

The Arcientic Andism

My Romantic Manifesto

Written component master thesis

Submitted in partial fulfillments of the requirements for the degree of Master of Arts (MA) at the University of Applied Arts Vienna, Institute of Fine Arts and Media

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Vienna, May 2019

Programme number: S066 776
Study programme: Art & Science
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Acknowledgements

I kindly express my thanks to my thesis advisor Virgil Widrich of the Art&Science masterclass at the University of Applied Arts in Vienna. He constantly offered me a critical, willing and patient support in questions with my master thesis and with several other projects.

Furthermore I would like to extend my gratitude and thank my co-supervisor Bernd Kräftner for his severe but fail-safe and encouraging criticism. Through his analyzing reviews I steadily came beyond my personal limits, which expanded my horizon in many respects.

I cannot express enough thanks to Michael Hoch, who coordinated all my collaborations and projects with Art@CMS at CERN, Geneva. He made this amazing cooperation happen at all. My sincere thanks also goes to the CERN-scientists Manfred Jeitler, Chaiara Mariotti and George Mikenberg who were very cooperative with answering my questions concerning this thesis.

In this context I also would like to dedicate my gratitude to the HEPHY institute in Vienna. Especially I would like to thank director Jochen Schieck and Helmut Eberl who were great interview partners for the research questions of my thesis.

A very big thank you goes to all of my colleagues of the Art&Science masterclass for their amicable support during rough times. Especially I would like to thank Daniela Brill for our productive and inspiring conversations. Additionally I thank Monica LoCascio for proofreading my thesis .

Besides, this manifesto is also a by-product of deep and often bizarre conversations—sometimes in jolly mood—with friends and dialogue partners. In this respect I kindly thank Sascha Bém, Norbert Brunner, Arnold Schmidt, Guido Tartarotti and Roger de Weck for very inspiring discussions about art and wine and science and life.

I express my warmest and deepest gratitude to my closest friends. I thank Sabine Gaisler, Katharina Kovac and Martina Wasserbauer for their lovely encouragement and support in whatever ideas I work on.

All my deepest love goes out to my parents, my brothers, my sisters in law and my nieces and nephews, who always ground me and give me a strong emotional and mental backup.

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1. Interrelations

A manifesto is a pronouncement, originally to the public. It defines a new position and sets new goals.

In the avant-garde of the early twentieth century the writing and proclamation of manifestos was considered a revolutionary, avant-garde act. By the exclamation of manifestos and proclamations ancient art forms were liquidated. The avantgardist sensed herself or himself as a vanguard with the intention of establishing a new ism. She or he provoked scandals with the aim to create a new movement. Her or his purpose was not to put an end to art, but to draft a new concept of aesthetics by the formulation of a manifesto.

Through manifestos limitations have been drawn and isms were created. People and systems were separated and excluded. The way of designing a manifesto was manifold. There were no limits in both the content form or the realization. In every respect, the aim was not to separate it from the artwork. The manifesto had to be captured as a bridge from art to life. (1)

The Arcientic Andism is different.

This manifesto is an unofficial pronouncement directed only at myself.

Being actively involved in both in fine art and traditional science, while actively working in the field of art & science causes an inner conflict. I am ranging between divergent categories. Or are they actually the same? What is art? What is science? What is art & science? How can one obtain access to the intermediate realm between art and science? How should I practice? How should I define them?

My mission is to explore my personal perception on border between two fictitious worlds. My mission is to unite and to bridge them. Is this possible at all?

In the end there should be an AND,
not an OR!

2. All and nothing?

This manifesto of the Arcientic Andism is my personal status quo. Here I am! It is an anti-manifesto, it proclaims a non-ism, it is a paradox. I am entering an infinite space between terminologies and categories. It is there where time and space are forgotten, where I perceive the moment. An indefinable area—it is the creative space between art and science.

The Arcientic Andism manifests the path to access the divine space of power, the interspace between art and science. “Arcientic” is a composition of the terms “art” and “science”. “Andism” originates from the word “and”. It is the literal conjunction between art *and* science, which provides their fusion. In this interspace, neither categories nor limitations guarantee certainty and stability. Namelessness defines this indefinable area.

My 13 oughts of the Arcientic Andism!

1. I ought to de-categorize! My old categories are obsolete, the new ones are intangible. The question automatically arises: Do I need categories? Am I prepared for my personal clearance? I cast away my fear and enter the indefinable area! I fling off my imaginary crutches, which lead me to believe in feigned well-being! I respect and glorify the space-in-between! I concentrate on breaking up with my limitations and clichés!

2. The “and” ought to be the central point of my orientation! The “and” is a conjunction! The Arcientic Andism is the fusion of art *and* science! It is the fusion of soul *and* mind! It is the fusion of the female *and* the male principle! It is the fusion of yin *and* yang! The Arcientic Andism does not draw new boundaries! It does not define new categories! The Arcientic Andism dissolutes and celebrates the “and”! It

conjugates, connects, de-limits and de-categorizes! It is my vanguard of my new integrative philosophy of life!

3. The space-in-between ought to push me into a well balanced middle! I use the connecting interspace between the two poles of art and science! There, where soul and mind unite and develop their invincible power, my complete dissolution in the indefinable zone provides a space for the high-level fertilization! Art cannot exist without science and science without art there! In order to limit my inner resolutions, in order to indulge in this interspace, I should practice!

4. I ought to practice! The Arcientic Andism becomes material! I create an awareness of my inner space—my information-free zone! This is my grey area, my intermediate zone! I find my own truth by Arcientic practicing procedures! I identify my own stereotyping and break free! Categories will be bared, crushed and forgotten! I conquer the space of self-determination! Now I am ready for my personal inner-revolution! I manifest it in reality!

5. I ought to practice the practicing procedures of the Arcientic Andism! Practicing procedures are methods for entering my indefinable area between art and science. The mere practice of art *or* science is not sufficient for its access. Like a meditative practice, or a retreat, practicing procedures boost my state of expansion of consciousness. I am

experiencing a relief from the trained limitations in my mind. Through practicing procedures I create automatisms. I am experiencing a flow state. I immerse myself into the proper practicing procedure to break up my inner boundaries! I discover my inner self and access my personal indefinable area! I, as a practitioner, have entered the Arcientic in-between-space where I feel safe in my newfound floating lightness. A new sense of self-determination is my focus of attention now.

I practice the practicing procedures in small scale in order to implement them in large scale.

Compared to a child practicing walking I, as an Arcientic Andist, practice immersing into the indefinable area again and again and again and again until I feel tangibly at home in it. Practicing procedures are free, flexible and different from the various states of my mind. They deeply depend on my proper situation. I arrange the duration, intensity and type of the procedure. The more intense and diversified the practicing procedure, the faster and more dynamic is my access into the Arcientic space.

The common feature of every practicing procedure is the automatism I create by repeating the practice of a physical or a mental procedure. Automatisms and flow states provide me the easiest access to my indefinable area.

How to select the method of a practicing procedure?

I select an appropriate activity for my practicing procedure. The selection process is directed by my gut feeling and a conversation with my inner self. I calm down, close my eyes, ground myself and actively ask my inner self what my body and my soul would need to enter into the indefinable area of the Arcientic Andism in that particular moment. I am highly mindful to perceive the subtle answer in the appearance of an impulse, of an inner voice, of a coincident encounter or of intuition.

My personal examples for practicing procedures:

- *Meditation* frees my mind from my daily limitations. I immerse myself into my indefinable area, which is directly connected with the Arcientic space.
- *Fasting* frees my body and my soul from old slags and creates space for the space-in-between. During and after the fasting-stage my perception for messages of my inner self is highly sensitive.
- Practicing *endurance sports*, I experience a flow state similar to a meditation. Boundaries in my mind are breaking up.
- *Domestic work* (ironing, dusting, vacuuming), experienced as a practicing procedure, grounds me and opens my soul and spirit.
- *Forest bathing (japan. Shinrin-yoku)* is an old Japanese tradition. In the forest I inhale its atmosphere. I

automatically connect with nature and with my inner self. It grounds me and opens my soul and spirit.

- Sustainable *Cooking* with organic vegetables, experienced as a practicing procedure, grounds me and opens my soul and spirit.
- *Writing* the “morning pages“ grounds me and opens my soul and spirit. Julia Cameron, the author of the book “The Artist’s Way“, introduces this method to break from limitations in the mind. I write my morning pages right after waking up in my bed. I write a full three pages of reasonable or meaningless texts or incoherent words to free my mind of stuck thought processes. I write in a flow state.
- *Sweet idleness* grounds me and opens my soul and spirit.

6. About learning-sensing-forgetting-creating! I ought to follow the precise course of the truthful Arcientic process of creation:

- *Learning* refers to the intensive study of my subject of Arcientic interest. This includes reading, studying and obtaining information about its nature. Dynamics and mobility need to be observed exactly, if available, along with its reflection from different perspectives. It is particularly important to ensure that none of the prospects is neglected!
- The *sense* of (or for) the Arcientic subject arises automatically when I have considered and studied it

sufficiently. My mind-level automatically connects with my emotional level.

- Now I *forget* everything I have learned about my Arcientic subject,
- in order to *create* the space for my arcientic creation!

7. In Arcientic cases of doubt, I ought to ask the following questions: What questions would a child ask? How would a child approach my subject matter? What would a child anticipate? How would a child act and react? A child is the master of Arcientic questions, answers and creations!

8. All of my art is a subject of the Arcientic Andism! I ought to add science to art!

Impulses for practicing procedures for my scientific research process in arts—an approach to the Arcientic space for me as an artist:

I study my Arcientic subject of interest! I read, learn about it and collect all possible information! I observe it under the magnifying lens or under the microscope! I write down any research findings in my notebook! I record my findings! I discover interdependencies! I collect evidence! I explore nature in the woods! I culture crystals or primeval crayfish! I develop methods! I discover my inquiring mind!

9. All of my science is a subject of the Arcientic Andism! I ought to add art to science!

Impulses for practicing procedures to refine my intuition and creativity in science—an approach to the Arcientic space for me as a scientist:

I play! I draw, sing, dance, compose, write a poem of my research results! I observe and record my emotions during my research process! I listen to my gut feeling! I consider an exhibition concept for my scientific findings! I create and draw from the whole!

10. I ought to perceive the Arcientic subject of interest unbiased from different perspectives! My point of view is subject to de-limitations! I raise my empathy! I become the master of empathy! I train my spirit!

My practicing procedure for the change of perspectives:

I place an apple (or other object) in the middle of a table. I draw the apple the way I perceive it with pencil on paper. Now I change my position and draw it again! Now I place the apple very close right in front of me! I draw it again! I remove from the apple as far as it is possible. I draw it again! Now I describe the apple with the words of a scientist and with the words of an artist! I write it down in my notebook!

11. I ought to escape from my comfort zone! I get out of my old shoes! I fly away with the wings of courage and disobedience! The Arcientic indefinable area is outside of the

box! I look over the edge! I leave the old system behind! I start my personal revolution!

My practicing procedure to refine non-adaption:

I buy a children's coloring book and fill the open spaces. Not the way every good child learns in school or kindergarten. No! I cross the pencil far beyond the lines! I paint until I feel no more anxiety in this act! I paint until I enjoy it! I paint until I have overcome my personal limitations in my mind!

12. I ought to welcome failure! Failure is a true celebration! Failure forces me to de-categorization! Once I have failed, I look at the subject of interest through different eyes! I open up to new perspectives! I adjust my directions! Failure and practicing procedures teach me self-reflection, empathy and creativity!

13. I ought to celebrate the party! I celebrate the feast of gathering! I celebrate the "and"! I celebrate curiosity! I practice the practicing procedures together with friends! As in ancient Athens, I found the Academy of Life and Celebration! I celebrate the Arcientic exchange in the interspace! Art is synonymous with science. I create beauty through knowledge and knowledge through beauty! I drink wine and celebrate the inspiration in large squares, in large rooms! I enter the Arcientic space! Art and science and life unite!

THE AND

Addendum

This addendum contains my unofficial biography and thought models of art & science in general. It is my very personal assisting narrative, from which I draw the conclusion for the progress of the Arcientic Andism.

My personal revolution

I am reluctant to compartmentalize.

Due to my very personal experience I perceive life as a fusion of multiple of disciplines that I try to grasp holistically. For me, restricted conceptualities and compartmentalization automatically leads to shallow treatment and do not correlate with the inner truth of real life.

I am moving in the field of tension between art and science. I call it the “grey area“. A frictionally energized zone, where intuition and creativity are fueled by a new power. In this zone I perceive that poles merge to form a unit. Poles appear equal and they grow a symbiotic relationship. There is no female without male power, no male without female; no soul without mind, no mind without soul; no art without science, no science without art. Here I can try to catch a free view in infinite depths.

1. Breaking boundaries in art and in science

1.1. My artistic approach in science

Even as a child, I was deeply attracted and connected to natural processes. I meticulously observed the transformation of tadpoles into frogs in our garden pond. I patiently explored the metamorphosis of the caterpillar "Sissi" to the butterfly in a jam jar. The breeding of water snails in the miniature aquarium was one of my everyday tasks for many years. I was able to persuade my goldfish "Hugo" to swim through a tire. Unfortunately, my attempt to hatch a chicken egg, which was stored in the refrigerator, within twenty-one days (nature prescribes it) failed miserably - my parents had warned me. This, to name but a few selected examples of my creative urge for research in childhood.

Still inspired by my early childhood discoveries in nature, I started my professional career after completing school with a diploma in pharmacy at the University of Vienna. I was infinitely fascinated by the diversity of scientific disciplines offered by this transdisciplinary course. A deep immersion in chemistry, biology, physics, mathematics, medicine and technology soon gave me the ability to think across many disciplines and to recognize larger contexts on a scientific level. For me personally, the boundaries of the individual disciplines began to blur and I considered the strict

classification of the objects as a hindrance and not meaningful. However, the fact that the university system still requires the clear separation of the individual institutes and that interdisciplinary projects can only be realized with great effort and difficulty, is another story.

Following my basic pharmaceutical studies, I received a one-time opportunity to do my doctoral thesis at the Institute of Pharmaceutical Chemistry. My thesis and research on my own project took me five years. It was enough time to immerse myself into the depth of my topic of interest. This stage of my life was groundbreaking, especially for my artistic career and the creative working process I have today.

In my scientific project, I created new drugs to fight skin cancer and colon cancer. It was exciting. From today's perspective, this was a highly artistic creative process in a scientific guise: By reading scientific studies and studying my subject of interest, I delved deeply into the microcosmic level. I literally got lost.

First I developed a deep understanding, followed by a feeling for molecular structures (receptors in the human body) and generally for the dimension in which the smallest building blocks of our universe are moving around. It was a good basis for keeping track of what was going on in the chemical and cell biological laboratory.

I began my intuitive working process (it was rarely my knowledge, much more needed was my gut feeling) by inventing new molecules for cancer therapy only with pencil on paper. Later, I tried to realize my ideas in the laboratory. Partly because of the complex chemical syntheses it was quite difficult. My most important finding was that nature is stronger than the chemist's stubborn brain. Chemistry might sound plausible in theory, but in practice it is not realizable automatically. I overcame many hurdles and detours to achieve my chemical goals. I learned a lot about nature, about chemistry in particular, about complex interdependencies in general and about myself. I almost had a romantic feeling, when spectroscopic measurements and other analysis methods proved that I had achieved my objectives. Meticulousness, stamina and additional efforts had paid off! I loved to observe a chemically perfectly purified substance, shown as a perfectly structured crystal form, under the microscope. Wonderful, almost sculpture-like structures in microscopic size, true art, as only Mother Nature could bring about and which I had just invented. Dormant in deep satisfaction, I found myself suddenly in a process of creation, in which I could no longer distinguish art from science.

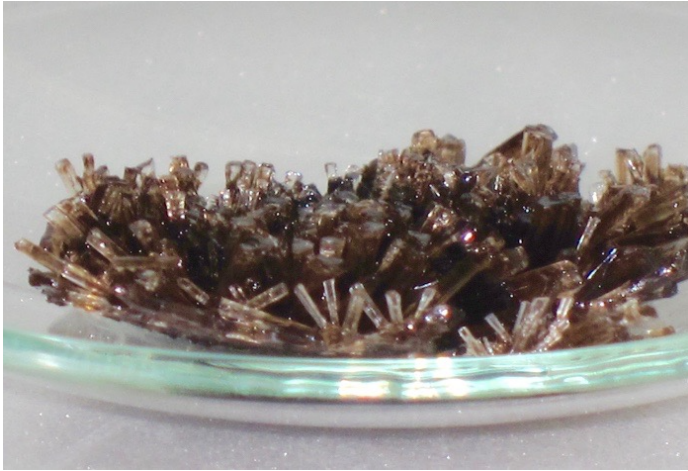


Foto: Denise Schellmann

Fig.1: Crystals of a newly invented compound during my doctoral thesis

As mentioned at the beginning, the creation of aesthetic forms was not the goal of my scientific work. I checked my new born crystals for their ability to destroy skin and colon cancer cells. For this I bred the already mentioned tumor cells in the test tube. (Note here the parallel to my early childhood function as a breeder of water snails. Caring for the tumor cells, however, was much more laborious!) The growth process of cell cultures fascinated and inspired me. Under suitable conditions, it was possible to observe the formation of each additional cell in the microscope. In no time it created beautiful, aesthetically perfect tissue structures. I was enraptured, completely forgetting that these were cancer cells, which I wanted to erase with my newly created, unique substances. And indeed, over time, some of my substances showed a terrific cytotoxic effect. So through my creative, playful and artistic approach, I

invented chemical drugs that were able to selectively kill tumor cells. Further investigations had shown that "healthy" cells are not destroyed by my substances.

1.2. My scientific approach in art

The period of my doctoral theses was also the birth of my artistic work. Through my intensive research, I developed a deep understanding and feeling for microstructures such as cell braids, cell organelles, molecular structures or crystal formations. Soon the microcosm had also become the subject of my creative process in visual arts. Science was not just a source of inspiration for me in finding a topic. I was able to apply my creative working process, which I had acquired for research and development, in the same way as in my artistic work. This continues today.

For example, my drawing process is preceded by a period of observation and research. I read and learn from textbooks and I collect samples from a variety of materials to study them closely under my microscope. Water droplets from ponds, which are usually a home for a variety of microbes, spider webs, salt crystals, plant parts and much more are part of my sources of inspiration. I need to understand the essence of my subject first and then develop a feeling for being able to

engage in the drawing process. I do not illustratively transfer my observations with pencil on paper, but I transform it into my own language. It is a very natural process. In a spontaneous flow that resembles a meditation, I intuitively abstract what I have perceived. The pencil has maximum freedom of movement and I try to give only small impulses by moving my whole arm starting from my shoulder.

It is the process of creation that fascinates me. Looking at a successful drawing gives me the same feeling I had in the lab when I admired my crystals under the microscope.

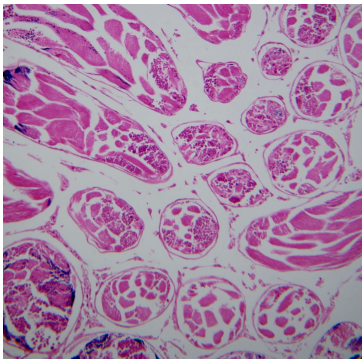


Fig.2: Testicals of a grasshopper,
microscopic view

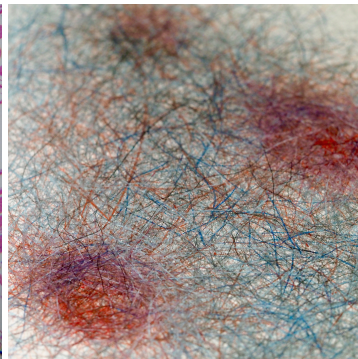


Fig.3: closeup, drawing, pencil and colour
crayons on paper

Foto: Denise Schellmann

1.2.1. learning - sensing - forgetting - creating

The stages of my natural process of creation can be roughly divided into scientific observation and artistic transformation.

First of all I have to study the object of my artistic interest. This is often associated with a learning effort and deep debate. It is the groundwork for the next stage of the process. I am ready to develop a feeling for the object. I perceive the essence of it with all of my senses. For me the most important stage is the next level: the stage of forgetting. The subject matter a main topic in my studies and about which I have learned a lot, must completely leave my mind. Only then I am free to create unhindered.

From this point of view, I cannot see any boundary between art and science. The creation process remains the same in both fields and cannot be explicitly assigned to a category.

1.2.2. CERN - colliding disciplines

When I finished the official part of my scientific work, I stumbled upon a report from the Art & Science master class at the University of Applied Arts in Vienna. I knew immediately that I should apply. I wanted to know. I wanted to find out if my artistic-scientific approach was exciting enough to be accepted at a prominent art university. I was admitted. Like many other things in my life, the admission process also happened out of intuitive, natural acting.

I was part of very interesting projects. Each was a challenge in itself, taking me one step closer to the core of my personal truth through self-reflective working processes. The highlight of my art studies was the opportunity to participate in a project in collaboration with Art@CMS program at the Conseil Européen pour la Recherche Nucléaire (CERN, the European nuclear research center headquartered in Geneva, Switzerland). Art@CMS is an initiative to promote a dialogue between the LHC scientific community (especially the CMS-experiment community) and the art world to provide a greater understanding of particle physics research and its contribution to education and society. (2)

For me, as a gifted groupie of micro-universal structures, it was a dream come true. During my doctoral thesis at the

Institute of Pharmaceutical Chemistry, I was deeply impressed by the reasons why the particle accelerator, the Large Hadron Collider (LHC), was built, and how what it was doing was possible at all.



Fig.4: the globe, exhibition gallery at CERN

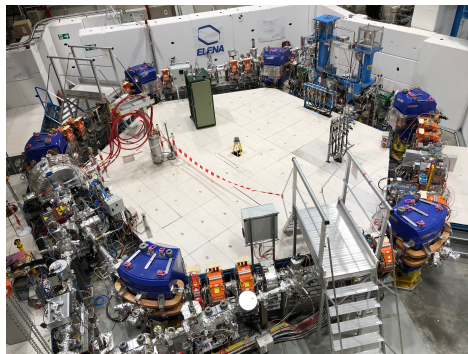


Foto: Denise Schellmann

Fig.5: ELENA, antimatter producing machine, CERN

For a better understanding, a short excursion into the world of CERN:

The key issues that gave rise to the construction of CERN in Geneva are not physical ones. They rather concern the basic questions of the creation story par excellence: Where do we come from? Why are we here? What happened around the Big Bang? What happens when the universe has expanded in the distant future? Even the questions "Is there a God?" and "Is there life on other planets?" are not uncommon at CERN. So,

by means of physical experiments, can questions from philosophy and perhaps even theology be answered there? Keeping this in mind, I conclude that scientists and engineers who deal with the CERN topic need to be extremely talented and open-minded to be able to look beyond their scientific horizons.

The Large Hadron Collider (LHC) is the world's largest and most powerful particle accelerator ever built. It is often referred to as the world's largest microscope. It is a circular machine that passes through parts of Switzerland and France in a subterranean ring tunnel at a depth of one hundred meters over a distance of almost twenty-seven kilometers. In the core of the LHC extreme conditions prevail, which make the acceleration of two proton beams in the opposite direction to nearly the speed of light possible. For this purpose, approximately 9300 high-performance magnets are installed inside. Along the LHC there are a total of four research stations (experiments), each independently pursuing its own research questions. At these four nodes, the two proton beams, in turn through magnets, are directed towards each other in such a way that the greatest possible number of protons collide head-on. The collision shatters the protons into their smallest particles. Around the collision points, huge detectors are made up of very sensitive, digital sensor surfaces. They record the traces of each particle that has formed, in order to subsequently provide them for data analysis.

Currently there are about one billion proton collisions per second. In other words, every twenty-five nanoseconds a proton collides with another proton. In the LHC, an amount of data is produced that is unimaginably large and would exceed the capacity of all storage locations available worldwide. (Not to mention that quite a few scientists would be overly busy for quite a long time.) While it is possible to create data, it is impossible to evaluate all the data. The high-performance machine and its inventors face one of their biggest challenges with this topic. Algorithms have to be programmed to sort out the existing data immediately after it has been generated according to aspects of its relevance for the respective research topics. Two large data filter systems, the so-called trigger systems, are used for this process. These reduce the data sets from one billion to only two hundred relevant (calculated per second) collisions, which are stored for further analysis and made available to the Worldwide LHC Computer Grid (WLCG, a global computer network for analyzing CERN data)

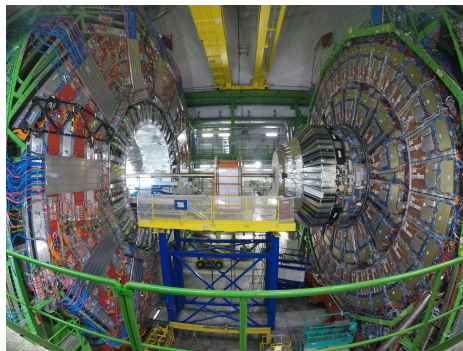


Foto: Denise Schnellmann

Fig.6: LHC, CMS detector

1.2.2.1. The data filter issue - a created reality

The results of the experiments at CERN depend to a great extent on which data passes through the trigger systems and is provided for evaluation. Collision events which the system considers uninteresting are destroyed immediately and therefore they are no longer traceable. The decision of the data filter for a so-called "interesting" data set automatically leads to the loss of a huge amount of data. Its relevance for new information and new discoveries about our universe remains completely unclear.

For me, the following question arises with this phenomenon: Who decides on the significance of the data? The assessment can only rely on past knowledge and surprise effects cannot be planned by algorithms. At CERN, deliberate programming of algorithms—this means subjective control of the data filters—creates a reality that is hardly left to chance. As a feature of art and science, I refer to this as a creative process on a grand scale.

In my mirror installation "reality", which was created as part of the annual project for my Art & Science-Masterclass in cooperation with Art@CMS, CERN in 2017, I address this issue. In real life, we create our reality ourselves, depending on what we focus on. Objects or topics that are not within our

field of vision are non-existent. We are the creators of our own truth. This phenomenon leads to the conclusion that everything can only be considered subjectively and questions the subject of objectivity.



Foto: Bishnu Alam

Fig.7: „reality“, mirror - installation, 2017

Four mirror surfaces are directed towards each other so that the viewer can perceive wire sculptures within the mirror labyrinth from a defined perspective only as a reflection. The real picture blurs with the illusion. Paul Watzlawick already asked: "How real is real?" (3)

My installation “reality“ is now permanently exhibited at the CERN control-center in Prévessin, France, initiated by Art@CMS.



Foto: Denise Schellmann

Fig.8: Art@CMS, CERN control - center



Foto: Denise Schellmann

Fig.9: Art@CMS, „reality“ at the CERN control - center

2. Critical thinking models

2.1. De-categorization?

Because of my different working and living conditions, I became a networked thinker. This provides me a view of deeper connections in general.

In my opinion, restricted and focused views can only lead to limited results in almost every subject area. For example, science limits itself when it excludes the playful-creative aspect and draws a clear distinction to art and creativity. All parts of a research- or artistic-object must be reviewed critically to fully understand its essence.

Compartmentalization and limitations do not correspond to our original nature. They are trained and arise in our heads. Even in infancy, humans are exposed to formative mechanisms for categorization. Independent thinking, intuitive action and creative work are severely restricted. The natural development of the individual, and thus of society, are left behind. Instead, the consequence is an adaptation to restrictive systems and tapping into the “average trap“ (4), as Markus Hengstschläger formulated very clearly in his eponymous book.

In earlier epochs polymaths were the great explorers, inventors, discoverers and artists of their time. For example, the creative field of Leonardo da Vinci's could not be clearly assigned. He intuitively and passionately drew on the whole, and even by today's scientific and artistic standards, he produces wonderful things. The apparent knowledge which humanity has acquired in the course of time and the structuring of every smallest subject area today inhibit research and creation on a holistic level. There is hardly a chance to succeed in a clear view of the whole.

Specializations generate a limited perspective and automatically lead to a selective and superficial perception. The ability to develop a holistic awareness, interdisciplinary thinking, and understanding the complexities of our lives is greatly affected. Karl Marx wrote in his "Misère de la philosophie", published as early as 1847: "What characterizes the division of labor in modern society is the fact that it produces the specialties, the professionals and with them the professional idiocy." (5) The critique of the social phenomenon for every small object to train an expert came already in the middle of the nineteenth century. Regrettably, since then, development has not been progressive.

I consider this trend particularly dangerous in the medical field. At the present time there are many different specialists for all different parts of our body. Hardly any doctor who has

received a conventional medical education, however, apprehends the overall construct of a human. (How should he? There is offered a degree program for almost every part of the human body!) Essential aspects such as lifestyle, nutrition, genetic factors and our psyche are usually ignored, both diagnostically and therapeutically.

Are categories essential and required at all? What consequences would the re-fusion of art and science have on our thinking and living conditions?

2.1.1. What if? A visionary utopia!

What consequences would the global integration of art with science have?

Only when art is an integral part of science and science of art will there be a way to truly draw from the whole. Doors automatically open, the entrances to which would never be accessible from a limited perspective. Science appears in a creative, playful ease and the recognition of complex contexts and structures is sharpened by intuitive impulses on the meta-level. Art gets a substantial depth through essential exploration of the object itself. Both terms become one. No art without

science, no science without art. Stagnation and narrow-mindedness come to an end.

The fusion of art and science has an impact on our society. For example, this provides the prerequisite for generally networked thinking and extends the perspective. Compartmentalization bridge the interpersonal area as well, since borders arise first in the head. The consequence of this is emphatic behavior for fellow human beings.

De-categorization is also noticeable in education. The creative-intuitive access to all disciplines is the highest priority. Childlike curiosity and the joy of creativity should be maintained unchanged in adulthood. The preservation of the naive awareness of metaphysical aspects in our universe breaks the line to almost everything and gives us a great vision. Science is more than an instrument of power and art more than commercial entertainment.

It takes courage to step out of the limited system. Specialists feel safe in their special field. Everything seems predictable, because the (hardly possible) movement in strict structures provides secure support. You hand over your personal responsibility almost entirely. Such a step out of the comfort zone and immersion in the true self is scary.

The fusion of art with science encourages us to think outside the box and to enter indefinable areas, where we are invited to redesign our mind followed by our world.

2.2. Ideas of the truthful creation process

The creative process itself can be seen as a natural process of the creation of an invention or a work. It cannot be assigned to any category or specialty. Whether in art, literature, music or science, the process of creation depends on the same parameters.

The prerequisite for a truthful creation is to unify mind and soul. In other words, intellect and emotional level should be in balance and open to each other. Only this provides a space for a creative, intuitive process. Albert Einstein once characterized the secret of his success to "just my forehead and my nose" (6). His forehead was a symbol of intellectual persistence, an expression of the mind level. His nose was the symbol of creativity and scientific intuition. Einstein's creative-playful approach to his subject matter made his success possible. His quote can be translated into the language of all existing fields of expertise.

The meta-level plays a major role in the truthful creation process. An increased openness to inexplicable, intuitive impulses can be indicative of the outcome and success of an invention or a work. As if one were automatically guided by a hand, as if by magic, by a force that cannot be rationally classified.

This was not the opinion of the representatives of the Vienna Circle of Logical Empiricism (1924-1936). A group of intellectuals from the fields of mathematics, science, social sciences, and philosophy declared the "Scientific Worldview" a "science free of metaphysics." "It has become increasingly clear that the not only metaphysics-free, but an anti-metaphysical attitude, is the common goal of all." (7) In my eyes, pure rationality cannot be the trace to a truthful creation. The natural creative process requires more than pure intellect.

Science is more than an illustration of nature. Art is more than pure entertainment. A truthful creation process is only imaginable if both fields are unified.

As I mentioned before, a thorough exploration of the subject of interest is essential for the truthful process of creation. Consequently, the stage of intuitive-creative transformation is initiated. Merging of the mind and the emotional level is essential for a sincere creativity. A profound understanding of the object of interest is gained through a research process. By

observing the form or the behavior, reading and studying the theory, as well as discussions and lectures about the special field of interest provide an understanding of the object not only with the intellect but also on the emotional level. Subsequently, what you have intellectually learned must be erased. The deep emotional senses must remain available to provide authenticity and intuition in the truthful creation process.

Being one with heart and mind and unbiased in the process, the view is also released for accidental discoveries and creations. For example, in medicine there are countless random discoveries (penicillin, birth control pill, LSD, Viagra). I do not want to go too deep into detail. It is interesting, however, that researchers acted very open-mindedly and intuitively to actually taking notice of their accidental discoveries. Even so-called “coincidence“ plays a major role in the truthful creative process.

Especially in this section, I would like to mention CERN again as an interdisciplinary role model and source of inspiration for the creative-scientific creation process. I was allowed to interview scientific staff at CERN. In each of the conversations, I clearly recognized the researcher’s open-minded and metaphysically-conscious approach. With childlike curiosity and almost playful carelessness, in the world of CERN, Anything may exist. Whether it is visible

with eyes, scientifically proven, or palpable with hands, every phenomenon has its *raison d'être*. The view extends far beyond the horizon and objects are viewed from various perspectives.

Among other things, the CERN Center was built to explore the standard model of physics. The existence of the famous Higgs boson was actually proved experimentally in 2012 with the help of the particle accelerator. The standard model of physics is almost definitively decrypted and has been consistently proven experimentally, however, scientists agree that there must be more in the universe than this model describes. In an interview with Dr. Jochen Schieck (Director of HEPHY, Institute for High Energy Physics in Vienna, cooperation partner of CERN), I learned that our universe consists of only five percent of the forces that can be assigned to the standard model. Of the remaining ninety-five percent, about seventy percent can be attributed to dark energy and twenty-five to dark matter. (8) However, very few details of these phenomena are known so far, and CERN hopes to gain some insight in the near future. These are topics that demand a great deal of imagination from researchers and require out-of-the-box thinking.

Dr. Helmut Eberl Theoretical Physicist, HEPHY Vienna, said in an interview that I conducted with him, "The more we know, the clearer it is that we do not know anything yet"(9). This very conscious and reflective attitude shows that CERN

is about more than generating power through knowledge. It's about the joy of doing and the playful handling of the secrets that our universe reveals to us. Einstein's forehead and nose is also a success story in Geneva.

3. Science and art in categories

Science is fictional!

Science in general is a system constructed by human beings. The scientist is searching for objective evidence of his research topic. However, the scientist always remains merely a subjective observer. His hypothesis is the product of his subjective creativity. The creation of an objective reality remains a scientific utopia.

For the first time during my research for a general definition of the concept of science, I realized that it does not exist. Science theorists have created countless divergent theories. These are evidently all created out of subjective motives. As diverse as the fields of the different sciences are, so are the perspectives of the researcher and, subsequently, his formula of definition. In my opinion, this is clear proof that everything is a unit and that no aspect can be considered absolute.

This text should not be a philosophical treatise. The thinking of the Vienna Circle stood out for me, however, and I would like to talk about that briefly.

The Vienna Circle consisted of a group of philosophers and philosophers of science who met weekly in the period from 1922 to 1936. The founder of the circle of selected intellectuals was the philosopher and physicist Moritz Schlick. Other members included Rudolf Carnap, Otto Neurath, Herbert Feigl, Philip Frank, Victor Kraft, Friedrich Weismann and Hans Hahn. The Vienna Circle had “no fixed organization; it consist[ed] of people with the same basic scientific attitude.” (10) They represented the view of logical empiricism, also called neo-positivism. This was particularly marked by an anti-metaphysical attitude. In the document *Die Wissenschaftliche Weltauffassung*, common goals were recorded as a collection. "The goal is a unified science" (11), which should present itself uniformly as a “metaphysics-free science”. "There are no depths in science; everywhere is surface. (...) Intuition especially emphasized by the metaphysicians as a source of knowledge is not even rejected by the scientific conception of the world. But we are striving for and demanding a retrospective rational justification of every intuitive knowledge step by step.” (12)

From this document it is clear that the widely held view of science practiced in the twentieth century was purely rational.

Strict boundaries were drawn, what had to be and what to refrain from. An artistic understanding of science at that time was a long way off in these circles.

Through my work in the field of science, I have noticed that the generally accepted view of science among my colleagues is still strictly limited. However, the suppression of metaphysical - creative processes is more of a hindrance to the successful process. It only allows a view on the object from a certain perspective and prevents any depth of understanding.

Art is!

Even the concept of art does not allow a general definition. It is a flexible one. As in science, depending on the epoch, the definition of art has changed constantly. In most cases, a new movement has just arisen through the breaking up of rules and borders.

"The highest and last law of art is to break every one!"

(Paul Pörtner, 1925 - 1984)

3.1.. Scientists as artists - artists as scientists

A large number of famous scientists are active in the field of art and vice versa. They practice an interdisciplinary thinking, which is crucial for their success in both areas. Find a few examples below.

Carl Djerassi (1923 - 2015) is particularly close to my heart because he also worked in the pharmaceutical and chemical sector and had a great affinity to art through his scientific experience. He is called the "mother of the pill" (13) and was a chemist, writer and passionate art collector. He discovered hormonal contraceptives, the birth control pill. By accident, he noticed the pregnancy-preventing effect of his substance, which he thought would be used against arthritis. Djerassi wrote numerous novels and plays and invented a new genre of science in fiction in theatre, in which he brought his scientific experience to the stage.

Lewis Carroll (1832 - 1898), who became famous for his story "Alice in Wonderland," was originally a mathematician. And Albrecht Dürer (1471 - 1528) was one of the most important mathematicians of the Renaissance. "Dürer, who always regarded the fundamental and systematic knowledge of geometry as the indispensable prerequisite for successful artistic creation, had early on studied Euclid's elements in the

original and authored the four-volume “Underweysung der messung mit dem zirckel un richtscheyt in Linien ebnen unnd gantzen corporen“ in 1525, the very first geometry handbook in German.“ (14)

It is Leonardo da Vinci (1452 - 1519) who embodies, for me, the true example of a polymath. He was a sculptor, architect, anatomist, mechanic, engineer and natural philosopher. (15) Da Vinci was famous for his transdisciplinary thinking and his creative/artistic research spirit. He drew everything from joy to pleasure and passion. None of his works can be clearly assigned to a specific discipline.

Eric Kandel (1929) is a neuroscientist. He is not working in artistic fields actively, but he deals with the processing of art in the human brain. His thesis on this topic: Artists as well as researchers can pick up a problem and try to understand it in depth. Because, according to Kandel, it unites the ability to focus on and focus solely on one component of a problem. (...) "Today, I suggest only one way to bridge the existing divide between the humanities and natural sciences: through neuroscience and the arts. More precisely, about abstract art, because it causes most fireworks in a human brain," Kandel explains. (16)

3.2.. Say it loud, say it clear!

In order to explain the meaning of the connection between art and science, I cite some quotes from famous artists below:

"Art is the queen of all sciences, speaking to all generations of the world."

(Leonardo da Vinci, 1452 - 1519)

"What is art? Condensed nature."

(Honore de Balzac, 1799 - 1850)

"Art is clarified science."

(Jean Cocteau, 1889 - 1963)

"Science is the mind of the world, art is its soul."

(Maksim Gorki, 1886 - 1936)

"Art is the truth, the knowledge of what is meant by life."

(Hans Egon Holthusen, 1913 - 1997)

"I think the term 'art' kills creativity."

(Douglas Adams, 1952 - 2001)

"Science is not only a student of reason, but also of romance and passion."

(Stephen Hawking, 1942 - 2018)

4. Conclusion

Inspired by my insights during my scientific and artistic career, and by exploring my personal realm of life, I decided to write this document as an overview of my experiences. During my writing process I had cheerful shifts between a real and a surreal conception of the text. The reader is invited to understand this romantic manifesto as a thinking model with a sort of seriousness AND a sort of a wink.

My personal interest lies in illuminating the connecting elements of art and science in order to receive even more depth and awareness to my own creative process on the content level. Likewise, I would like to capture my current status quo in art & science in order to move on to the next level from this point of view.

Bibliography

- (1) Wolfgang Asholt, *Manifeste und Proklamationen*, J.B.Mertzler Verlag, 2005
- (2) Art@CMS, introduction, 2014
- (3) Paul Watzlawick, *Wie wirklich ist die Wirklichkeit?*
- (4) Markus Hengstschläger, *Die Durchschnittsfalle*, Ecowin Verlag, 2012
- (5) Karl Marx, *Misère de la philosophie*, 1847
- (6) Marco Wehr, *Einstein's pädagogische Formel*, article FAZ, 2016
- (7) Der Wiener Kreis, *Wissenschaftliche Weltauffassung*, by Verein Ernst Mach, 1929
- (8) personal Interview with Dr. Jochen Schieck, 2017
- (9) personal Interview with Dr. Helmut Eberl, 2017
- (10) Der Wiener Kreis, *Wissenschaftliche Weltauffassung*, by Verein Ernst Mach, 1929
- (11) Der Wiener Kreis, *Wissenschaftliche Weltauffassung*, by Verein Ernst Mach, 1929
- (12) Der Wiener Kreis, *Wissenschaftliche Weltauffassung*, by Verein Ernst Mach, 1929
- (13) Carl Djerassi, *This man's pill, Sex, Kunst und Unsterblichkeit*, Haymon Verlag, 2001
- (14) Prof. Dr. Wilderich Tuschmann, *Albrecht Dürer als Mathematiker*, Mathematisches Seminar, Christian - Albrechts - Universität zu Kiel, 2008
- (15) Stefan Klein, *Da Vinci's Vermächtnis*, S. Fischer Verlag, 2008
- (16) Eric Kandel, *Die Kunst und das Gehirn*, article of ÖAW based on a speech at the IMBA Austria, 2017, author unknown