiotic field. This process leads to some kind of hyperreal nebula one can travel thorugh only while listening to the compositions of Edward Sielicki, Jarek Grzesica and Hubert Napiórski.

Land of Silence and Darkness

It is often the case that during the formation of the images in our consciousness we find it difficult to differentiate sensations from perceptions since they both inhabit our stream of consciousness simultaneously. Take sleep and dreams for example, with their isolated sensations separated from sensory perception. We need to keep in mind, however, that dreams are frequently inspired by our perception.

Land of Silence and Darkness is a 1971 documentary film by German director Werner Herzog. The film investigates inaccessible world of the perception of the blind and deaf, shrouded in mystery. Initially, the film focuses on the story of Fini Staubinger, who was born healthy, but through an accident gradually lost her sight and hearing. Ms. Staubinger helps other blind and deaf teaching them how to communicate. The document also focuses on people who were born deaf-blind. It is a very intimate story about their lives which turns into a story about perception and feeling, a very universal one and in close relation to our considerations. To some extent we are able to take a small step into this strange world and look at our own perceptual

experience from a completely different standpoint.

At some point in the documentary Fini Staubinger describes the titular Land of Silence and Darkness: “people think that deafness means peace, but it is a mistake. This constant noise, ranging from a gentle hum, switching to noises, ending with the continuous buzz. This one is the worst. You do not know what to do next. This is very difficult for us. Sometimes it makes us quite sensitive. The same applies to blindness. It is not a total darkness. We often see all sorts of colours. Black, gray, white, blue, green, yellow ... it depends.”

Fini Staubinger teaches other blind and deaf how to communicate with the environment, for example using codes, such as a sign language of strokes. “It is a system of strokes and taps but you have to take great care when using the language, for example, short taps are done with down strokes” explains Ms. Staubinger, touching both the top of one of the fingers and swiping towards the center of her palm.

Another code is the vibration and lip-recognition technique when you apply a hand to the mouth of a speaker.

„When you let go of my hand, it is as if we were thousand miles from each other,” says Fini Staubinger.

People who were born blind with no experience in interpreting visual data are also able to see. Seeing very often happens in their dreams. They have no sense of perspective or visual space. Roman Roczeń, one of the people portrayed in Magda Parol’s short documentary Train to Morpheus, says „In my dream I enter (the room) and I feel the handle, touch is very strong in my dreams.” Roczeń adds that sometimes these are abstract dreams: „abstract world of these dreams is built on an abstract world of sounds, not that they are unimaginable, I think that the brain can generate something familiar, while it is the configuration of sounds that is actually unimaginable.”

Simulacra and Simulation

Jean Baudrillard was a French philosopher, one of the leading representatives of post-structuralism and postmodernism, along Michel Foucault, Jacques Derrida and Jean-François Lyotard. Baudrillard first used the concept of hyperreality in his 1981 philosophical treatise "Simulacra and Simulation". According to Baudrillard, along with the development of sign systems the boundary between the real world and its representation gradually fades, leading to a gradual independence of a sign having no reference to reality. Baudrillard called emancipation phases of this transition process the "precession of simulacra". According to this precession simulacra are images without resemblence, they simulate or mock fragments of reality, sometimes generating their own reality/realities. Baudrillard describes the processes according to which we face the ever-increasing phenomenon of multiplication of reality. Signs cease to posess their function due to the ever growing and evolving number of connotations and feedback overload. The relation between the image and its semantic field is no longer important. This process initiates the creation of a simulation, the hallmark of which is a departure from the referential quality of a sign. Instead, they simulate real existence, similar

to the way sick people simulate the disease, e.g. they invoke real symptoms associated with the real phenomena. These signs no longer conceal reality. They hide the fact there is no reality. When the communication is interrupted the expansion process begins to accelerate. Perhaps it contributes to the preventive function of misinformation, false readings appearing as a result of successive accumulations and semiotic fields overlap.

In this case, information may take on this preventive function, thwarting the ability to read the message. It is possible this process takes place in the hyper-reality simulation – hyperreal communication and meaning loop. These are simultaneous and equally real phenomena taking place in a reality that one can no longer grasp. In this way, the reality is suspended. Trust and belief in information turns out to be illusory. Baudrillard often refers to the emancipation process of blurring the differences between the real world and its representation. Because of this fusion many artists and theorists associated with contemporary art, in particular with video-mapping, frequently refer to "Simulacra and Simulation". For example, the basic assumptions of video-mapping are strongly based on the experience of unreality of the objects via simulation – adding more layers, masks and assigning new contexts to these objects.

According to Jean Baudrillard, "Disneyland is a perfect model of all the entangled orders of simulacra. It is first of all a play of illusions and phantasms: the Pirates, the Borderlands, the Future World, etc. This imaginary world is supposed to ensure the success of the operation. But what attracts the crowds the most is without a doubt the social microcosm" (Jean Baudrillard, Simulacra and Simulation. Ann Arbor: University of Michigan Press, 1994, p. 12). Moreover, says Baudrillard, people prefer perfect imitations to originals. That is why Disney's Matterhorn is more famous in the US and more often visited than the actual mountain peak in the Swiss Alps.

Street artist Banksy hurt the feelings of Disneyland fans for the first time, when he placed an inflatable doll dressed in an orange jumpsuit, reminiscent of the inmates of the infamous Guantanamo Bay prison camp, inside one of the rides. The dummy had its hands and feet manacled and a black bag put on its head. The hooded figure was spotted by the bewildered visitors during one of the rides, while Banksy himself had to flee as quickly as possible so as not to fall into the hands of security guards.



"Dismaland" project by Banksy, 2015, (The Tropicana, Weston-super-Mare in North Somerset)

Banksy has recently revealed his latest project, Dismaland. The artist has created a specific simulation of Disneyland theme park. There are rides and other structures usually used for recreational purposes – except that in Dismaland everything is a bit closer to our reality than in Disney fairy-tale land. For example we are welcomed by security at the entrance gates similar to those standing at the airport. The officers treat us harshly and the whole area is filled with omnipresent CCTV surveillance. Once we enter Dismaland, in the central part of the theme park, we see a fountain made from a crashed police van. Each tent houses objects and art installations, depicting, among others, a blonde princess lying dead in her crashed carriage in front of a battery of paparazzi taking photos, miniature boats filled with migrants from Africa floating in the pool, or a woman sitting on a bench attacked by a flock of pigeons.

Some of these exhibits include Banksy's graffiti printed with a 3D printer. 58 artists from all over the world joined Banksy and participated in the project, among them Damien Hirst and Jenny Holzer. One of the works was provided by Jimmy Cauty, who created a dystopian large scale model of a village after the riots. Blocks of residential buildings and empty streets lit only by street lamps and the lights of police cars. Here and there the visitors can see small groups of journalists and TV crews visitng the apocalyptic scene. The work is a perfect synthesis of the street artist's previous artistic activities.

"The imaginary of Disneyland is neither true nor false, it is a deterrence machine set up in order to rejuvenate the fiction of the real in the opposite camp (...) This world wants to be childish in order to make us believe that the adults are elsewhere" writes Baudrillard (Simulacra and Simulation, p. 13).

Interestingly, videomapping debuted at the 1969 opening of the Haunted Mansion ride in Disneyland where the 16mm film presenting disembodied heads was projected onto non-flat surface (busts) imitating the heads' movement and facial features.



"Dismaland" project by Banksy, 2015, (The Tropicana, Weston-super-Mare in North Somerset)



"Dismaland" project by Banksy, 2015, (The Tropicana, Weston-super-Mare in North Somerset)



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Ph.D. Jakub Wróblewski

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Animation is a field of visual arts. Its aim is to create motion over time. Animation is very often based on a particular treatment – story. However, it can also be abstract and use art as the main axis of dramaturgy.

Animation requires a well-determined plan. All animation techniques (two-dimensional, three-dimensional, as well as experimental animation) are based on:

° Idea
° Script
° Choice of visual style
° Storyboard
° Production plan
° Organisation of a workshop
° Photography
° Editing
° Sound
° Postproduction

„Animation is not the art of drawings that move but the art of movements that are drawn."

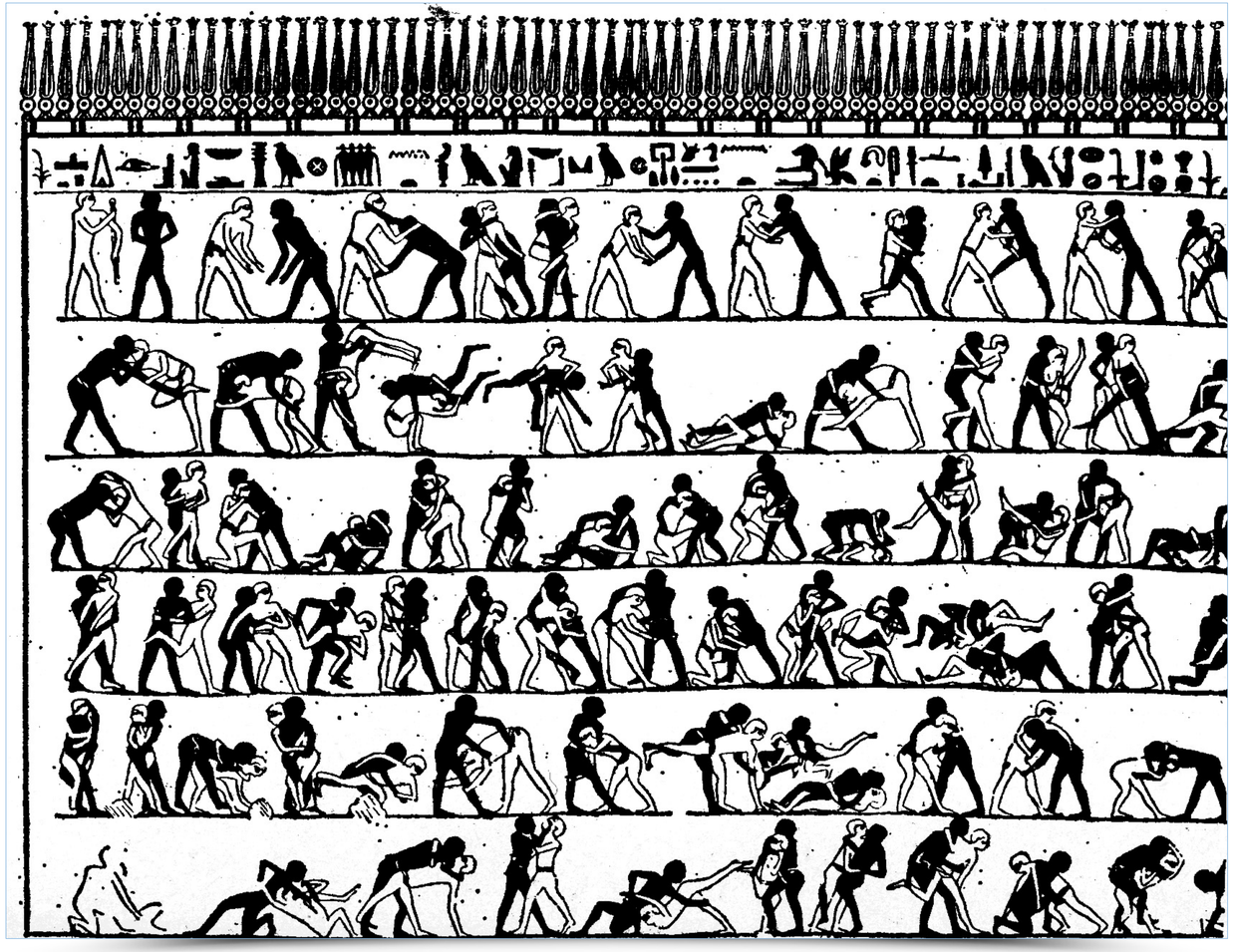
Norman McLaren

The creation of an illusion of movement has always been one of areas of interest of man.

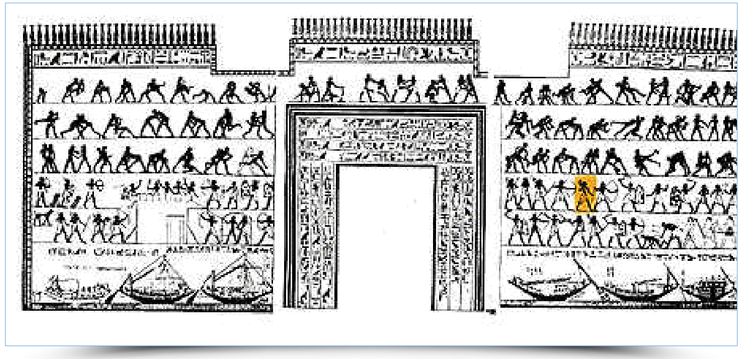


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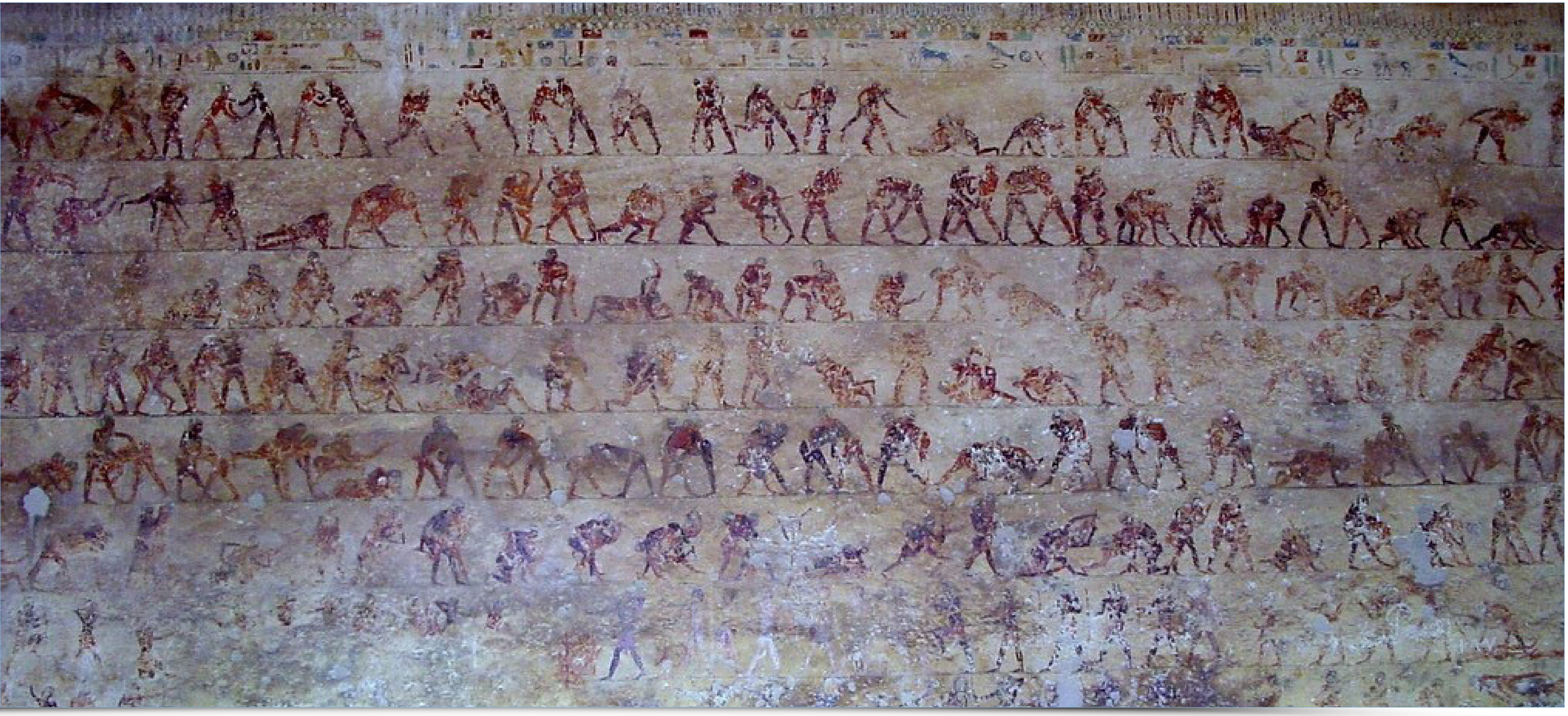
An Egyptian burial chamber mural from the Beni Hassan cemetery from the 30th century BC. It shows a series of frozen in time images from a wrestling match. Each image depicts subsequent movements. The images are presented on the plane so the movement is created only after comparing consecutive images. Presented one after another with appropriately set duration of a frame they would result in classical animation.



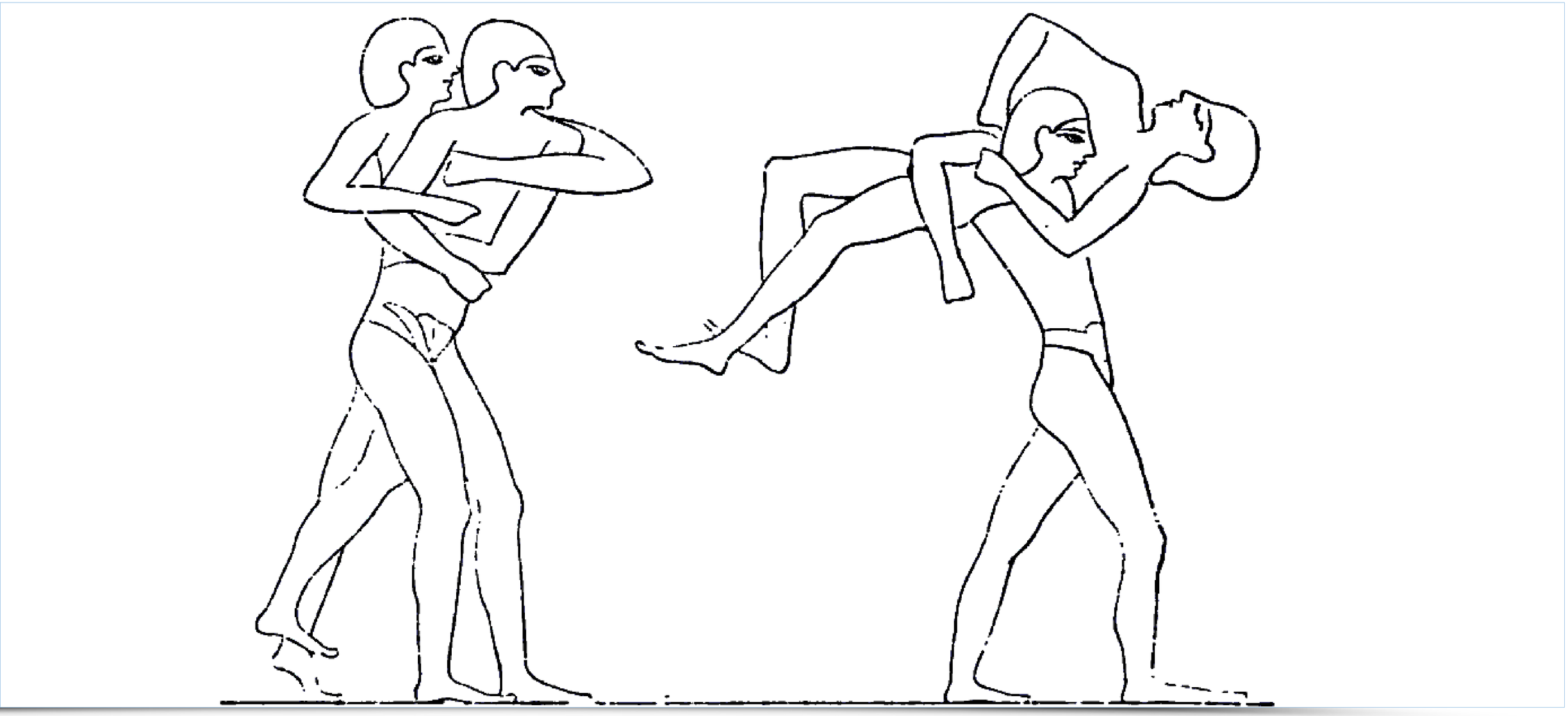
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https://upload.wikimedia.org/wikipedia/commons/1/1f/Vase_animation.svg

One of the earliest examples of animation discovered in Shahr-e Sukhteh. It is over a 5000-year old pottery bowl with 5 images painted around it. The images show phases of a goat leaping up to nip at a tree.

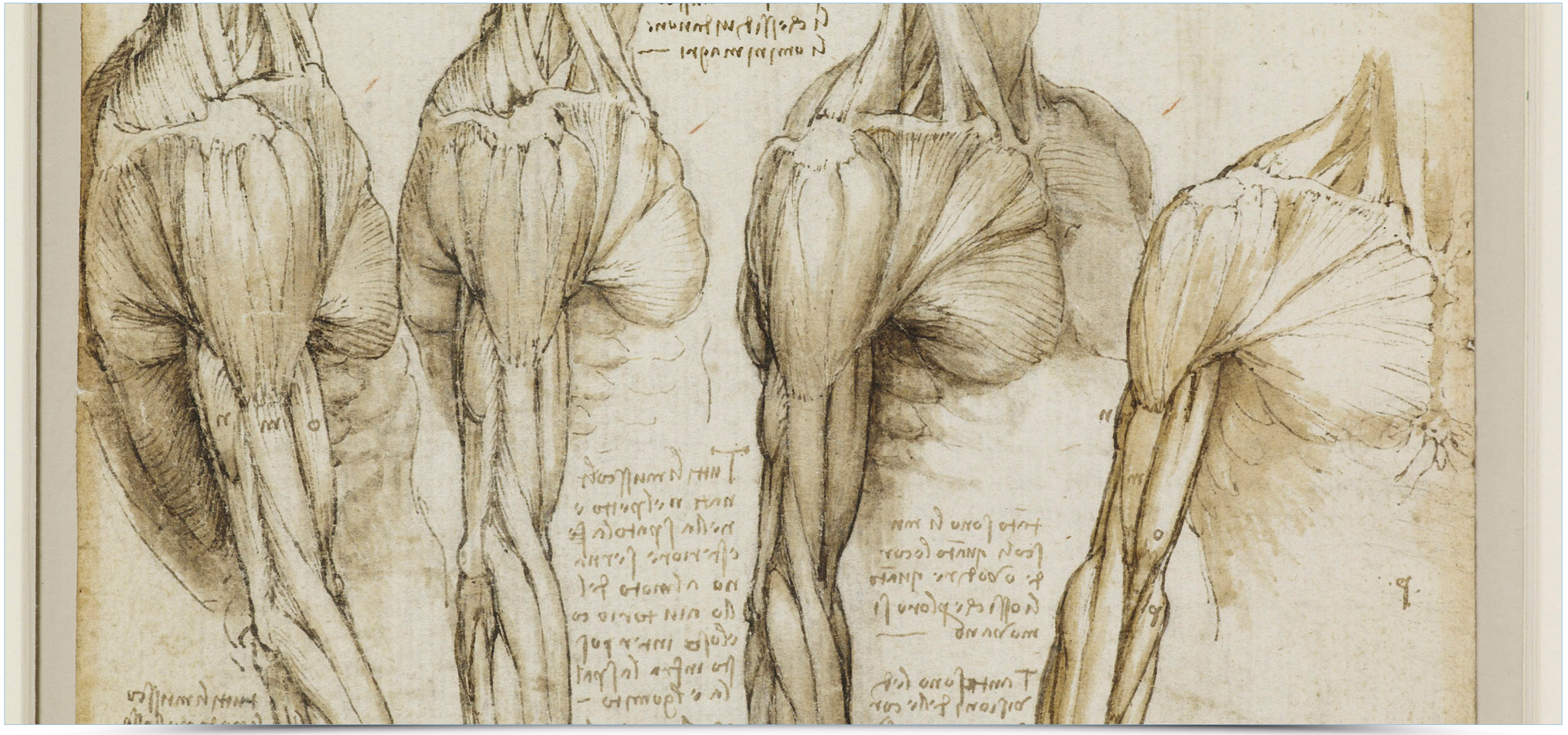


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source: http://i1.wp.com/www.kavehfarrokh.com/wp-content/uploads/2012/03/Animation-Sequence-Shahr-e-Sookhteh.jpg

This drawing by Leonardo da Vinci shows the anatomy of man. Medical approach is very important for the subject of movement. Multiple renderings of the upper body at slightly different angles gives the impression of the figure's movement - contrary to the movement of the presented object this time the movement is created by the movement of the viewer watching the images.

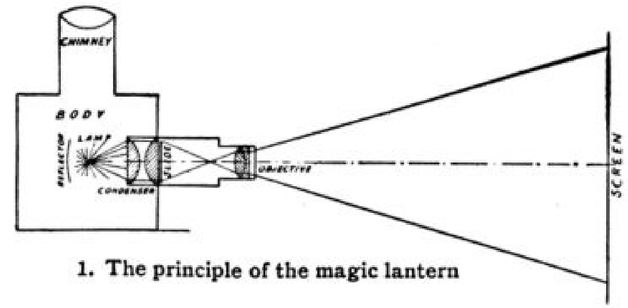


source: http://gallery.nen.gov.uk/assets/1205/0000/0110/the_muscles_of_the_shoulder_arm_and_neck_919008.jpg

The magic lantern is an optical device used to display images, an early precursor of the modern day projector. Lit with a light source an image would pass through the lens and appear projected onto a flat surface (wall or screen). The device would show one image and did not allow to project multiple frames at a time to obtain movement, however, the invention of the magic lantern was essential in the development of animation.

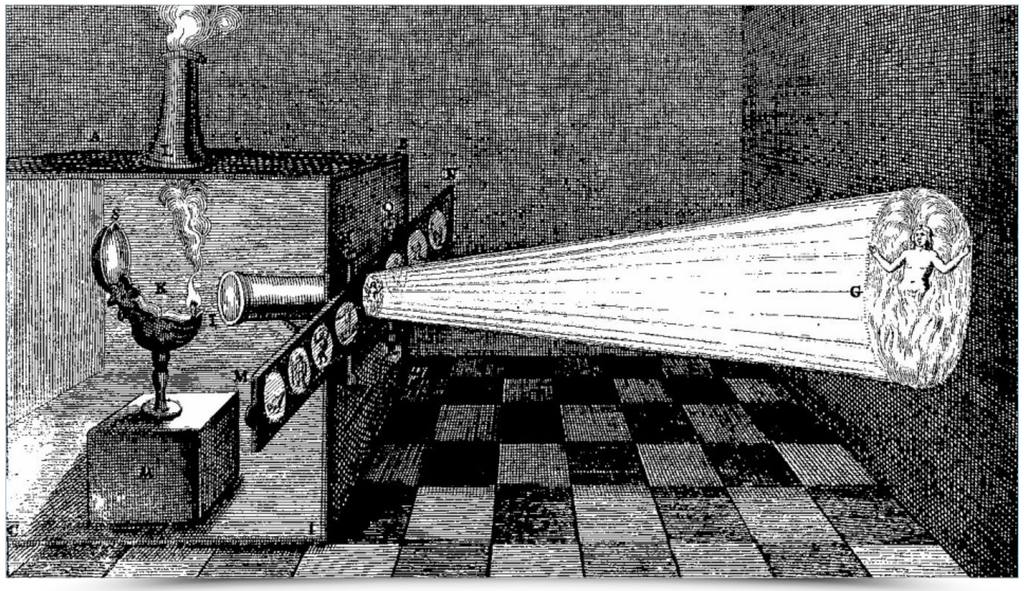
„Well, luckily with animation, fantasy is your friend."

Steven Spielberg

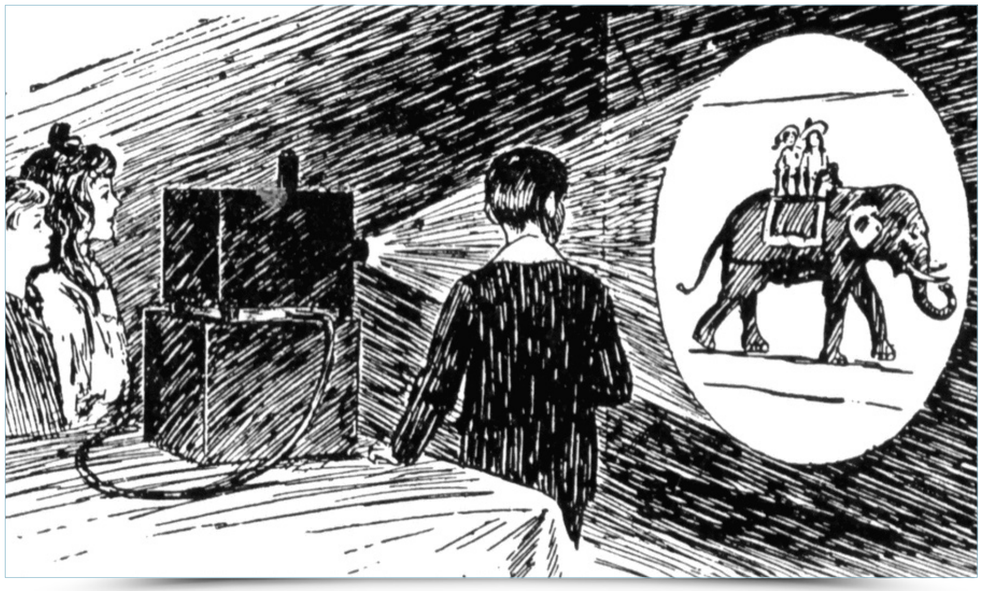


1. The principle of the magic lantern

source: http://www.infomercantile.com/images/thumb/7/70/Magic-Lantern-Plans-Diagram-1.jpg/400px-Magic-Lantern-Plans-Diagram-1.jpg



source: http://web.stanford.edu/group/kircher/cgi-bin/site/wp-content/uploads/kircher_013-1024x829.jpg



source: http://matterunorganized.com/files/2013/04/magic-lantern_1_lg.gif

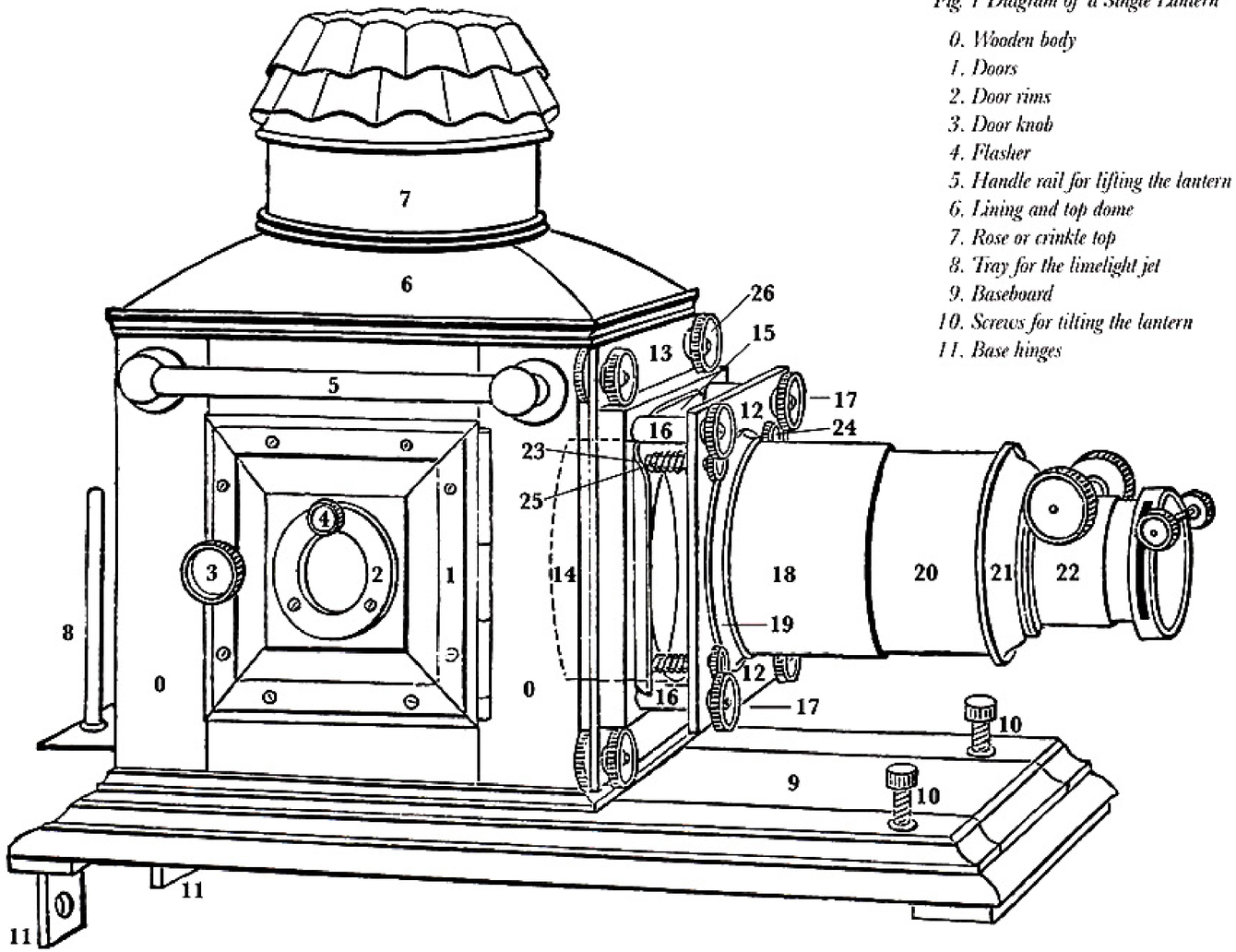


Fig. 1 Diagram of a Single Lantern

0. Wooden body
1. Doors
2. Door rims
3. Door knob
4. Flasher
5. Handle rail for lifting the lantern
6. Lining and top dome
7. Rose or crinkle top
8. Tray for the limelight jet
9. Baseboard
10. Screws for tilting the lantern
11. Base hinges
12. Front stage plate
13. Back stage plate
14. Condenser and sleeve in dotted lines
15. Spring plate
16. Barrels or pillars (and sleeves)
17. (Front stage plate) nuts
18. Outer tube
19. Flange of the outer tube
20. Inner tube or draw tube
21. Ogee which connects the inner or draw tube with the jacket
22. Jacket of the objective tube

To which we have added:
23. Spring plate pillars and sleeves
24. Spring plate nuts
25. Spring plate springs
26. (Back stage plate) nuts

In addition, the three sets of threaded studding used on the slide stage can be referred to as:
Back stage plate screws
Front stage plate screws
Spring plate screws

source: http://www.magiclantern.org.uk/images/whatisalantern.jpg

Below: „Rare and extraordinary magic lantern „Peacock" slide reel by Pettibone Manufacturing for the Stereopticon circa late 1800's." The device as well as the projected images were very interestingly designed and have an intrinsic value.

„Design is not just what it looks like and feels like. Design is how it works."

Steve Jobs



source: https://shard3.1stdibs.us.com/archivesE/upload/9154/196/9154_1353345928_6.jpg



source: http://cine-invisible.blogs.fotogramas.es/files/2012/02/DLINTERNA-MAGICA-PEACOCK.jpg

Styles of the slides created for the magic lantern were very different, but generally exhibited high artistic value. Their contents were characterised by their purpose - among them were images depicting fairy tales, moral stories, didactic materials, images depicting remote lands.



source: https://wandervogeldiary.files.wordpress.com/2011/06/a-karl-may-vision-of-the-west1.jpg

A separate attention should be drawn to artwork of promotional materials, packaging or posters associated with the magic lantern. Te device was highly valued and had a very special role at the time before the invention of television.



source: https://jawaheralhajri.files.wordpress.com/2014/11/screen-shot-2014-11-16-at-1-28-26-am.png



source: http://www.magiclantern.org.uk/images/sales/omlj-dvd-cover.jpg

nvention of Zoetrope was key for animation with the development of the magic lantern and the addition of a spinning mechanism providing the illusion of movement.

„Animation can explain whatever the mind of man can conceive. This facility makes it the most versatile and explicit means of communication yet devised for quick mass appreciation."

Walt Disney



T. H. McALLISTER, OPTICIAN, 49 NASSAU STREET, N. Y.

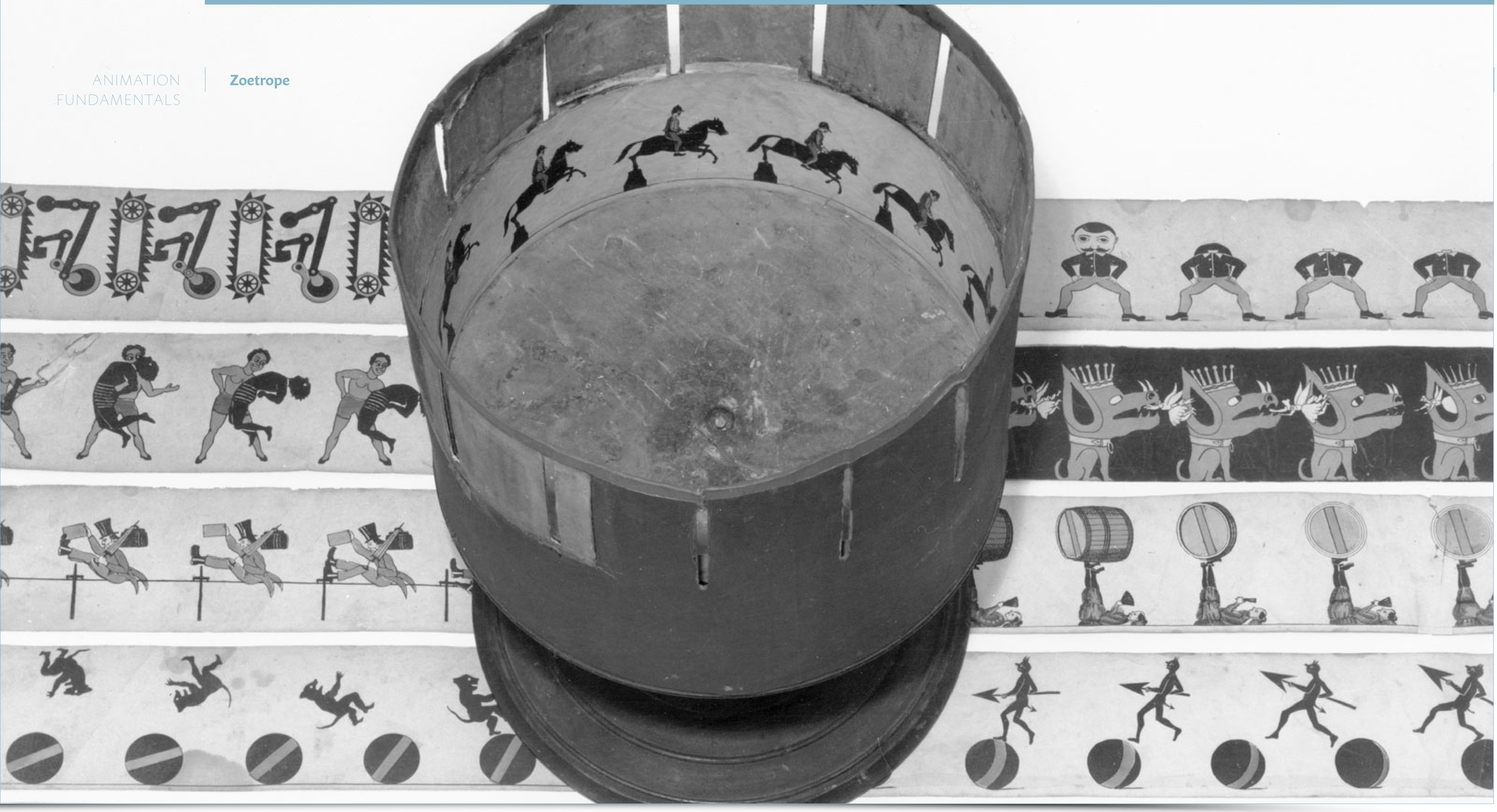
ZOETROPE.

The **ZOETROPE, or "Wheel of Life,"** is an instructive Scientific Toy, illustrating in an attractive manner the persistence of an image on the retina of the eye; it consists of a card-board cylinder, about 12 inches diameter, and 8 inches deep, with 13 equidistant narrow openings, each about 3 inches long, arranged near the top as shown in the engraving. The lower end rests on an iron shaft, rising from a substantial wood base; on strips of paper, about 3½ inches wide, 36 inches long, are printed figures of men, animals, etc., in different positions, which are placed in the cylinder. By revolving the cylinder by the hand, and looking through the openings, the images passing rapidly before the eye are blended, so as to give the figures the motions of life in the most natural manner. As many persons as can stand around the Zoetrope can see the movements at the same time.

PRICE OF THE ZOETROPE, $2.50.

Including following series of 12 amusing pictures: Base-ball Player, Chewing Gum, Dolphin Swimming, Donnybrook Fair, Gymnast, Hash Machine, Jig Dancer, Johnny Jumper, Keep the Ball Rolling, Kick her up, Old Dog Tray, Raining Pitchforks.

source: https://zoetropic.files.wordpress.com/2010/09/zoetrope31.jpg

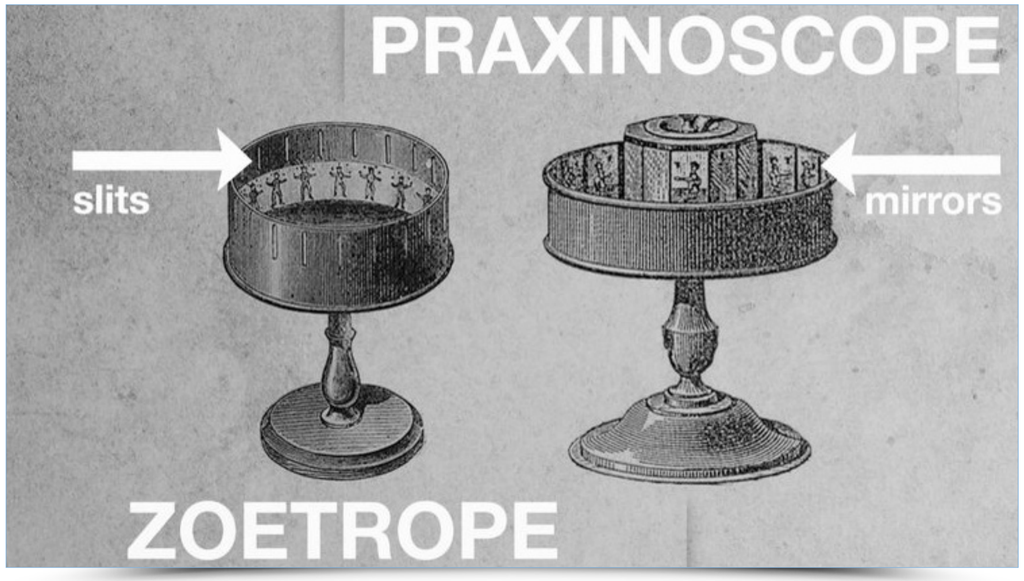


source: http://media.web.britannica.com/eb-media/30/62530-050-55A02BE6.jpg

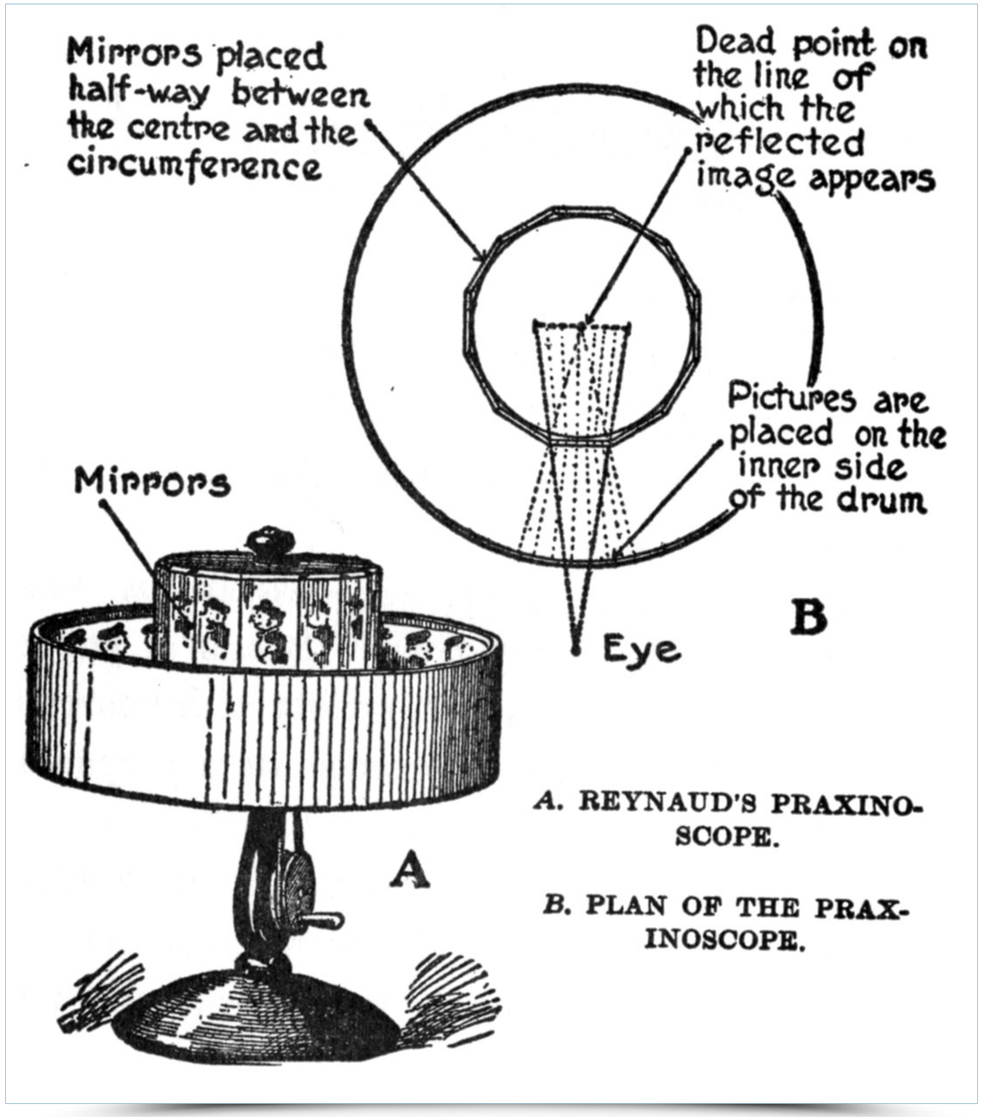
The main difference in the way both devices operated had a key influence on the development of animation techniques.

„I am an animator. I feel like I'm the manager of a animation cinema factory. I am not an executive. I'm rather like a foreman, like the boss of a team of craftsmen. That is the spirit of how I work."

Hayao Miyazaki



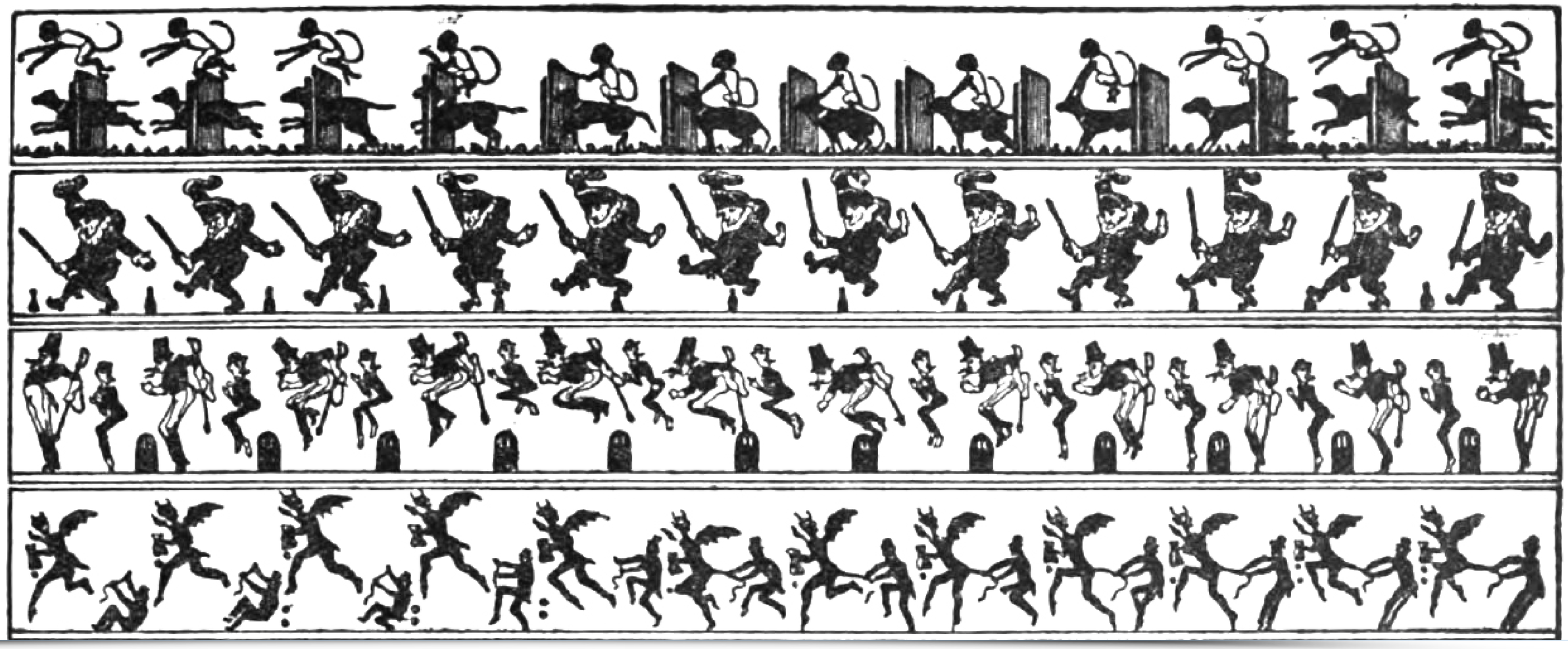
source: https://awesam333.files.wordpress.com/2014/02/praxinoscope-zoetrope.jpg



source: https://awesam333.files.wordpress.com/2014/02/reynaud-b.jpg

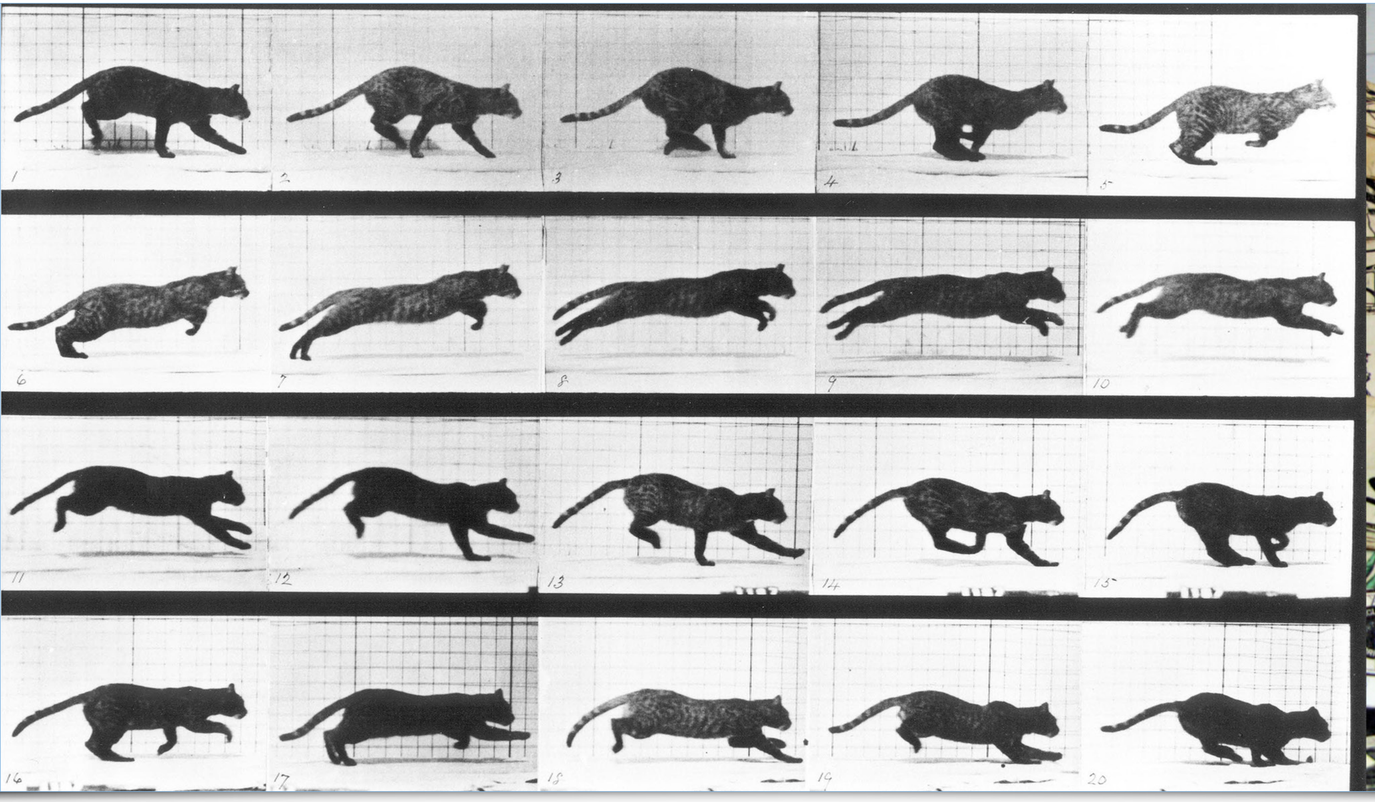


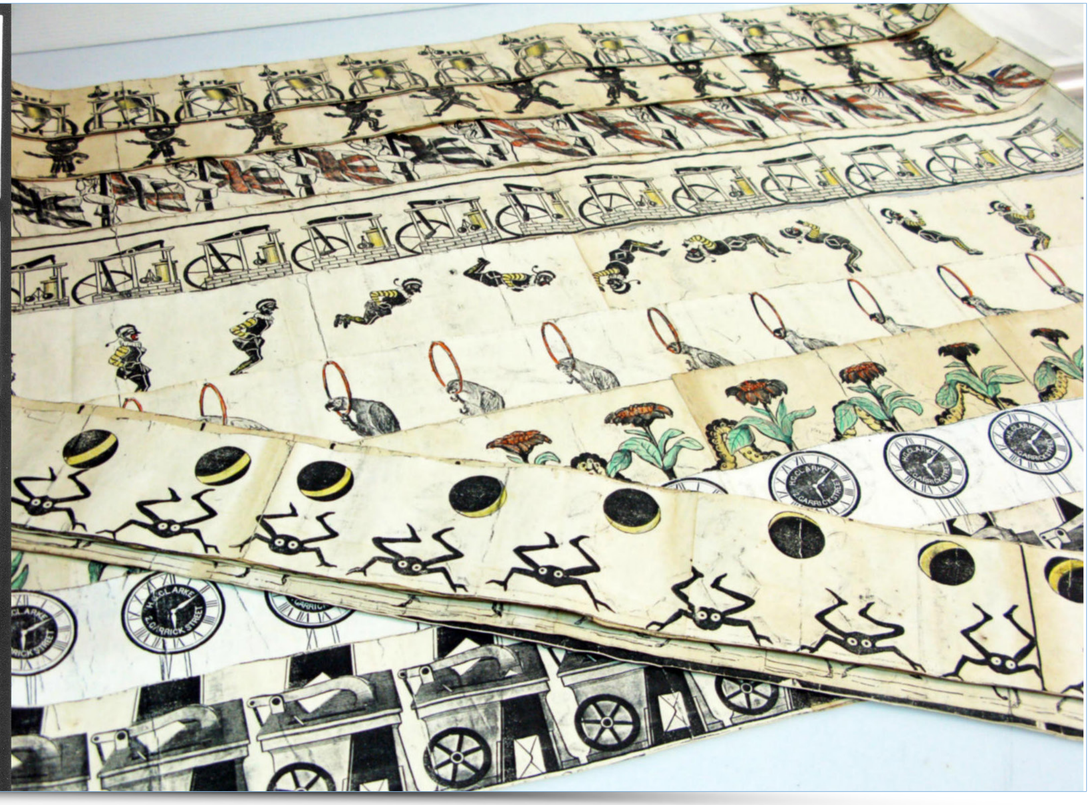
source: http://www.simonbeattie.kattare.com/blog/wp-content/uploads/2014/03/Zoetrope-2.jpg



source: http://www.cable-car-guy.com/images/bigu/2014/ypcogs_zoetropes_004.JPG

Note the visual aspect of presented images. Drawings were very carefully constructed maintaining the richness of lines, patch and colour. Illustration and drawing were moved to a higher level.





source: http://www.atomic-snail.com/wp-content/uploads/2014/02/expo_pixar_02.jpg

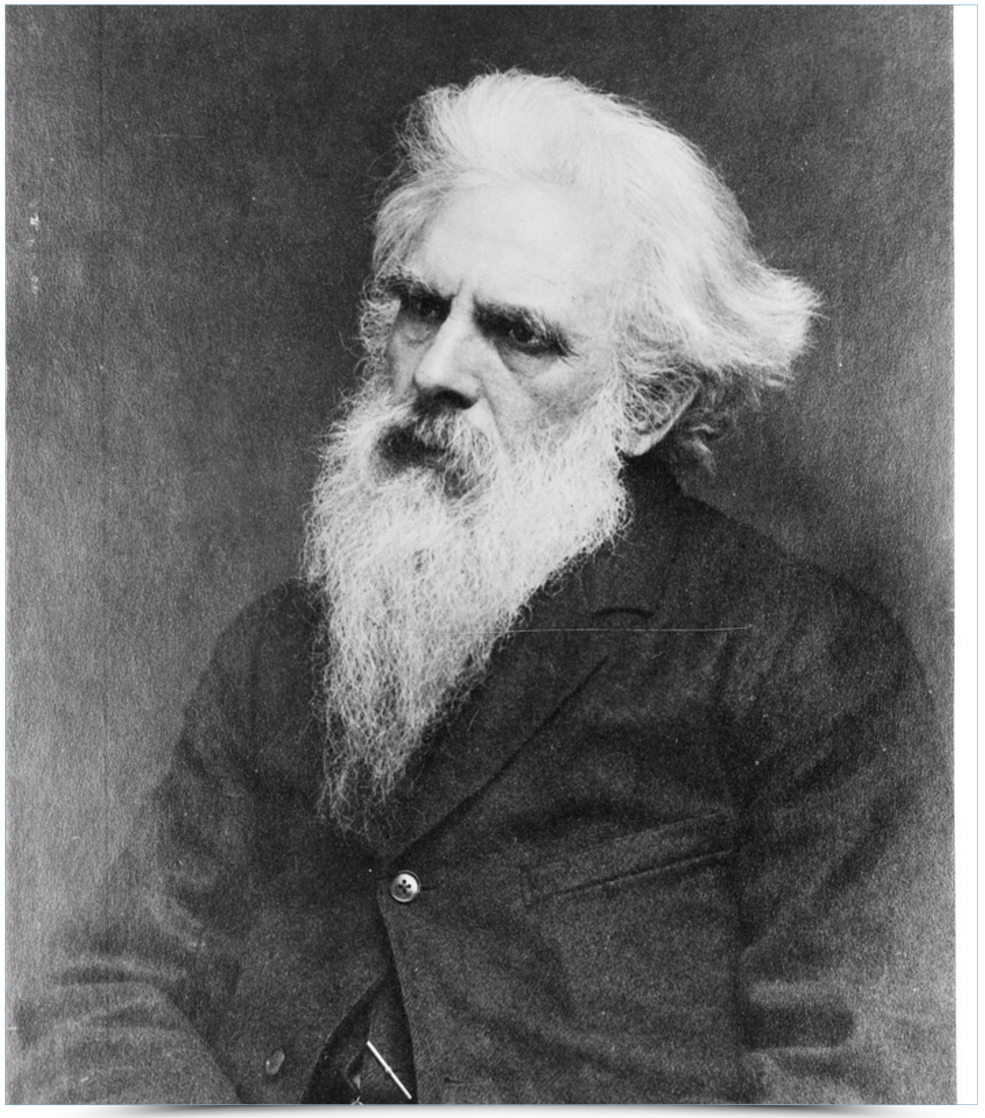
Eadweard Muybridge was a photographer work in photographic studies of motion highly influenced stop-motion projection. His photographic experiments focused on capturing the movement of people, animals and objects with the use of a bank of synchronized cameras.

„People who get into animation tend to be kids. We don't have to grow up. But also, animators are great observers, and there's this childlike wonder and interest in the world, the observation of little things that happen in life."

John Lasseter



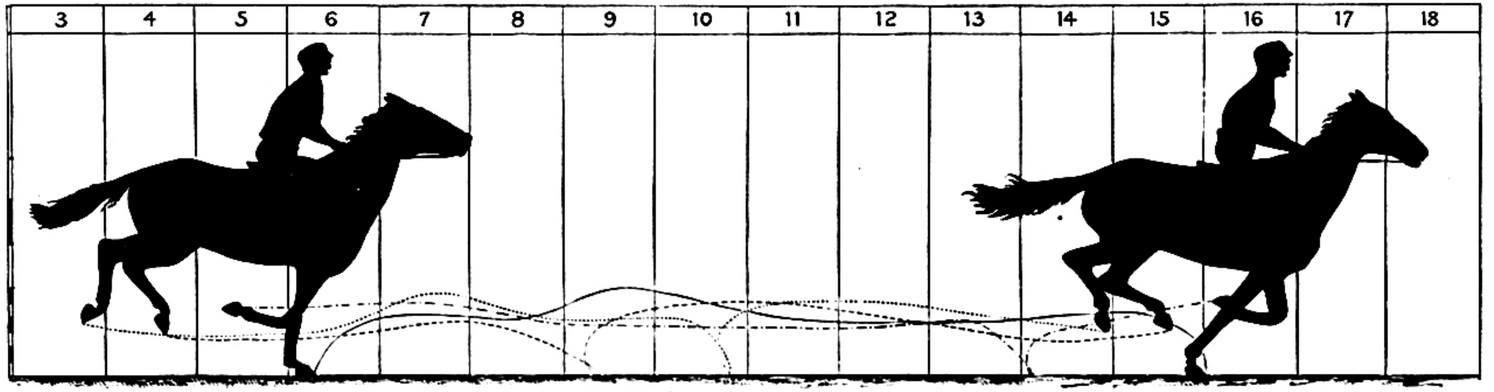
source: http://gwydir.demon.co.uk/PG/Muybridge/images/illus_004.jpg



source: https://troverove.files.wordpress.com/2011/09/eadweard-muybridge.jpg

"SALLIE GARDNER," owned by LELAND STANFORD; running at a 1.40 gait over the Palo Alto track, 19th June, 1878.

DIAGRAM OF FOOT MOVEMENTS.



Copyrighted 1879, by MUYBRIDGE.

Vertical lines 27 inches apart. Total length of stride, 265 inches.

The above diagram is projected from a series of electro-photographs, executed by instructions of GOVERNOR STANFORD, and illustrates the course traversed by the feet of the mare SALLIE GARDNER, during a single complete stride.

The mare being thorough bred, one of the fastest runners on the coast, and noted for her graceful form and superb gait, the successive positions assumed by her during the stride, may be accepted as representative in their character.

During certain portions of this stride, the feet of the mare were moving with a velocity equivalent to more than 100 lineal feet in a second of time, or nearly three-fourths of an inch, during an exposure of the two-thousandth part of a second. To enhance the usefulness of the photographs, the indistinctness of their outline resulting from this rapid motion, has been corrected, with care to preserve their actual positions. Photographs from the original untouched negatives are curious for comparison, and can be obtained at the same rate, if required. Hereafter the exposures will be reduced to the five thousandth part of a second, thus limiting any movement to one-fouth of an inch.

In future experiments it will be interesting to observe, to what extent, a knowledge of the foot movements of a colt, as illustrated by electro-photography, can be availed of to determine his probable speed at a more advanced age.

MUYBRIDGE,

LANDSCAPE AND ANIMAL PHOTOGRAPHER,

THE MORSE GALLERY, 417 Montgomery Street, San Francisco, California.

OFFICIAL PHOTOGRAPHER U. S. GOV'T. GRAND PRIZE MEDALIST, VIENNA, 1873.

INVENTOR AND PATENTEE IN THE UNITED STATES, ENGLAND, FRANCE, ETC.

OF THE

Automatic Electro-Photographic Apparatus.

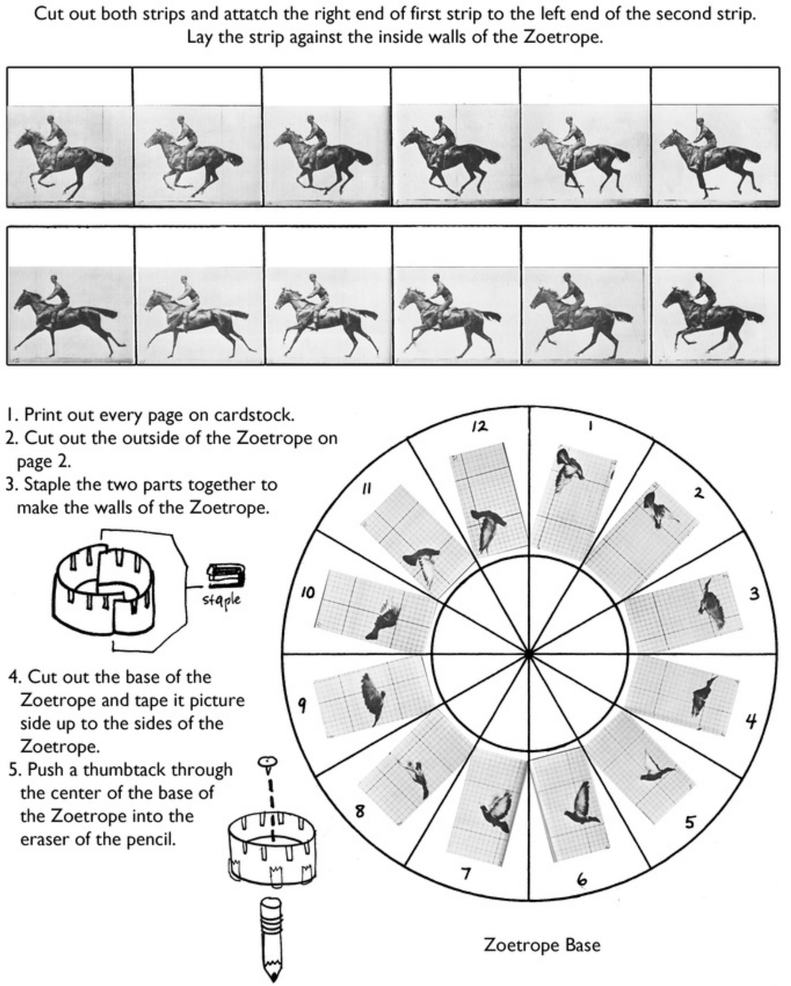
The following photographs are now published: "*Occident*" trotting at a 2:20 gait, 12 positions. "*Edgington*" trotting at a 2:24 gait, 12 positions. "*Edgington*" trotting at an 8 minute gait, 8 positions. "*Edgington*" walking at a 15 minute gait, 6 positions. "*Wheatley*" cantering, 6 positions. "*Sallie Gardner*" running at a 1:40 gait, 11 positions. Each series is mounted on a card, and illustrates a single stride. They will be sent to any part of the world in registered letter, free of postage, upon receipt of $1.50 for each series.

Arrangements made for Photographing and Recording the action of Animals in motion, in any part of the World.

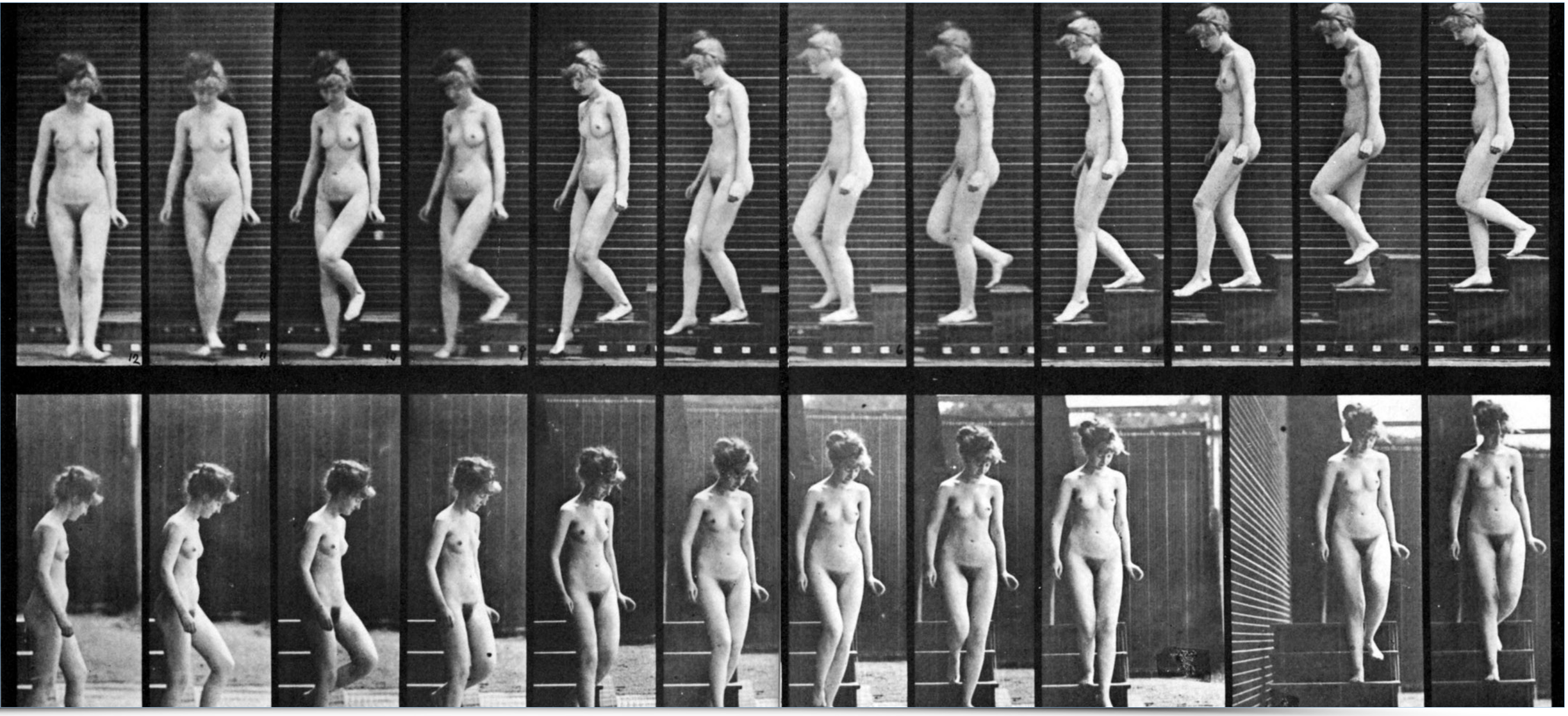
source: http://megadeluxe.com/wp-content/uploads/2012/01/sallie-gardner-muybridge.jpg

Left-click on the photo enables downloading of a printable document to create your own Zoetrope.

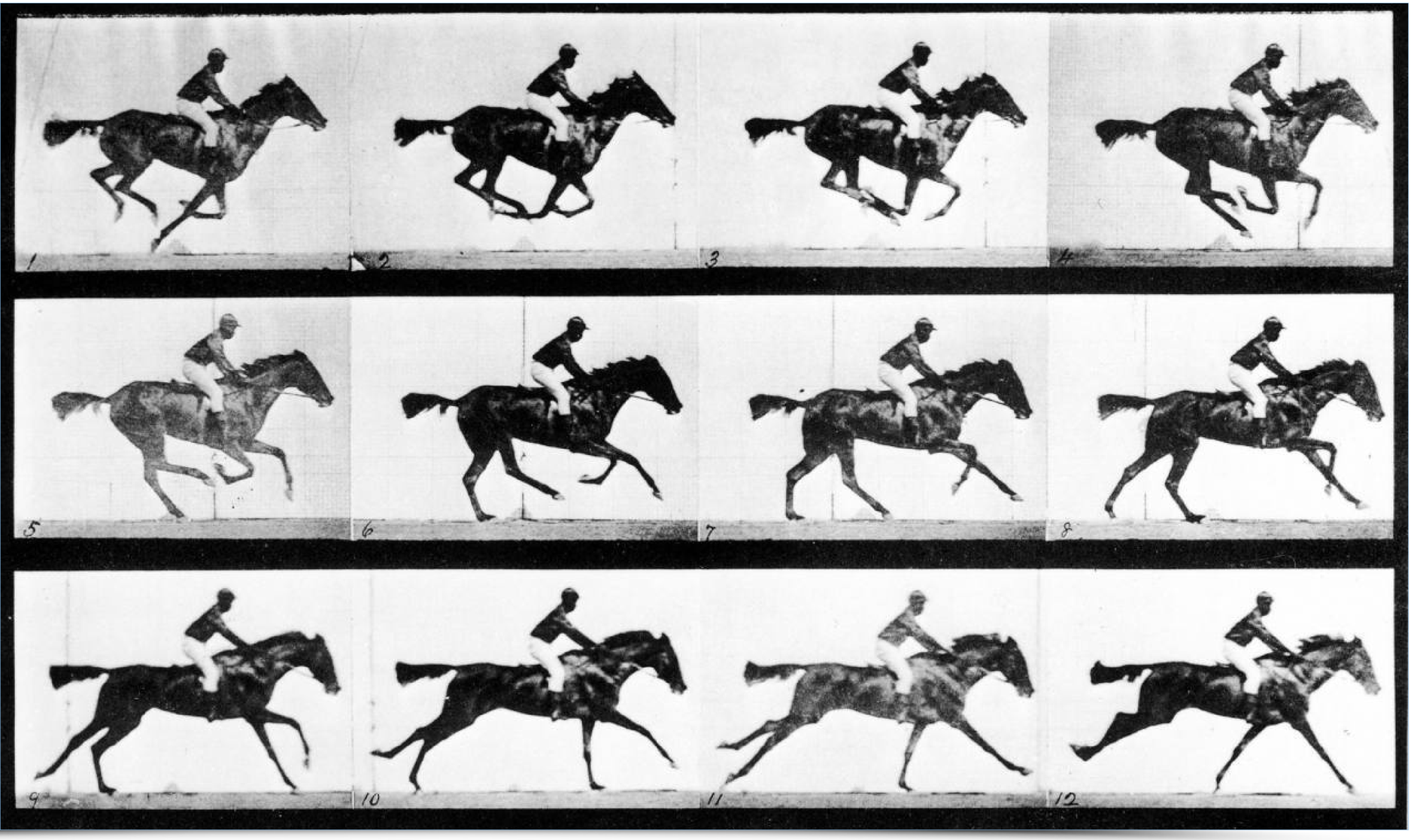
Eadweard Muybridge
9 April 1830 – 8 May 1904,
English photographer important for his pioneering work in photographic studies of motion, and early work in motion-picture projection.



source: http://image.slidesharecdn.com/zoetrope-091021202601-phpapp01/95/free-printable-edweard-muybridge-zoetrope-1-728.jpg?cb=1256156775



source: https://upload.wikimedia.org/wikipedia/commons/9/9e/Female_nude_motion_study_by_Eadweard_Muybridge_%282%29.jpg

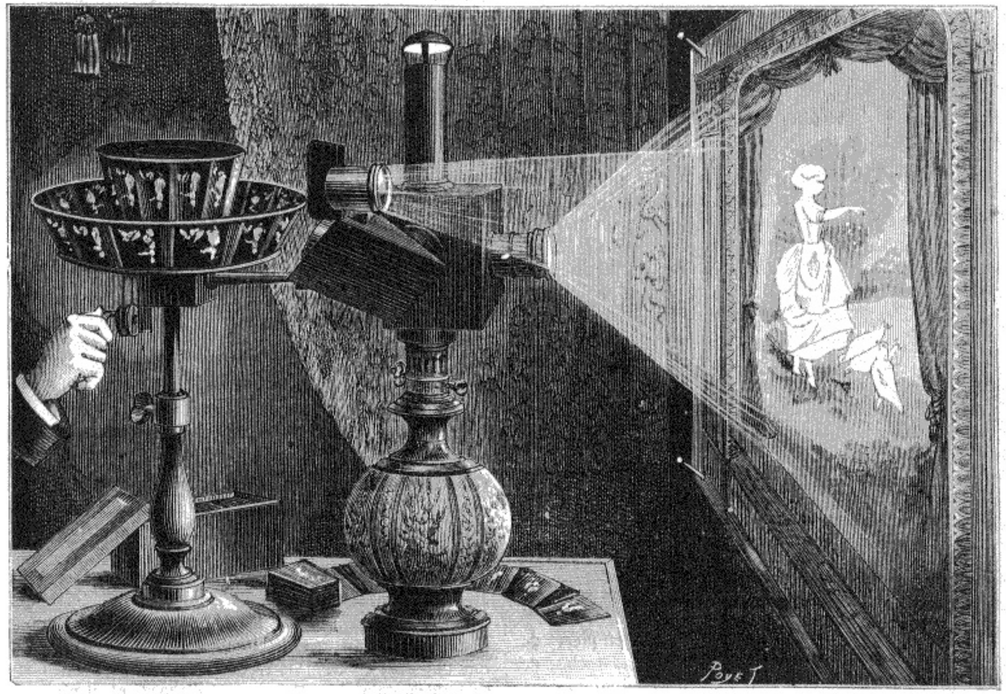


source: http://www.creativeapplications.net/wp-content/uploads/2009/11/35c392654c1809bb_large.jpg

Observation of motion architecture allows to disclose actual processes taking place in the dynamics of moving objects. It is a good exercise for beginners in the field of animation.

Below: „Rare and extraordinary magic lantern „Peacock" slide reel by Pettibone Manufacturing for the Stereopticon circa late 1800's. Photos include front and back and show hand written numbers by a projectionist. Scenes vary from „The Hero Pythias" to the pyramids and swamp creatures. Fabulous to mount as a sculpture."

Ut aut et, sitas dolori venim harum oreheTempor repra int laccupta dolenitas dolum..."



Nouveau praxinoscope à projection de M. Reynaud.

source: https://upload.wikimedia.org/wikipedia/commons/6/60/Lanature1882_praxinoscope_projection_reynaud.png



source: http://www.historiasztuki.com.pl/ilustracje/film/Praxinoscope-2.jpg

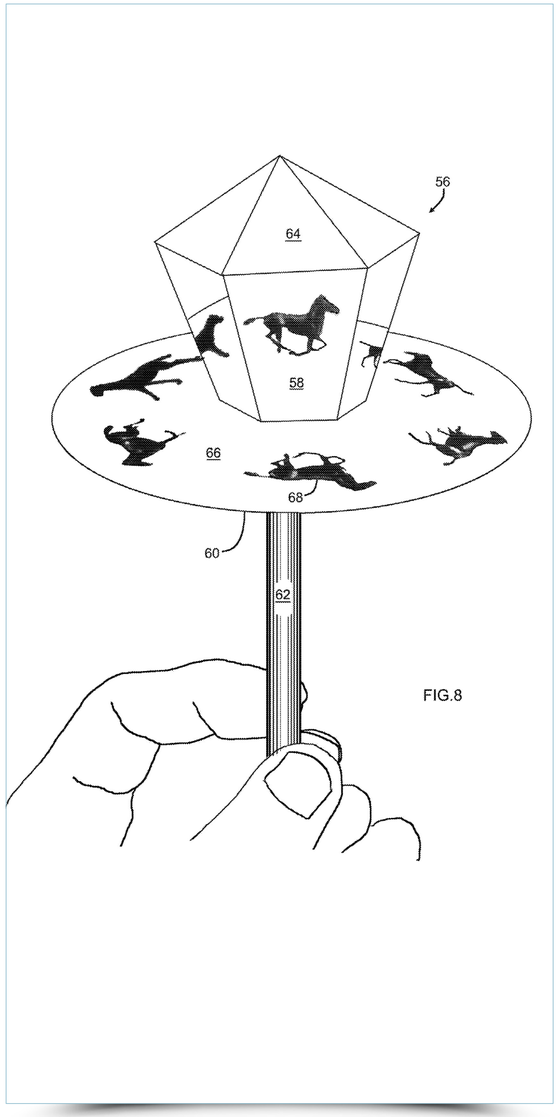


FIG.8

source: http://patentimages.storage.googleapis.com/US8373842B1/US08373842-20130212-D00006.png



source: http://static1.squarespace.com/static/51283cf9e4b0706f4bc69c8d/513425d7e4b02135 8bcde6b6/513427d7e4b06081 9b130d9c/1362372575422/Vieira_3.jpg

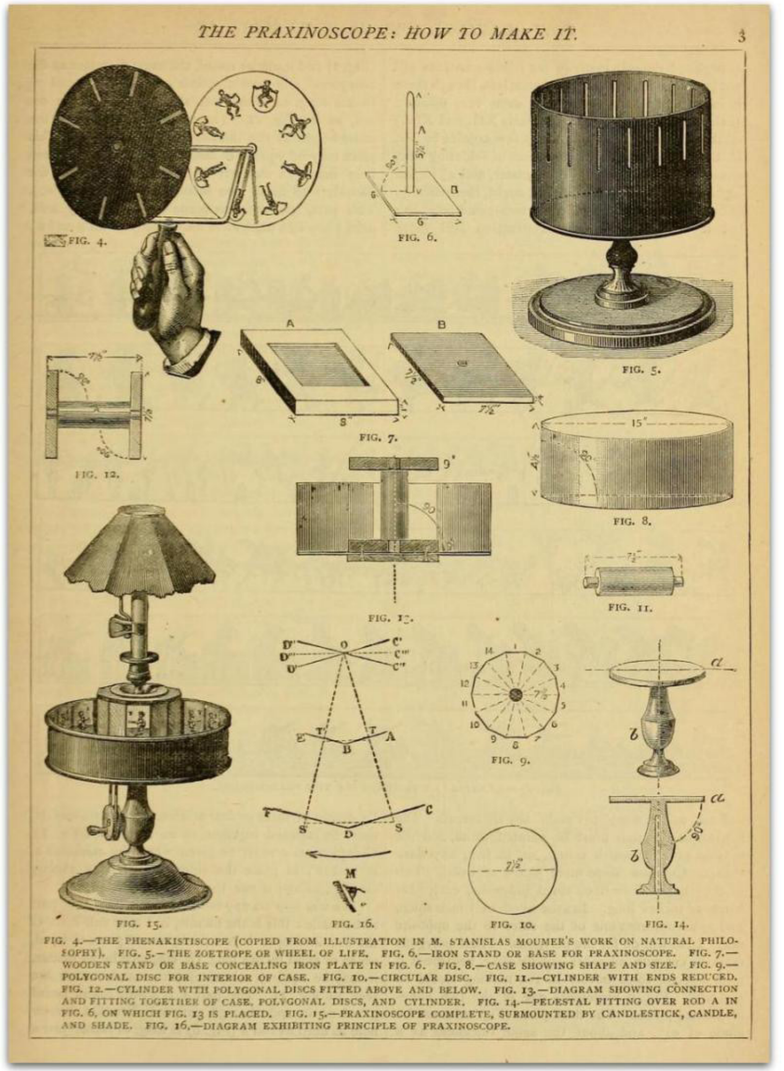
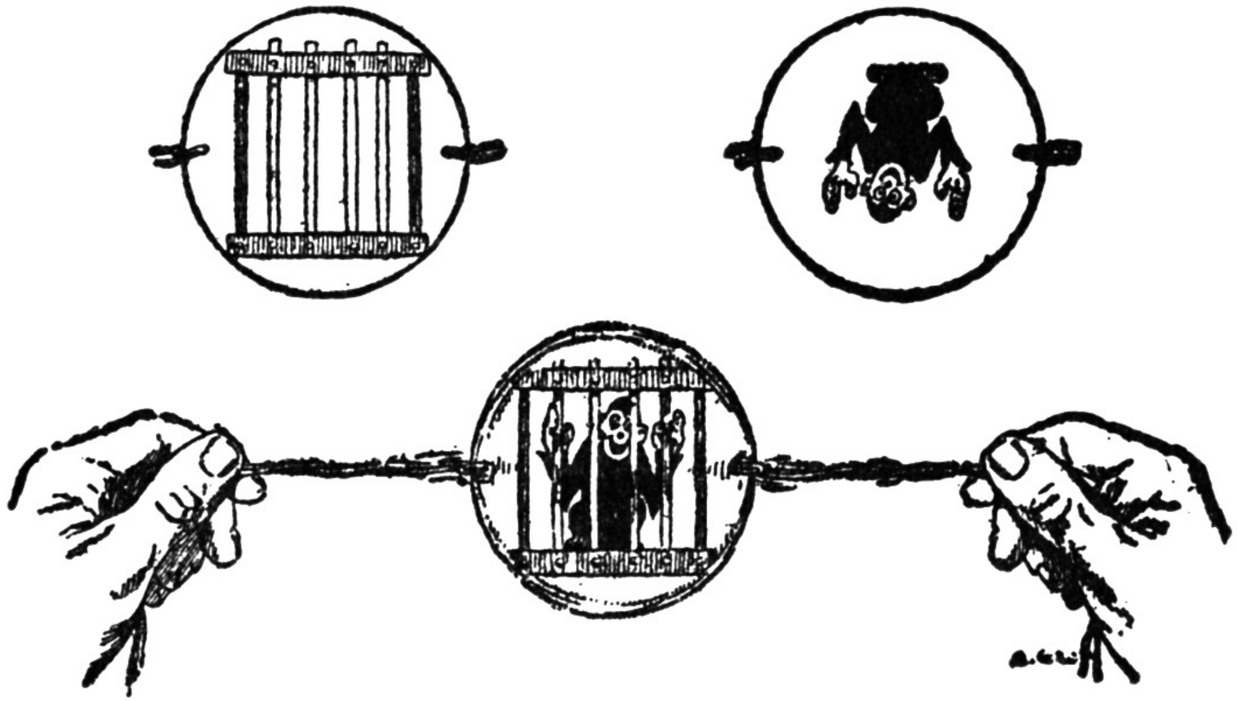

THE PRAXINOSCOPE: HOW TO MAKE IT. 3

FIG. 4. FIG. 6. FIG. 5. FIG. 7. FIG. 12. FIG. 8. FIG. 13. FIG. 11. FIG. 15. FIG. 16. FIG. 9. FIG. 10. FIG. 14.

FIG. 4.—THE PHENAKISTISCOPE (COPIED FROM ILLUSTRATION IN M. STANISLAS MOUMER'S WORK ON NATURAL PHILOSOPHY). FIG. 5.—THE ZOETROPE OR WHEEL OF LIFE. FIG. 6.—IRON STAND OR BASE FOR PRAXINOSCOPE. FIG. 7.—WOODEN STAND OR BASE CONCEALING IRON PLATE IN FIG. 6. FIG. 8.—CASE SHOWING SHAPE AND SIZE. FIG. 9.—POLYGONAL DISC FOR INTERIOR OF CASE. FIG. 10.—CIRCULAR DISC. FIG. 11.—CYLINDER WITH ENDS REDUCED. FIG. 12.—CYLINDER WITH POLYGONAL DISCS FITTED ABOVE AND BELOW. FIG. 13.—DIAGRAM SHOWING CONNECTION AND FITTING TOGETHER OF CASE, POLYGONAL DISCS, AND CYLINDER. FIG. 14.—PEDESTAL FITTING OVER ROD A IN FIG. 6, ON WHICH FIG. 13 IS PLACED. FIG. 15.—PRAXINOSCOPE COMPLETE, SURMOUNTED BY CANDLESTICK, CANDLE, AND SHADE. FIG. 16.—DIAGRAM EXHIBITING PRINCIPLE OF PRAXINOSCOPE.

source: http://i2.wp.com/voiceofthemonkey.com/wp-content/uploads/2014/12/The-Praxinoscope-How-To-Make-It.jpg

Thaumatrope is one of the simplest mechanical devices, allowing you to experience movement. You need a disc with paired drawings on each side of the surface and the mechanism, such as string (see picture below) puts both sides in motion. Thaumatrope is easy to make and allows to easily observe how two individual frames interact with each other.



THE THAUMATROPE.

Above: **How the designs of the two sides are placed with respect to each other.**
Below: **The combined image when the thaumatrope is twirled.**

source: https://intelligentheritage.files.wordpress.com/2010/09/thaumatrope1.jpg

Thaumatropes, both in terms of quality as well as the overlying graphics, are a great example of excellent design work and attention to detail. They are also highly sought-after collectors' items with the rarest items reaching very high price levels.

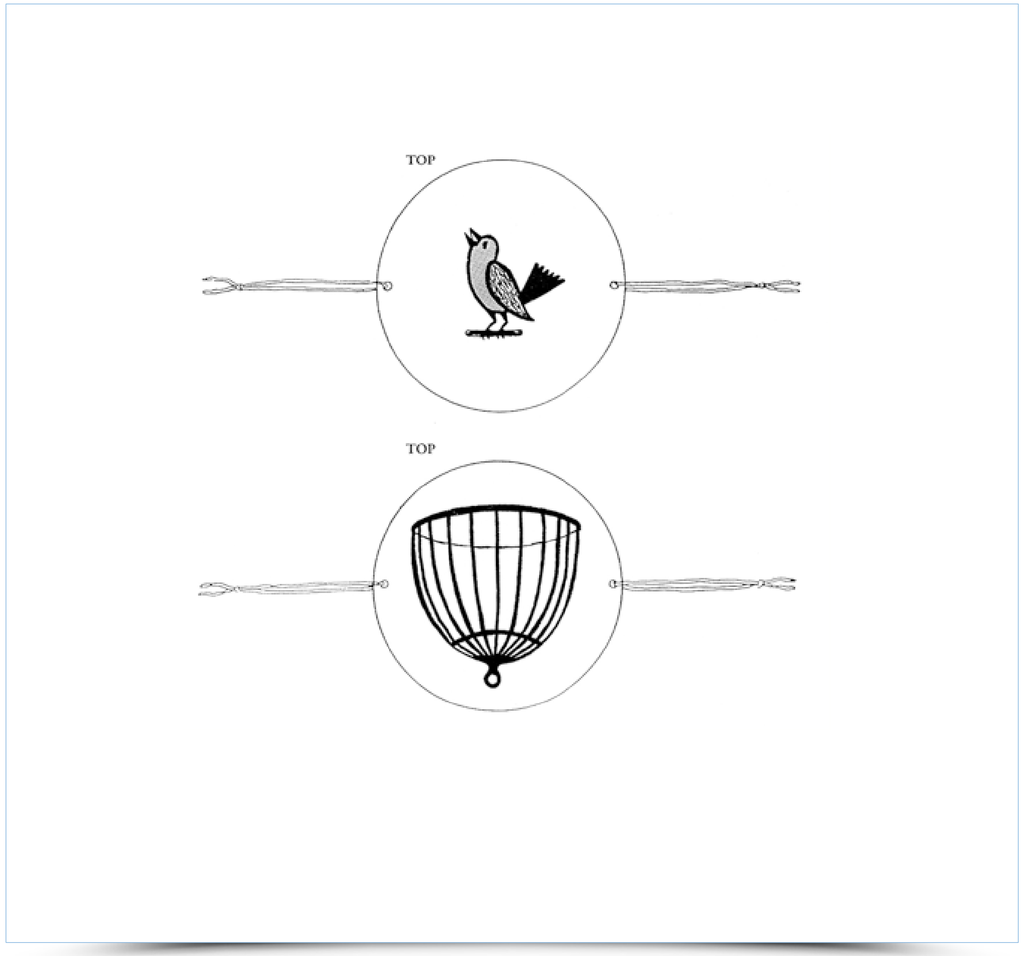


source: http://p.maquaire.free.fr/heeza/antispain/thaumatrope002_2.jpg

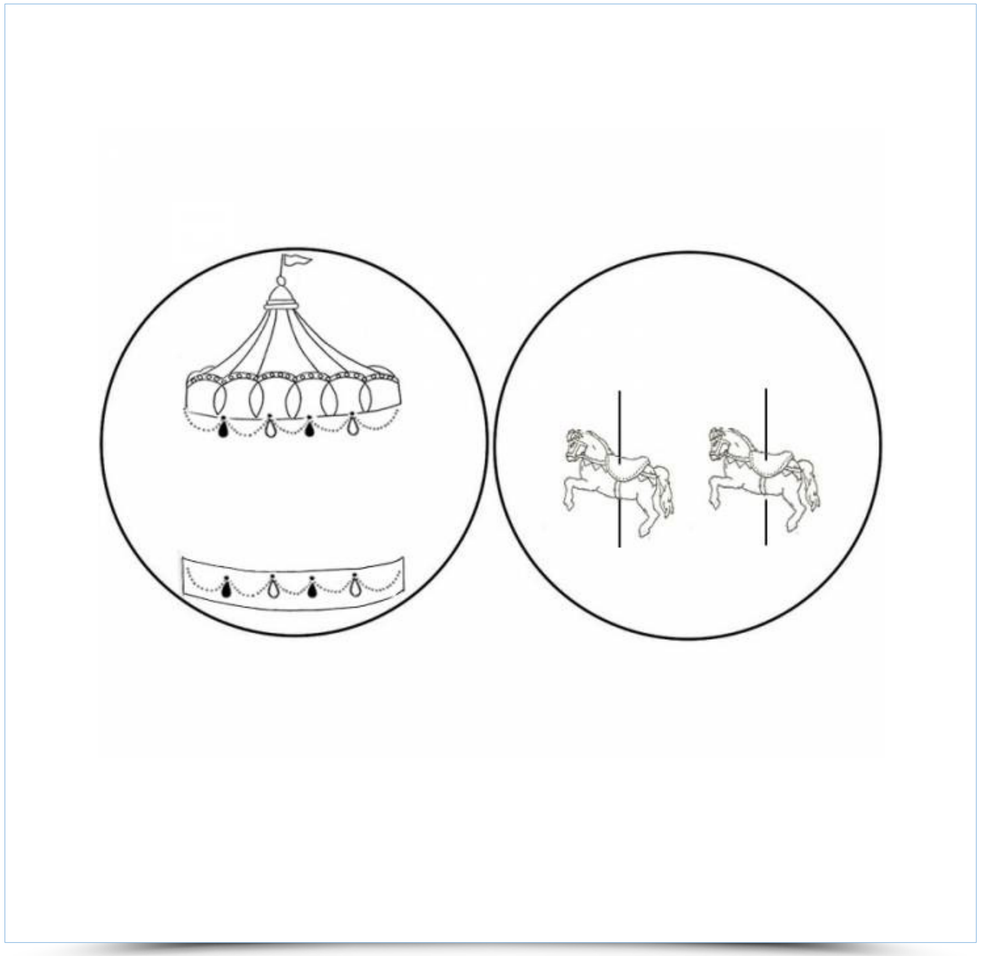


source: https://cheshirelibraryscience.files.wordpress.com/2012/09/rondelle3.jpg

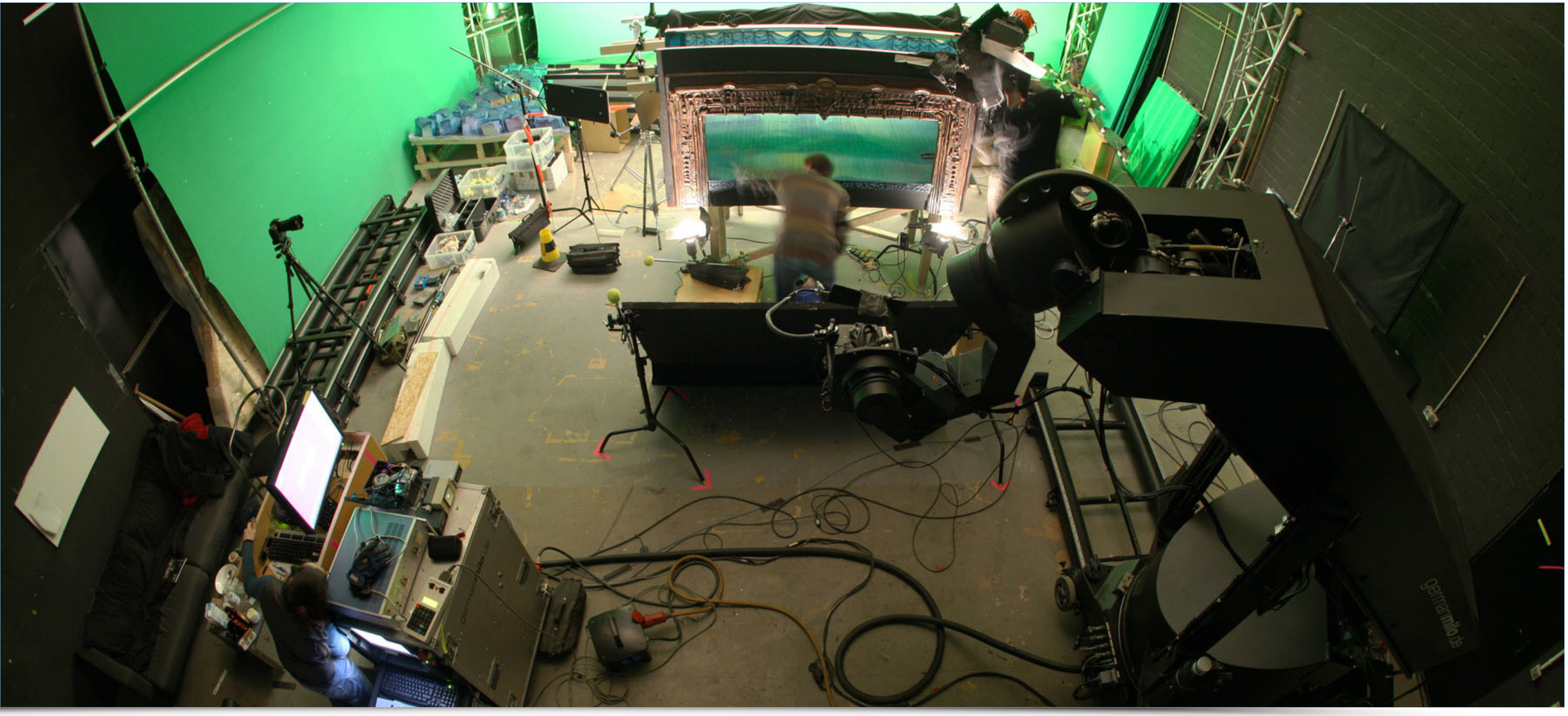
Below are examples of artwork covering Thaumatrop. Exact matching of images is of utmost importance for the effect.



source: http://education.eastmanhouse.org/discover/kits/files/3/thaumatrope2.png



source: http://www.cabaneaidees.com/wp-content/uploads/2011/09/thaumatrope-manege.jpg

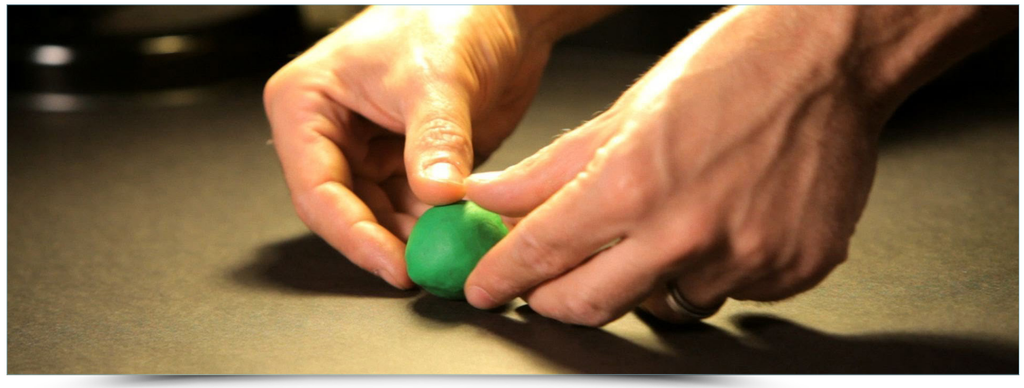


source: http://vd-fx.com/articles/studio/fisheye_kara.jpg

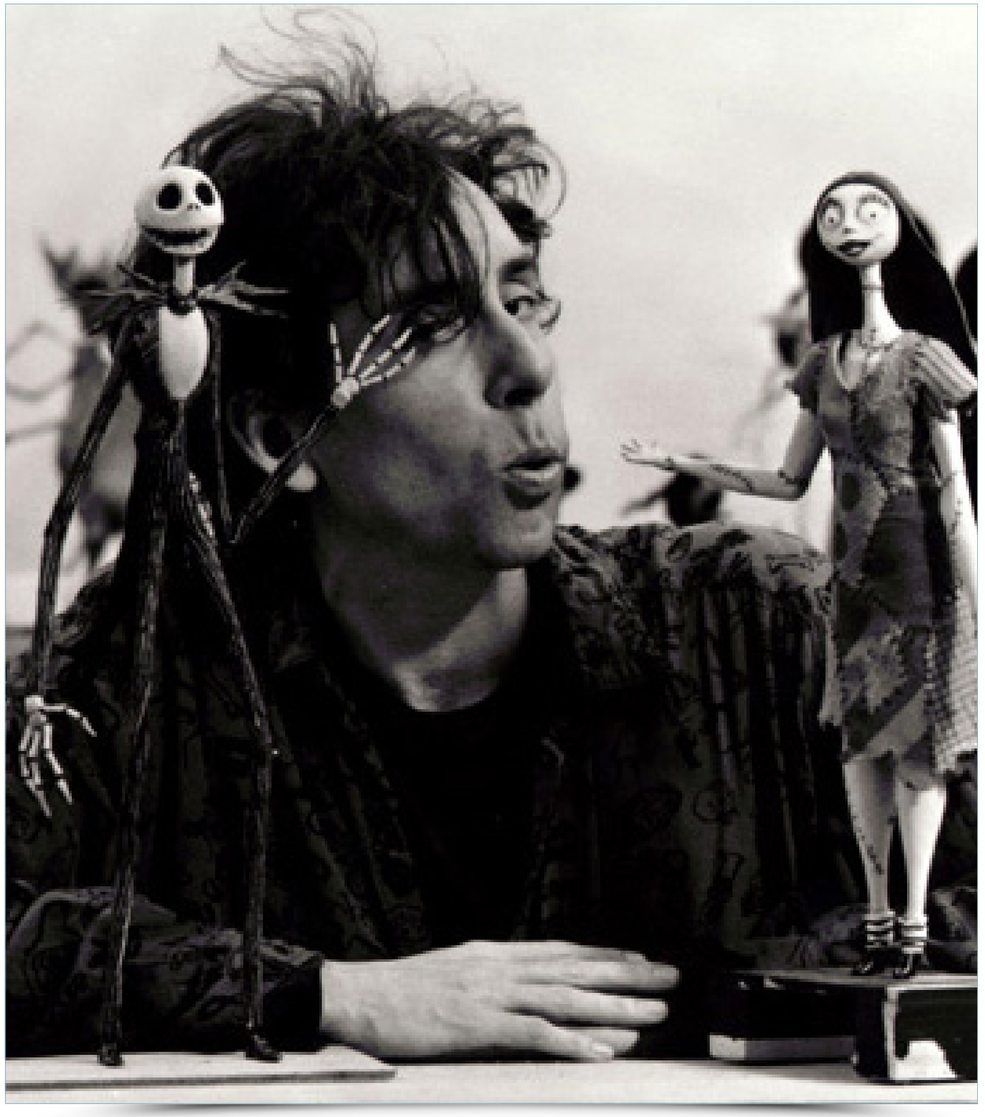
Stop-motion animation is a classic technique used for recording motion of an object. Consolidation of changes in movement and display of an object in a series of frames played as a continuous sequence allows to create animated film. Depending on the idea - the film can be shot on the backlit surface, with the use of an evenly lit background implementing keying technique, or by using sets - mostly built in animation studio.

„I started to do stop-motion when I was a kid. You take a Super 8 and make some models, and move, click, move, click. All that. I love all forms of animation, but there is something unique and special to stop-motion: it's more real and the set is lit like a set. But I think it's also a kind of lonely and dark thing to want to do."

Tim Burton

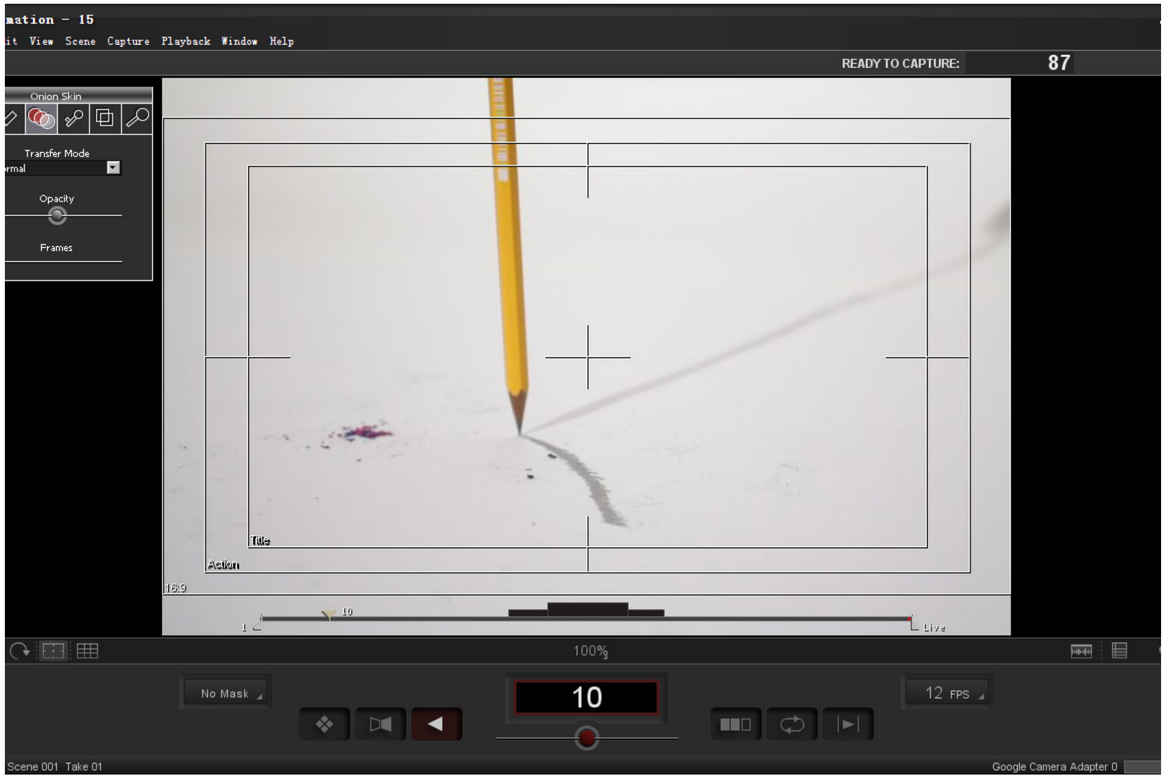


source: http://i.ytimg.com/vi/PHTQrokfA98/maxresdefault.jpg



source: http://www.empireonline.com/images/features/evolution-of-stop-motion/The-Nightmare-Before-Christmas.jpg

One of the basic tools that lets users shoot and properly compose stop-motion animation is Dragonframe animation software.



source: http://zhangyangchen.com/wp-content/uploads/2010/10/dragonStopmotion.jpg

Below is an example of Dragonframe use in an animation studio. The camera recording each frame is connected to a computer unit with a preview of the recorded scene. The software lets you watch the previously recorded frame, current scene, as well as generate preview of the next frames in a timeline with a predefined movement of a given object in the scene.



source: http://images1.dragonframe.com/blog/wp-content/uploads/2009/01/l1210238.jpg

Sets of more advanced stop-motion productions use motion control. It allows you to predefine the movement of the camera, with the device's control unit moving with camera arm moving along a predetermined path. The feature allows to take full advantage of the language of film – close-up, long shot, depth of field (DOF) together with its changes – shifting focus planes. Objects can be rearranged – animated – between successive changes of camera movement.



source: https://shootingpeople.org/blog/wp-content/uploads/2012/03/Hinterland_LindaMcCarthy_Studio.jpg

dragonframe.com

DRAGONFRAME

BUY NOW $295
FREE TRIAL

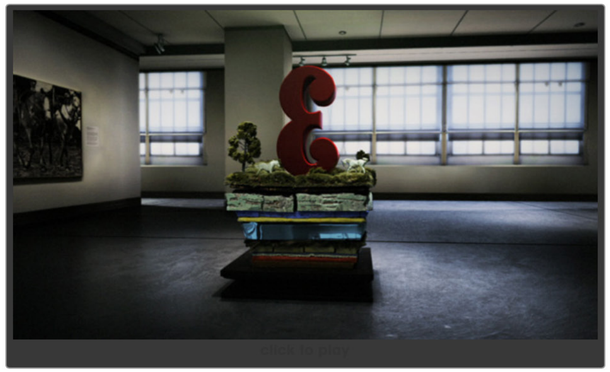
STORE ▫ FEATURES ▫ CAMERAS ▫ STUDIOS ▫ MOCO/HARDWARE ▫ SUPPORT ▫ TUTORIALS ▫ BLOG

BLOG

TITLE SEQUENCES

SANTA MARIA'S STOP MOTION, CG HYBRID FOR J&B

Sunday, April 12th, 2009



Josh Goodrich and David Hill of **Santa Maria** give us a behind the scenes peek of their J&B ampersand logo set up. We asked them to tell us how Dragon Stop Motion was used in the process.

Dave and Josh:

> Dragon software was very easy to set up with the camera we used, a Nikon D90. It also let us go back and preview/edit our footage, which was very important to us, for our amount of experience. The fact that the prop had to move on a turntable was the biggest technical challenge, so to be able to see it working sped up our shooting process.

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PROFILES



Dan Ojari

If you could peek inside Dan Ojari's childhood sketchbooks, you might very well find evidence of the same characters brought to life through his films today. *Slow Derek*, Ojari's graduate film project at RCA, Royal College of Art, London, is the tale of Derek, a common office worker struggling to come to grips with the fast pace of planet Earth. Ojari's attention to detail is evident in the careful use of light, sound, and poetic juxtapositions that frame his storytelling. Since its release in 2011, Ojari's award winning film has spun its way around the international film festival circuit, proving that *Slow Derek* – may not be so

source: http://www.dragonframe.com/blog/

Stop motion animation
DRAGONFLAME EXAMPLE→ visit: *https://vimeo.com/134635726*
Video: You Could Sunbathe in this Storm *from Alice Dunseath*

An example of experimental stop-motion animation. Richness of the means of expression is remarkable.



source: https://vimeo.com/134635726

Stop motion animation
SHUGO TOKUMARU / KATACHI→ visit: *https://vimeo.com/58022280*
Video: Kijek / Adamski

Animation by Katarzyna Kijek and Przemyslaw Adamski (Warsaw Academy of Fine Arts in Warsaw) surprises with craftsmanship and completely analog approach to the process of building the form. All objects had been cut from a special material and the recording took place without any support of digital means (apart from editing and colour correction).



source: https://vimeo.com/58022280

Stop motion animation
The Adventures of Prince Achmed (1926) → visit: *https://vimeo.com/75068546*
Video: Dir. by Lotte Reiniger. Germany.

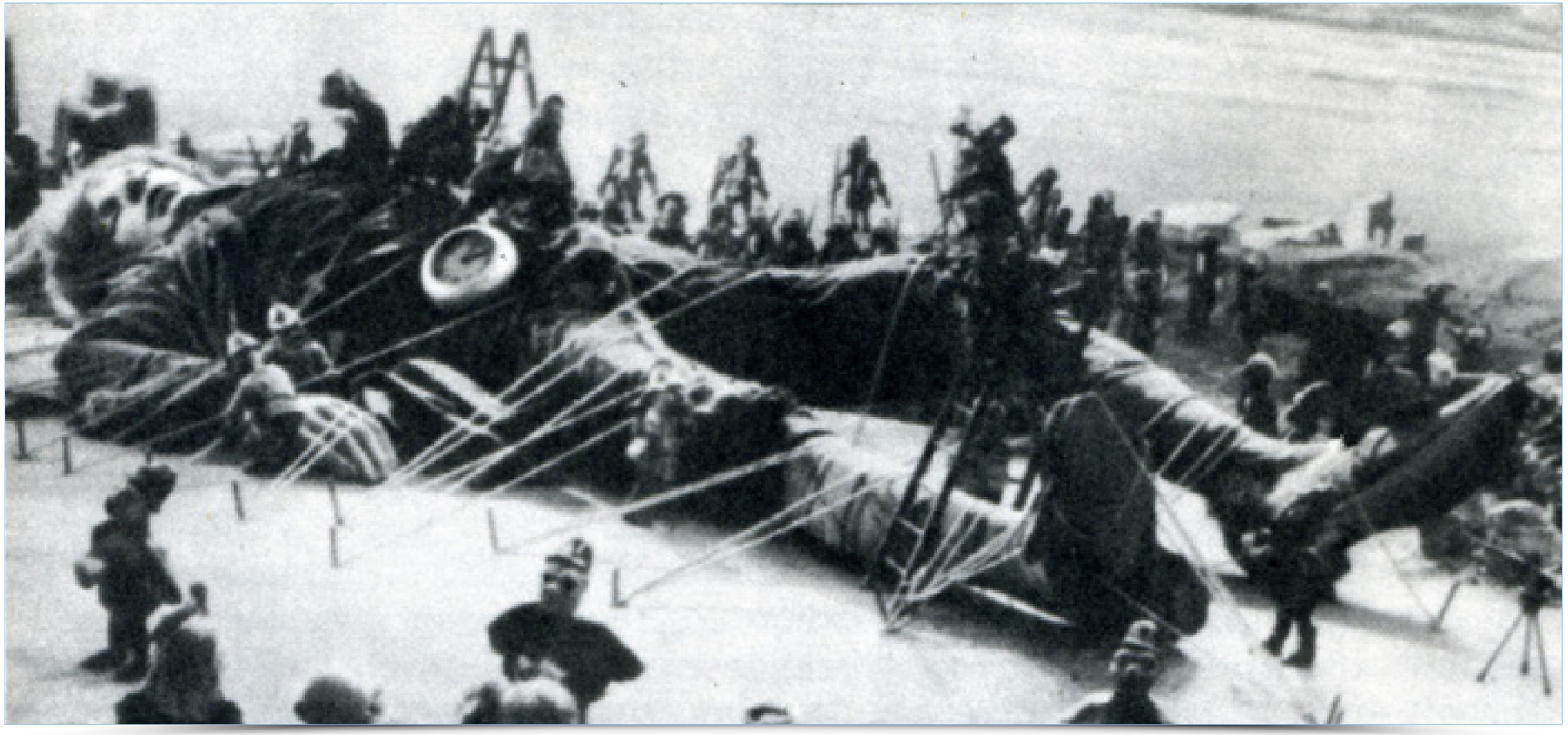
This classic pre-war silhouette animation implements the perfect balance of contrast and a masterful use of contour.



source: https://vimeo.com/75068546

Stop motion animation
The New Gulliver (1935) → visit: *https://www.youtube.com/watch?v=bi4MmwIj-P8*
Directors: Aleksandr Ptushko, A. Vanichkin

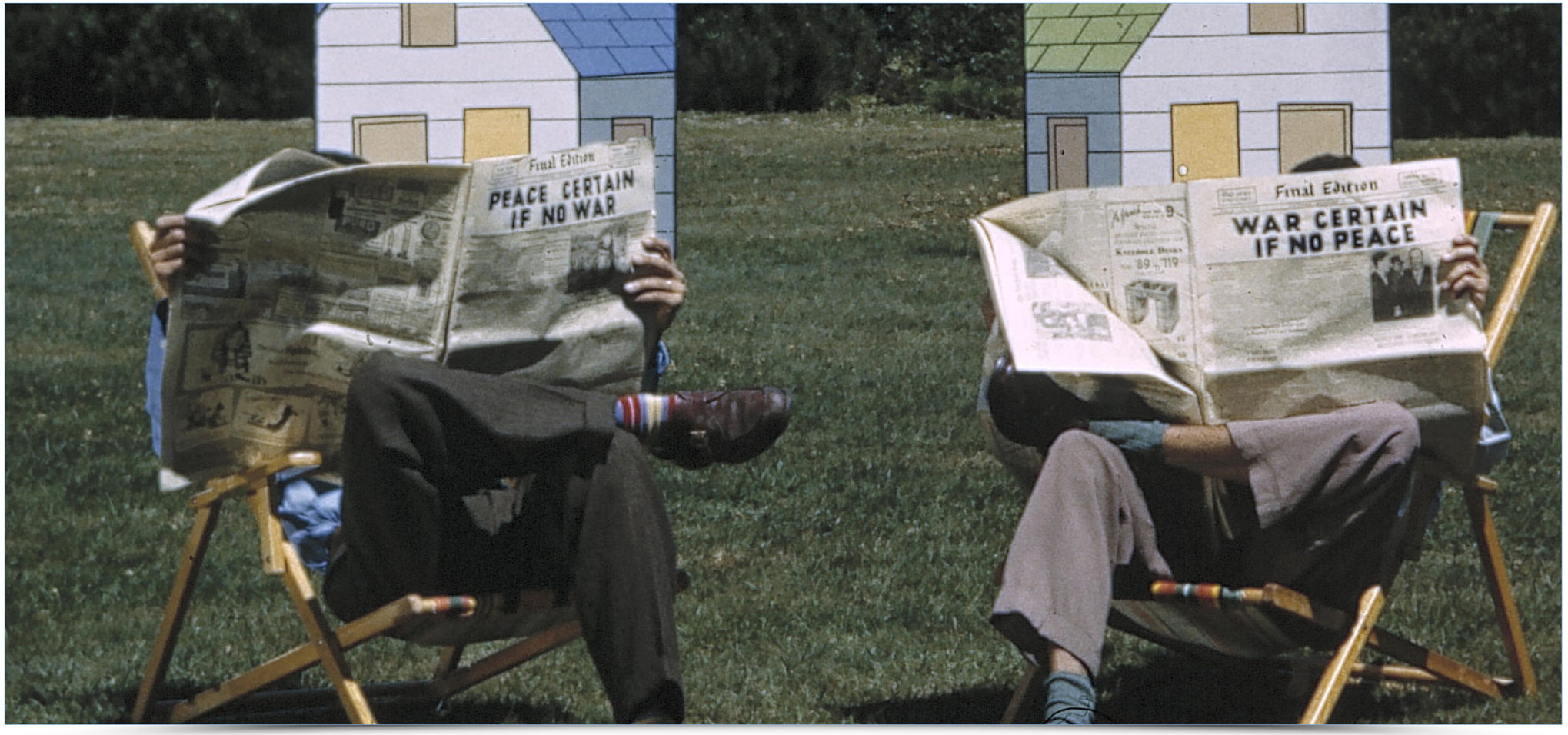
In this Russian production many shots are based on stop-motion animation. A skillful combination of live action scenes and puppets is very impressive.



source: https://www.youtube.com/watch?v=bi4MmwIj-P8

Stop motion animation
Neighbours (1952) → visit: *https://www.youtube.com/watch?v=P-09dYwro_Q*
Directed / Produced / Written BY Norman McLaren

Another animation technique, known as pixilation, uses live actors as stop-motion objects.



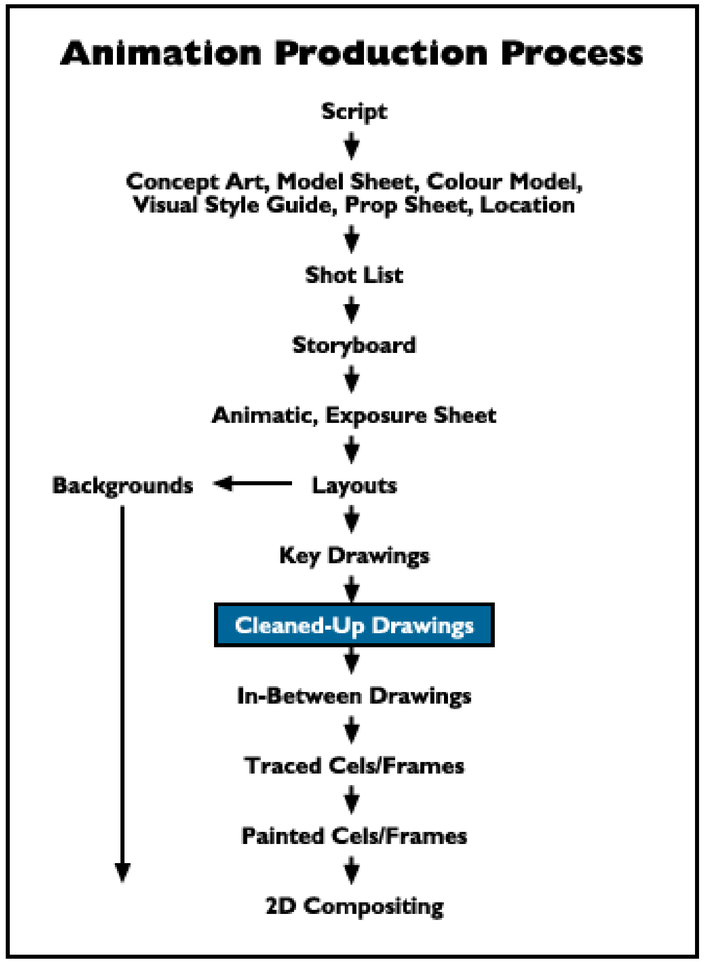
source: https://www.youtube.com/watch?v=P-09dYwro_Q

„When I was a kid, there was no collaboration; it's you with a camera bossing your friends around. But as an adult, filmmaking is all about appreciating the talents of the people you surround yourself with and knowing you could never have made any of these films by yourself."

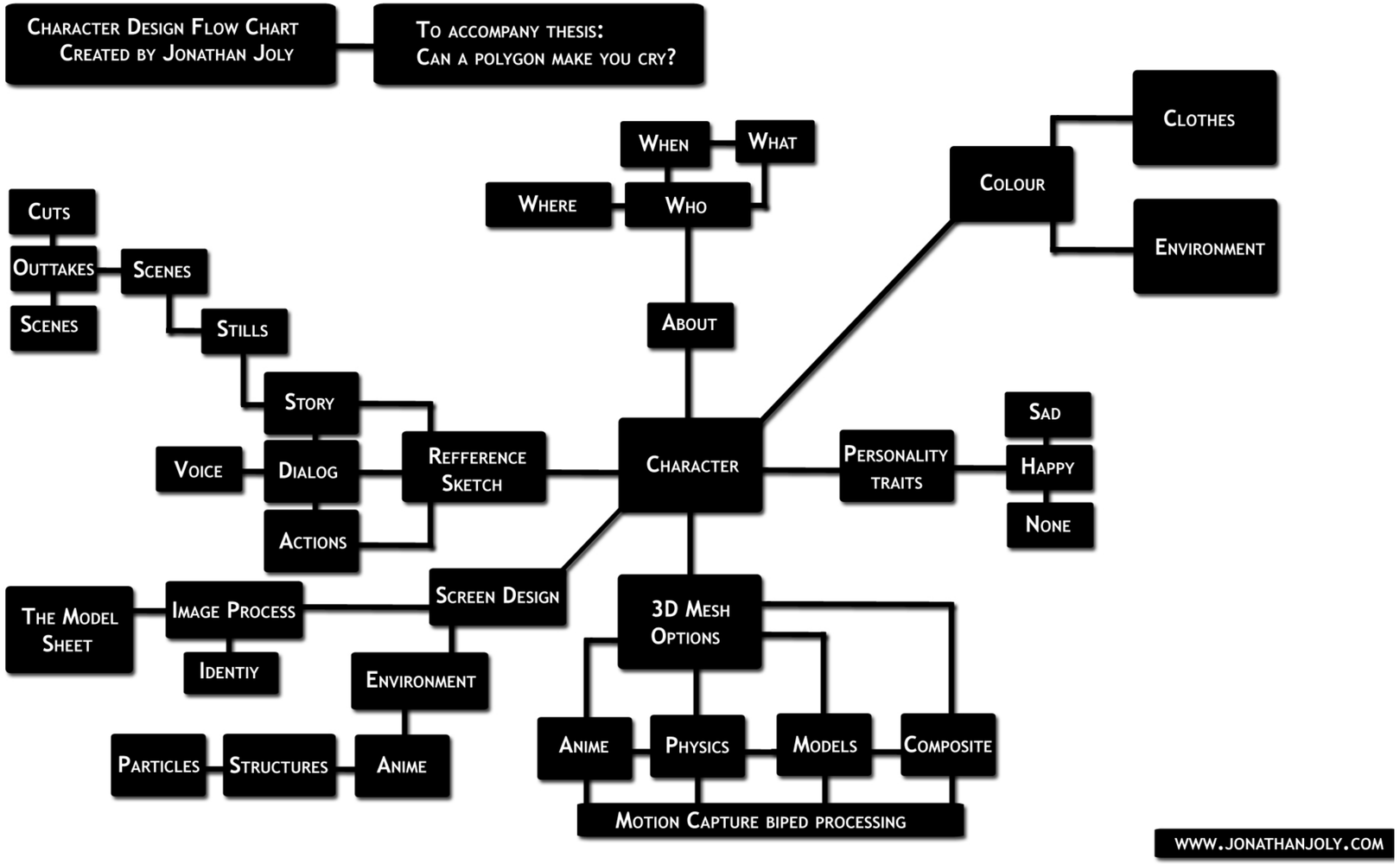
Steven Spielberg



source: http://3.bp.blogspot.com/-ZyiJYkFlJUU/VK_9idoS4RI/AAAAAAAACpQ/TxgdINbLG7g/s1600/20141202_103151.jpg



source: https://sielearning.tafensw.edu.au/toolboxes/Animation/tour/ca/images/sca1p1.gif



source: https://jonathanjoly.files.wordpress.com/2008/10/thesisflowchat.jpg

3D animation
The Adventures of Tintin (2011) → visit: *https://www.youtube.com/watch?v=9ua_4ajpP58*
Director: Steven Spielberg

Interesting translation of comic book into a movie. The mood of the scenes is created with colour palette and framing.



source: https://www.youtube.com/watch?v=9ua_4ajpP58

3D animation
Up (2009) → visit: *https://www.youtube.com/watch?v=qas5lWp7_R0*
Pixar Studio

Animation produced by Pixar Animation Studios – one of the largest commercial computer animation film studios that frequently revisits its roots with computer-animated short films.



source: https://www.youtube.com/watch?v=qas5lWp7_R0

3D animation

Avatar (2009) → visit: *https://www.youtube.com/watch?v=5PSNL1qE6VY*

Director: James Cameron

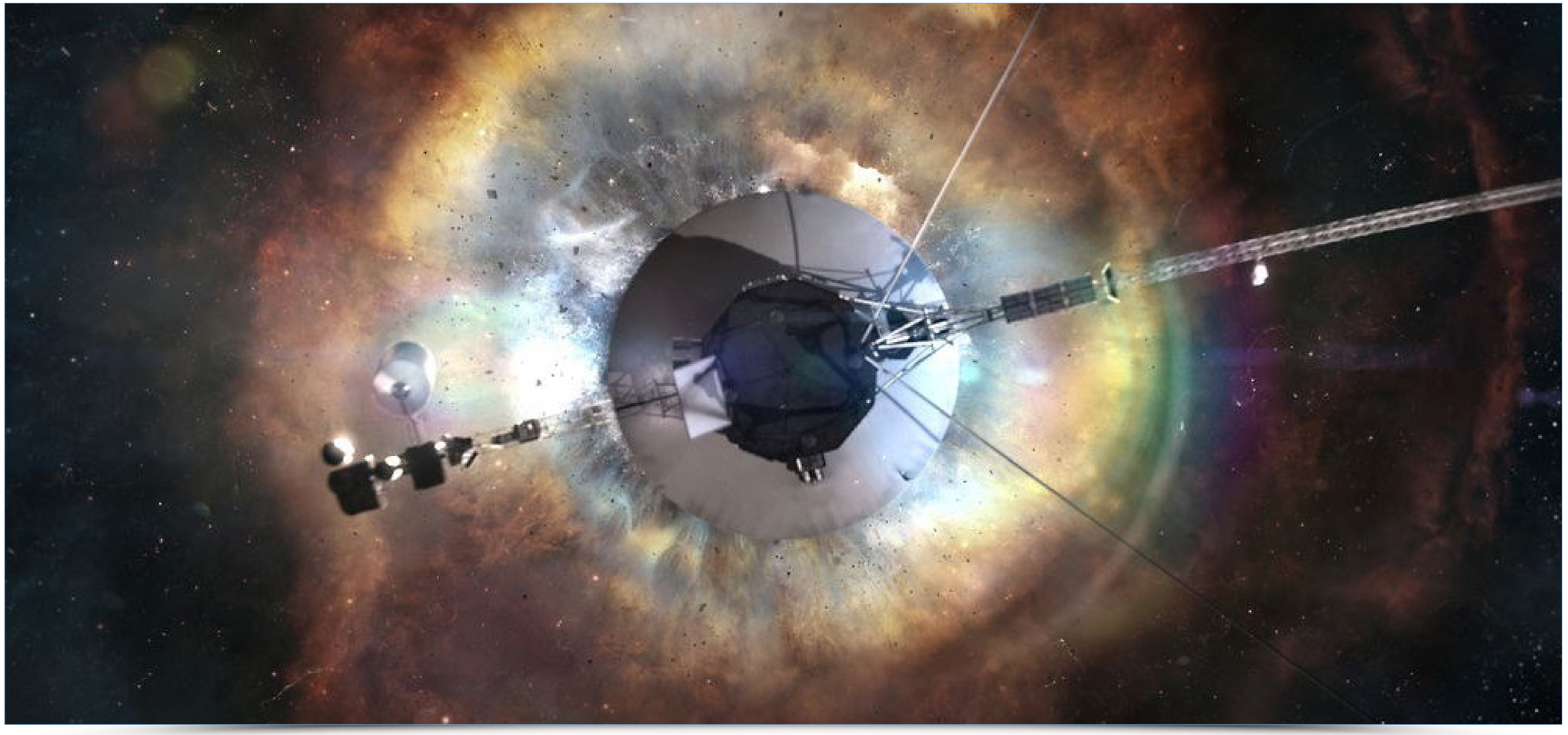
This feature-length movie successfully blends traditional methods of filming with 3D animation. James Cameron pioneered and used Motion Capture technique allowing the movement and facial expressions of the actors to be captured for three-dimensional models and processing. → **visit:** *https://www.youtube.com/watch?v=1wK1Ixr-UmM*



source: https://www.youtube.com/watch?v=5PSNL1qE6VY

3D animation
Stardust (2011) → visit: *https://vimeo.com/58626695*
Director: Mischa Rozema

A computer generated short film where the story unfolds via its stunning visuals.



source: https://vimeo.com/58626695

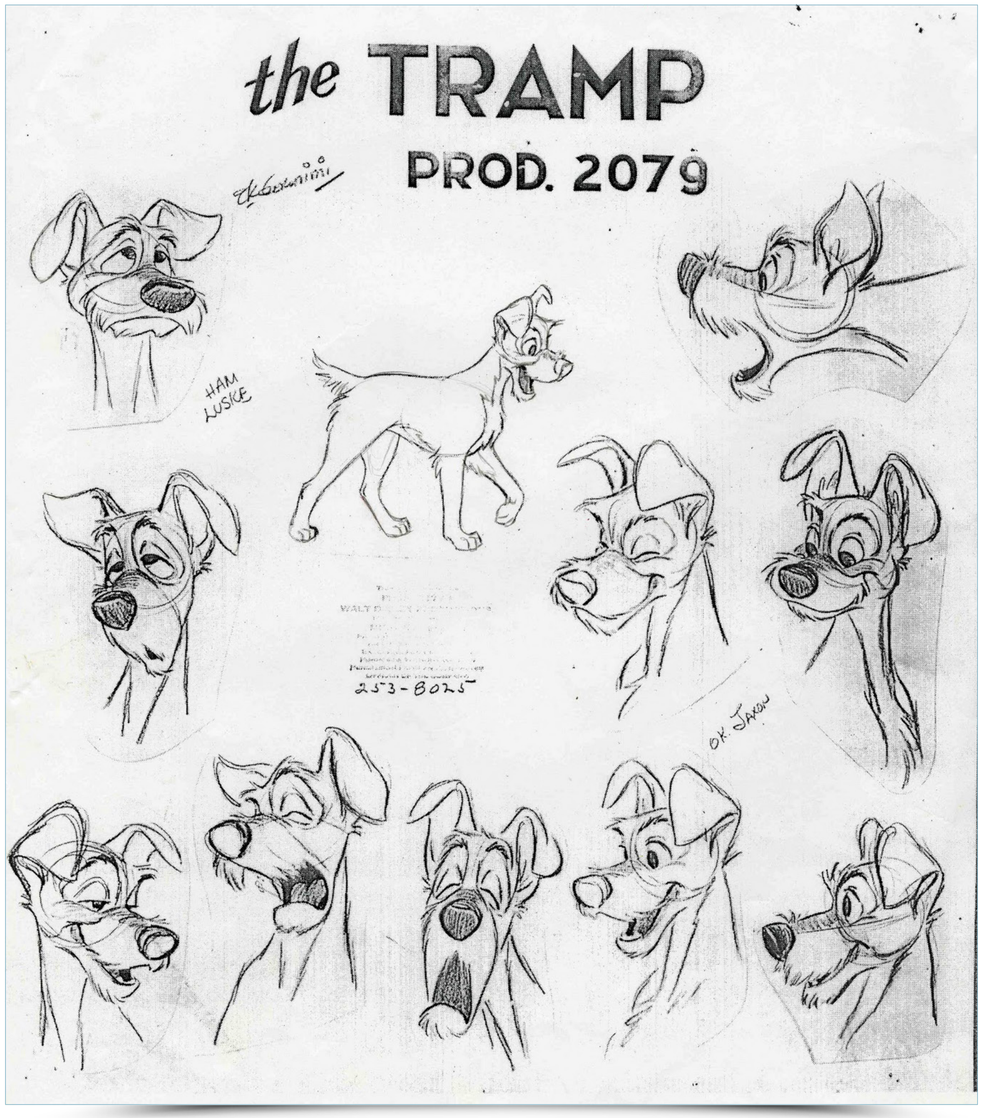
haracter design is the process of creating the look of animated characters for a narrative. Artists create full appearance, poses and gestures for a given character. One of the initial stages of the process is to define the visual style for animation. Artists decide whether the animation will be black and white or use a strong line. They also establish the range of colours used for the production. The process focuses on the style of designed characters – it may be realistic and keep human proportions or introduce completely new biological forms.

"...when you look at a photo or realistic drawing of a face, you see it as the face of another . But when you enter the world of the cartoon , you see yourself."

Scott McCloud

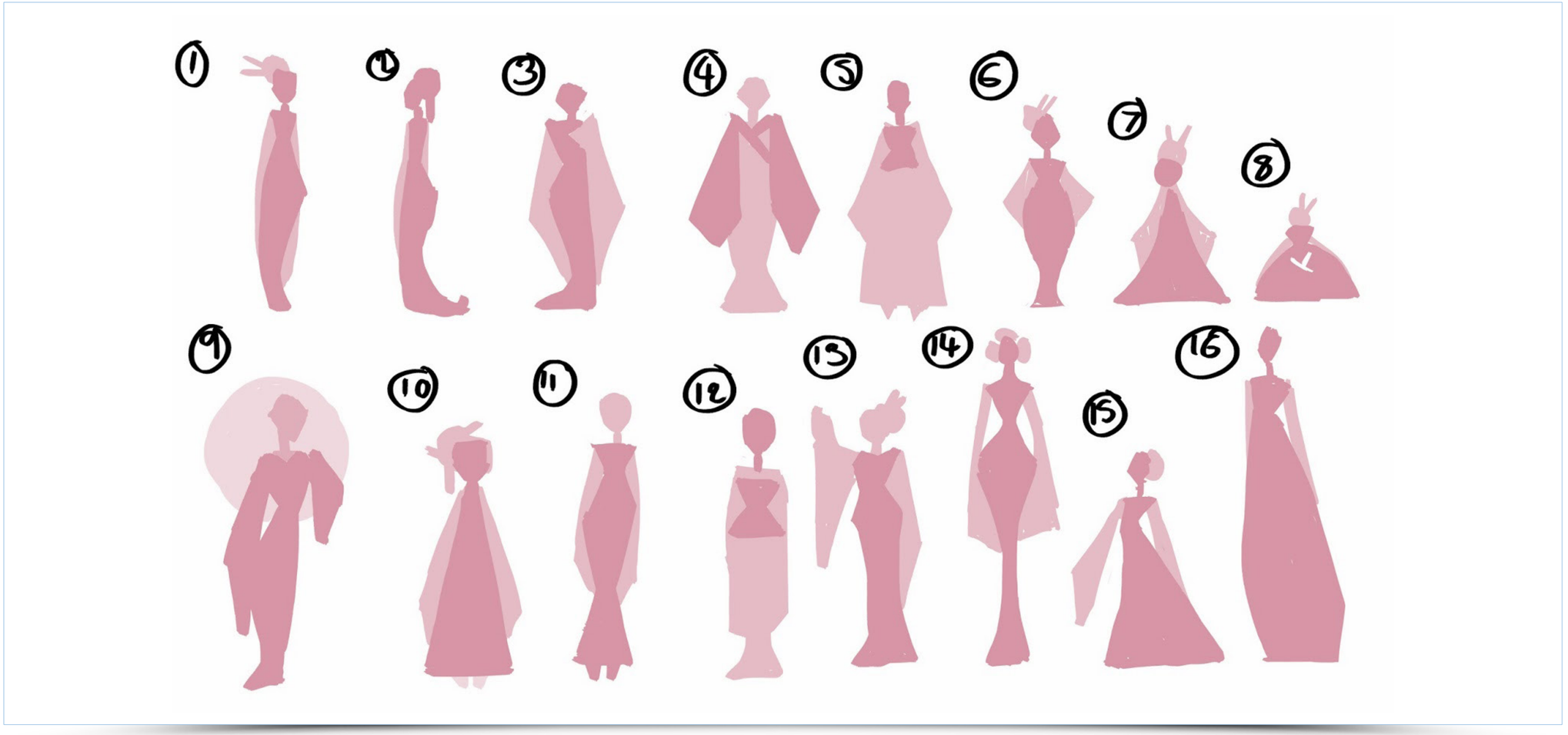
Artists create a series of sketches/drawings – ranging from the simplest to the more advanced ones. If the story happens at a specific time period, it needs a thorough research. Artists take a look at realities of a given era, clothing, headgear or hairstyles that are characteristic for a given period.

The drawing/development of a given character will influence the way the viewers react to that character. The portrayal of positive and evil characters is completely different. Usually the devil is in the details - sometimes the smallest ones are the most important. Scar on a cheek, limping or any other special way of moving can make characters more realistic.



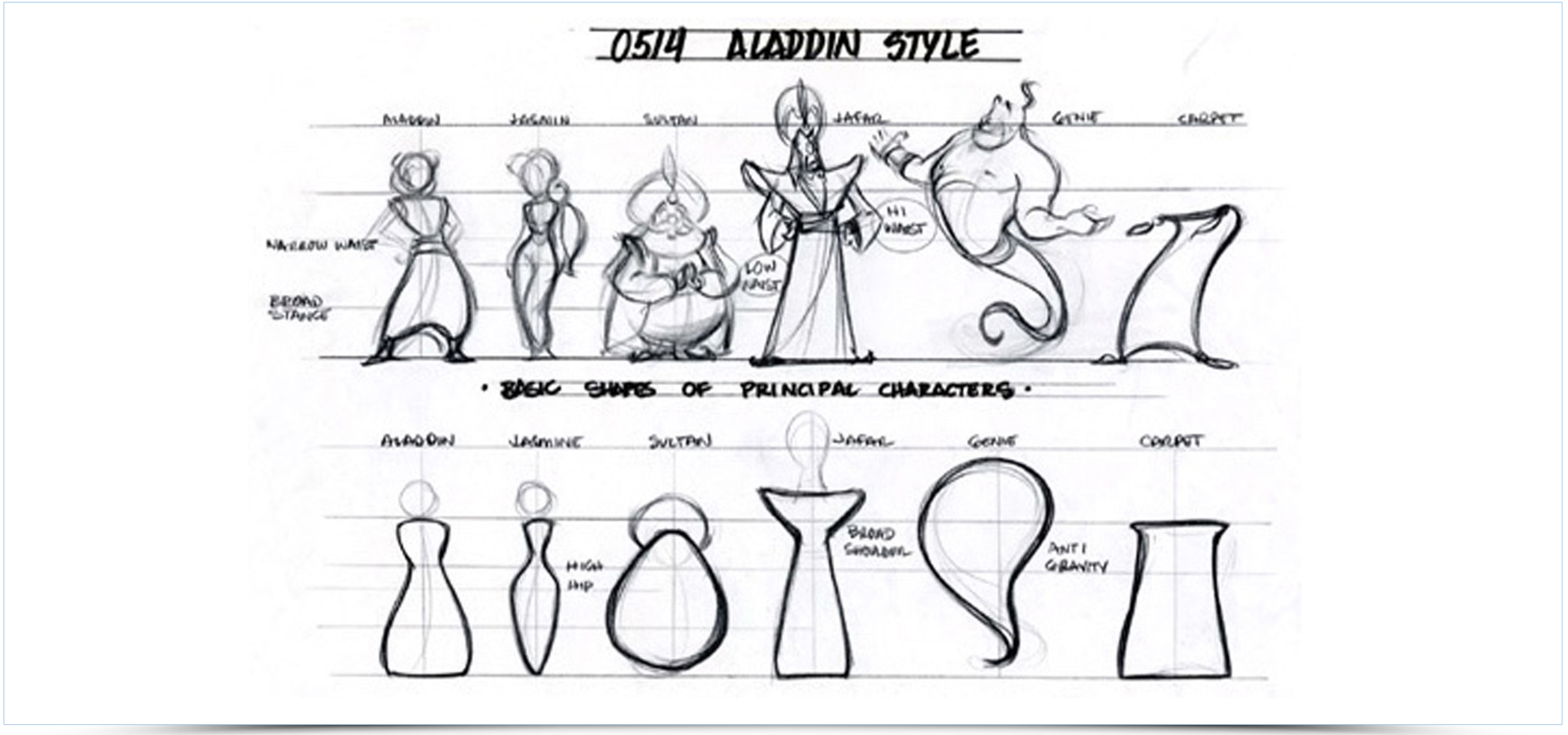
source: http://3.bp.blogspot.com/_oR7sYJzWZ1k/TQCWAAN77XI/AAAAAAAAAh8/gpcW22rO4dI/s1600/Rough+Tramp+ms243.jpg

Implementing top-down approach, character design begins by defining basic parameters, such as the general shape of a character.



source: http://4.bp.blogspot.com/-15kwuiMndsA/UxDRw-erQpI/AAAAAAAAA_U/-9STlVa9jXM/s1600/japanese_female_geisha_warrior_thumbnails.jpg

Silhouette of characters influences the way the viewers react to them. Early stages of character design specify their dynamism.



source: https://awsomesauce.files.wordpress.com/2012/10/aladdin_disney_concepts_02.jpg

The quality of strokes affects the way we react to characters. Numerous tests are required before the final decision about the character's appearance is being made.

„You can't do sketches enough. Sketch everything and keep your curiosity fresh."

John Singer Sargent

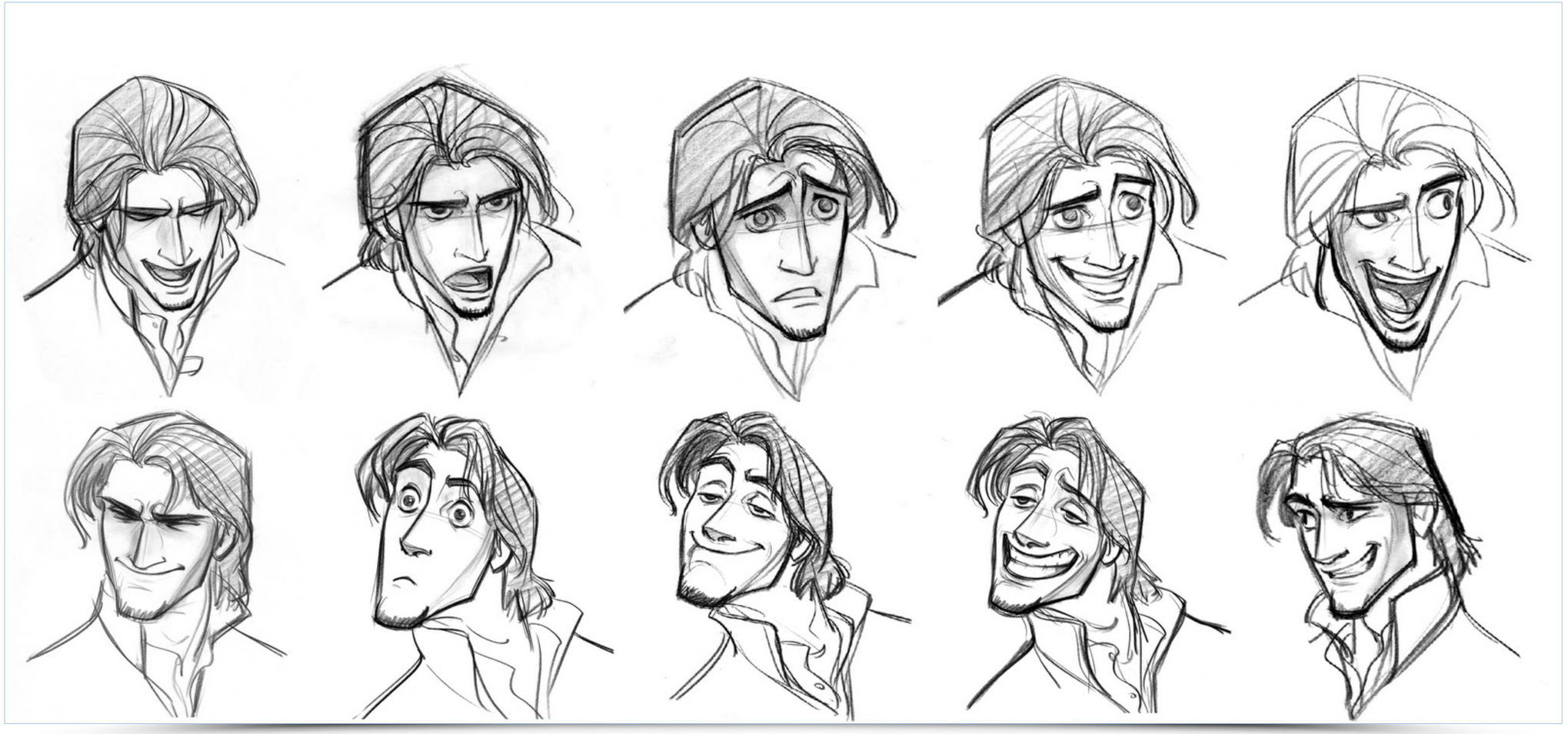


source: https://lineweights.files.wordpress.com/2009/06/giraffe-web22.jpg

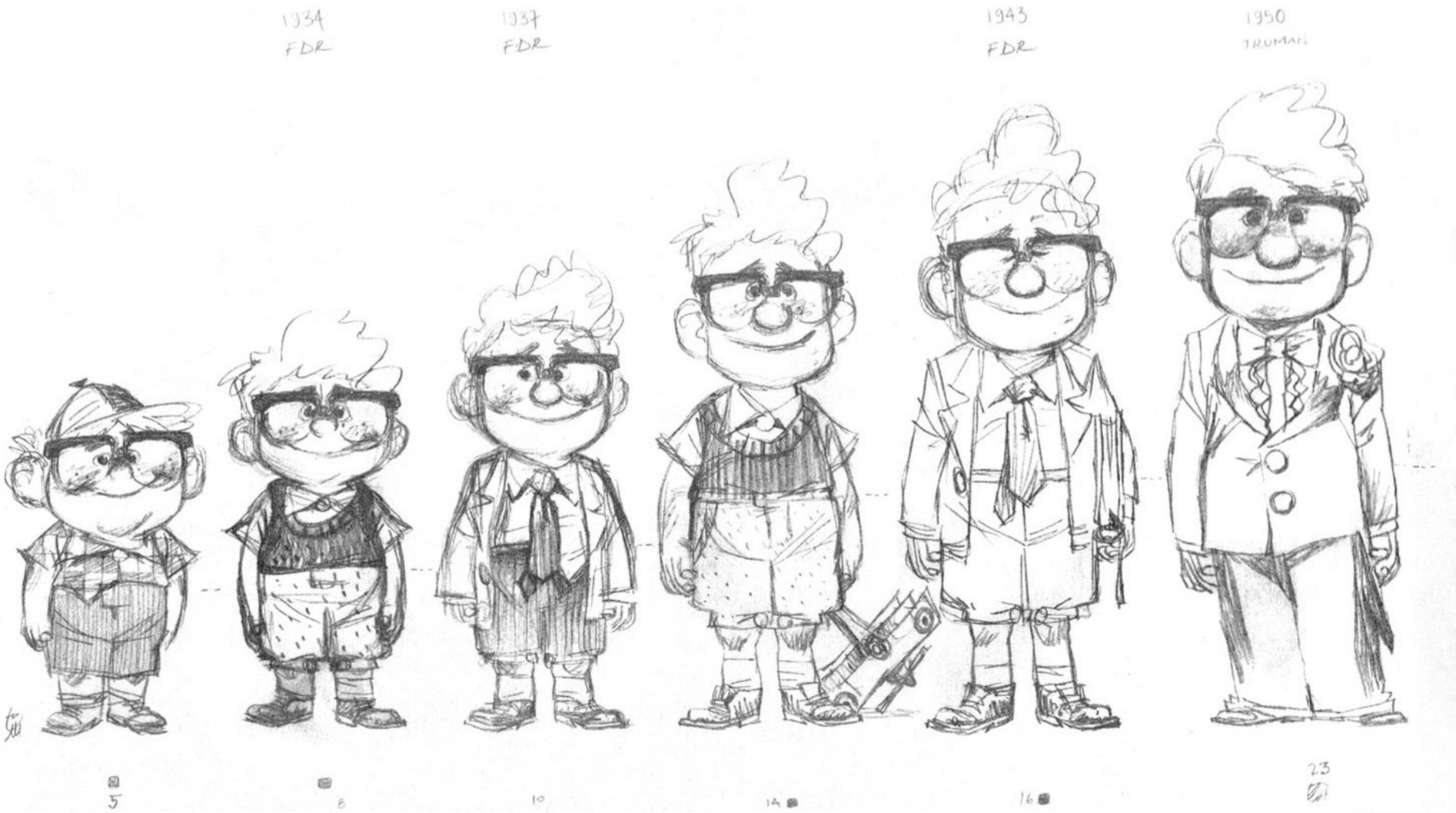


source: https://spring2013animationseminar.files.wordpress.com/2013/02/screen-shot-2013-02-24-at-11-44-06-am.png

It is also important to fully utilise the full potential of our protagonist's „acting skills".



source: https://characterperformance.files.wordpress.com/2014/06/flynnfacial_02b.jpg



source: http://3.bp.blogspot.com/-Mo8Y2gwo1sc/ToDlMT3zoNI/AAAAAAAAdlM/vaUdT_EOUBE/s1600/up_pixar_concept_art_character_01.jpg



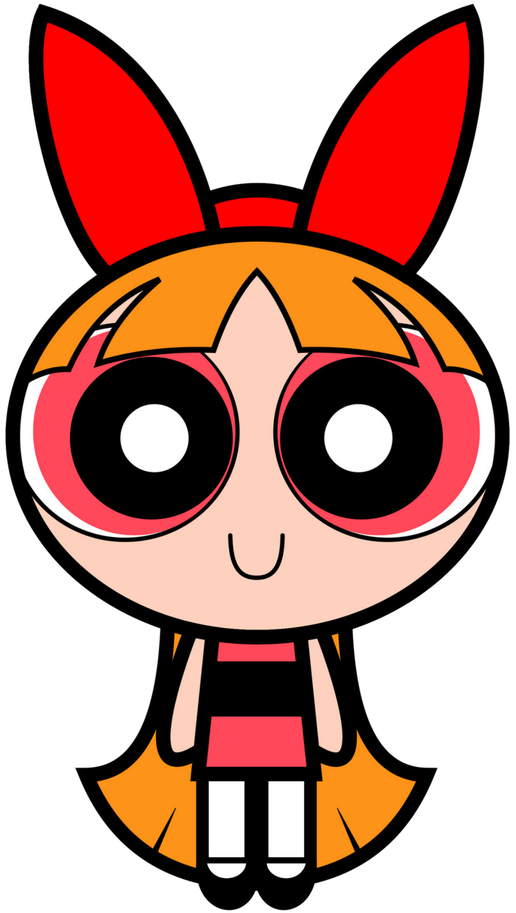
source: http://orig14.deviantart.net/a427/f/2011/312/f/d/forest_troll_by_uaejoun-d4fjenm.jpg



source: http://www.nowgamer.com/wp-content/uploads/2014/09/344602.png



source: http://img07.deviantart.net/d6db/i/2013/297/3/6/steampunk_character_design_by_paulohjp-d6rmi3z.jpg

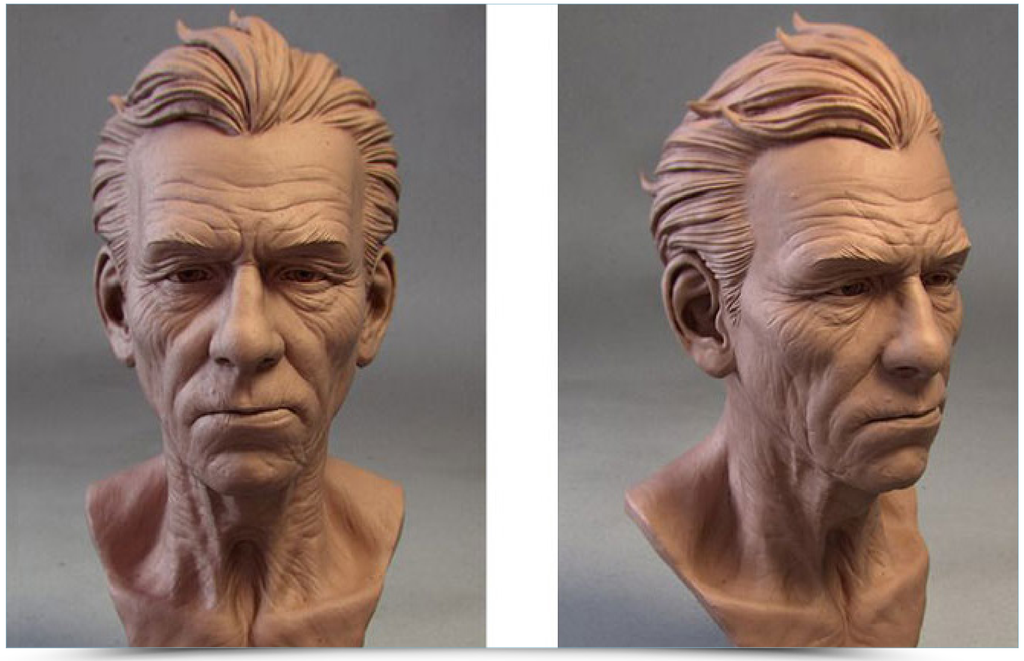


source: http://img4.wikia.nocookie.net/__cb20120915153425/blossom/images/0/08/BLOSSOM_OF_POWERPUFF_GIRLS.png

Examples of character design in 3D environment.

„I've always been passionate about geometry and the study of three-dimensional forms."

Erno Rubik



source: http://graphicdesignville.com/images/3D-Character-Designer.jpg



source: http://imgs.abduzeedo.com/files/articles/3d-character-design-olivier-couston/the-administrator.jpg



source: https://s-media-cache-ako.pinimg.com/736x/93/fb/d9/93fbd91395ee658e38114ae498f38fbe.jpg

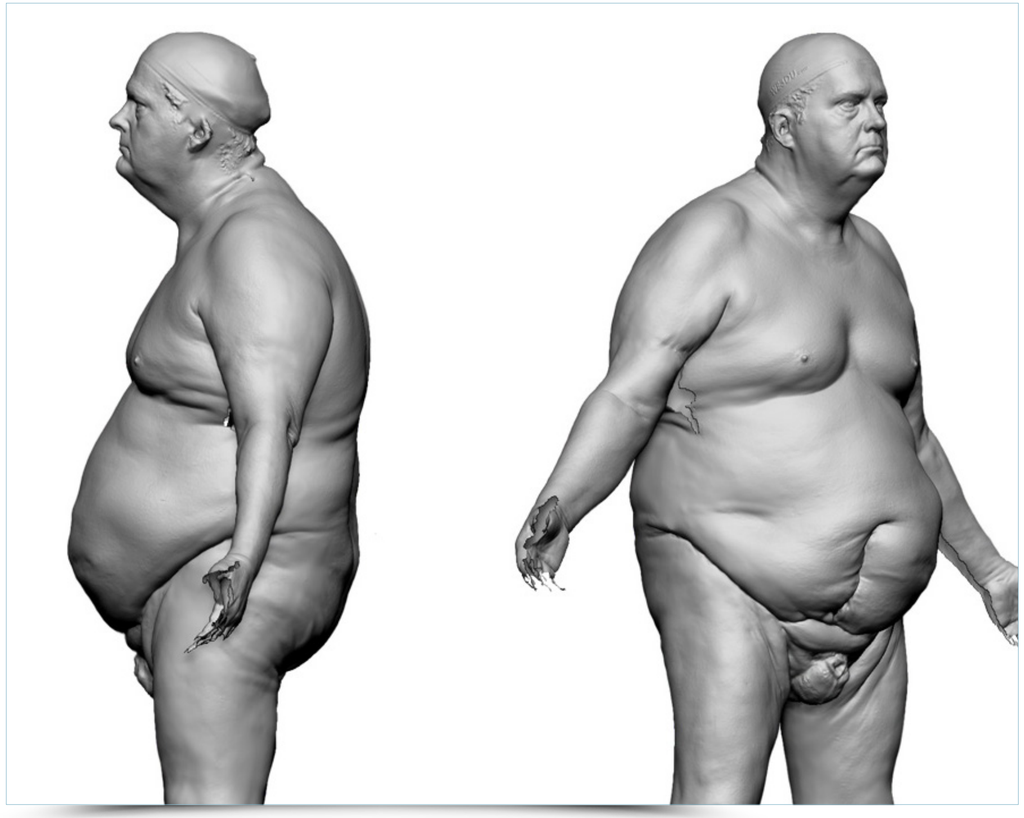


source: http://www.3dtotal.com/admin/new_cropper/interview_content_images/73_tid_NightWatch%20Amsterdam%20Rijksmuseum.jpg

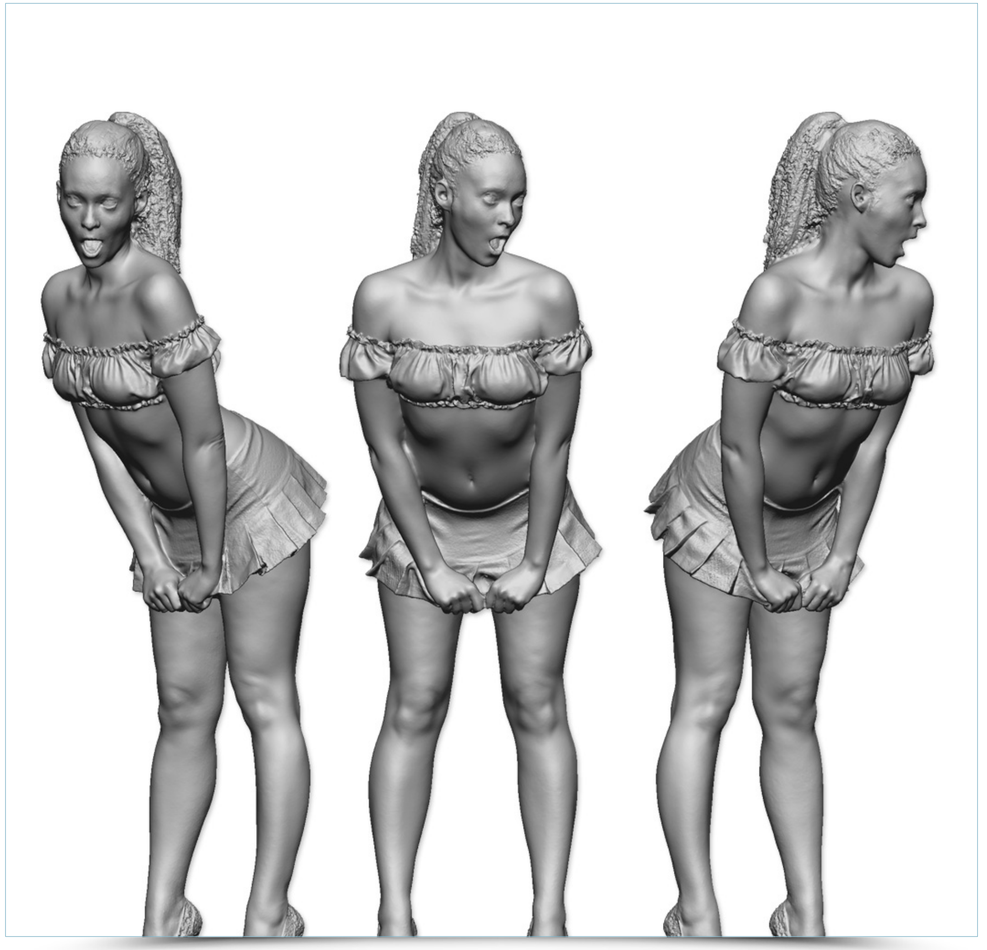
Nowadays scans of man's body are frequently used to obtain a three-dimensional model. It saves time needed for a very precise development of a given body. Advances in digital scanning provide solids and textures with very high resolution.

„Sculpture is the art of the intelligence."

Pablo Picasso

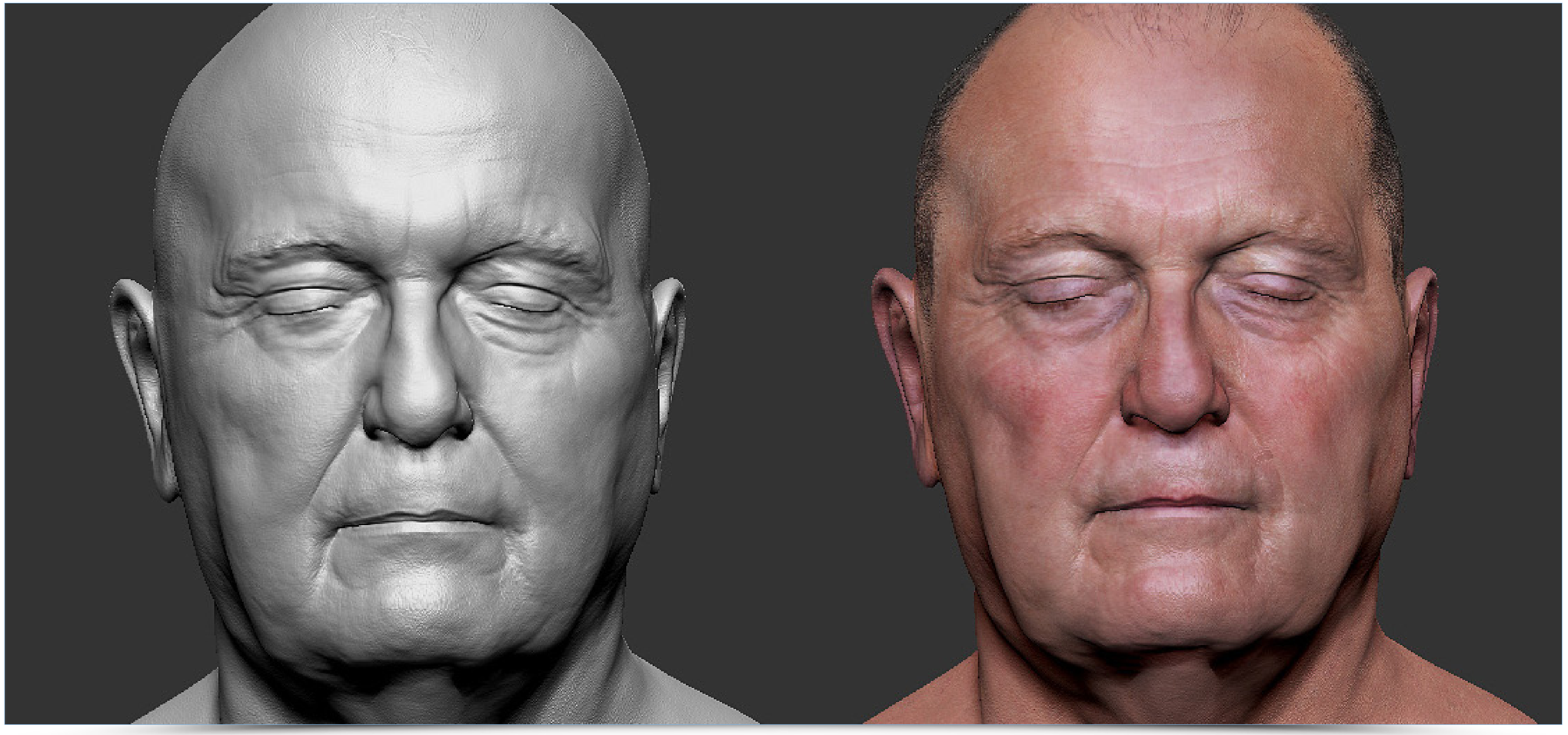


source:http://3ddigitaldoubles.com/wp-content/uploads/2014/10/3D_MS_Product_TPose_013_032.jpg



source: http://www.3dtotal.com/admin/new_cropper/interview_content_images/73_tid_NightWatch%20Amsterdam%20Rijksmuseum.jpg

Processing, application of textures and proper light may produce an image of the scanned person confusingly similar to the original.



source: https://s-media-cache-ako.pinimg.com/originals/15/41/20/1541203fb7498c75eb17d565222514af.jpg

After texturing and rigging 3D models are ready to be animated.

„I believe in 3D for certain kinds of films. I certainly believe in using 3D for all things in animation because animation has such clarity and so much depth of focus. It worked great with ‚Avatar' because 70 percent of that film is animated."

Steven Spielberg



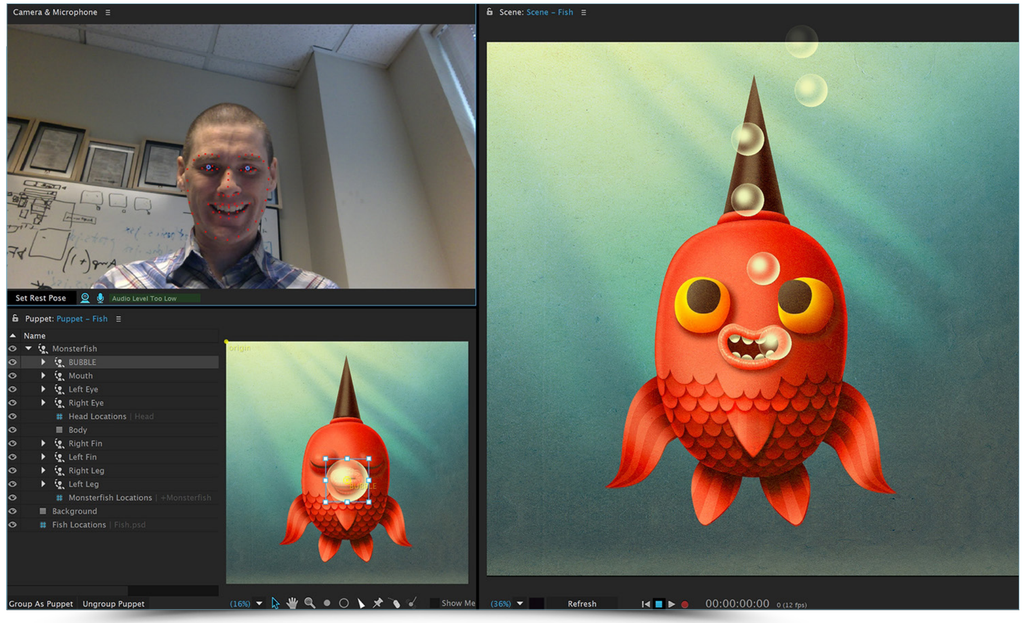
source:http://www.ir-ltd.net/wp-content/uploads/2012/08/pose004-prod-c.jpg



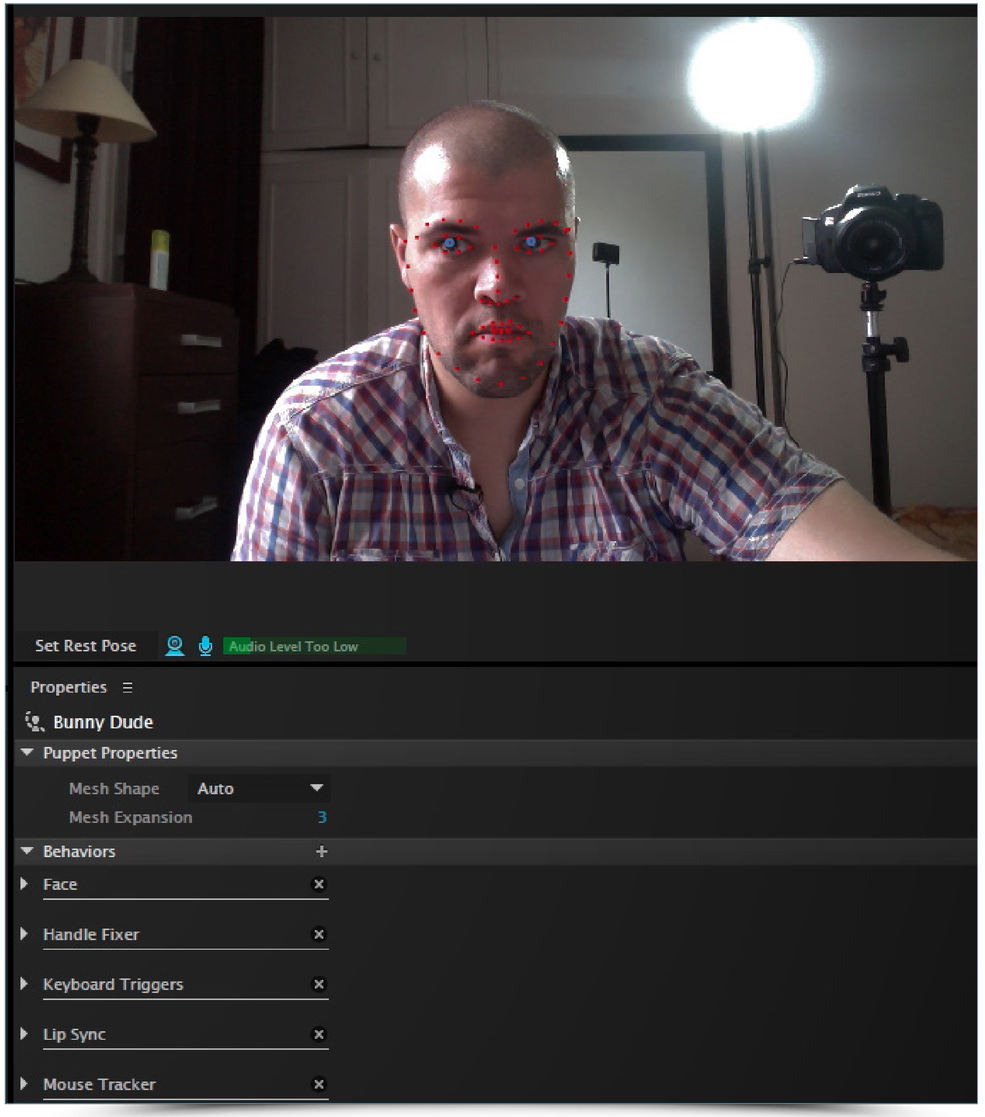
source: http://www.ir-ltd.net/wp-content/uploads/2012/08/pose003-prod-c.jpg

Adobe Character Animator → visit: *https://helpx.adobe.com/after-effects/character-animator.html*

Adobe Character Animator allows to easily create animated avatars or control facial expressions of 2D characters via webcam and face detection system. This commercial tool speeds up animation workflow using real time algorithms.



source: http://cdn2.digitalartsonline.co.uk/cmsdata/slideshow/3607016/Character-Animator-1.jpg



source: http://www.rollins.fr/__website/sebyrollins/wp-content/uploads/adobe-character-animator-screen.jpg

Adobe Character Animator → visit: *https://www.youtube.com/watch?v=lmPoo_WZyPU*

„Character Animator is a character animation application that allows you to bring expressive characters to life using your own artwork.

Adobe Character Animator allows you to import artwork from Adobe Photoshop or Adobe Illustrator, and breathe life into them. You can do so by first capturing your performance using a camera and microphone. While you're performing, Character Animator reproduces your facial expressions, synchronizes mouth movements to your speech, and provides complete control over all aspects of a character's movement.

You can simply perform to animate a character that you've acquired from someone else, or you can rig your own characters based on your own artwork from Photoshop or Illustrator. You can even write your own behaviors or use existing behaviors from elsewhere."
more: https://helpx.adobe.com/after-effects/character-animator.html



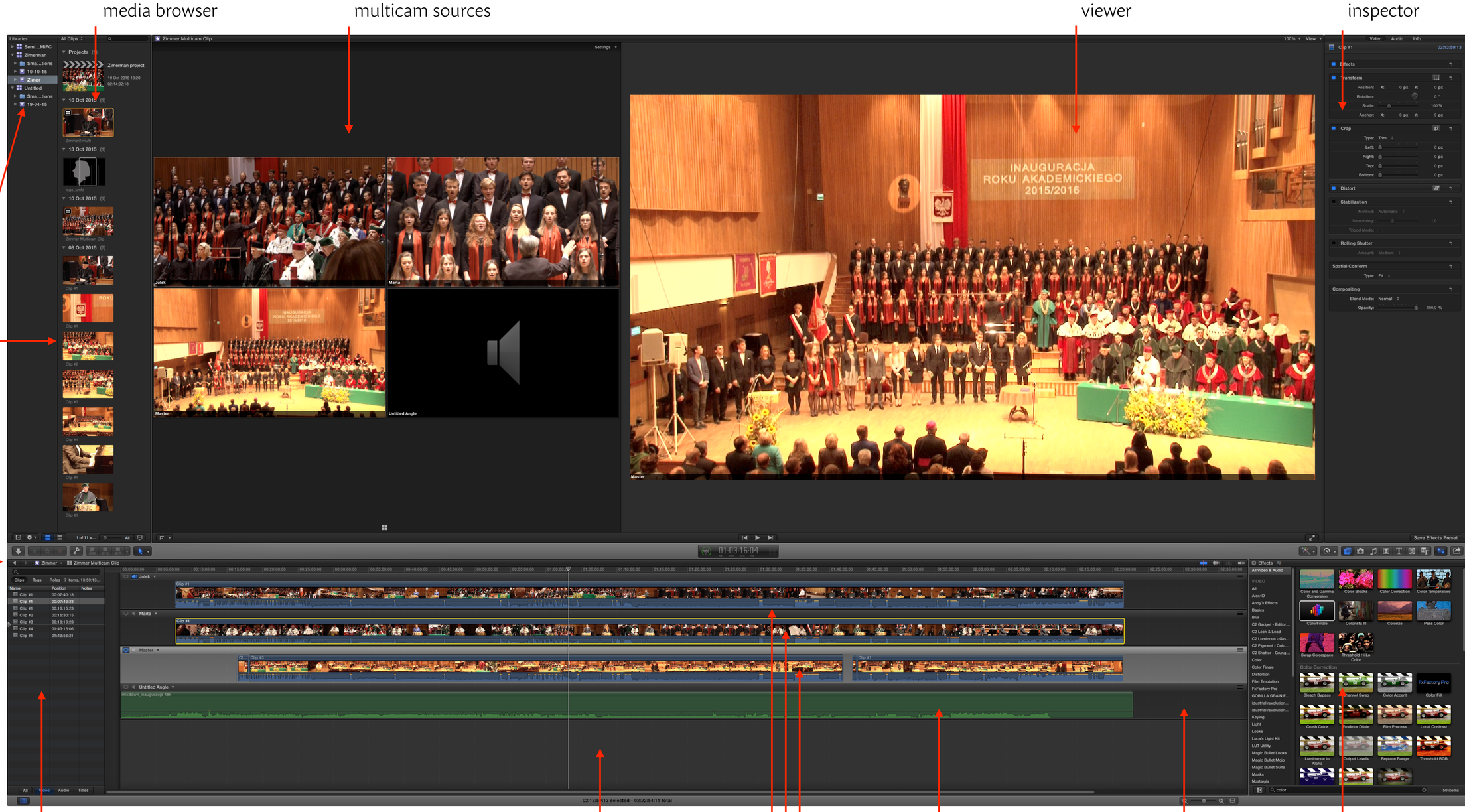
source: https://www.youtube.com/watch?v=lmPoo_WZyPU

FINAL CUT PRO X VIDEO EDITING AND PROCESSING BASICS

Andrzej Artymowicz

Final Cut Pro X
Video editing
and processing basics

FCPX main window



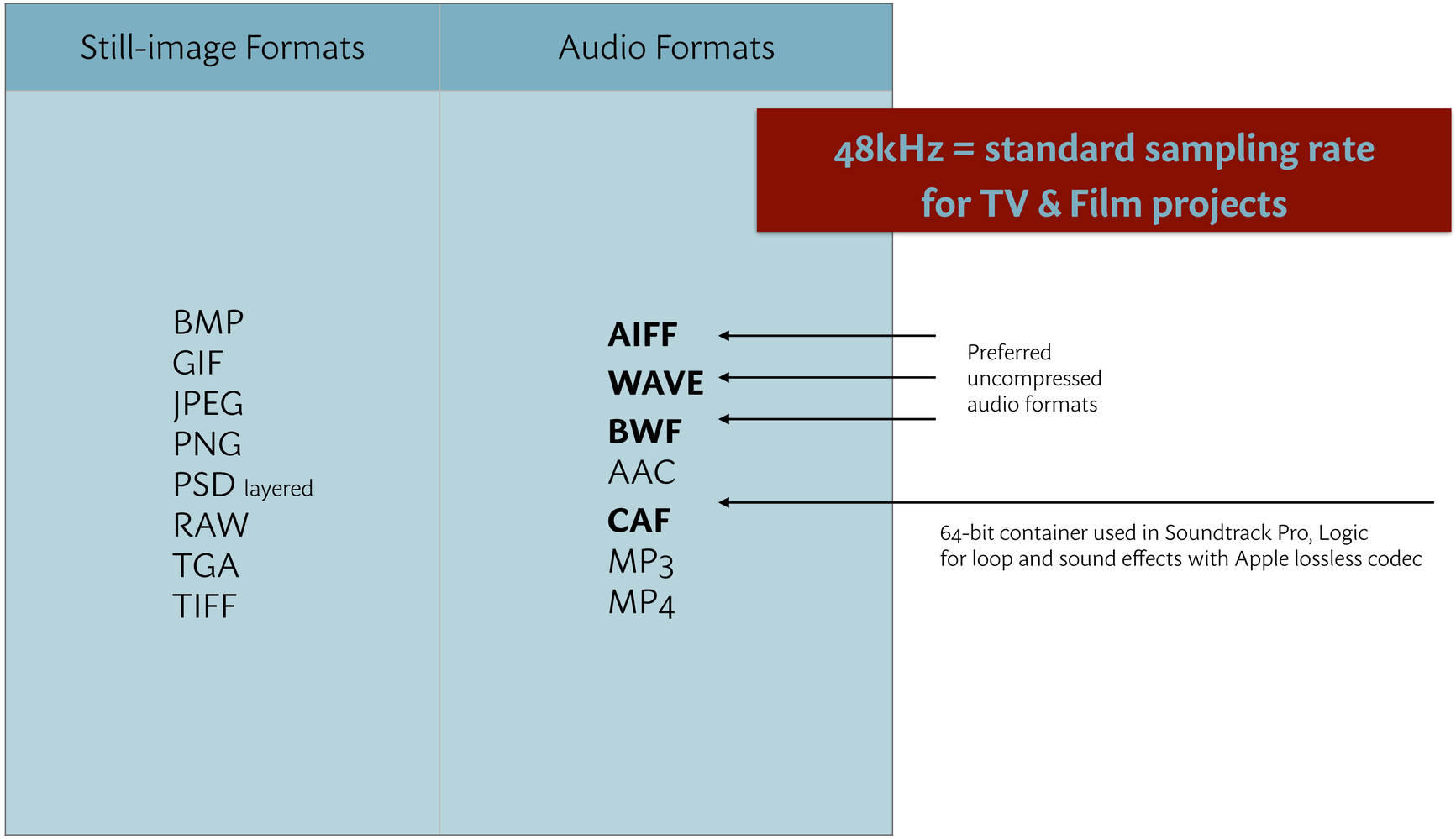
Final Cut Pro is a application for creating, editing and producing high quality video with high performance real time audio-video engine, native support for many video formats from heavily compressed formats like HDV, h.264, DVCPRO HD, AVC Intra, XDCAM HD to editing codecs like Apple ProRes 422 family. FCPX supports resolutions like 1080, 2K, 4K and 5K on main display or second display.

FCPX Native Video Formats

SD	HD and higher resolution
DV, DVCAM, DVCPRO, DVCPRO 50, IMX	DVCPRO HD, HDV, H.264, AVCHD, AVCCAM, NXCAM, AVC-Intra, XAVC, XDCAM EX/HD/DS422, XF MPEG-2
iFrame, Motion JPEG, Apple Intermediate, Apple Animation	
Apple ProRes 4444, 422HQ, 422, 422LT, 422Proxy, Log C	
REDCODE RAW (R3D)	
Uncompressed 10-bit and 8-bit 4:2:2	

High quality visually lossless codecs preferred for efficient video editing

FCPX Still-image and Audio Formats



Selected European TV and Film post-production digital video resolutions

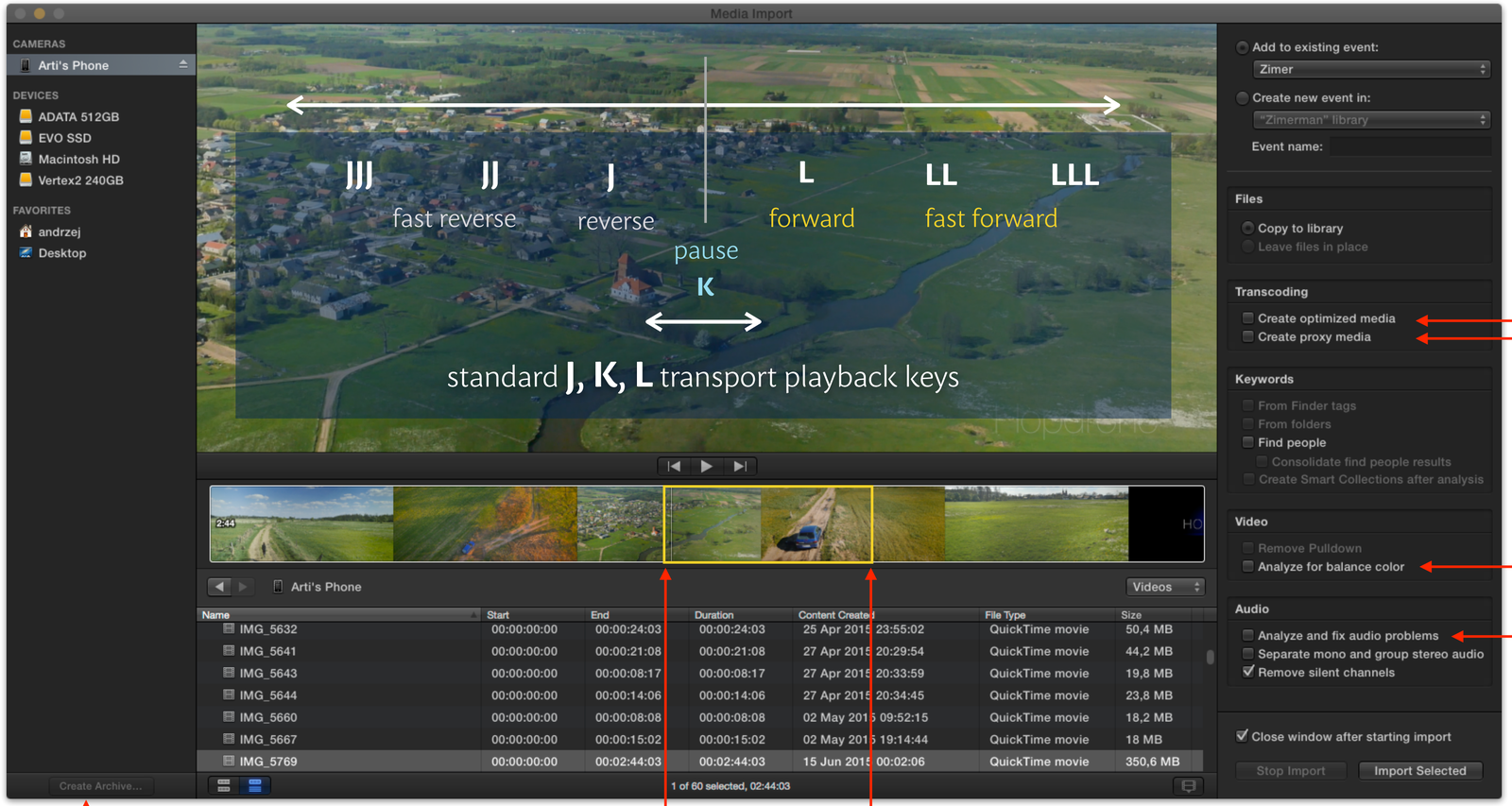
Standard	Resolution	Display aspect ratio	Pixel aspect ratio	Pixel count approx.
DV PAL	720x576	1,33:1	***rectangular***	0,3Mpix
720p	1280x720	1,78:1	square	0,9Mpix
HDV 1080i, 1080p	1440x1080	1,78:1	***rectangular***	1,5Mpix
1080i, 1080p HDTV, Blu-ray	1920x1080	1,78:1	***rectangular***	2Mpix
Digital Cinema 2K	2048x858	2,39:1	square	1,7MPix
Ultra HDTV	3840x2160	1,78:1	square	8,3Mpix
Digital Cinema 4K	4096x1714	2,39:1	square	7Mpix
IMAX Digital	5616x4096	1,37:1	square	23MPix
6K	6144x3160	1,94:1	square	19,4Mpix





Clean, intuitive and clutter free multicam Final Cut Pro X (FCPX)
user interface in lowest and 4K screen resolution

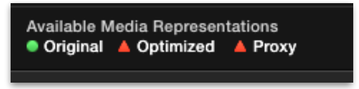
Importing, transcoding and analyzing footage window



Options:

ProRes 422 transcoding

ProRes 422 proxy transcoding



Auto color temperature correction

Hum, background noise removal tool

Creating original media archives

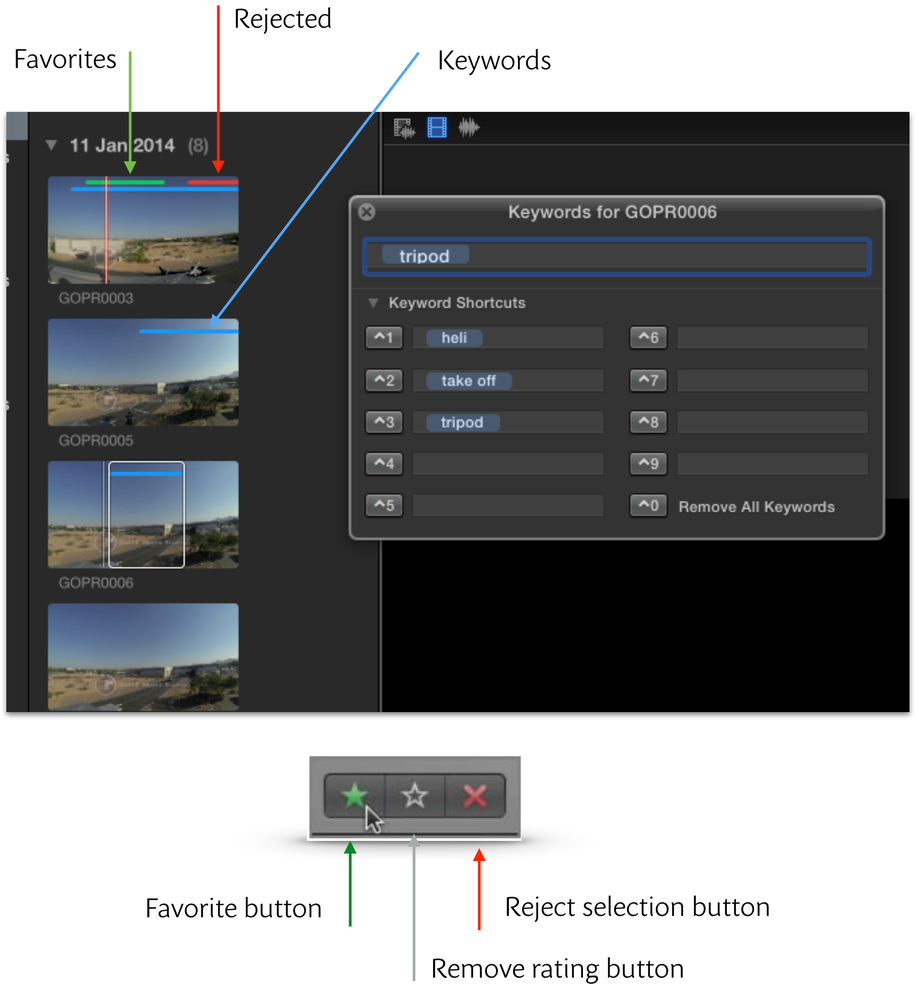
In point (I)

Out point (O)

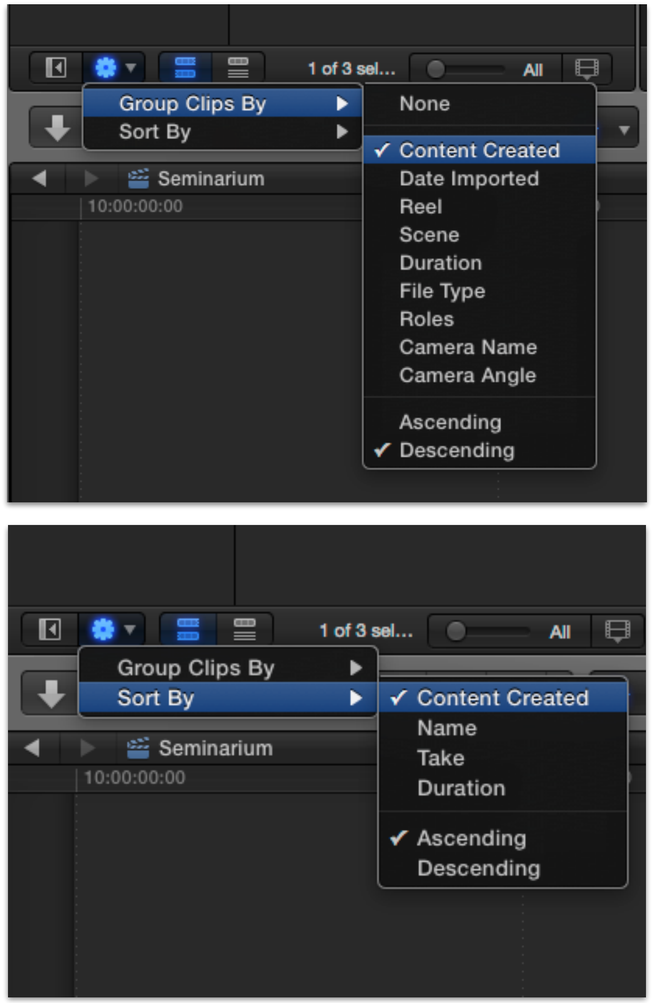
Creating original media image archives feature is essential tool for successful footage and full metadata set backup

Keyword collections

Adding keywords to media selections helps in fast video asset searching



Grouping and sorting media files



Magnetic Timeline

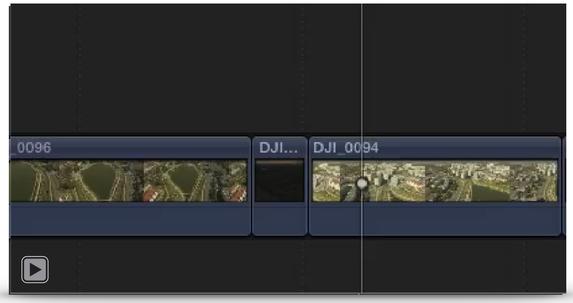
New creative ways for fast, safe, non-destructive editing

Insert edit

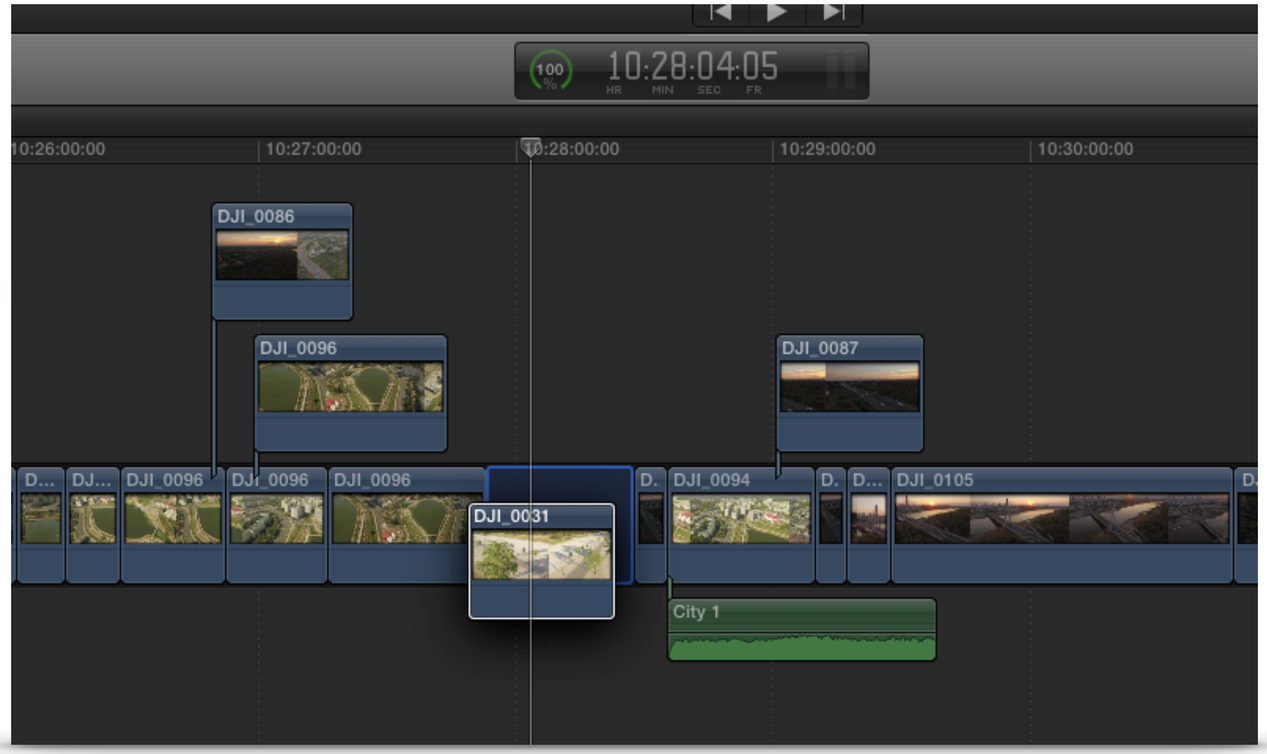


click the image for video playback

Replace edit



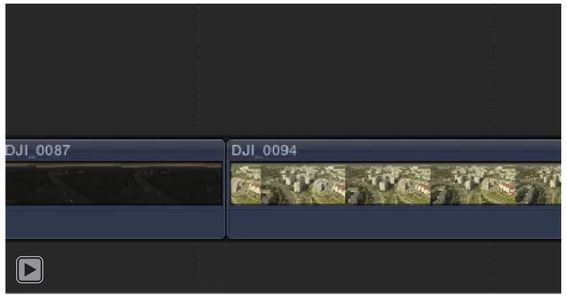
click the image for video playback



Dragging a clip to a project for insertion between two clips (before releasing mouse button)

Assembling clips with Magnetic timeline which fluidly adjusts clip around the clip you're dragging to eliminate gaps and sync problems

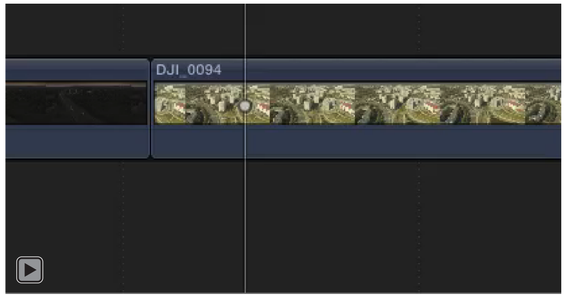
Adding 3D title



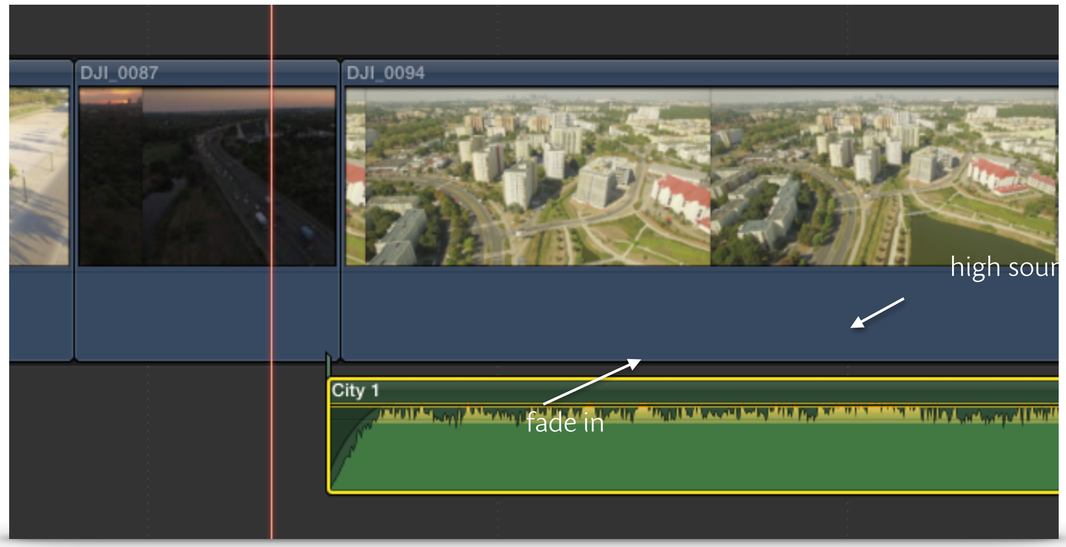
click the image for video playback



Adding sound file

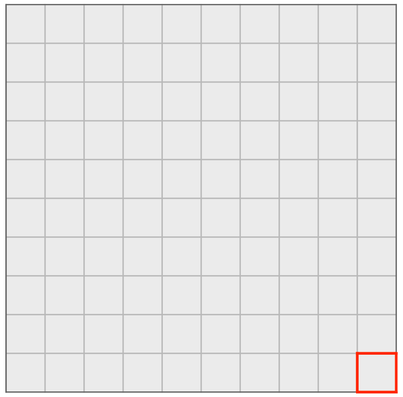


click the image for video playback

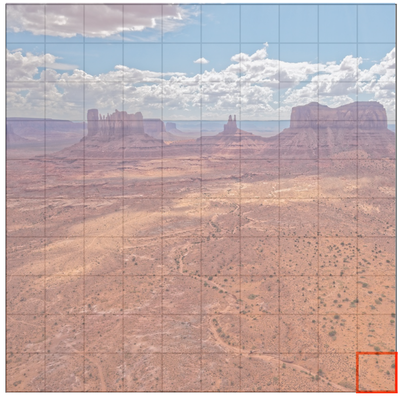


Rectangular and square pixels in digital video world

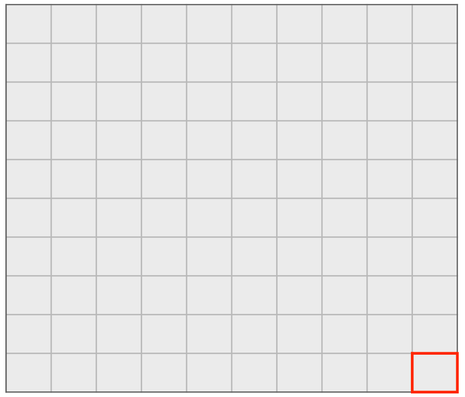
Check if pixel aspect ratio conversion is needed to retain proper image aspect ratio



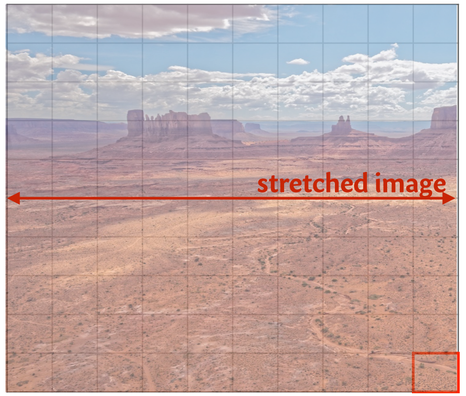
pixel aspect ratio 1:1 square



simulated picture

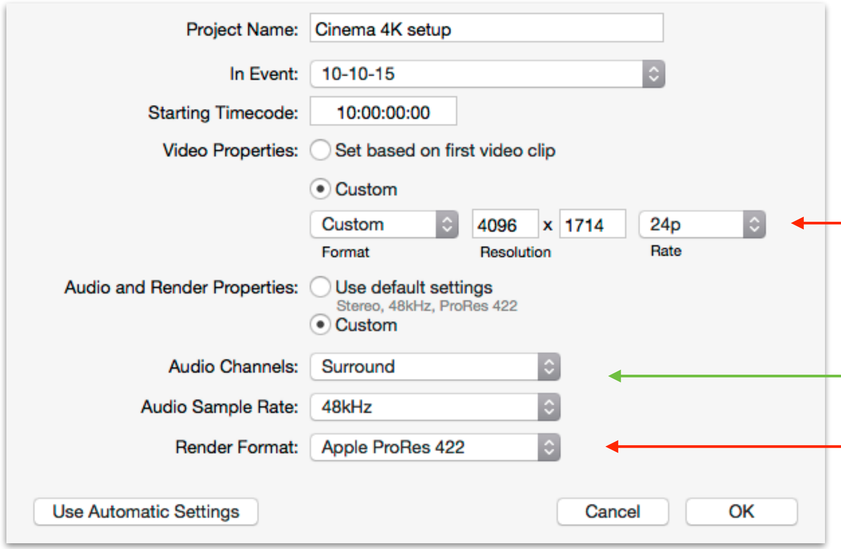


e.g. pixel aspect ratio 1,5:1 rectangular



simulated picture

Custom audio-video project settings

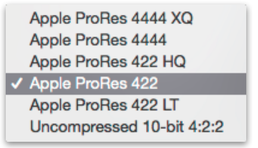


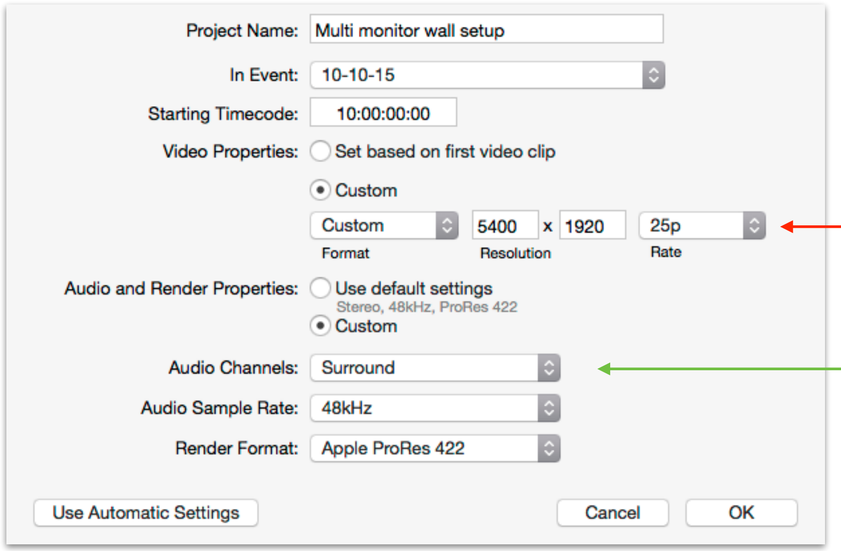
Cinema 4K project setting

Cinema 4K custom standard 2,39:1
display aspect ratio, 24p frame rate

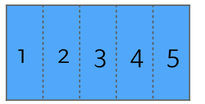
5.1 channel audio setup (Ls, L, C, R, Rs, LFE)

Rendering file formats options:





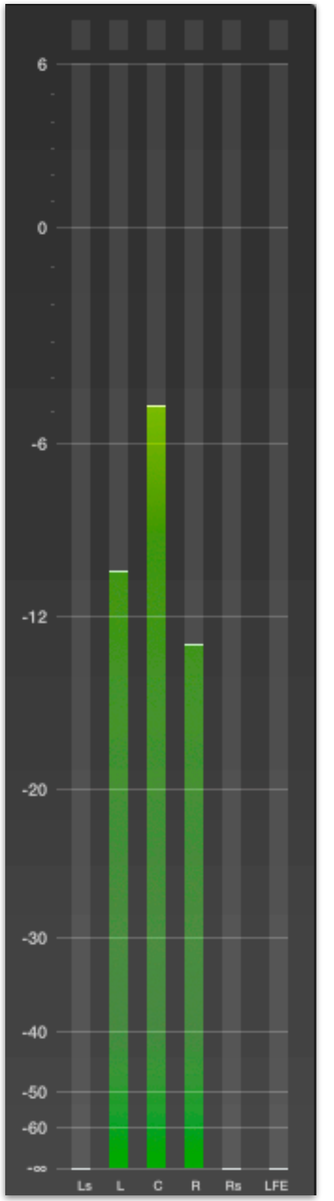
5 vertical monitor wall project setting



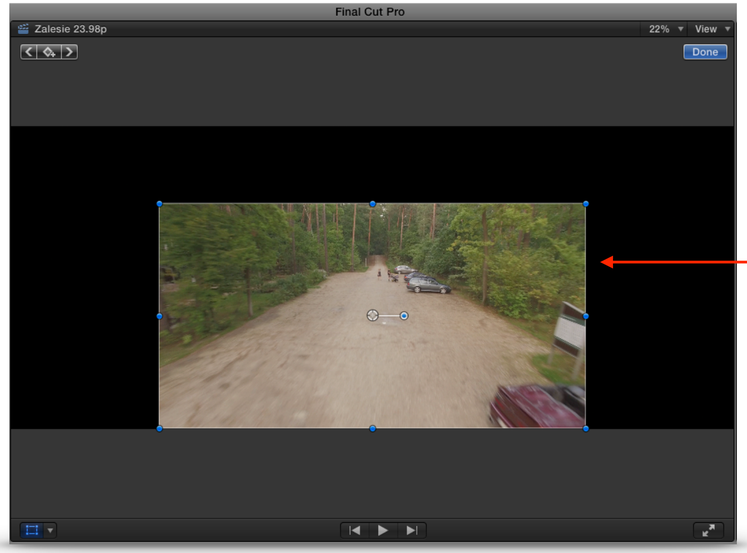
5 vertical full HD monitors setup, 25p frame rate

5.1 channel audio setup (Ls, L, C, R, Rs, LFE)



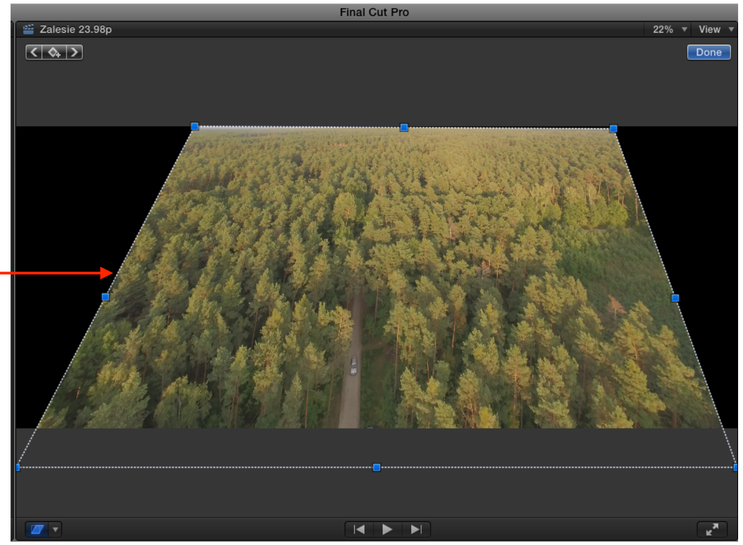


Transform window functions

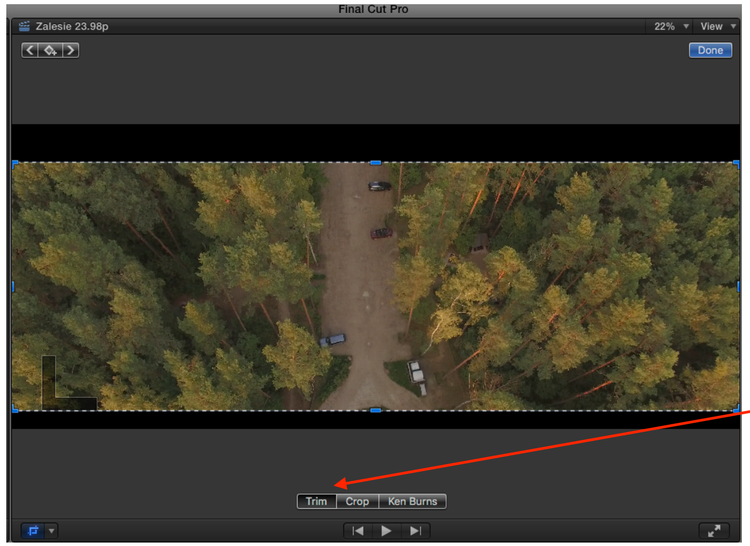


Transform

Distort

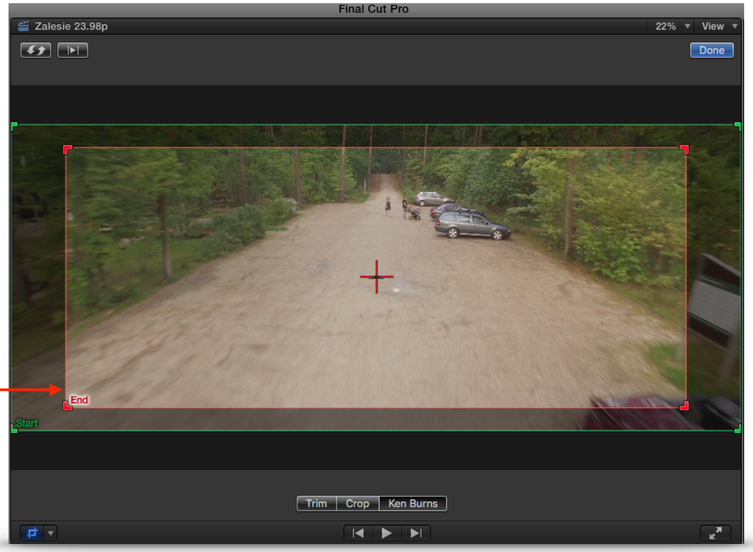


Transform window provides several kinds of effects and controls



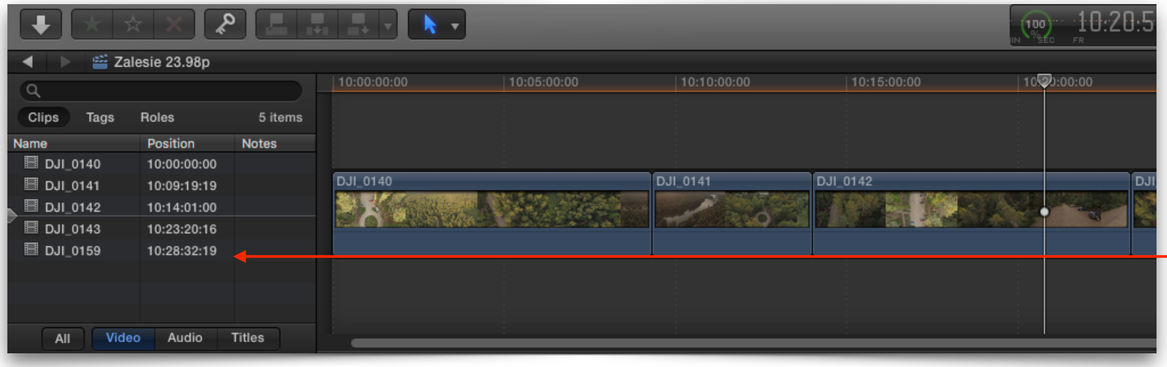
Trim

Ken Burns effect

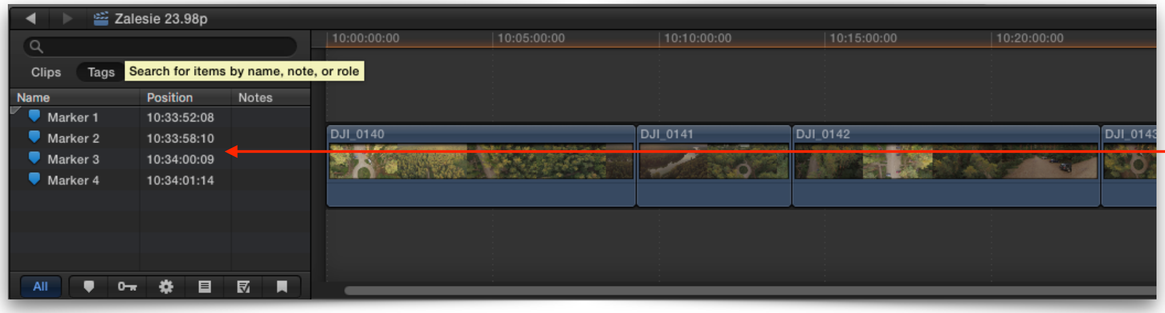


Timeline Index

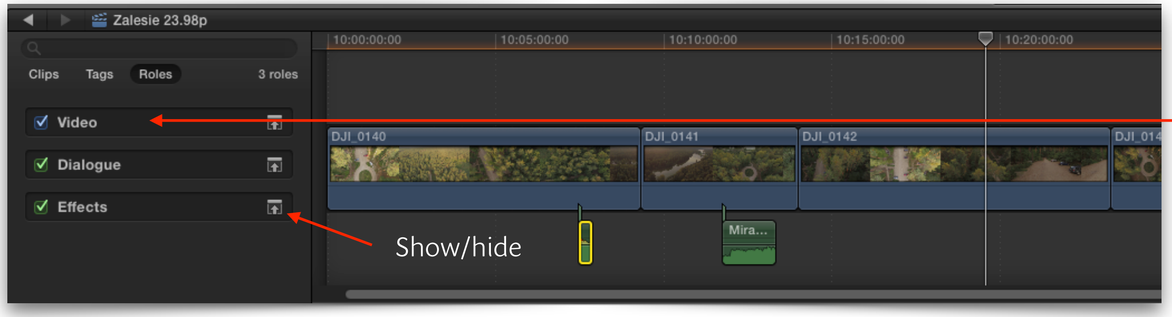
The Timeline Index provides a text based view of the clips and tags, markers, keywords used in the timeline with event filtering,



Text clip listing with file name and timecode position



Marker listing with timecode position



Audio and Video Roles

Videoscopes - luminance

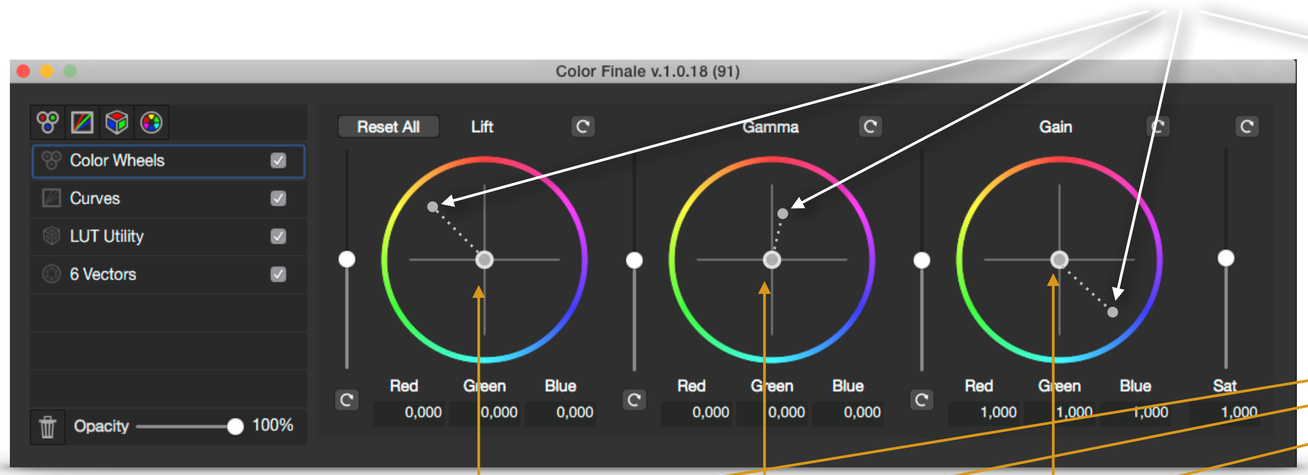


Color correction basics - 2 approaches
Different ways to operate chrominance channel

vs.

Color Finale: color wheels

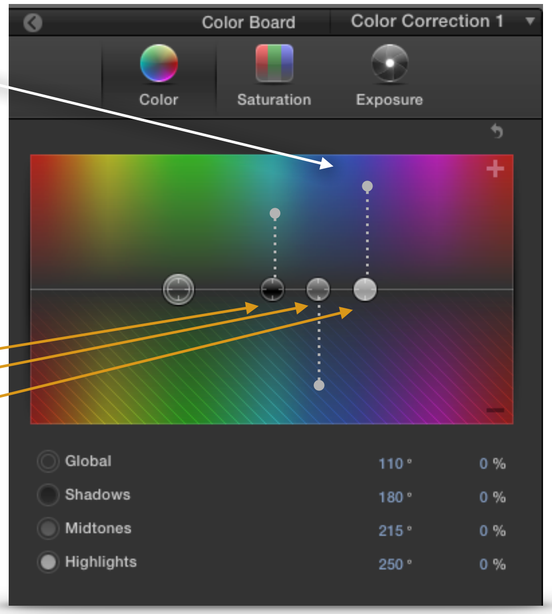
more distance from the center - more saturation



lift gamma gain

shadows midtones highlights

FCPX: color board



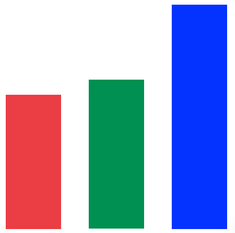
color correction

Chrominance

Videoscopes



RGB channels imbalance

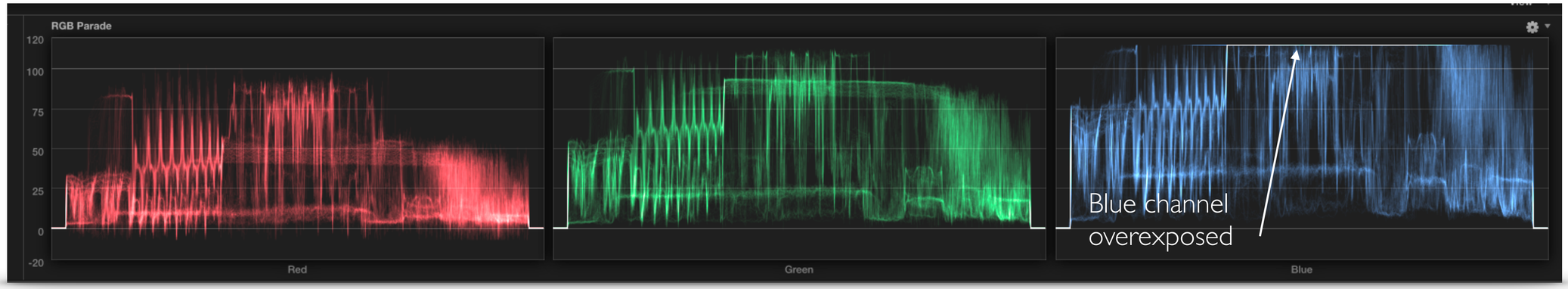


vectoroscope (chrominance)



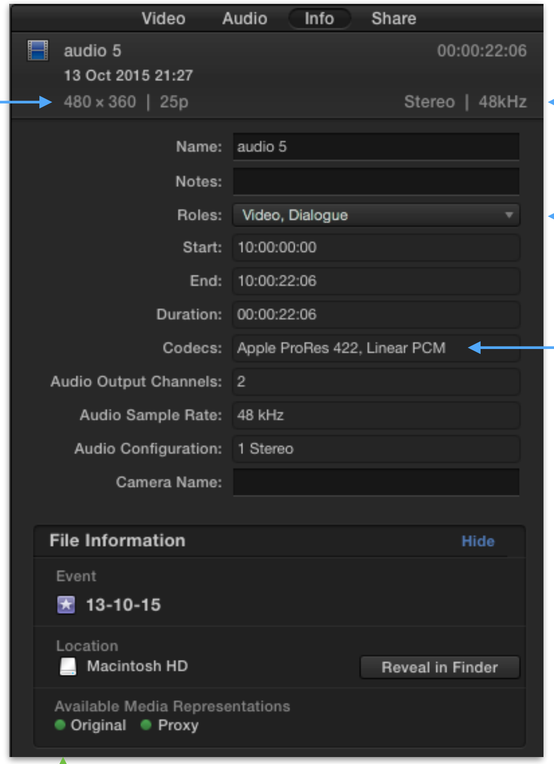
RGB parade

Bad White Balance setting



File info window features

Info tab



Resolution and framerate

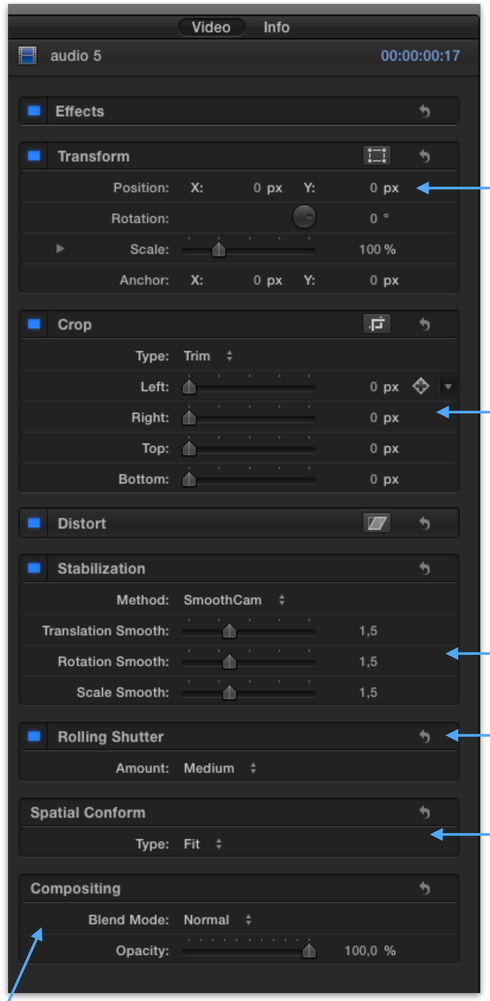
Audio sampling rate

Dialog role

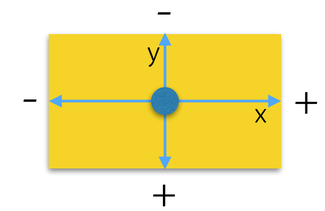
Source video format

Original and proxy files available

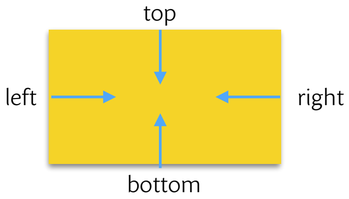
Video tab



Frame center position



Cropping



Video stabilisation options

Anti rolling shutter feature

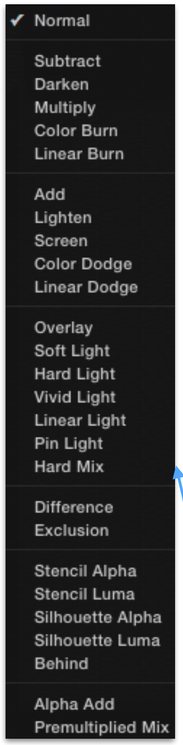
Spatial conform options



fit to project height or width

fill to project width and height

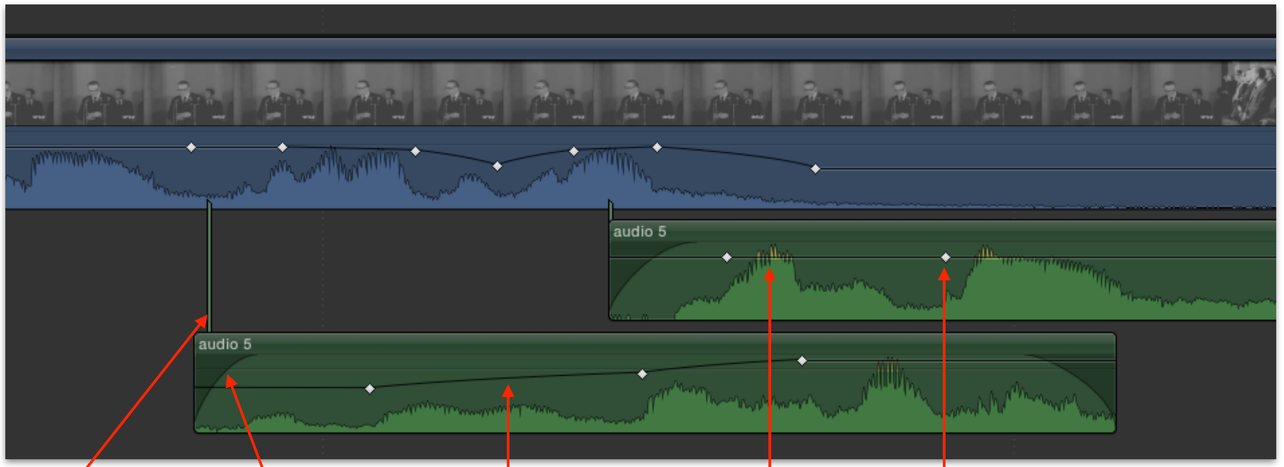
no scalling



Creative compositing options

Audio mixing basics

Audio mixing is available by using keyframes with smooth curve transitions between the grey diamonds you can see on the picture. Non destructive fade-ins and audio clip connecting points are clearly visible.



audio connecting point

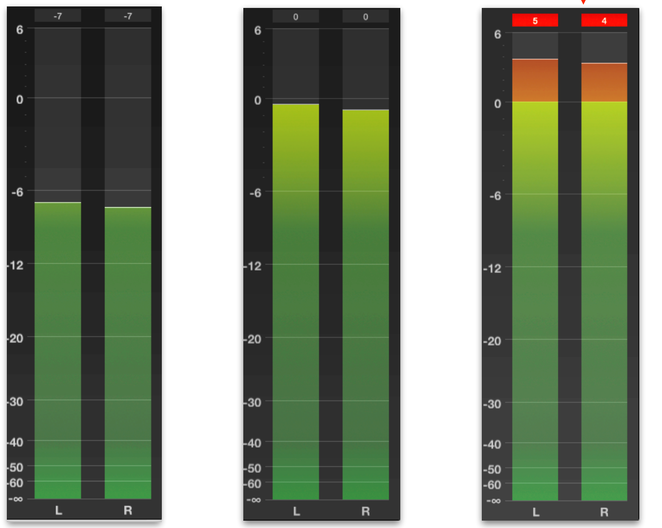
non destructive fade in

smooth gain curves

yellow „hot" waveforms

audio keyframes

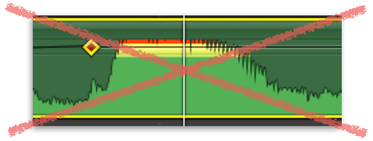
number of clipped distorted samples



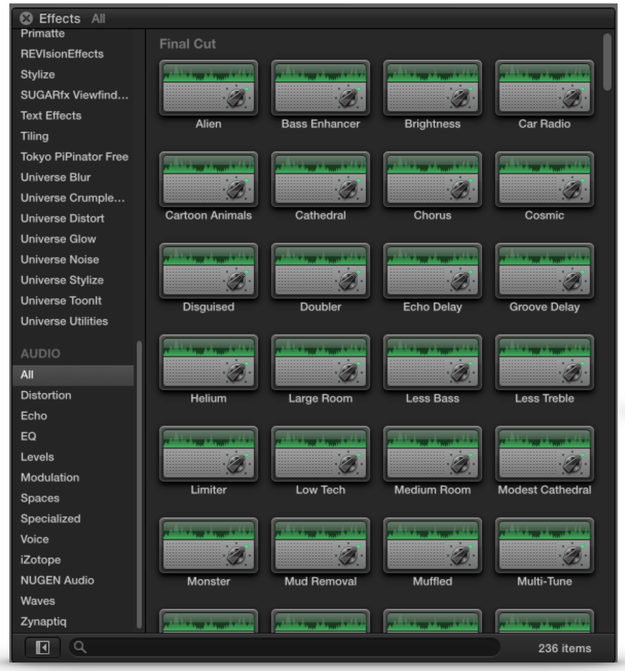
green safe zone

yellow hot zone

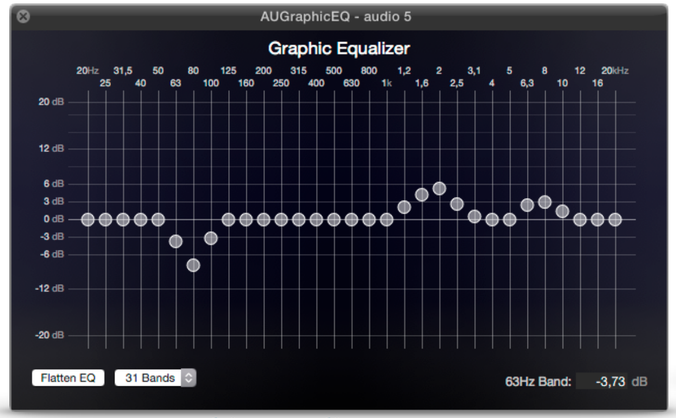
red CLIPPING zone



Selected real time audio filters dedicated for fine tuning audio clips



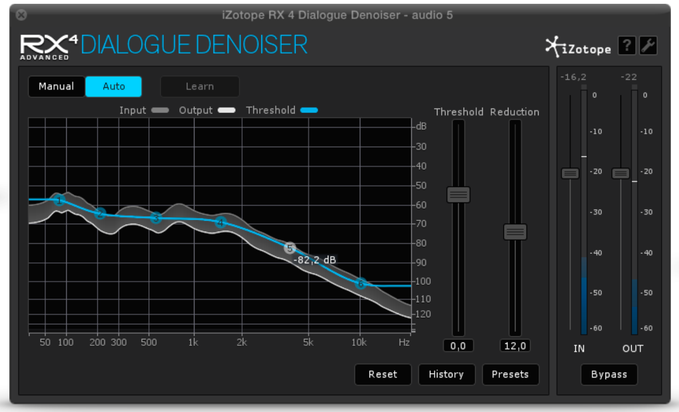
audio plugins listing



⅓ octave graphic equalizer



ring shifter



adaptive dialogue denoiser



parametric equalizer



distortion

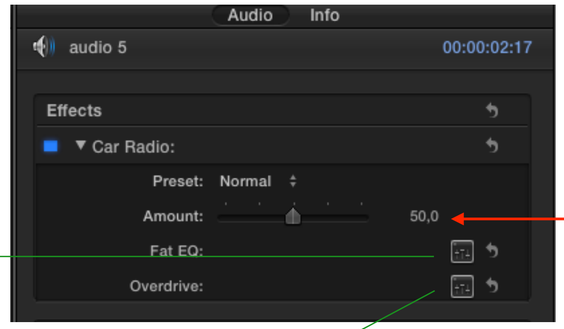


vocal processor

These are multi purpose professional quality plugins ready for your project

Simple car radio effect is using 2 serial audio processors: Fat EQ + Overdrive





Dry/Wet ratio
0% - 100% car radio effect

+



=

Car radio filter

vertical audio/video filter flow

Original sound file

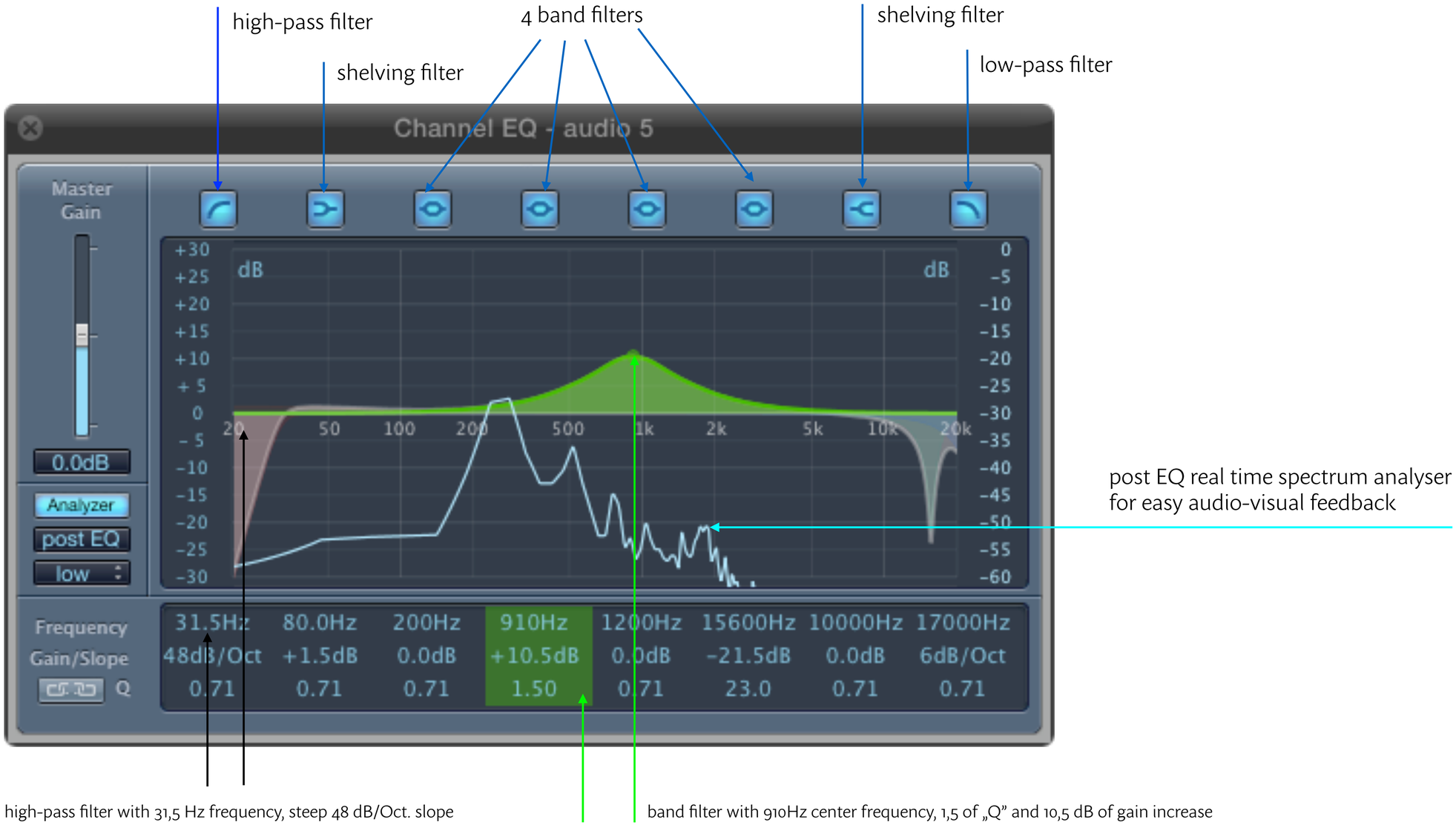
Fat EQ

Overdrive

Car radio filter

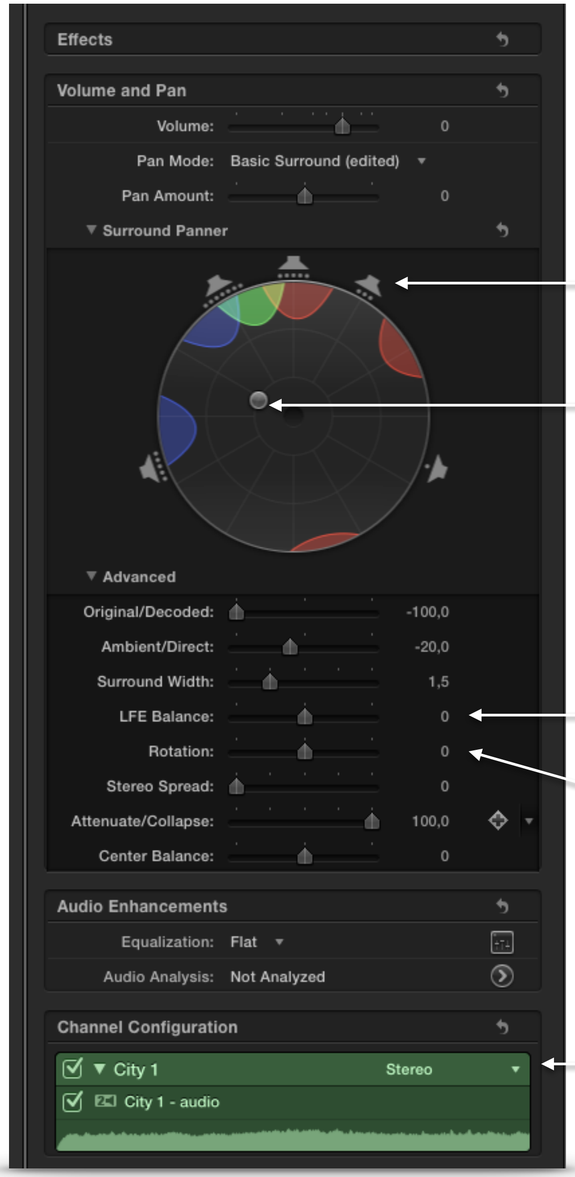
Mixer output

Powerful 8 band *parametric equalizer/analyser* for precise sound frequency shaping



Powerful surround sound inspector for each sound file

Convenient way to spatialize the sound sources in 2D space with equalization, panning and audio plugins



5.1 channel configuration

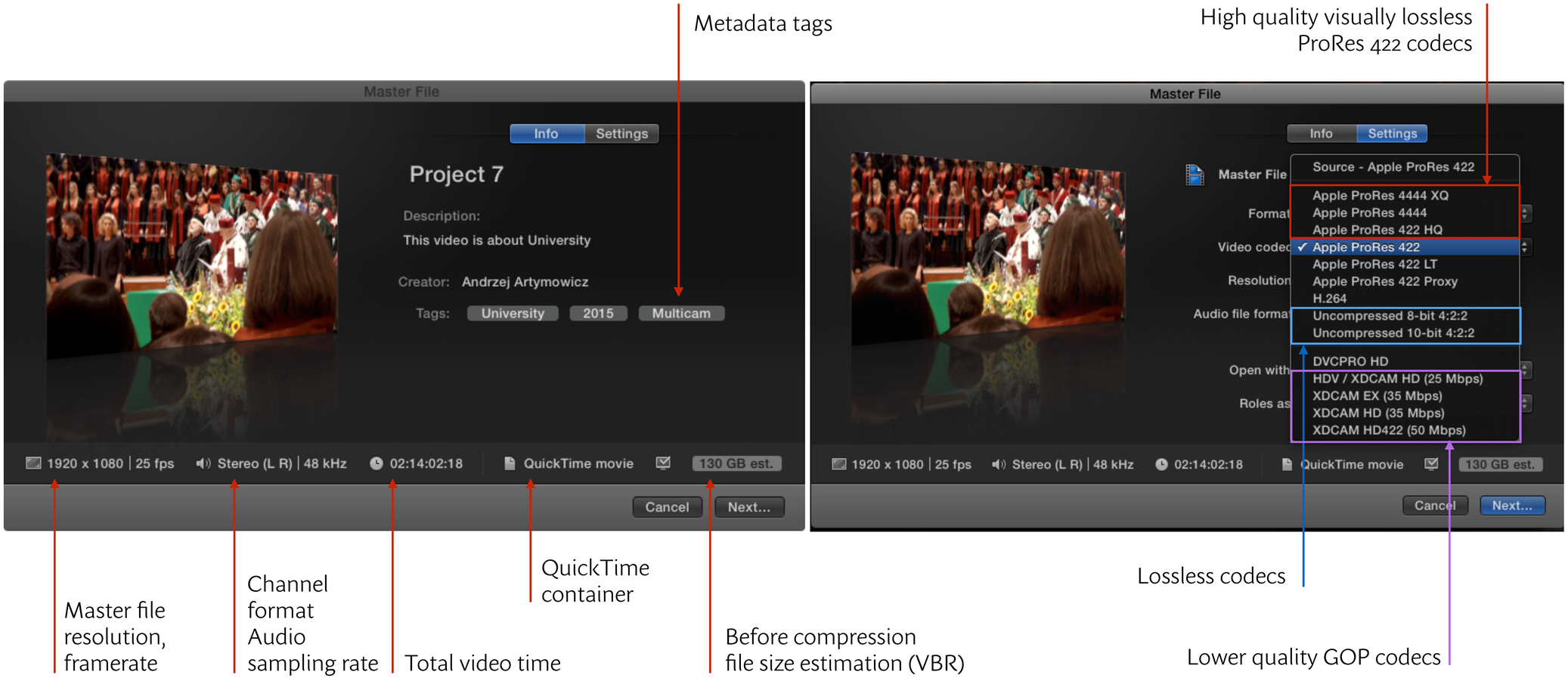
off center virtual
sound source position

low frequency enhancement
channel level

sound source rotation

stereo sound file panning in 5.1 space

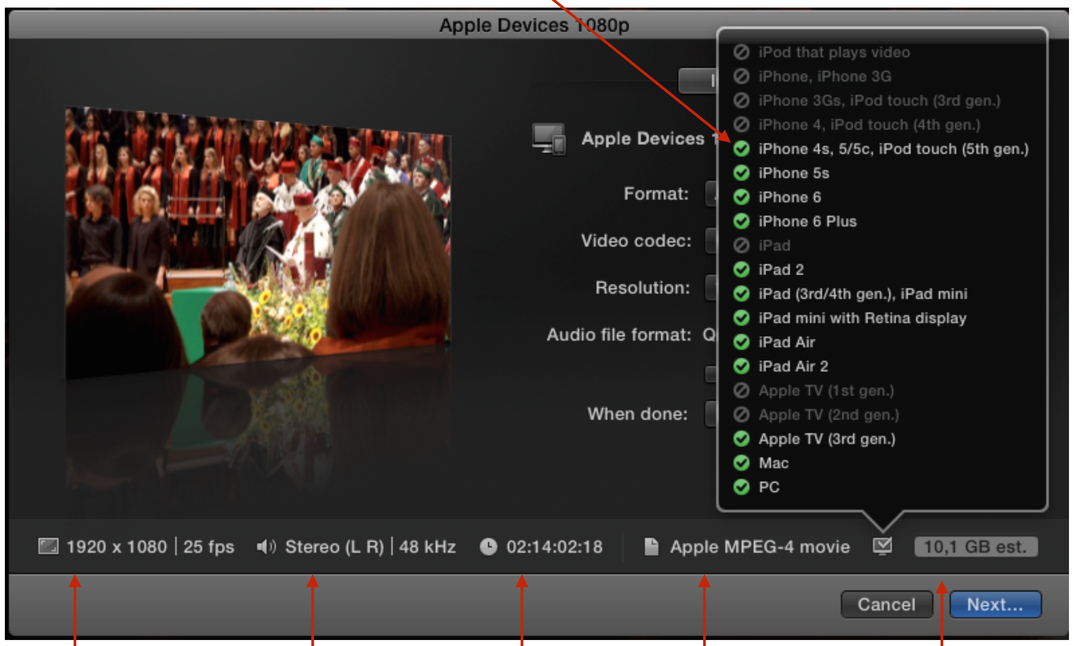
Exporting master video file using high quality Variable Bit Rate I-Frame, 10 bit, ProRes 422 family codecs with uncompressed audio

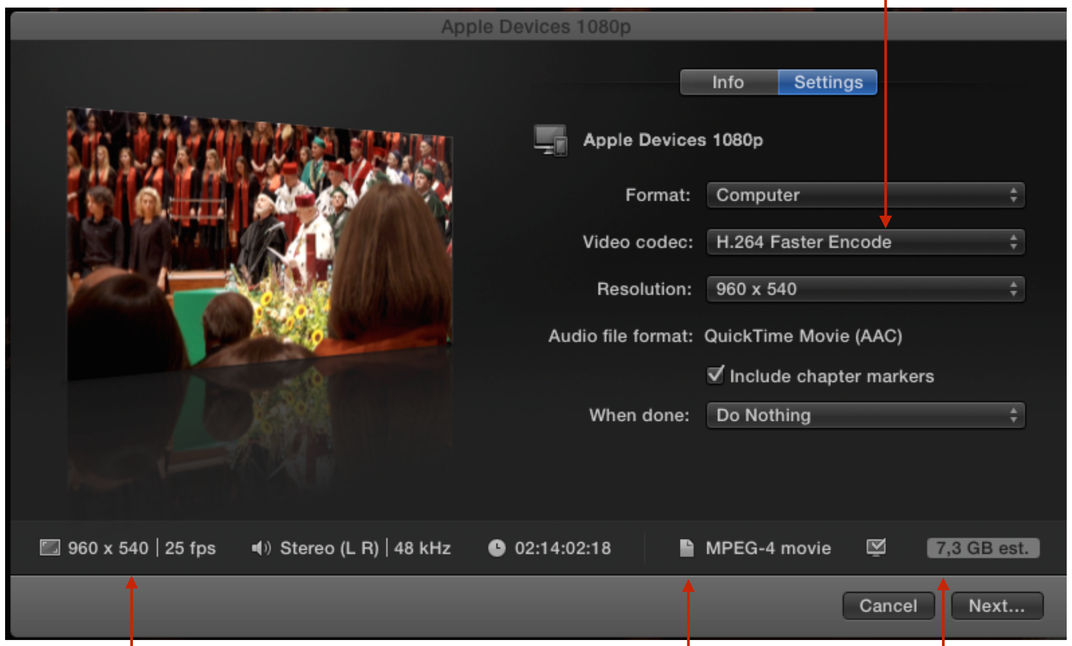


Exporting to Apple devices or computer use

Limited Apple devices
compatibility list

h.264 one-pass or
multi-pass encoding options





Channel format
Audio sampling rate

mp4 container

Total video time

File resolution & framerate

Before compression
file size estimation

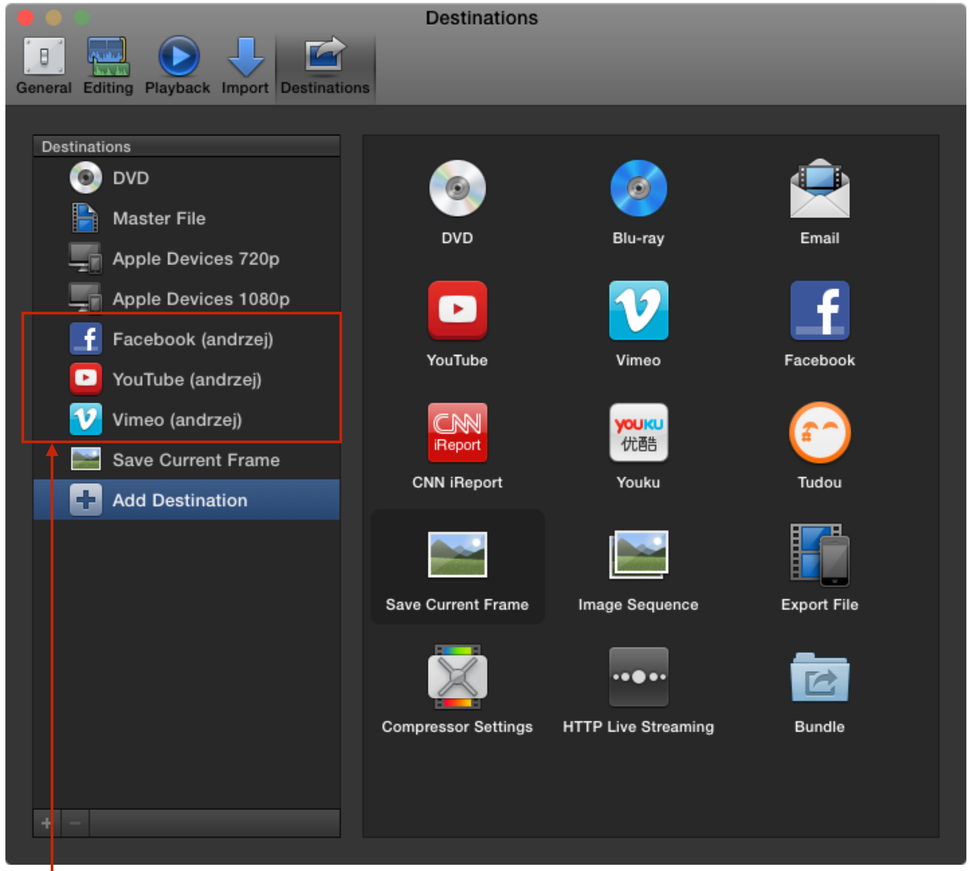
Quarter frame resolution

mp4 container

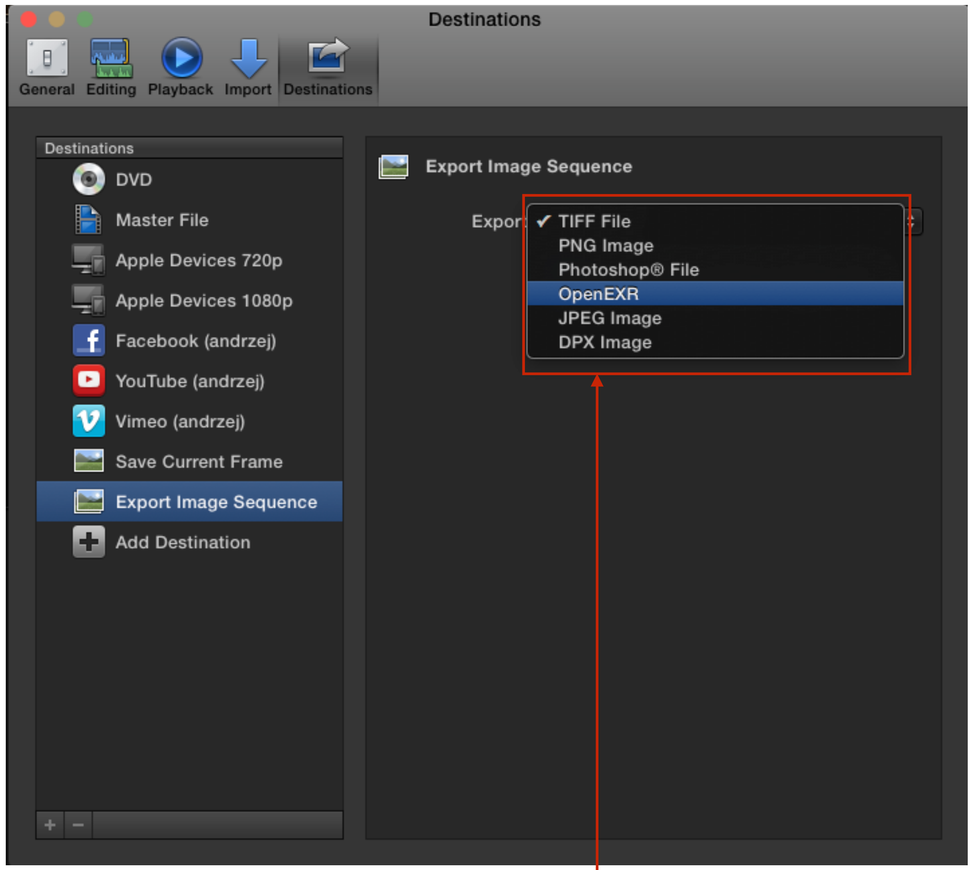
Before compression
file size estimation

Exporting video to multiple destinations with the mouse click

Use Apple Compressor application for more feature loaded transcoding tool



Exporting directly to social media
and video sharing sites



Exporting high quality image sequence
up to 32-bit floating point format

Compressor is an application with batch functionality that transcodes audio and video files into variety of formats. Creating DVD, Blu-ray discs using h.264, MPEG-2 for DVD and Dolby Digital formats, podcasting, creating package of media for submitting to iTunes store.

Compressor offers advanced cropping, image sequence importing and exporting, frame size and pixel aspect ratio conversions as well as retiming function.

Compressor main window

