

HUNDRED VIEWS OF MOUNT FUJI

Visual art and natural science are two independent fields of knowledge which leave different traces and directions in our cultural environment. A closer study of the long cultural history of Western Europe reveals the visual arts as the art form which has the closest correlation to the natural sciences. Many visual artists have sharpened and broadened their perception by assimilating and adapting scientific research's discovery of new concepts and conditions for our view of nature. Observation, experience, and experimentation are the starting point for both artists' and scientists' endeavour to reach a new insight. Even though they are completely different in character, a central focus of the artistic and scientific work process is a direct approach to the surrounding world, matter and space.

A scientific breakthrough comes as the result of a specific glimpse of the idea behind the material confines of measurable results, rules that make experiments repeatable, and the critical, theoretical language used to communicate these results to others in the field. Only through painstaking research and ordering of detail, results, and experiences is it possible to reach a nuanced and yet specific conclusion. A view which Niels Bohr used to express by quoting Schiller: »Nur die Fülle führt zur Klarheit, und im Abgrund wohnt die Wahrheit«. The form-language of visual art is not encumbered by these limiting rules or codes, only by the limitations of the materials used to communicate the concept. Part of the creative process itself requires the artist to break away from the already existing norms and structures. New rules for imagery or form come into being and are made tangible-specific as the work is done.

Breakthroughs in the visual arts occur when a new view of the world can be made tangible and framework for a new mode of thought and means of experience are laid out. Artistic breakthroughs can for example be the result of the placing of a large scale work in a public space which changes the surrounding spatial relationships giving a new constellation and point of reference in our visual milieu. In the visual arts perception, thought, experimentation, and the process of adapting these to tangible forms exist on the same plain.

Artists and scientists have often dreamed of nature drawing back the veil for a moment to give us insight into a new and unexpected order which would gather all the glimpses into one great and all inclusive whole concept or image. Unfortunately this dream has never been fulfilled. New boundaries are revealed continuously and expand the frontiers of our knowledge. These in turn become limited by the inability of existing linguistic and

form structures to adequately express them. Twentieth century artists and scientists have in harmony and contrast in their own separate fields of study began to realize that neither the image nor the idea can totally express or explain the world. We have to be content with small glimpses and partial recognitions which mutually exclude each other and yet together give a richer more varied view of the world.

Since his earliest youth Niels Bohr had been preoccupied with this epistemological problem. His interpretation and development of the quantal description of atomic systems gave him the opportunity to define and solve it. The starting-point was the famous double slit experiment which revealed that one can perform an experiment which shows the wave aspect of the electrons and another experiment that clearly shows their particle aspect. These experiments which are mutually exclusive, offer together a complete description. They are in that relationship of mutual exclusiveness, Niels Bohr called complementarity.¹⁾

In a speech of thanks to Japanese physicists he used the mountain »Fujiyama as a symbol of complementarity, by describing the impressions given by the different lights and visual angles as complementary in the sense that only together did they give the full and impressive picture of the ethereal and pure lines of this mountain, such as is attempted in Hokusai's famous »Hundred views of Mount Fuji«.²⁾

Niels Bohr's efforts to clarify the complementary features of quantum mechanics led to an important epistemological breakthrough which gained the acceptance and acclaim of natural scientists, philosophers and artists. In his article »The Copenhagen Interpretation« Henry Pierce Stapp interprets it as follows: »The repeated attempts to unify all human knowledge of the basis of one conceptual framework . . . (is) the natural outgrowth of the absolutist viewpoint, which holds that the ideas of man can grasp or know the absolute essences«. The prospect of scientist achieving the absolute knowledge is minimal: »For him progress in human understanding would more likely consist of the growth of a web of interwoven complementary understandings of various aspects of the fullness of nature«.³⁾ To talk of what reality is »in its self« was for Niels Bohr just empty words. We are as he said forced, to accept that »we are both onlookers and actors in the great drama of existence«.⁴⁾ We do not have an omnipotent platform from which we can observe, describe and draw comparisons. We are *in* the world and can therefore not expect to understand it »as it is«. Our instruments,

theories, and language are a barrier between us and the world and yet these are the tools which make it possible for us to communicate with each other. Neither visual nor analytic language can embrace the whole world, only complementary aspects of it.⁵⁾

Quantum mechanics deals with itself. It can never be used as a basis for other interpretations of existence. However, it does tell us something important about the conditions for human understanding. This understanding is diminished when we try to limit nature to the confines of a theory of our own instead of as Niels Bohr says »to order our concepts in humble submission to the lessons we learned from Nature« and accept that we can never know or see everything at once.⁶⁾

In Mogens Møller's and Dorte Dahlin's exhibition the directions of these insights are crossed with the manifestation of the place which the visual arts occupy in the frame of reference of the 1980's. Mogens Møller's three dimensional works and Dorte Dahlin's paintings were not designed for any specific exhibition space and can, therefore, not be regarded as installations. The individual pieces have their own clearly defined character and result from different rules for visualization. Therefore, they create many different delineations and intervals in their surrounding environment. They do not express a single pattern of meaning but reveal something central to the conditions for understanding art and formulation as such. Dorte Dahlin's paintings and Mogens Møller's sculptures – for example the snowman and the scotch plaid canvas – create a condition, a situation of observation, which is not subjected to a central principle or code. The viewer must interpret them from the context of his own experience and is therefore a creator and interpreter as well as observer and participant. That which he sees can neither be summed up at a single glance or maintained as a single image. Different areas of intensity and openings which cannot be experienced at the same time come into view. In the context of time honored concepts we cannot cognize the whole world at once, only complementary aspects of it. We must be content with a scotch plaid canvas which contains multiple perspectives, complex structures and nuances, but not a system that blocks the view and prevents experimentation and invention.

The second pair of works shown in relation to each other are Mogens Møller's bronze cast of a model of Niels Bohr's hat. This is fastened to the wall, in the same plain as »the four eyes« that emerge from the large, hushed, blue space of Dorte Dahlin's painting.

»The four eyes« shatter the perspective of the painting and expose points of view which can never be in focus at the same time. Perhaps an allusion to the Janus faces of natural science: its »inferno aspect« – blind using of nature and the destruction of life and civilization as we know it. Or the »human face« – obedience and respect to the nature being researched, and as Niels Bohr wished, in an open dialogue with other sciences and different art forms.

Niels Bohr was convinced that we will never have a watch post that would let us understand the world »on its own terms«. We have to accept that »it is necessary in almost every field of knowledge to pay attention to the circumstances under which evidence is obtained«⁷⁾ and fully realize that we are always a part of that world we research or interpret. So to Einstein's claim that »God does not play dice«, Niels Bohr remarked that about such matters we can never know anything: »In meiner frechen Weise möchte ich sogar sagen, dass niemand – und nicht mal der liebe Gott selber – wissen kann, was ein Wort wie »würfeln« in diesem Zusammenhang heissen soll«.⁸⁾

The Nobel prize-winner in chemistry, Ilya Prigogine, is in no doubt that Niels Bohr's interpretation of the quantum theory has contributed to the breaking down of the separation between natural science and culture: »... la compréhension de la nature... nous impose de nous découvrir acteurs là où nous croyions pouvoir contempler, et de reconnaître les limites de nos possibilités d'action, la nécessité d'attendre et de regarder là où nous croyions pouvoir contrôler... Aussi, nous pensons que le fait que cette science qui féconde tant d'autres pensées créatrices en soit venue à reconnaître la nécessaire diversité des interrogations et l'impossibilité d'un modèle unique a priori d'intelligibilité rationnelle revêt une grande importance culturelle. Il est important que nous sachions aujourd'hui que même le monde physique n'est pas simple, n'est pas, comme tel, offert et soumis à nos manipulations«.⁹⁾

Are there structures in artists' pictures of the world which have caught the interest of natural scientists and have been an incentive for their research? The breakthrough in natural science which has been given the name »Chaos« contains many answers to this question. This field of research, unlike quantum mechanics, deals with the tangible world, objects of human proportion which can be observed, for example currents, vortices, ice crystals. Researchers have developed techniques of computer usage and special graphic output which capture fascinating and detailed structures. This

work led to researchers being interested in comparing artistic and scientific pictures. From this scientists realized, that visual art can harbor important knowledge about reality.

The mathematician Mitchell Feigenbaum expressed it as follows: »In a way, art is a theory about the way the world looks to human beings. It's abundantly obvious that one doesn't know the world around us in detail. What artists have accomplished is realizing that there is only a small amount of stuff that's important, and then seeing what it was. So they can do some of my research for me. When you look at early stuff of Van Gogh there are zillions of details that are put into it, there's always an immense amount of information in his paintings«.

Mogens Møller's sculpture of a snowman resembles the snowmen we remember from our childhood. They also refer to things we do not remember, snow and ice crystals, which as Feigenbaum has shown express the hair fine balance between order and disorder. Feigenbaum has a sense for the fact that in works of art time is built in: »There's some level of stuff, and then stuff painted on top of that, and then corrections to *that*. Turbulent fluids for those painters is always something with a scale idea in it«. ¹⁰⁾ These scales and processes are very apparent in Dorte Dahlin's scotch plaid canvas.

Science and art's premises are always completely different. »Chaos-research« shows, however, that there exist common areas of cognition: preoccupation with time, change, and the specific event, lines of demarcation and last but not least, the concept of form.

Else Marie Bukdahl
Phd, Chancelor of
The Royal Danish Academy
of Fine Arts, Copenhagen

English translation
Alfred C. Woodward
Barbara Shanklin

NOTES:

- 1) Henry J. Folse, *The Philosophy of Niels Bohr. The Framework of Complementarity*, New York, 1985, p. 108 ff.
- 2) Hans Bohr, My Father« in *Niels Bohr. His Life and Work as seen by his Friends and Colleagues*, edited by S. Rozental, Amsterdam, 1968, p. 337.
- 3) Henry Pierce Stapp, »The Copenhagen Interpretation« in *American Journal of Physics*, August 1929, p. 1110-1111.
- 4) Niels Bohr, *Atomic Theory and the Description of Nature*, Cambridge, 1961, p. 119.
- 5) Tor Nørretranders, *Det udelelige, Niels Bohrs aktualitet i fysik, mystik og politik*. København, 1985, p. 402-407.
- 6) Léon Rosenfeld, »Niels Bohr in the Thirties. Consolidation an Extension of the Conception of Complementarity« in *Niels Bohr*, edited by S. Rozental, 1968, p. 120.
- 7) Niels Bohr, *Atomic Physics and Human Knowledge*, New York, 1958, p. 2.
- 8) Niels Bohr. Scientific Correspondence, film 28, section 2, Niels Bohr Archive, Copenhagen.
- 9) This quotation cannot be found in the English edition of *Order out of Chaos, Man's New Dialogue with Nature*, New York, 1984. It is taken from the more recent French version of this book, which the Danish translation is based on. Therefore we have quoted the original French text.
- 10) Quoted by James Gleick in his book, *Chaos. Making a New Science*, Viking Penguin, 1987, p. 186-187.