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Mobility: The Fourth Dimension in the Fine Arts and Architecture

Gerd-Helge Vogel

Abstract

Mobility is a basic behavioural pattern of human beings that has been accelerating in the course of its social development. Especially since the beginnings of the industrial revolution, mobility has caused a fundamental change in human relationships that continues today. This becomes visible when we look at the aesthetic and spiritual impact on architecture and the fine arts. It is my intention to present significant examples in order to give an idea of the different stages of its development today.

Key Words

architecture, fine arts, mobility, modern, post-modern, pre-industrial

1. The Artistic Expression of Human Mobility in Pre-industrial Society

Pre-industrial societies are marked by relatively slow dynamics in mobility because they were based on restricted technical devices for locomotion, which in turn had to rely solely on physical manpower, domesticated animals or natural resources, such as air currents for sailing. The gathering and hunting for food, military expeditions, errands, transports, commercial journeys and other necessary changes of location could only be managed under the conditions of restricted or unpredictable power resources by man, animal and wind. However, even this underdeveloped form of mobility was not available to everyone, and it made possible only slow-motion progress.

Despite the fact that a nomadic lifestyle had been common in many pre-industrial societies since the Stone Ages, there was nevertheless a somewhat static viewpoint on the major life processes, due to the relatively slow locomotion from place to place: gods, rulers, manifestations of nature, such as men, animals, plants and, later, also landscapes had to be perceived as "fixed" quantities that were shaped after an ideal and expressed either in two dimensions, in painting and drawing, or in three dimensions, in sculpture and architecture. But the idea of time, which includes motion or mobility, was not yet relevant for artistic expression, and if it appeared, then it was only in the shape of abstract symbols. Such symbols could generate associations of locomotion and mobility in the mind of the observer.

On the one hand, this was related architecturally to the idea of a mobile home, which we find in the depictions of tents (Fig. 1, below), yurts, wigwams, tipis, igloos, cabins, buildings on stilts and other ephemeral homesteads, easy to construct and dismantle as transportable accommodation.^[1] On the other hand, locomotion was symbolized through allegorical figures expressing mobility: the changing of location and time, the fourth dimension in the arts. We can detect such symbolic

expressions of mobility in Giovanni da Bologna's *Mercury*, the symbol for trade and traffic, or in depictions of horse and coach,^[2] which was the most important means of transport and travel before the invention of the steam railway.



Fig. 1: Hans Schäufelein: Judith with the Head of Holofernes. Pen and ink. Design for the wall painting at the Town Hall in Nördlingen. 1515. University College, Strang Print Room / Photograph by University College London, Strang Print Room.

2. The Artistic Reflection of Mobility in the Age of the Railway

The breakthrough of the Industrial Revolution was connected with the discovery of the first useable steam machine by James Watt in 1772; the development of the locomotive, "the steam machine moving from one place to the next," as a power machine on a railway track followed, carrying travellers and freight and thereby completely transforming and accelerating previous traffic systems. English engineers Richard Trevithick in 1803/04^[3] and George Stevenson in 1814/29^{[4][5]} developed the necessary prerequisites for a global railway system, and their discoveries provided new possibilities for human mobility, most importantly a reduction of space and time. In 1843, the German poet Heinrich Heine wrote about the trauma that people were suffering because of the rapid expansion of the railway network after the opening of the first German railway line from Nuremberg to Furth in 1835 and the first German main-line service from Leipzig to Dresden in 1837/39^[6]: "What changes are happening now, are being imposed on our perceptions and our imaginations! Even the elementary concepts of Time and Space are swaying. The railway killed Space, and now only Time remains."^[7]

The phenomenon of accelerated mobility was reflected in the architecture of railway stations, "castles and cathedrals of travel."^[8] The new-found speed and mobility of the railway age was expressed in a new architectural style that aimed at conveying pathos and awe. Transport and traffic in themselves were awarded new formulas of dignity in an attempt to sacralize the track system of an accelerated changing of places. We can see this, for instance, in the Bavarian Station that opened in Leipzig in 1844 (fig. 2).^[9]

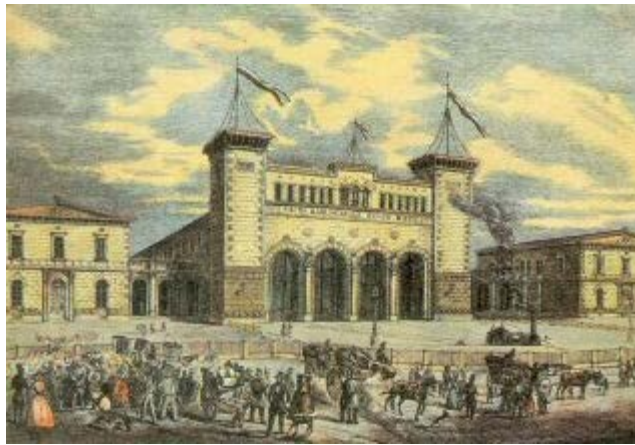


Fig. 2: Anonymous: View of the Bavarian Station at Leipzig. 1844. Coloured print / Rolf Bayer, Gerd Sobek: *Der Bayerische Bahnhof in Leipzig* (Berlin: transpress VEB Verlag für Verkehrswesen, 1985), title page.

This building assumes the form of the ancient triumphal arch from under which the trains of the Saxo-Bavarian governmental railway set out on their world-conquering forays. Although the dynamics of the process of traffic are expressed through the symbol of the gate, emphasizing mobility -- the departure and arrival from this place -- the building, with its shape of a castle with two towers on each side, looks rather static. Only the small clock tower on the roof provides a hint of time and transience and the acceleration with regard to the timetable of the trains, while the waving flags generate the idea of the triumph of the railway system that is revolutionizing the mobility of mankind. Soon both the growing competition between the railway societies and the desire of the upper class for more luxury^[10] began to be manifested through a love of things big in the construction of stations. For this reason, the *process* of traffic, the striving for a better and faster mobility, could be interpreted as a mystification of the special service of mobility provided by the railway. George Gilbert Scott's St. Pancras station was built between 1868 and 1873 for the Midland Railway in London, and it also incorporated a hotel and an office in the shape of a neo-gothic church or castle.

Because of this shift, the visual expression of its original function was lost, and it no longer displayed the newly gained mobility for its users. In this case, representation took precedence in order to elevate the banality of travelling to a pseudo-sacral state of nobility, so as to provide the upper-class clients with the necessary guarantee that the revolution of the transport system would not endanger the essentials of the social order. Instead, technical progress would only contribute towards making life easier, without any fundamental changes in society. For this reason, the symbol of mobility appears only in the interior of the station's hall, where arriving and departing trains showcase the dynamics of the Victorian age's accelerated mobility through their backwards and forwards movements, the effect of pistons in a case.

In the early days of railway station construction, the experience of dynamics in traffic was never displayed by means of the symbolic shape of "architecture parlante," but with the help of sculptures and wall paintings with their allegorical content firmly

based on ancient mythology. Thus Mercury, the god of trade and travelling, with his winged ankles and helmet, is depicted at many station buildings as representing speed. For instance, as late as 1911/13, at the zenith of the age of railways, Mercury attracts the travellers' attention in the shape of a figure placed on top of Grand Central Station in New York (fig. 3, below) as an explicit hint at the blessings and the goodness that the railway system has brought to the people by the acceleration of mobility in traffic that has generated prosperity in agriculture, economy and culture.

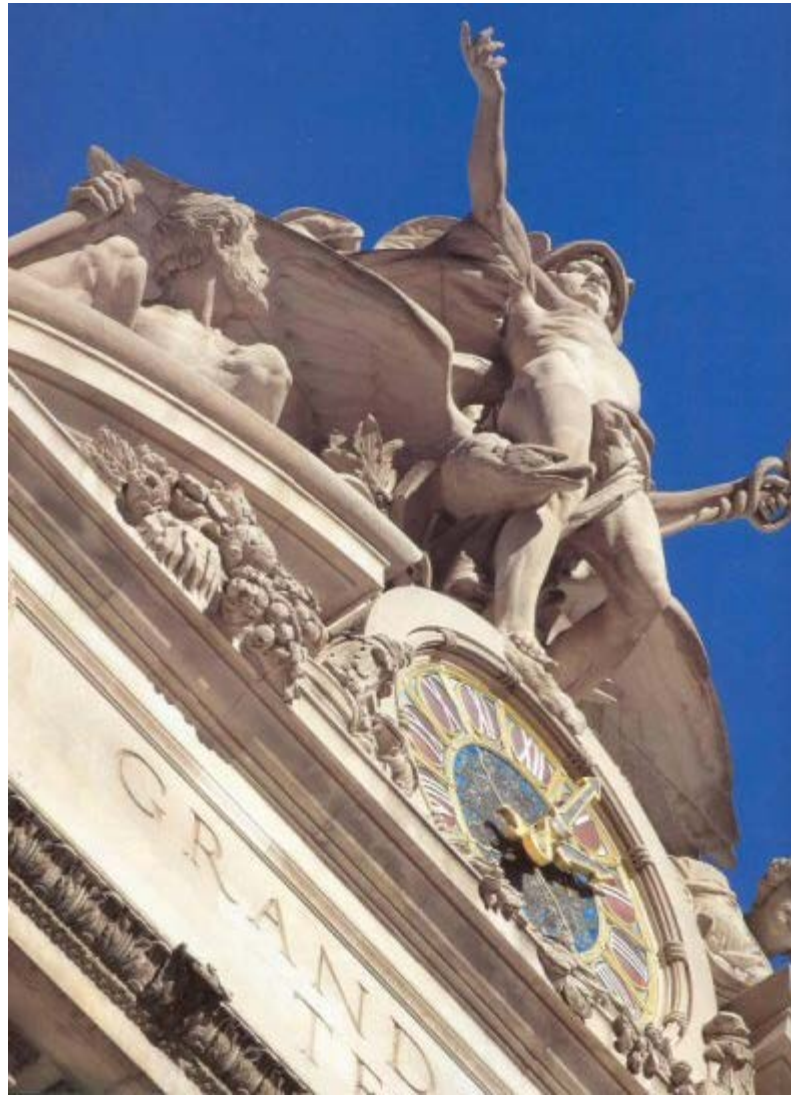


Fig. 3: Jules Alexis Coutan: Mercury with the Personifications of Agro-culture and Science as figure on the top of the Grand Central Station façade in New York, 1911-1913 / Steven Parissien, *Bahnhöfe der Welt* (München: Knesebeck, 1997), p. 136.

But not only Mercury represents this idea; his figure was also mingled with others, such as the embodiments of agriculture and art. Even the clock, symbol for Chronos, the god of time, was subsumed under this intention of symbolizing abstract ideas of traffic and mobility. Soon after, the Olympic herald, protector of paths and patron of the new means of transport, delivered up the symbol of the winged wheel, the general abbreviation for the railway that promises profit and speed.^[11] Innovative allegories were discovered for the energy of steam, those elementary

forces that caused the accelerated mobility of the railway age by teaming up within a locomotive. Thus the heroism of the new epoch received a mystical explanation. For instance, Adolf Echtler's (1843-1914) wall painting *Steam Power* in the departure hall of the government station in Munich depicts the ambivalence of modern mobility. Here the winged hero, who blows up his chains, destroys the symbols of ancient times, the customs barriers that imposed restraints to free transport and passage, but he also poses a similar threat to the snail attempting to creep away. Meanwhile, the hero of steam power, his sceptre adorned with a winged wheel, tries to tame the hero of steam, the embodiment of the locomotive, in order to harness his destructivity and develop his useful powers. This gainfulness is what the *putti* with the axe and the horn of plenty are referring to.

The sculpture at the top of the main station in Frankfurt also signals the departure of the railway in a new eon as an allegory: Atlas who carries the weight of the globe is supported by the geniuses of steam and electricity. This sculpture together with others was created by Gustav Herold (1839-1927) in 1885 in order to decorate the façade with an allegorical programme^[12] regarding the development of the modern industrial society. However, it was restricted to a symbolism that was not really capable of characterizing the powers of mobility of the modern era.

This was far better expressed in two paintings: one by William Turner (1755-1851) and the other by Adolph Menzel (1815-1905). Turner's painting, *Rain, Steam and Speed*, from 1844, for instance, shows the rapid triumph over space by means of the railway that is moving independently wind and weather. The mobility of the new age is depicted by a new painting technique: The artist employs a pre-Impressionist blurring to show the motive in an atmospheric dissolving of light and colour. In this way, he actually provides the impression of the dynamics of a swiftly progressing train. Adolph Menzel's painting, *Berlin - Potsdam Railway*, also portrays the speed of the train that is covered in drifts of smoke, embedded in an atmosphere of spring. His painting announces the dawn of a new age, where society and nature are forced to develop along completely new paths. New roadways are now mercilessly cutting into the idyllic nature of the landscape, and the smoky haze of the growing city in the distance already testifies to urbanity and its increasing greed for territory, which are so typical of industrial society. This process coincided with terrific changes in human society from the fact that, along with the acceleration of mobility, the utopia of equality among the social classes within the bourgeois society did not come true. On the contrary, the existent differences between the classes became increasingly evident. This could even be seen in everyday life in a single train, in which passengers of the first and third classes clashed. The depiction of this social problem can be easily be found when we compare some paintings that refer to different wagon classes. Honoré Daumier's (1808-1879) *Wagon of the 3rd class* obviously corresponds to Charles Rossitter's (1827-1897) *There and back to Brighton for 3 Shillings and 6 Pence* and Vladimir Alexandrovich Poyarkov's *Interior of a Russian 1st-class Dining Car*.

In their portrayal of social antagonisms on a train, the artists

subtly differentiate between various facets of the impact of speed on social life in modern industrial society during the age of railway. For this reason we find in their artistic stances both approval and criticism. Additionally, the difference between slowness in the age of mail coach and speed in the age of railway became a frequent artistic subject. At times, the technical progress in connection with social changes was welcomed, as we can see in works by Paul Meyerheim (1842-1915)[\[13\]](#) (fig. 4, below), or the loss of coziness and equanimity from the good old times of Biedermeier was lamented in the works by Pius Ferdinand Messerschmidt (1858-1915). In Messerschmidt's works, the mail coach became the symbol of a nostalgic yearning, and an idyllic ideal of the slow speed in the mobility of pre-industrial times.[\[14\]](#)



Fig. 4: Paul Meyerheim: Mail and railway. 1873/76. Oil/copper, From the series "The development of a Locomotive," painted for Villa Borsig in Berlin-Moabit. Copy at Bundespostmuseum Frankfurt/Main / Wolfgang Bickel, *Der Siegeszug der Eisenbahn. Zur Bildsprache der Eisenbahn-Architektur im 19. Jahrhundert* (Worms: Wernersche Verlagsgesellschaft, 1996) p. 7.

3. The Artistic Reflection of Mobility in Modern Times

Albert Einstein's (1879-1955) development of the special (1905) and the general theory of relativity (1915) brought about the

crisis of the idea of space from the fact that now space and time became a unity so that space now no longer inhabited an objective dimension. In the light of this, architecture, the art of space, was in a critical condition because its former absolute parameters, such as statics and aesthetics, appeared to be fundamentally questioned. Instead, speed and light replaced Newton's system of time and space,^[15] and modern architects were attracted by those ideas. For this reason, the depiction of the moment of speed and mobility became one of the favourite motifs for avant-garde architects in order to be able to reflect on mobility emphasizing the relativity of their structure's location. Expressionist architects, such as Bruno Taut (1880-1938), Erich Mendelsohn (1887-1953), Fritz Höger (1877-1949), Otto Bartning (1883-1959) and many others created impressive illustrations of these reflections. For instance, Taut's designs attempted to liberate his buildings from the traditional idea of representation in the era of emperor Wilhelm II. Instead, the architect created the crystal house, the glass industry's exhibition pavilion at the *Werkbund*-exhibition of 1914 at Cologne. The principal theme as well as the element responsible for the setting-of-scene was light. Taut's building was a major contribution to light-kinetic experiments and his pavilion became a template for later buildings.^[16] In this case, the light was used as an essential element for the visual construction of a wall in the shape of a crystal. This element of design reached its emotional peak in Albert Speer's temporary installation *Light-domes* (fig. 5, below). Here even time and space were visually melted with the help of light-kinetic principles.



Fig. 5: Albert Speer: Dome of Light, 1936 / Dawn Ades, Tim Benton, David Elliot, Iain Boyd Whyte, *Kunst und Macht im Europa der Diktatoren 1930 bis 1945* (Oktagon Verlag 1996), p. 280.

Erich Mendelssohn's astrophysical observatory, the *Einstein* tower in Potsdam,[\[17\]](#) with its metaphorical form, also served to show the aspects of the theory of relativity in an experimental way. For this reason he tried to visualize the idea that "mass is only a kind of concentrated energy,"[\[18\]](#) thus developing the neo-technical style. Its "functional dynamic" was influenced by his knowledge of machines and superior technology, and Mendelssohn used this kinetic principle as a model of mobility in transforming it into architecture. In this way, he could display kinetic energy or "the violence of speed" within the building itself. Through the formal adaptation of the submarine shape, a very special means of transport, he aimed at "the building's mobility," and by means of its streamlined, aerodynamic shape he aimed at an experiential moment of mobility.[\[19\]](#) We find similar ambitions visualized in Höger's *Chile-House* in Hamburg.[\[20\]](#) The sharply defined east contour of this building evokes the image of the bow of a ship. This is a symbolic reference to the architectural function as an office for shipping companies in the seaport of Hamburg, where the ocean liner building is anchored.

Meanwhile, new means of transport were becoming common and so mobility was constantly accelerating. The employment of cars,[\[21\]](#) luxury steam liners,[\[22\]](#) aircraft,[\[23\]](#) zeppelins,[\[24\]](#) subways,[\[25\]](#) suburban lines[\[26\]](#) and trams[\[27\]](#) gradually transformed daily life. In comparison with a statement by John Stuart Mill in 1848 in his book *Outlines of Political Economy*,

"Production has the same meaning, as movement," through the revolution in transport the meaning of this sentence was finally reversed, because movement or mobility became more and more a part of production itself.^[28] Because of this, "social deregulation coincides with the de-synchronisation of space and time in human activities, and this means a dictatorship of movement and total mobilisation"^[29] for people at work and during leisure time. It is not surprising that reflections of this development can also be found in the arts.

Thus the age of railway experienced its historical peak, but in order to show up the benefits of this traffic system in comparison with others, there was also a need for a publicity campaign, because the railway had to prove all its advantages under the condition of a permanent competition with other means of traffic. Intensive publicity campaigns with posters were launched where the pleasures of mobility, the thrill of speed and the comfort of travelling held pride of place. This can be seen, for instance, in a series of posters by Adolphe Mouron-Cassandre (b.1901) (fig. 6, below) as well as in commercial art by other artists.

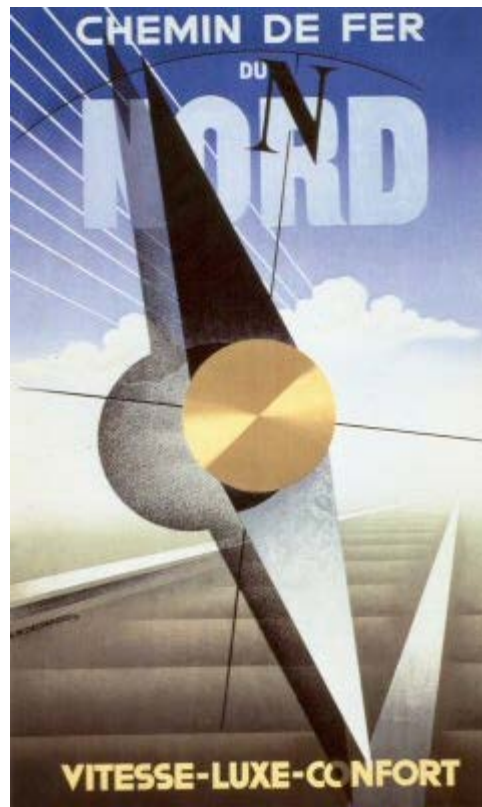


Fig. 6: Cassandre (Adolphe Mouron): Nordexpress, 1927. Poster, coloured lithography / Charlotte Benton, Tim Benton, Ghislaine Wood (ed.): *Art Deco 1910-1939* (London: Victoria & Albert Museum, 2003), p. 314.

The age of railway came gradually to an end after the German fascists developed their utopian project of constructing a broad-gauge railway^[30] in order to connect the European continent in a way that would link mobility with comfort. This cosiness and luxury in travelling suggests a settled mode of existence. It propagated a homelike ambience during the journey that emulated in its interior the immobile luxury that top hotels aspire to, despite the streamlined design of the broad-gauge train's

exterior. We find such a luxury of immobility also incorporated in the interior decoration of ocean liners[31] and in the gondolas of zeppelins[32] in order to provide the passenger with the feeling not that the passenger is moving but that the world is passing on the other side of the window. The sensation of space and time became relative not only in the cosmos but also on the earth, the sea and in the air.

Thus the depiction of movement, which in its expressions goes far beyond the common associations of symbolism, became an increasingly urgent task for avant-garde artists. Marcel Duchamp, for instance, caused a scandal at the Armory-Show in New York in 1914 with his painting *A Nude Descending a Staircase* by revolutionizing traditional modes of perception. He started off with kinematic experiments derived from the still-novel cinema and in a cubist or futuristic manner used its special capability for showing successive sequences in the course of motion.

The Italian Futurists had similar ambitions. They fought against the nostalgic cult of the millennia-old art traditions in this country "with dynamism and kinetic / . . . / the latest values of modern age" and proved with their painting that ". . . all is moving; nothing is immobile in space and time." [33] The mechanization of man together with the simultaneity of the exterior and interior provide the stylistic means of their futuristic concept of art. They show the rhythm of a dynamics that is dominated by technical processes where an analytic deconstruction of shape is effected by vibrations of power lines. The Futurists used this kind of expression in order to develop an art for the future that is able to display the current experience of life in an increasingly mobile society. Umberto Boccioni's (1862-1916) sculpture *Unique Forms of Continuity* and his painting *Dynamic of a Soccer Player*, for instance, clearly show the power lines and areas of daily life motions in contrast to the flight painting "aeropittura" [34] in the second phase of futurism, which opened up a new perspective of space and time. Gerardo Dottori (1884-1977) with his triptych *Speed* or Tullio Crali (1910-2000) and others were among those artists who created examples of alarming vividness, taking their inspiration from experiences of aerial battles as well as from the thrill of speed in motor sports.

Against this background it is no wonder that, in the area of architecture, utopias came into being in those years after World War I. Architects tried to satisfy the social need for permanently changeable locations with the idea of mobile cities or flying buildings, even though there were no technical or social prerequisites at hand for their realization. Wenzel Hablik (1881-1934) was one of the pioneers with his dream of a colony in the air (fig. 7, below) [35] when, in 1925, he intended to populate the sky with a kind of a flying machine in the shape of a vertical zeppelin.

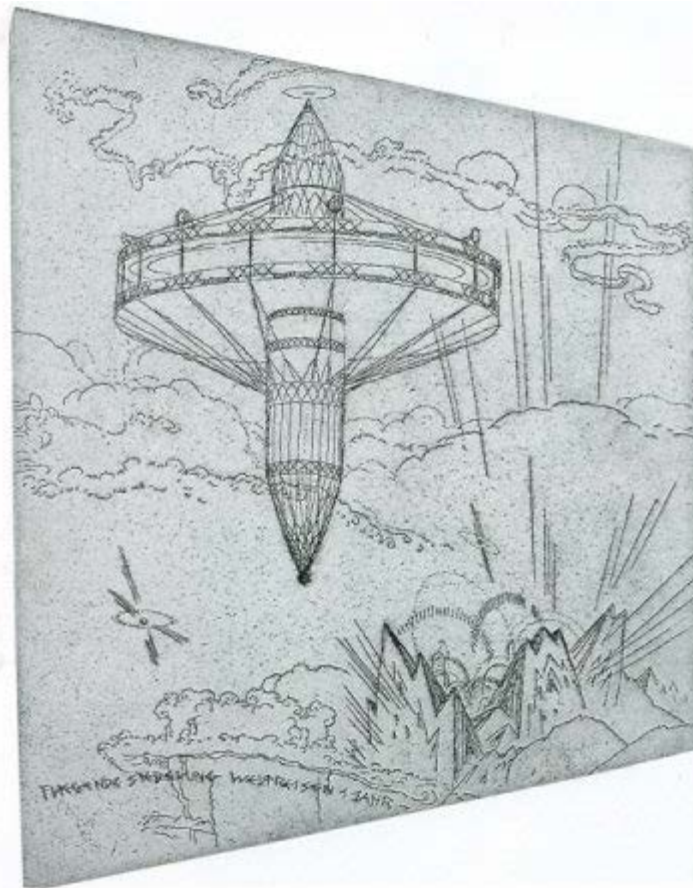


Fig. 7: Wenzel Hablik: Colony of Air. From the series "Architecture." Sheet 19, (Berlin), 1925, etching / Wolfgang Pehnt: *Die Architektur des Expressionismus* (Ostfildern: Verlag Gerd Hatje, 1998), p. 140.

This idea was re-used by Bodo Rasch (1903-1995) in 1938 when he registered a patent for "a portable house made from tents filled with air." A friend of his commented: "You will be the first man indeed who is able to construct castles in the air to live in! /. . . / Houses made of air, cities made of air . . . how about proposing to Speer (government minister and principal architect), to try and construct a new aerial Berlin ? /. . . / In this case Berlin would be portable and could be moved easily /. . . / then people will probably assume a new kind of nomadic lifestyle."[\[36\]](#)

But this trend to create mobile buildings was not just the fantasy of visionary architect-freaks whose science fiction utopias blossomed unrestrained. It was more of a reaction to the "phenomenon of de-urbanity,"[\[37\]](#) those social and political crises of the city, which lost its geographical fixed location through the absolute mobility of its inhabitants in their permanent movement to and fro between place of residence, place of work and place of leisure. Vincenzo Fani Ciotti, called Volt, supplied the theoretical base for the futuristic annulment of the city in his manifesto *La casa futurista*, published in 1920, where he wrote about the nomadic lifestyle of modern man: "The people of the future will refuse to live in houses which are rooted to the ground. Their accommodations which are equipped with splendid engines will walk, cross over water and fly."[\[38\]](#) Although the process of de-urbanization had reached a new dimension, the problem of the realization of a mobile city had not yet been solved.

The attempts at creating an aesthetics of mobility also progressed in the area of the fine arts during the second decade of the twentieth century, and this entailed a development towards a convincing depiction of the fourth dimension. This had become necessary in order to adapt to the increasing requirement for mobility caused by technical progress and changes in social life. For this reason experiments became important in their work, where the visibility of the new dimension of time but also of the acoustics and visual-spatial changeability of objects took up a central position in order to create kinetic art. Marcel Duchamp's (1887-1968) "bicycle-wheel" of 1913, the first ready-made work of modern art, could be manually rotated in order to visualize translation by means of rotation. At the same time it manifested the cubistic principles of poly-perspective and simultaneity of a single object where place and time were interwoven.

It was not only the interest in the depiction of a concrete motion that was a subject of kinetic art: Alexander Calder's (1898-1976) 'mobiles' balanced the elements of gravity in their multi-dimensional and simultaneously occurring motions within an organic system of mobility, while reacting to environmental influences, such as a gentle breeze. But Robert Delaunay's (1885-1983) paintings stress the momentum of colors by the fact that his pictures are based on revolving circles of similar shades. In this way his paintings provide an analogy to machines and technology. In addition, Naum Gabo's (1890-1977) or Anton Pevsner's (1886-1962) kinetic sculptures develop rhythms of motion and energies of space as vibrant and curved shapes that stride across space and time in order to lend shape to the fourth dimension.

4. Reflections on Mobility in Post-Modern Times

At the beginning of the twentieth century, "the disappearance of the distance in kilometres" became increasingly perceptible and "with the advent of supersonic / . . . / the disappearance of the distance in time"[\[39\]](#) was more and more noticeable. "Time and space became de-synchronised"[\[40\]](#) with the acceleration of mobility through rockets and space travel. World and space became smaller with every rocket launch and every intercontinental flight. Now the process of globalization was connected with a revolution in telecommunication[\[41\]](#) that unrestrainedly charted its own course. Finally, we have arrived at the global village where the difference between place and time seems to be so irrelevant so that production can be easily transferred to every place without taking into consideration the factor of time and is reduced to the ambition of making the utmost profit. Modernity was the expression of a highly developed industrial society in art and culture. Post-modernity, however, is the expression of a post-industrial society, and the problems of mobility are also reflected in aesthetic experiences.

The concept of a mobile city as an utopia still plays an important role for architects and town planners in attempting to solve the growing discrepancy between urban centralization and periphery, between city and suburb. Thus the design of "mobile urban centres that can be set up in agreement with economic and sociological needs but free of needs of space and time"[\[42\]](#) exemplifies an utopian solution in the project *Walking City* by the English Archigram Group in 1964. One cannot fail to see the

ironic, provocative aspect that closely observes and follows the technical patterns derived from science fiction. Valeska Peschke (b.1966) also takes up post-modern concepts of cities in her portable project *Plug-in-Plug-out: Instant Home* (fig. 8, below) from 1998/99. Inflatable within two minutes, it satirizes the current basic need for individual home comforts in our "on-the-move-society,"^[43] with its vinyl membrane and "gigantic inflammable cosy living-room-equipment, including even a fireplace and an unfoldable standard lamp."^[44] But in the first place her inflammable, instantly "stable living structures" express her doubts about the realization of the "dream of total independence" ^[45] in a mobile society. For while drawing up a primitive mobile living equipment, she is also drawing our attention to the fact that our society generates so many homeless people.



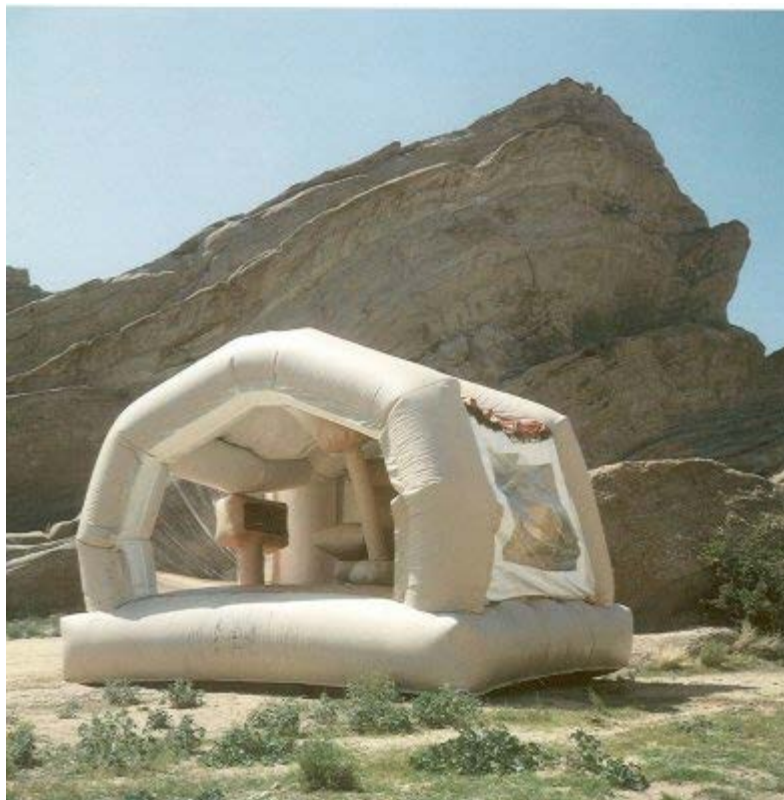


Fig. 8: Valeska Peschke: Plug-in-Plug out: Instant Home, Hope Street. Los Angeles 1998. Vinyl / Photograph by Ian McCausland.

Eleonore Straub's conceptual art also draws attention to the ambivalence of our societal progress and stresses the darker sides of the growing alienation of people caused by mobility in an accelerated society. For instance, her *Narcissus*^[46] (fig. 9, below) combines the "international language of road signs" with the ancient myth of Echo and Narcissus in order to visualize complex social facts in a symbolic shape. She draws responsible attention to the dangers of our time with the help of warning signs which are employed in her sculpture as the alienated shape of the head of a narcissus atop a pole of a streetlamp that is mirrored in the water. Her message emphasizes the self-love of narcissistic people who, in their striving for pleasure, are unaware of the deformations in environment and society.



Fig. 9: Eleonore Straub: Narcissus poeticus EST. 2004, Sculpture, metal, glass, electric equipment. Rio de Janeiro, Federal University / Photograph by Eleonore Straub.

But despite all warnings, the process of acceleration in a mobile society does not seem to stop. This is obvious in the daily traffic jams caused by the car-mania and in the massive scale of cheap flights that are increasingly congesting the skies. For both artist and observer, the question of whether there is any solution for this problem remains unresolved in view of the enormously increasing volume of traffic even in the third world and the beginning of global tourism that entails new and dangerous perspectives.

In conclusion we can propose that the arts of all these periods have been reacting in two ways to the challenge of mobility and the problems of coping with time. One approach tries to do justice to the need for mobility with an aesthetics of mobility that uses the fourth dimension in the arts in order to express the new nomadic way. The second approach is the reaction to the process of acceleration by means of changed ways of shaping ideas in order to reflect critically or affirmatively on these developments through a symbolic language.

Endnotes

[1] Berthold Burkhardt, "Zur Geschichte der Zeltarchitektur" in *Zelte*, (Basle: Catalogue of the Museum of Architecture Basle, 1986), pp. 13-21.

[2] The significance of the horse for the increase in mobility in

pre-industrial society, see Paul Virilio, *Der negative Horizont. Bewegung / Geschwindigkeit / Beschleunigung* (München, Wien: Carl Hanser Verlag, 1989), especially pp. 29-45.

[3] In 1803/04, British engineer Richard Trevithick (1771-1833) constructed the first steam locomotive which did not yet meet the demands of continuous use because of the inferior quality of rail track material made of wrought iron.

[4] British engineer George Stevenson (1781-1848) constructed his first locomotive, the "Blücher" in 1814, but it was not before 1829, during the competitive trial of his locomotive "Rocket" on the Stockton-Darlington line ("the locomotive race of Rainhill"), that he could demonstrate the superiority of his steam-based towing vehicle that finally led to the development of the railway system in England and, later, after the opening of the railway line from Liverpool to Manchester in 1830, across the globe.

[5] Francis D. Klingender, *Kunst und industrielle Revolution* (Dresden: VEB Verlag der Kunst, 1974), pp. 66-69.

[6] The first section of the main line service between Leipzig and Dresden was opened on April 27, 1837. Manfred Berger, "Die Leipzig-Dresdener Eisenbahn" in *ibidem, Historische Bahnhofsbauten Sachsens, Preussens, Mecklenburgs und Thüringens* (Berlin: transpress VEB Verlag für Verkehrswesen, 1980), pp. 30-50.

[7] Heinrich Heine in the year 1843, quoted from P. Virilio (1989) in the jacket text.

[8] Steven Parissien, *Bahnhöfe der Welt* (München: Kneesebeck, 1997), especially pp. 43-76.

[9] M. Berger, "Die Sächsisch-Bayerische Eisenbahn" in M. Berger (1980), pp. 52-64; Rolf Bayer, Gerd Sobek, *Der Bayerische Bahnhof in Leipzig* (Berlin: transpress VEB Verlag für Verkehrswesen, 1985).

[10] Paul Virilio (1989) also stressed the moment of "well-being" in the Anglo-Saxon ideology of travelling by ship or train: "The body of the traveller indulging in luxury is a counterpart to the sheltered body of a resident" and this idea finds its congenial expression in the luxury of St. Pancras' Station due to the fact that there it is the settled form of existence that is emphasized, rather than mobility.

[11] Wolfgang Bickel, *Der Siegeszug der Eisenbahn. Zur Bildersprache der Eisenbahnarchitektur im 19. Jahrhundert* (Worms: Wernersche Verlagsgesellschaft, 1996), pp. 70-77.

[12] Manfred Berger, "Der Hauptbahnhof Frankfurt (Main)," in *ibidem Historische Bahnhofsbauten III, Bayern, Baden, Württemberg, Pfalz, Nassau, Hessen* (Berlin: transpress VEB Verlag für Verkehrswesen, 1988), pp. 239-254, especially p. 253.

[13] Irmgard Wirth, *Berliner Malerei im 19. Jahrhundert. Von der Zeit Friedrich des Großen bis zum Ersten Weltkrieg* (Berlin: Siedler Verlag, 1990), pp. 419-421; Margot Pfannstiel, *Der Locomotivkönig. Berliner Bilder aus der Zeit August Borsigs* (Berlin: Verlag der Nation, 1987), pp. 46, 142-143; W. Bickel (1996), p. 25, plate 3.

[14] Karl Georg Pfändtner, "Kutschenromantik," in *Pius Ferdinand Messerschmidt 1858-1915. Retrospektive*, ed. Lothar Henning, Karl Georg Pfändtner (Bamberg: Historisches Museum Bamberg, 1998), pp. 33-40.

[15] Paul Virilio, *Rasender Stillstand* (München, Wien: Carl Hanser Verlag, 1982), p. 85.

[16] Wolfgang Pehnt, *Die Architektur des Expressionismus* (Ostfildern: Gerd Hatje, 1998), pp. 103-106.

[17] W. Pehnt (1998), pp. 179-185.

[18] Paul Virilio, *Das irreale Monument". Der Einstein-Turm* (Berlin: Merve Verlag, 1992), p. 37.

[19] Paul Virilio, (1992), pp. 20-21.

[20] W. Pehnt (1998), p. 186-188.

[21] In 1878 Carl Friedrich Benz developed his first two-stroke gas engine and in 1885 he constructed his first car. Since 1894, Benz produced serially his "Victoria" model.

[22] Since 1825, steam boats were used for overseas connections. The first fast steam boat, the "Mauretania," was brought into action in 1907 in Great Britain.

[23] On 17 December 1903 the brothers O. and W. Wright carried out the first known flight in a motorized plane and initiated the era of flight traffic.

[24] The first takeoff of a zeppelin airship was effected on July 3, 1900 with "LZ1" from the Bodensee region, but with the disaster of Lakehurst on May 6, 1937 the airship era came to an end.

[25] Between 1860 and 1863, the first underground railway track in a city was constructed in London, but it was not before the replacement of steam locomotives by electric locomotives that the development of subway lines became common. The first subway opened in 1896 in Budapest, followed by the subway in Paris in 1900 and in many other cities during the following decades.

[26] Suburban lines based on electricity and running on their own tracks were developed for the solution of problems in local traffic in big cities. In 1871, the first part of a suburban line was opened in Berlin between Tempelhof, Rummelsburg and Moabit.

[27] The first tram was introduced in New York in 1852, and in Germany we find the first horse-drawn tram in Berlin and Charlottenburg in 1865. In 1879, Werner von Siemens produced the first tram based on an electric engine. Since 1881, the electric tram began to run in Berlin, but the first regular tram use began in 1891 in Halle/Saale.

[28] See Paul Virilio (1989), p. 79.

[29] Paul Virilio (1989), p. 86.

[30] Anton Joachimsthaler, *Die Breitspurbahn. Das Projekt zur Erschließung des groß-europäischen Raumes 1942-1945* (München: F. A. Herbig Verlagsbuchhandlung GmbH, 1986) (6.

enlarged edition 1999), especially pp. 192-221.

[31] See: Paul Atterbury, "Travel, Transport and Art Deco," in *Art Deco 1910-1939*, ed. Charlotte Benton, Tim Benton, Ghislaine Wood (London: Victoria & Albert Museum, 2003), pp. 315-323.

[32] See: Erich Rackwitz, *Reisen und Abenteuer im Zeppelin. Nach Erlebnissen und Erinnerungen des Dr. Hugo Eckener* (Berlin: Verlag Sport und Technik, 1958), (2nd improved edition), pp. 42-49; Max Geisenheyner, "Die Schlagzeile des Jahres 1929. Ein deutsches Luftschiff fährt um die Welt," in *Giganten der Lüfte. Geschichte und Technik der Zeppeline in ausgewählten Berichten und zahlreichen Fotos*, ed. Wolfgang Meighörner (Luxembourg: Nebel Verlag, 1997), (2nd updated edition), pp. 94-123.

[33] Giovanni Lista, " Was ist Futurismus?" in ... *auch wir Maschinen, auch wir mechanisiert! Die zweite Phase des italienischen Futurismus 1915-1945*, ed. Ingo Bartsch, Maurizio Scudiero (Bielefeld: Kerber Verlag, 2002), p. 33

[34] Gudrun Escher, "Aeropittura - Arte Sacra Futurista. Die futuristische Flugmalerei im Kontext von Fluggeschichte und zeitgenössischer Kunst," in: I. Bartsch (2002), pp. 47-56.

[35] W. Pehnt (1998), p. 137, 140.

[36] Quoted from a letter by Johannes Camis to Bodo Rasch in 1938. In *Zirkel 9, Bodo Rasch, Ideen, Projekte, Bauten, Werkbericht 1924 bis 1984*, (Stuttgart: Architecturgalerie am Weissenhof, 1984), p. 57.

[37] P. Virilio, (1989), p. 86-87.

[38] Volt (Vincenzo Fani Ciotti), "La casa futurista. Indipendente-Mobile-Meccanica-Esilarente," in *Roma Futurista*, N. 81, 25 April 1920 and N. 82, 2 May 1920. Quoted from Ezio Godoli, "Stadt, Architektur, Einrichtung," in I. Bartsch. M. Scudiero (2002), p. 132.

[39] P. Virilio, (1989), p. 177.

[40] *Ibidem*.

[41] See P. Virilio, (1982).

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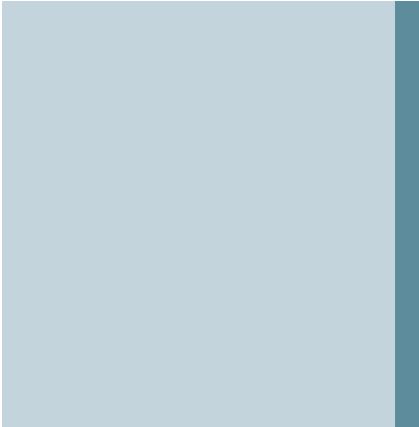
[42] See Virgilio Vercelloni, *Europäische Stadtutopien. Ein historischer Atlas*, (München: Diederichs, 1994), p. 185.

[43] Christoph Doswald, *Airbag Generation. Celebrating Inflatables. The Inflatable as a Simulation of Society* (Monaco: Grimaldi-Forum, 2000), p. 106.

[44] Christoph Tannert, "Pole. Räume. Resonanzpunkte," in *Valeska Peschke. Catalogue for the exhibition Plutonic // boxes. Inventionen im Stadtraum* (Frankfurt am Main: Dresdner Bank, 2000), without pagination.

[45] C. Tannert (2002).

[46] See: Gerd-Helge Vogel, "Wandel in der Ästhetik. Zu einem Beitrag auf dem XVI. Internationalen Kongress für Ästhetik in Rio



de Janeiro," in *Kulturpolitische Mitteilungen*. Nr. 106, III/2004,
pp. 44-45.

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