



“ANYTHING, IN A WAY, IS A CLOUD.”
REFLECTIONS ON A PHENOMENON AT THE INTERSECTION OF
PHILOSOPHY, ART AND SCIENCE *

Clouds can be seen as border-posts separating two distinct domains of reality or as self-generating significant shapes. Two radically different forms of dealing with the phenomenon can be deduced from this. On the one hand, there is the logic of the veil, of covering and uncovering. One can plunge into the mist or emerge from a sea of fog. In this specific case, clouds do not play the predominant role, but point to something more essential hiding behind them. This conception is mostly associated with stratus formations, with altostratus, cirrostratus and stratocumulus. On the other hand, there is the logic of projection and emergence. One can discover shapes in shapelessness, structures in the transitory and fleeting; and one can witness the surfacing of meaningful figures from amorphous masses of clouds. In this second conception – mostly connected with the bizarre outlines and numerous protuberances of the cumulus, altocumulus and stormy cumulonimbus – clouds are swarms, collectives without a center, developing according to an autopoietic principle.

In my talk I would like to focus on the second perspective – both in its complementary manifestations of projection and emergence –, trying to explore the role clouds have played in Western culture as a mediating intersection between philosophy, art and science. Clouds have repeatedly been used to reflect about a possible convergence and merging of these distinct domains because of their manifold hybrid character: hovering between the sky and the earth, on the very border of chaos and order, ephemeral in nature, difficult, if not impossible to classify. Clouds are metaphors of the unstructured, endlessly moving and shifting and as such they ask for a different point of view. It is for this very reason that clouds have always attracted thinkers fascinated by the overlapping of discourses and a possible synthesis of exact knowledge and creative imagination.

My talk is divided into five sections, dealing with the meaning of clouds in the work of five different thinkers: Lucretius, Leonardo da Vinci, Wolfgang von Goethe, Michel Serres and Vilém Flusser. Even if these five thinkers are introduced according to a chronological sequence, I do not want to suggest any kind of progressive, linear development. I want to present five different views focusing on possible meeting points and correspondences between the single thinkers, who were all pursuing a similar agenda: looking for a unified view of reality, for unity in difference.

In his poem *De rerum natura* that could be read as a poetic philosophy¹ Lucretius, referring to Epicurus, describes the cosmos by means of two basic concepts: the vacuum

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1. Compare Gernot Böhme and Hartmut Böhme, *Feuer, Wasser, Erde, Luft: Eine Kulturgeschichte der Elemente* Beck, Munich 2010, p. 174f.

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and the atoms swirling around in it, the invisible, homogeneous, impenetrable, smallest components of the world. Thanks to a process of agglomeration and concentration first distinct elements and then reality itself emerge from an aimless and meaningless game. This subliminal, invisible world is the presupposition of all life. Finished things appear only in a second moment, surfacing from an initial teeming cluster of circling elementary particles. The cosmos and the body are composed of mixed tissue: they possess a permeable structure, are fluid and porous, soft and elastic. From the initial general mixture emerge individual shapes that all share the same cloudlike origin and ending. In Lucretius' work individuality is the temporary interruption of a continuous stream of atomic textures – a thought that reappears in Wolfgang von Goethe's work. Although Lucretius mentions the existence of atomic agglomerations held together by small interlocked hooks – and this holds also true for clouds – his analyses is clearly dominated by the fluid element.

The development and meaning of clouds is discussed nearly exclusively within the context of spectacular meteorological events, and as a direct result of extreme weather conditions. Lucretius' clouds are threatening, impregnated with rain, lashed by the wind and seared by lightning, above all cumulus- and cumulonimbus formations. This has to do with the fact that with his analysis he is aiming for a secularizing reinterpretation of disastrous, devastating natural events. These are not an expression of godly wrath, but simply the consequence of describable atmospherical changes. Clouds are naturally associated with storms. Their material composition is deduced from their outer appearance and the substances hidden within them. The cloud is a container that has not been assembled out of dense heavy substances like stone or wood; it is created out of fine thin vapors. Clouds are, however, more densely knit than fog patches or trails of smoke. Because of this winds do not easily succeed in dissolving them. The substances they contain in their interior are stacked away as if they were balls in a bag. The rugged and fissured visual appearance of clouds, their fractal exterior, is inseparable from their disharmonic acoustic dimension. The contemporaneous appearance or disappearance of clouds and the noises associated with them make a closer definition of their inner and outer nature possible. Clouds crackle, rumble and boom or noisily burst asunder. They are shaken, ruffled, ripped apart and torn to shreds.

Lucretius uses the metaphors of the sail swelled by the wind and suddenly torn apart by a stiff breeze, the metaphor of the lacerated sheet of paper swirling in the air and the metaphor of a garment flapping in the wind. All three metaphors suggest something convulsive anticipating Lucretius' description of the cloud as jagged and fragmentary. At the same time clouds have something stiff and unwieldy, as if they were wild maneuvering galleys, vessels majestically drifting past in an imaginary sea battle in the sky. Clouds do not penetrate each other, but deafeningly clash into each other. Clouds are massive, but at the same time brittle and flimsy crystalline objects, like the hailstones and the ice-crystals they are hiding in their interior.

Lucretius mentions four reasons for the formation of clouds. I would like to focus here on the first one based on Democritus' theory of atoms and the inner connection of the



single elementary particles. "The clouds condense, when in this upper space / Of the high heaven have gathered suddenly, / As round they flew, unnumbered particles- / World's rougher ones, which can, though interlinked / With scanty couplings, yet be fastened firm, / The one on other caught. These particles / First cause small clouds to form; and, thereupon, / These catch the one on other and swarm in a flock / And grow by their conjoining, and by winds / Are borne along, along, until collects / The tempest fury." ² Clouds are born out of the casual meeting of atoms, they emerge like all other things from swarming particles invisible to the eye. The law governing the interlinking of the single particles is repeated on all subsequent levels, an astonishing explanation if one compares it with the fractal principle of self-similarity proposed by chaos theory. According to Lucretius, clouds exist before they can actually be perceived by the eye. They emerge, so to speak, from nothingness and come about through growing density.

In his book *La naissance de la physique* dedicated to Lucretius, Michel Serres describes the cloud above all as a place of unending war. „[Le] chaos-nuage, [...] la nébuleuse première [...] masse orageuse [...] *la turba*, le combat orageux des atoms [...] masse désordonnée, fluctuante, brownienne, de dissimilitudes et d'oppositions." ³ According to Serres, Lucretius anticipates another form of knowledge opening up to turbulence, chance and hyper-complexity. The atomistic science of the amphibian meteors, located between heaven and earth, operates in a hybrid theoretical space between astronomy and mechanics, stability and instability. Lucretius' philosophy is at the same time archaic and highly up-to-date, it represents a poetic form of science, incorporating the everyday knowledge and experience of sailors and farmers, and a form of temporality that transcends the purely historical. „[...] le lieux du désordre et de l'imprévisible, du hasardeux local, de l'informe. Parce qu'il est le temps d'un autre temps. Parce qu'il est le temps des nuages et qu'il ne faut pas y avoir la tête ni les avoir dans la tête." ⁴

As was the case with Lucretius' poetic philosophy, Leonardo da Vinci's unsystematic observations of clouds are positioned at the very intersection of art and science. Leonardo's remarks, combining the phantasy of the painter with the passion of the researcher, are not trying to interpret empirical phenomena with the help of a theoretical model. Leonardo is looking for an invisible principle animating the unanimated, a secret law that becomes visible only in its effects. Besides sketchy comments on the formation and movement of clouds, one can also find reflections on the perception of light and shadow, as well as detailed recommendations in view of different forms cloud illumination, three-dimensional effects and the rendering of the shadow of torn clouds. These fragmentary annotations are disseminated throughout Leonardo's oeuvre: in diaries and notebooks, in his writing on visual arts, as well as in his precise observations of natural phenomena.

2. Lucretius, *On the Nature of Things*, Book VI.

3. Michel Serres, *La naissance de la physique dans le texte de Lucrèce*. Fleuves et turbulences, Les Éditions de Minuit, Paris 1977, p. 37ff.

4. *Ibidem*, p. 86.

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Since Leonardo usually jotted down his annotations and reflections in small notebooks and copied them later on, probably adding new details, one comes across frequent repetitions, different versions and elaborations of the same ideas. Thanks to this form of rapid sketching of impressions characterized by abrupt transitions, sudden interruptions and swift changes of subject Leonardo's line of thought is always on the move – a cloudlike thinking. Typical for this kind of thinking is a coming back to what has already been thought of from a new point of view. This explains among other things Leonardo's indefatigable interest for water movement, vortices, eddies and turbulences, phenomena he has also repeatedly attempted to draw.

In Leonardo's work, writes Alessandro Nova in his book on the history of the wind, “science and art are inextricably connected with each other also because in his view perspective as well as painting were sciences.”⁵ With Leonardo precise empirical and experimental observation of natural phenomena is combined with the systematic study of different artistic practices. His work initiates a change of style, leading to the dismissal of the ideal of clear and distinct representation typical of the *Quattrocento*. In order to generate vague blurred outlines and cloudlike *sfumato* effects he made use of black and red chalk.

Leonardo has assigned the characteristics of the volatile to water and air in which clouds drift along like ships. He does not study clouds as a separate subject-matter but always in relation to other areas of knowledge. The starting point of his reflections is generally a concrete image, calling for other related images linking up with each other. He tries, for instance, to explain the appearance and disappearance of clouds with a series of metaphors: clouds are like mountainous formations, blossoms or the human body. They behave like sponges soaked with water, like bellows or a piece of artillery. Leonardo is not after a systematic classification of the different cloud formations. He is interested, above all, in an explication of the genesis and unfolding of clouds and an explanation of the hidden forces of nature that can be deduced from this.

As was already the case with Lucretius clouds never do stand still, but are in continuous evolution, in uninterrupted metamorphosis. But there is more to it: as in the work of Goethe and Serres the cloud represents a principle of blurring mixing and merging. In Leonardo da Vinci's cosmology it occupies the decisive position on the border or uranology, aerology, hydrology and geology successfully negating through this any separation between the single areas of knowledge. Leonardo forcefully and deliberately practices a mixing of categories and a destabilization of systemic boundaries. In this sense, the order of perspectivism is not negated but constantly tested and disturbed by a study of those very atmospheric phenomena it fundamentally excludes – wind, storm, floods, wave crests and vortices –, and it is the cloud that is used to translate these elusive natural phenomena into a figurative language. Small clouds of dust represent single riders in the thick of the battle. To depict a storm, Leonardo makes use

5. Alessandro Nova, *Das Buch des Windes. Das Unsichtbare sichtbar machen*, Deutscher Kunsterlag, Berlin 2007, p. 77 [translation RG].



of torn, drifting cloud-vortices lashed by the wind, charging against mountain ridges like waves against rocks. Waves, on the other hand, can be represented as dense fog patches made of nebulized water particles carried away by gusts of wind.

The cloud has, thus, a double meaning and function: it stands for a new painting technique, no longer looking for a linear elaboration or perspectival construction of single shapes, but rather for a diffusion of forms and subtle *chiaro scuro* light effects and it is, at the same time, a new way of looking at things, located on the border of different discourses, a search for possible overlappings and mixings on a stylistical and reflexive level. In both cases things are no longer considered in their being but in their becoming.

A possible thematic and discursive integration of the cloud with regard to a mixing and merging of art and science is best discussed in relation with the image of the battle. The cloud is compared to a cannon, lightning and thunder to artillery effects. Clouds drifting past in the sky remind of compact heavily armed military forces. Different formations of clouds, furthermore, display specific concentrations and disseminations reminiscent of clusters of contending soldiers. Further common aspects are the entanglement of manifold chaotic movements, the impenetrable confusion of intertwined soldiers and the simultaneity of continuous changes that lead to a loss of a comprehensive view. Contrary to landscapes whose stratifications are analogous to the textures of rocks and geological structures, but are characterized by immobility, battle scenes are dominated by movement and contingency. Battles are like clouds, like unpredictable disorderly turbulences, characterized by a fleeting state of aggregation and a multiplicity of events taking place at the same time. Because of this reversible metaphoric connection Leonardo recommended the use of clouds as form generators, especially when it came to the representation of convincing battle scenes.

Within Wolfgang von Goethe's thinking – as with Lucretius and Leonardo da Vinci before him – the cloud takes center stage. Goethe situates his work consciously and provocatively at the intersection of different discourses and this at a time of increasing differentiation. Lucretius and Leonardo still operated before the great divide, the divorce of art from technology and science. Goethe, however, lived in a historical period when this diversification reached a completely new dimension. His attempt at creating a unified vision of the world assumes, thus, even a more radical significance.

In Goethe's understanding clouds are always on the move, not only with regard to their actual position in the sky but also in view of their constantly shifting outer appearance. The essential attribute of clouds is their tendency to relentless mobility and uninterrupted development, their autopoietic nature. In a short note, reminiscent of Leonardo da Vinci's work, written on the 8th February 1817, one of his typical occasional meteorological annotations, Goethe writes: „[...] the movement of the clouds seemed to be originating from within them.“⁶ Of fundamental significance for

6. J. W. Goethe, *Sämtliche Werke*, Frankfurt a. M. 1989, vol. 25, p. 198 [translation RG].

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Goethe's understanding of clouds is the essential typology introduced in 1803 by Luke Howard in his essay *On the Modifications of Clouds*. Howard distinguishes between four fundamental types: stratus, cumulus, cirrus and nimbus. These, however, are in constant evolution, continuously metamorphosing into one another.

Within Goethe's work the complex interplay of natural sciences and poetry is based on reciprocal interpenetration and enrichment, on the interaction of the conceptual and the poetic. The poetic, however, in the sense of pictorial vividness – in German 'Anschaulichkeit' – always plays the major role. Goethe, as Lucretius, Leonardo, Serres and Flusser is always aiming for a synthetic view. True knowledge of nature is not to be had through the practice of isolated means of perception. Because of this the main stress lies not so much on the separation of the single domains as on multiple kinship, correlation and analogy. Science and poetry are not seen as two irreconcilable tendencies, but as intimately belonging together.

Goethe's "Witterungslehre", his theory of weather, is not a well rounded off theoretical system, it is more a conglomerate of more or less systematic scientific essays, sketchy annotations, autobiographical passages, aphorisms, notes in journals, letters and above all poems. The manifold nature of his meteorological text-corpus and the interplay of different perspectives seem to meet the fleeting appearance of clouds, as if the subject matter had successfully contaminated the method. Goethe strongly opposed the growing differentiation of science and art taking place in the early 19th century, as well as the development of a mathematically oriented conception of natural sciences and a new evolutionary biology. His morphology – and Goethe's description of clouds is above all morphological – is a study of the *Gestalt* of clouds, that is, of their formation and transformation. Its main aim is to mediate between art and nature. If one wants to achieve an overall unity, however, as Goethe pointed out, "science must necessarily be thought of as art." ⁷ The two discourses are so densely interwoven that the fabric falls apart as soon as a single thread is extracted. Goethe calls this all-encompassing view an „exact sensuous phantasy“ ⁸ – taking up Leonardo's verdict of a *fantasia essata* – without which, so again Goethe, no true art is actually conceivable. This artistic synthesis, though, is not a merely external procedure poeticizing a given scientific content. Sensuous perception and phantasy are joined by natural knowledge and through this the original closeness of poetry and science can be reestablished.

The laconic terminology of science and the subject-matter isolated through analysis have to be vivified again. Clouds are not to be separated and dissected analytically, that is, they should not be terminologically determined but recontextualized and reanimated. Goethe tries to reach this by strengthening the immanent tendency of clouds towards self-motion and self-formation, that is, by transforming them, so to speak, in self-acting living organisms. In fact, each of Howard's four cloud types disposes of a specific inner animating principle. In the circular flow of clouds – in

7. Ibidem, p. 270 [translation RG].

8. Ibidem, p. 308 [translation RG].



German “Wolkenkreislauf” –, as Goethe defined it in his poem in honor of Luke Howard, one form autonomously emerges from the other. Goethe’s bottom-up reading moves from stratus to cumulus through the intermediate stage of a hybrid cloud, the strato-cumulus. Cumulus mutates into cirro-cumulus and finally into cirrus, reaching the top layer. From there, however, the evolution proceeds through dispersion and falling, leading to the last of the four types, the nimbus. Goethe describes this cyclical up and down movement using for each cloud a specific verb: „Wie Streife steigt, sich ballt, zerflattert, fällt.“⁹ *Streife* (strip) – stratus, *sich ballen* (to agglomerate) – cumulus, *zerflattern* (to disintegrate) – cirrus and *fallen* (to fall) – nimbus. This comprehensive cyclical connectedness of the different cloud types – the unity in the diversity of forms –, not the single isolated cloud but a view of the whole as a multi-level, circular process of transformation has to be grasped and shaped by the artist. The different cloud types should not be separated strictly from each other, but gently and mildly interact with each other. This can be achieved only by a method that Goethe describes as ‘zarte Empirie’, tender empiricism, a procedure that is ultimately superior to any purely mathematical and physical method.

A satellite image included in the first edition of Michel Serres’ *La légende des Anges*¹⁰ shows stormy whirlwinds and dense cloud-formations over West-Africa. With a black marker Serres has added a series of prepositions in order to stress both the temporal and spatial, vectorial and connective nature of clouds. From South-West to North-East one can read a word that best sums up their manifold hybrid position: *parmi*, among and between.

Michel Serres describes clouds as fields of possibility made up of fluctuating points. Clouds are pure surface. They represent the aleatoric and fortuitous, continuity and change, order and chaos, all that which escapes a perspectively reduced view of reality. The cloud is an expression of an unintentional, accidental order that comes about through distancing from a chaotic background. “La règle qui fait l’ordre de notre monde n’est qu’une singularité sur fond de fluctuations. [...] Nuages, tourbillions, flux, bruits, toute masses premières sans qualités ou sans propriétés définies.”¹¹ This cloudy principle does, however, not only apply to the reality surrounding us, but also to ourselves. “Ce n’est pas seulement dans le monde qu’il y a des nuages ou des flux qui dansent [...] c’est aussi en celui qui parle des nuages [...]”¹² The fractal structure of clouds iconically represents this new point of view: „Toute chose du monde est nuage, en son genre, est tourbillion et miroitement. Un organisme, par exemple, est un système ouvert et c’est, mieux qu’un art, un savoir que de le dessiner à limites floues et fluentes. Ainsi l’évidence n’est-elle pas d’ici, ainsi demande-t-elle un décompte infin. [...]. Toute connaissance est vague.”¹³ Serres’ cloud represents a principle of pure possibility, on the

9. Ibidem, p. 238 [translation RG].

10. Compare Michel Serres, *La légende des anges*, Flammarion, Paris 1993, p. 142-3.

11. M. Serres, *Hermès V - Le passage du Nord-Ouest*, Les Éditions de Minuit, Paris 1980 p. 53-4.

12. Ibidem, p. 56.

13. Ibidem, p. 49.

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one hand, because its composition is a fortuitous condensation of particles detaching itself from the noisy chaos surrounding it, on the other, because of the indeterminacy of its contours negating geometrically unequivocal borders. The description of clouds calls for another terminology – *fuzzy set*, bifurcation, interpenetration, osmosis – a terminology that would also regulate the relationship of the single discourses to each other, and especially the close affinity of art and natural sciences.

Serres comes across this principle in Robert Musil's *Der Mann ohne Eigenschaften* – The Man without Qualities – from which he quotes the entire first chapter in his book *Hermes V. Le Passage du Nord-Ouest*. In Musil's description of the city of Vienna at the beginning of the 20th century the individuality of names dissolves and nothing conclusive ensues from the given initial conditions, as the title of the first chapter – ‚Woraus bemerkenswerter Weise nichts hervorgeht‘ – has it. This laconic assessment keeps reappearing, as a sort of signal, suggesting the presence of another chaotic logic, the logic of non-linear equations. That the sentence quoted above comes from a literary and not a scientific text is an intentional irony on Serres' part. The following chapter – ‚Exacte et humaine‘ – echoing Goethe's dictum is dedicated in its entirety to the cloud. The fifth *Hermes* volume thematizes the exploration of dissolving vibrating outlines in the border area between science and literature, the humanities and natural sciences. The search for the legendary northwest-passage that went on for centuries is used to epitomize this undertaking. „Le chemin existe, il n'existe pas. C'est ainsi. C'est ainsi la mer de Davis à Beaufort, c'est ainsi dans les phénomènes, nuages et rochers, c'est ainsi pour le savoir, quelle que soit la carte.”¹⁴

In order to discover a possible way Serres combines in the very first pages of the book the work of the German writer Robert Musil and the American cyberneticist Norbert Wiener. It is a montage of two parallel passages, of two different beginnings: a short statistical statement from the first chapter of Wiener's *Cybernetics: Or the Control and Communication in the Animal and the Machine* and the first two sentences from Musil's novel. The cyberneticist and the writer form together a complex cloud that represents the passage itself and the untranslatability of the two discourses. Serres is looking for a space in between, an empty space that separates the humanities from the natural sciences and at the same time links them to each other: two continents, America and Europe, in between the Atlantic Ocean; two moments from a tragic century, in between the watershed of World War I and II; a day in January 1950 and August 1913; two weather situations. „Boston, 17 janvier 1950, ciel couvert à 38%, cirro-cumulus. On signalait une dépression au-dessus de l'Atlantique; elle se déplaçait d'ouest en est en direction d'un anticyclone situé au-dessus de la Russie et ne se manifestait encore aucune tendance à l'éviter par le nord. Les isothermes et les isothères remplissaient leurs obligations.”¹⁵

Norbert Wiener also begins his book with a comparison. Starting out from a little

14. Ibidem, p. 23.

15. Ibidem, p. 30.



German song on stars, clouds and their countability he discusses the relationship of two branches of science that Aristotle had already clearly separated at the beginning of his *Meteorology*: astronomy and meteorology. Weather phenomena, argues Wiener, contrary to phenomena of the sky are much more difficult to determine. Stars, as the song goes, are mostly countable apart from a few uncertainties and because of their permanent condition can be easily catalogued. But meteorology is a completely different affair. "If (...) you requested from a meteorologist to provide you with a similar, thorough scrutiny of clouds he would laugh at you outright or tell you indulgently that within the whole repertoire of meteorology there is no such thing as a cloud defined as an object with a quasi-permanent identity and that if it existed he would not have the capacity and would not really be interested in counting them."¹⁶ What we are left with are statistical data. On a scale from accuracy to inaccuracy, from Newtonian astronomy to meteorology, most sciences, so Wiener, would be lying somewhere in between and most of them closer to meteorology than astronomy.¹⁷

This leads us back to Michel Serres whose discourse on the cloud is very much influenced by the suspension of clear cut distinctions and the overlapping of order and chaos. In his fourth *Hermès* volume, *La Distribution*, he defines this as a fundamental epistemological change: „Au commencement est l'indifférenciable sur quoi nul ne saurait avoir d'information. Cela peut s'appeler: nuage. Un ensemble de points, d'atomes ou de moles, d'éléments tout à fait quelconques, don't le comportement est ignoré, nuage à bords non définies, fluctuant ou fondus. Quelque essaim d'abeilles en déplacement capricieux (...) Un lac de taches ou un banc de nuées. (...) Il y avait un ordre stable. (...) Au milieu, comme une exception, un désordre sans intérêt. (...) Renversement: les vieux systèmes ordonnés (...) ne sont plus que des îles rares sur une mer qui ne s'arrête pas (...) L'ordre n'est que rareté où le désordre est ordinaire. L'exception devient la règle et la règle devient exception. Le nuage n'est plus eulement le beau temps ou le mauvais temp (...) mais il est en nous et autour de nous, dans le brownien des choses elles-mêmes (...) et tout (...) est nuage.“¹⁸

As the subtitle of the first paragraph of *Le Passage du Nord-Ouest* suggests it is all about a combination of 'exact' and 'human issues', whereby the 'and' implies a similarity in nature. The text itself seems to submit to the border dissolving logic of the cloud. The law of linear causality is unhinged. Scientific and literary discourses keep exchanging their roles. Single elements break free from their context, abruptly switching sides. Curious correspondences seem to be connecting the two authors. In 1931 Musil published the first volume of his novel which, however, remained fragmentary, cloud like. He left Vienna, lived temporarily in Berlin and died 1942 in Geneva. In 1947 Wiener published his book in a first English edition, but with a French editor. He wrote the introduction in Mexico City, where he worked for the National Institute of Cardiology.

16. Nobert Wiener, *Kybernetik. Regelung und Nachrichtenübertragung im Lebewesen und in der Maschine*, Düsseldorf und Wien 1992, p. 64 [translation RG].

17. Compare *ibidem*, p. 69.

18. Michel Serres, *Hermès IV - La distribution*, Les Éditions de Minuit, Paris 1977, p. 9-10.

Musil and Wiener were both nomadic and rootless, as their subject-matter the clouds. Scientific and statistical clouds. Cirrocumuli: high clouds generally forming with the approach of a cold weather-front. Urban clouds: „Vienne où les piétons font des cordons nébuleux. Vienne-nuage. Nuages de la dépression qui court sur l'Atlantique, nuages qui défilent, et que Dieu compterait, de la petite chanson allemande, aux premières lignes de *Cybernetics*. Nuages spatio-temporels. Où sont-ils? Que font-ils? Que feront-ils bientôt?" The point of departure of Serres' attempt at rapprochement of scientific and artistic thinking is located within a specific frame. „Les circonstances ici même sont le jeu des nuages. Or ce nuage-ci qui vole maintenant au-dessus de ma tête, voicé qu'un coup de vent turbulent l'éparpille, et tout à l'heure, il n'y a plus que du ciel bleu. D'où, chose remarquable, rien ne s'ensuit. Curieuse circonstance. Wiener: 'Il n'existe pas de terme tel que nuage, défini comme quelque chose de quasi permanent; topologiquement, c'est peut être une région de l'espace où telle densité de l'eau est telle ou telle, mais cette définition n'a aucune valeur et représente tout au plus un état tout à fait transitoire.' Le nuage est sans qualités. Ulrich a le sens du possible, beaucoup plus que le sens du réel. Qui a ce dernier sens compte les arbres en mètres cubes de telle ou telle qualité. Or la forêt reste malaisément définissable: une région de l'espace où ... Forêt-nuages, Ulrich-nuages. Où est-il? Que fait-il? Que va-t-il bientôt faire?"¹⁹

After this introductory exploration of some aspects of the logic of clouds, taking place in the no-man's land of literature and natural sciences, Serres returns to another relevant dimension: the relationship of astrology and meteorology. Any reflection on this specific connection clearly moves beyond a simple link between two scientific branches. Aristotle's superlunary world of planets and fixed stars, as well as Newton's clock-like cosmos working according to strict mechanical laws had always the advantage of predictability with regard to the volatile atmospheric conditions of the sublunary dimension. With Musil and Wiener, however, this relationship is clearly inverted. „[...] le nuage, la dépression et l'anticyclone [...] précèdent l'astronomie et la mécanique céleste. [...] Pourquoi? Parce qu'elles sont plus fortes, épistémologiquement parlant, parce qu'elles mobilisent un savoir plus complexe, des concepts plus riches et moins abstraits. Voici venu le moment indatable, voicé le lieu sans lieu où l'ordre classique s'évanouit comme un spectacle superficiel et désuet.”²⁰ This paradigmatic change, moreover, can be discovered in both forms of discourse. „Il y a d'autres objets du ciel que les galaxies, les étoiles et les planètes, ce sont les météores. D'où les nuages de Wiener. Ceux de Musil.”²¹ Instead of an identifiable subject, unequivocally locatable in time and space, moving along his predictable, calculable orbit we have now the new epistemological situation of the cloud based on unpredictability. Here the only possible way to approach the object is through statistical calculation. „Les termes de 'nuage', 'température', 'turbulence', etc.,” writes Serres, taking up an already quoted passage from Norbert Wiener, “sont autant de termes qui ne se réfèrent à aucune

19. Serres, *Le passage du Nord-Ouest*, p. 30-1.

20. *Ibidem*, p. 36.

21. *Ibidem*, p. 37.



situation physique singulière, mais à une distribution de situations possible don't l'une seulement se réalise en fait." ²² Each and every event is constantly surrounded by a playful cloud of possibility, from which only one concrete option at a time can be realized. The noise cloud: „Le bruit forme nuage, le signal s'en détache, figure singulière sur fond distribué. Quel est le sujet du signal, ou de l'éclair sur le nuage? On. Le on sans qualité." ²³ In this passage Serres has transposed the homophonic ambivalence inherent in the German title of Musil's novel into French: Mann or Man ohne Eigenschaften.

Clouds have mostly been perceived as objects swiftly moving through the sky as if they were projectiles thereby constantly redefining their outlines but basically always on the move as a whole. Within this context one of the fundamental questions was: how is it actually possible that clouds remain suspended in the air and do not simply fall to the ground? This point of view, as far as contemporary meteorology is concerned, is no longer relevant. In fact, the introduction of the concept of thermodynamic restructuring has led to a „consistent dissolution of any kind of realistic form." ²⁴ In this context Karin Leonhard speaks of ‚Wolkendampfmaschinen‘, of clouds perceived as self-generating and self-dissolving steam-engines. „For researchers of the troposphere there is no difference between clouds and their surrounding air space. For them, a cloud can be visually differentiated but basically remains an aggregate of hydrogen molecules that can also be detected in its cloudless environment. The difference is assessed from a purely quantitative point of view [...]“ ²⁵ This atomistic redefinition works on the assumption that clouds do not fray and frazzle, but ultimately disperse and spray into particles and atoms whose distribution can be statistically calculated. This has made it possible among other things to create artificial clouds and has „generated a profession of its own: that of the cloud-modeler.“ ²⁶ The consequences of such a redefinition are far-reaching. They not only dismiss the traditional form-dependent conception of the cloud, but also inscribe the moment of chance into its basic structure.

There is, moreover, another, even more influential and fruitful aspect that has to be mentioned here. The concept of thermodynamic restructuring from meteorology and the new computer-operated imaging modalities based on cybernetics have, in fact, joined together to form a completely new form of imagination, which Vilém Flusser called „Einbildungskraft“ to differentiate it from older traditional forms of imagination. Thanks to the infinitesimal refinement of the grids of computer-monitors clouds can now be simulated as digital images. But there is more to it: the dot-like structure of the images that have been generated on computer-screens also possesses a cloud-like quality: the digital image itself has become a cloud. In this connection, Thomas Heilmann speaks of the „cloud-performance of the computer-screen“ ²⁷ and adds: „in

22. Ibidem, p. 37.

23. Ibidem, p. 37-8.

24. Karin Leonhard, Wolken modellieren, in: Wolken Archiv für Mediengeschichte, ed by L. Engell, B. Siegert und J. Vogl, Weimar, 2005, S. 97.

25. Ibidem, p. 97.

26. Ibidem, p. 95.

27. Thomas Heilmann, Schleierwolken des Realen, in: Wolken Archiv für Mediengeschichte, hg. von L.

the form of the electronic image” the cloud becomes “de facto the very kernel of any kind of representation (even its own).”²⁸ Therewith Leonardo’s use of clouds as form-generators has finally found its technical implementation.

In the introduction to Flusser’s unachieved book *Vom Subjekt zum Projekt* – From Subject to Project – part of which has been published posthumously, thinking in post-modern times is defined as a groundless nebulous enterprise. We have definitely lost our faith and trust in the solidity of things and in the materiality of the world, writes Flusser who recapitulates the path from early modern times to the present as a double questioning and a twofold dissolution of everything that is firm, in short, as the slow and inexorable discovery of a general principle of cloudiness. „In the course of the modern era numerical thinking has penetrated more and more deeply into things but instead of reaching the ground it has dissolved things into wafts of mist that float in nothingness. But this is not the essential moment yet. While bending over things it has dissolved itself into wafts of mist floating in nothingness. This uncanny process is generally termed euphemistically ‘Enlightenment’ confusing fog with clarity.”²⁹ These two converging tendencies implying each other have shown that subject and object possess the same numerical, that is, dot-like structure. Because of this, both decompose into “swarms of particles”.³⁰

A second, earlier reference to this specific conception can be found in the chapter „Lücken“, gaps, from *Lob der Oberflächlichkeit*, Praise of superficiality, a preparatory work for *Ins Universum der Technischen Bilder*, Into the Universe of Technical Images. According to Flusser our universe and our perception of it are visibly breaking-up and crumbling. Waves dissolve into spray. Sand-dunes are pulverized by the wind. Clouds disband into ice-crystals and water-drops. A new dot like universe is emerging, a “jumble of atoms and bits, particles and gaps [...]”³¹ creating a ghost-like atmosphere from which there is no way back. This new situation gives us the creeps, continues Flusser, but it is the typically human mode of existence.³²

We come across this new world consisting of particles also on TV and computer screens. The ghostly figures that emerge from them are dots agglomerated into shapes. It is possible, thus, to deduce new forms of thinking from the appearance of new media. The gestures of video artists, film directors, photographers and computer programmers bear witness to a radically different way of projecting models. In the universe of technical images this is no longer done by cutting and gluing, by collage, but by imagining, in German *einbilden*. *Einbildungskraft* is a new form of imagination

Engell, B. Siegert und J. Vogl, Weimar, 2005, S 37.

28. Ibidem, p. 38.

29. Vilém Flusser, *Vom Subjekt zum Projekt*. Menschwerdung, Bollmann Verlag, Bensheim and Düsseldorf 1994, p. 11-2 [translation RG].

30. Ibidem, p. 10 [translation RG].

31. V. Flusser, *Lob der Oberflächlichkeit*. Für eine Phänomenologie der Medien, Bollmann Verlag, Bensheim und Düsseldorf, 1993, p. 11.

32. Ibidem, p. 11.



made possible by the development of the new media. It is a programming and informing gesture that by the simple push of a button gives form to dots buzzing around in nothingness.

The computerization of the gesture of modeling shows what “computation of dots”³³ actually means. In this new context the attempt to find one’s way back to concreteness – which according to Flusser determines the whole media revolution from the very beginning – is an assembling and agglomerating gesture. “Models are cotton balls that are extracted from nothingness. The cotton-like, cloudy, ungraspable and at the same time incomprehensible, but also easily malleable and mutable nature of our models explains the existential climate in which we live. We walk in patches of fog.”³⁴ This metaphor has become tangible in the *Blur Building* that the two American architects Elisabeth Diller and Ricardo Scofidio³⁵ realized for the expo.02, the Swiss National Exhibition by the Lake of Neuchâtel.

I would like to conclude my talk with a quotation that aptly recapitulates the path we have covered so far hinting at a possible reconciliation of science and art under the patronage of the cloud. „Ever since the fifteenth century” writes Flusser, “occidental civilization has suffered from the divorce into two cultures: science and its techniques – the ‘true’ and the ‘good for something’ – on the one hand; the arts – beauty – on the other. This is a pernicious distinction. Every scientific proposition and every technical gadget has an aesthetic quality, just as every work of art has an epistemological and political quality. More significantly, there is no basic distinction between scientific and artistic research: both are fictions in the quest of truth (scientific hypotheses being fictions). Electromagnetized images do away with this divorce because they are the result of science and are at the service of the imagination. They are what Leonardo da Vinci used to call *fantasia essata*. A synthetic image of a fractal equation is both a work of art and a model for knowledge. Thus the new photo not only does away with the traditional classification of the various arts (it is painting, music, literature, dance and theatre all rolled into one), but it also does away with the distinction between the ‘two cultures’ (it is both art and science). It renders possible a total art Wagner never dreamt of.”³⁶ ■

33. Flusser, *Lob der Oberflächlichkeit*, p. 43 [translation RG].

34. *Ibidem*, p. 43 [translation RG].

35. Compare Philipp Ursprung, *Weißes Rauschen*. Elisabeth Diller und Ricardo Scofidios *Blur Building* und die räumliche Logik der jüngsten Architektur, in: *Kritische Berichte*, Zeitschrift für Kunst und Kulturwissenschaften, 3/2001, S. 515.

36. Vilém Flusser, *The Photograph as Post-Industrial Object: An Essay on the Ontological Standing of Photographs*, in: *Leonardo*, Vol. 19, n° 4 (1986), p. 331.