between nodes and data packets
FLORIAN RÖTZER

I. What will the intelligent houses and cities of the digital age be like? How will the life within them be organized? How will McLuhan's global electronic village integrate itself into the cities and villages?

These are the known horror scenarios of the electronic globetrotter, otaku or data dandy who holes up, lonely but in a teleorgiastic mood, in his media center, which is connected to the rest of the world via networks. At the same time, the environment does not interest him at all, and his home has become a mere house, the interior walls and facades of which are decorated with images and symbols. Life between the intelligent housings, in which artificial nature settles dies out for the most part, reduced to specific areas for the transportation of goods and physical sports, social encounters, staged events or the aesthetic perception of nature. Even the shrinking of the body, which has been declared a cumbersome bio-mass, is prophesied by some technophiles who are not afraid of this eventuality.

With the help of the media of immersion, journeys, adventures and encounters with other people are possible without having to leave the house. We could also move robots outside of the space built around us which contains our bodies by means of telepresence and telemechanics should our virtual face appearing on some type of surface not suffice. In 1995 an American company is planning to send a remote-controlled vehicle to the moon which can be piloted by anyone who is willing to pay, either from an amusement park or his or her private home. Furthermore, remote-controlled robots can be sent into wars and violent uprisings, contaminated areas, distant workplaces or just to the store, and one will be able to listen, speak, move, touch and feel at long-distance. Although one's presence in this world was formerly dependent on the body's location, teletechnology splits the experience of presence: One can be in two places at the same time.

But developments are progressing rapidly. Assuming that commercial interest is presently concentrated on making it possible for people to be connected to the networks at all times and by means of ever smaller battery-operated devices, wherever they might be, thereby filling in the gaps in virtual space, then the first steps are being made to replace the body in its function as an instrument of control. Cybersex with data suits and all the equipment for simulating and stimulating the body's surfaces seems even now to be the nostalgic mechanics of teleintimacy, comparable to a novel of chivalrous romance. The next step is directed towards the most important part of the body, the brain, and is intended to stimulate it directly, thereby dispensing with cumbersome apparatuses, and possibly even to enable its replacement. Up until now, neural prostheses, the coupling of natural and artificial data-processing systems, have been designed solely to replace damaged brain functions. However, they simultaneously increase the knowledge of how to influence and change the brain in other ways, thereby clearing the path for neurohacking. Screens will no longer be needed: A laser will draw the images onto the retina. Headphones will no longer be needed: A cochlea implant will stimulate our auditory center. Hands and body movements are no longer needed to control computer programs: Pointing the eyes, speaking, EEG signals from brain waves perform the same function. At present, direct stimulation of the visual center by means of signals from video cameras is being made possible. The direct coupling of neural tissue to computer systems and the implantation of chips in the brain is now the hot, new subject of research projects. Finally, we will no longer need our bodies for telemechanics; picking up the signals to the motor systems and directing them to machines will be sufficient. At the same time, we are trying to lock biological life into easily grasped and controllable cells that are independent

of their environment. "Biosphere II" has failed, but the project points the way from the ruined earth to the future of self-sufficient systems, of "singles" that have freed themselves of local conditions: from the intelligent house to the intelligent biotope. What is left of nature, permanently monitored by sensors, retreats to the innermost part of the space constructed around us, which is connected to other spaces solely by means of telecommunications.

The organization of the static space around us, between the cells of which the data packets circulate, will always be necessary. The important thing at present is not favoring an existence in the networks to the body's existence in "real" space, to say nothing of praising the former as being essentially superior, but designing the body's housing and its conditions for self-preservation. At present, of course, coupling the brain to computer systems directly and enabling the remote control of robots by means of telepresence and telemechanics is being worked on. Ambivalence concerning whether computer systems are being coupled to the brain or vice versa characterizes this project, which could lead in the long term to the detachment of cognition from the body and the implied here-and-now restrictions in a post-biological age. The near future, however, will bring different problems, the core of which will be the coordination of the various areas of tele-existence in the global network architectures, which are slowly drifting apart, and life at fixed locations. The important issues are therefore how cyberspace will be embedded in the real world and the retroactive effects it will have on this world.

II. We do not even know how the conventional mass media — books and newspapers, but above all telephone, radio and television — have intervened in the structure of our cities, in their architecture and especially in the details of the urban forms of life. Therefore, one can only speculate on the changes that will result from the broadband cable networks just now being installed. The telegraph and telephone have already extensively transformed the city into an instrument of spatial condensation, and therefore of acceleration, intensification and the coupling of communications and decision-making processes. When the difference between local and long-distance communication has been reduced, spatial condensation, which characterizes the cities, will become dispensable. In addition to the expansion of the global media, this process is, of course, driven by the acceleration of transportation and traffic.

Cities have always fulfilled the function of networking through condensation for the areas surrounding them; they are the focus of power, capital, the movement of goods, labor, knowledge and culture. Since the birth of the first cities, the have dominated history. Cities have not only been characterized by the fact that they are centers or main allures in their regions; they have also connected the various regions and, with their traffic routes, have represented a material network. Internally, the short distances have made it possible for all the different areas to interact quickly with one another and with the areas surrounding other centers; coordination and escalating competition been made possible; their dynamism has led them to use their elbows against one another. The collision of heterogeneous cultures and sharp social contrasts has contributed to the cities' dynamism, just as with the urban lifestyle, in the anonymity of which subcultures can develop. These subcultures have torn down the reigning social conventions and enabled new ways of dealing with foreignness.

The public sphere determined by the spatial nearness is migrating more and more to the realm of the media and networks. Still, as was already the case when telephone lines were laid, large agglomerations are the first to be connected to the information highways, which means that the cities are again more privileged than the countryside at first glance. However, this is a temporary process, which aids the urban periphery in its growth and, as a whole, further

undermines the importance of location. Information which travels through networks replaces the paths along which objects, people and information pass from one place to another and uses a new kind of simultaneity to connect locations far removed from one another in a virtual space which can no longer be localized. The telephone gave birth to the dimension of tele-existence in cyberspace, which is beyond real space and changes its coupling function. The telephone, the prototype for the networked media, made spatial distortion and coordination of actions and decisions possible. This has affected commerce, politics and administration, but also private life. Meetings can be arranged quickly; close relationships develop at long distance. The private sphere is perforated by the media, while the public sphere and its opportunity for chance encounters loses importance.

In the past few decades in Europe, the trend of turning the old urban centers into open-air museums has begun. They are to be protected as monuments and exhibits, while everything behind the facades is changed. On the other hand, the "Kommission Zukunft Stadt 2000" ("Urban Future Commission 2000") called into being by the German Federal Government determined the following: "City planning on the periphery is no longer characterized by a consensus, or by a code of regulations and rules of behavior. In the past 15 to 20 years, city planning on the periphery has pursued ad hoc solutions leading to arbitrary results for the structural shapes and the designs of the investors". In spite of the regionalistic attitude, which emerged in the postmodern period, this caprice is not very widespread in the rest of the world. More than ever, construction makes use of an international style, which brings peripheries into conformity with one another just as the rest of the culture has conformed to popular culture. Multinational companies and the increasing concentration of capital permeate regional centers with their branch offices, which are identical wherever they are found. If the public sphere is in any case too dangerous or too barren and therefore to be avoided as much as possible or only traversed quickly, the old city centers are transformed into urban museums and shopping zones. These areas are pervaded with the cathedrals of international concerns, while the networks permit the commercialization of every step taken in their "public" spaces. The stroller pays for everything that he or she sees, or is bombarded with advertising to which he or she must submit when merely passing from one place to the next. Advertising, however, is no longer diffusely directed at everyone and is therefore directed at no one; now, every step taken is tracked and the offerings are tailored to the individual stroller.

The influence of the mass media and the opportunity to come into contact with others at any time is possibly an important reason why many people live in the suburbs[1] to the exclusion of any urbanity, holed up in their private spheres, and why traditional familial structures are disintegrating. Spatial closeness develops into mere coexistence, and interaction from within the private caves takes place only with distant partners. At present, the media occupies urban space. In contrast to streets, paths, doors and windows, information highways and networks, the doors to cyberspace, are not immediate elements of architectural design, even if they must lead into and out of the structures.

We probably still underestimate the meaning of cities because they still exist at present as relics. In the last decades, the most important changes have taken place behind the distracting theatrical architecture in the urban periphery and in rural areas — and always outside of the 'great" architecture and urban planning. After networks with broadband cable and satellites have made many of those functions of the cities, which are based on the concentration of heterogeneous institutions and cultures superfluous, a ruralization of the information society might begin. Concentration through condensation would no longer be important. Dispersion and networking over great distances would set the standards for the sizes of orientation. That would correspond to the transition from the serial processing, centralized von Neumann

computer to decentralized computer architectures which function parallel on a massive scale. Rural or digital urbanism (Martin Pawley) and its lack of densely settled areas and a universal face extends along the traffic networks, mixing residential areas in the countryside with settlements in industrial regions, warehouses, administration buildings, agriculture and biotopes, leaving the city centers empty of social life. Because of the greater quality of life offered and thanks to the spatial independence enabled by telecommunications, the middle class is withdrawing from the city centers, and this trend is especially obvious in the USA. The new cities in the country leave the differentiation between center, periphery and countryside behind and destroy the traditional hierarchy through which regions are organized, controlled and represented by a center, or a central accounting unit, so to speak. Even now, the contours of the new European metropolises can be seen; they begin in Milan, run through Switzerland and along the Rhine into the Benelux countries and end in London.

III. The body's material environment, as shown by the value now placed on the body and nature, will not become unimportant in the society of digital networks, though it will be organized and directed strictly according to functional criteria. At the same time, more and more of the external world's functions will be assumed by the constructed spaces of the internal world. The informatization of ecological systems, the permanent monitoring by means of all kinds of sensors, serves the primary purpose of providing warning and security systems designed to enable the protection of the foundations of human life. The resulting knowledge, however, is directed towards the ability to control the complex ecological machine and, should this be impossible, to construct autonomous microcosms which are isolated from the environment, which are completely monitored and which can be 'run" in the same way as other extensive technical systems. The external world is used for the transportation of goods and people; nature serves as the place of food production and that of certain recreational needs, to which the aesthetic perception of "staged" nature in parks, nature preserves and biotopes belongs. The environment continues to be a resource one must protect in certain respects in order to maintain life in the constructed areas, which however tend to become more independent and autonomous because of their "intelligence". The homebodies in their bunkers will replace spatial closeness with an intimate telepresence; the encounters in cyberspace will supersede those in the public space, which will become more and more inhospitable.

If "Biosphere II" is the ultimate model for digital urbanism, then the intelligent box is its predecessor. One of the first steps in this direction, though it is per se less important, but still spectacular, was the creation of "media facades", which will cover the walls of certain buildings of the future. Architecture, which stands immobile, is dynamized not only in its form; its interior and exterior will be transformed to make it a vehicle that navigates through the virtual spaces.

When the Center for Art and Media Technology in Karlsruhe, Germany invited architects to submit entries in a contest for a new building (which was never constructed due to a lack of funds) Rem Koolhaas' design won the first prize. The main body, a symbol of the media culture that would exist within it, was to be simple and monumental. Of course, a "media facade" was planned, and the visual spectacle would have delighted rather those persons arriving on the highway than the passers-by on the street. Surely, the myth of functionalism has been shattered just as that of being able to read a book by its cover. "Media facades" are only sequels to the decorated boxes of which Venturi had spoken: the vehicles of advertising messages, residue from the public sphere that lives within its housing. Toyo Ito's "Tower of the Winds", on the other hand, controls the facade according to ecological data. A computer program translates the random audio-visual impulses into a constantly changing light

installation. Here too, however, facts are only transformed into a monumental aesthetic event in that the intelligent facades of the future will use sensors to scan the events taking place in the environment in order to maintain the stability of the interior climate. The box planned by Koolhaas not only shows that the architecture of the digital age will reduce buildings to mere housings, he also expresses the form in which the digital technology is embedded. It is the form, which continues to serve a function solely for the multi-functional and mutable internal spaces, specifically those functions of providing protection with the necessary interface ports.

IV. Sweeping promises accompany the future network of the so-called information super-highways through which it will be possible to send data packets around the world. Many things are supposed to change and these changes will exercise considerable influence on the nature of urban life and its architecture. This assumes that it will be possible for everyone to afford (or that everyone will be forced to acquire for reasons of survival) access to the networks everywhere and all the time, and therefore be able to communicate with everyone in the world, who are all connected to the network as well. The pillars of this change would be tele-homework, tele-shopping, tele-education, etc. and the resulting decentralization of organizations, the slimming down of companies and administrations to the point of their becoming virtual enterprises, and the increase in free-lance labor without any job security. The latter is a factor, which makes the necessity of spatial condensation largely superfluous and which could reduce the volume of traffic, while the transport of goods will certainly continue to increase as a result of the growing dislocation and decentralization.

The media stations in private apartments or houses will be in the center of the upheaval. One will no longer travel to work by car or public transportation, but by modem, so to speak. Telecommuting will become the new labor form. At least, this is the goal of telecommunication enthusiasts: "The standard apartment or house will not only have a living room, bedroom, kitchen and bathroom — a new room, which we could call the 'communications room', will become the focus. The media station, or the monitor, will be located at the center. All information will arrive at or depart from this room. This media station will be connected to an 'in-house network' linking all the rooms in the house or apartment. … One will even be able to activate the station from the yard, via cellular devices, meaning that a physical presence in the communications room is unnecessary. This creates the possibility of relaxing outside and still being on standby. … By relocating the workplace to the area that was formerly exclusively private, the apartment will become a living space to a considerably greater degree. A consequence of this development: The amount of office space will decrease, and the size of apartments and residential houses will grow. The remaining 'industrial administration space' will also have a different appearance. … The architecture will be forced to adapt to the status of a 'meeting-place'. This means that the issue of living and working space must be redefined and discussed anew."[2]

That which sounds so inviting (and which will probably be reality for a only certain class) will not really be, in the final analysis, so very attractive, especially as everything depends on whether the utilization of information super-highways makes economic sense in the first place. IBM Deutschland has apparently already halted the further increase in the number of teleworkstations in the face of the immense costs involved. On the other hand, residents of the Third World are already being hired to perform simple telework tasks - of course without any job security and at extremely low wages - because the location of the workplace is no longer important and the multinational companies can easily divert operations to other locations which promise to provide higher profits.

At present, the fact can also be observed that the decentralization of production, made possible by telecommunications and the opportunities for swift transportation, is leading to an increase in inexpensive labor in the wealthy countries' service sectors. Most of all, in other words, in that sector which fills the gaps created by automatization and telecommunications. In spite of the renewed upswing of and increase in these low-paid jobs, the process of pauperization has increased by leaps and bounds in the USA in recent years and can be observed in Europe also. As long as the world is organized into nationstates, the various countries and communities will be hostages of the multinational companies. And wherever the population density and concentration of problems are greatest, the dreams of the reawakening of cities will also founder because of the lack of these cities' money.

V. If this diagnosis is correct, further erosion in the border between city and country will be the result for urban areas. As the need for living space rises, complete utilization will increase, as will the ecological problems of uncontrolled development, even if there are no considerable changes in the areas with intensive agricultural industries or artificial ecotopes are created to replace the landscape that has disappeared. With the exception of a few global cities, which will continue to exist (as Saskia Sassen argued) and which will be the places where management and certain special services provided by the multinational companies are concentrated, the urban areas will decline in importance. This can be seen in the downfall of the once great and powerful industrial bases.

Of course, the pathways to work and those to meetings will be shortened, but passenger-car traffic will not decrease considerably, because the construction of public transportation networks, which service large areas of the periphery and the countryside, is impossible. Public-transport networks are usually starshaped in alignment with the urban center and adapted to the currents of conventional cities from the exterior to the interior and vice versa. As more and more working and living spaces are moved out of the center, traffic between it and the periphery or the country will increase, and the trips which have been saved by teleshopping will be made up through the delivery.

The brave, new world of telework is intended to turn the private domicile into a workplace. With the exception of a few jobs in production, distribution and customer service, many processes could be controlled by remote control via the networks and with the aid of the technologies of telepresence and telemechanics. This would include "custom mass production" of consumer goods within certain standards by means of Computer Integrated Manufacturing (CIM) combined with just-in-time production; the customer, in addition to choosing and ordering prefabricated goods at a distance, would be able to determine and control the design of the desired product. Life in the electronic cave, which increasingly combines work and leisure time, will also promote the individual's isolation, at least in that one will no longer be forced to leave the private sphere every working day and spend a relatively large amount of time with strangers in the same room. This might not only be a problem for singles, but also for small families, which presumably are able to keep functioning more or less because they are not forced to be together constantly and because fixed working hours provide them with time apart; telework, on the other hand, could lead to personal conflicts in the process of balancing interests which then evoke psychological strains, thereby possibly making relationships with a quantum of distance, telesocial relationships, more attractive. In any case, the consequences of a society networking via telecommunications will extend into the private sphere and require a change in the organization of the private life which will, in turn, be reflected in architecture and urban spatial structure.

VI. The brave, new world of the networks and the life forms developing in them is global, but it also contains huge areas which remain unexplored and lag behind. These areas can be found not in rural areas, but in the cities. It appeared for a time that the attraction of the cities in Europe had disappeared, as if their death, proclaimed by many, had finally taken place, and that they have begun to grow in the recent past, above all because of the immigration and influx of foreigners. At same time, the cities of the Third World continue to explode, and the rural population figures sink steadily. At present, between 45% and 60% of the world's population live in cities, and this figure was only 10% 30 years ago. Slums and ghettos are replacing the villages, and their growth is exponential. In many metropolises in developing countries, almost half of the residents will soon live in slums or on the streets of the city, or at least in an area connected to the city, but strictly separated form urban life, caught in the trap of new social structures with their own rules and almost always living with the fact that they will have to resign themselves to remaining outsiders.

Territorial closeness in this case does not only provide the chance to integrate oneself into the established urban life at some point. Poverty and unemployment characterize suburbs, ghettos and slums, by ethnic minorities, refugees and immigrants, by crime, drugs and alcohol, by warring youth gangs and an underground economy, by a more or less lawless area which evades the political authorities and urban administration. Many other characteristics of urban life are also missing in the European suburbs; only boredom is in abundance. There are few businesses and fewer jobs. Leisure-time facilities are just as rare as those of the public transportation system. Instead, radio and television form a link between the people and urban life, which is often further removed from the suburbs and slums in a social sense than from the villages and small towns, although the standards of the popular culture, which in principle promise participation, are omnipresent thanks to telecommunications technology. To a great extent, they have drowned out and destroyed the social culture and neighborhood control of even the earlier worker settlements. One constantly sees that which one can neither be nor have. The media, in so far as the residents of the suburbs can afford them, are similar to messengers from another world who constantly pound the difference in levels of affluence into the heads of the people and show them how things are somewhere else, possibly just around the corner. Interactive media such as computer games reinforce this trend of promising participation, though even television has, of course, already undermined social ties, which are of course always constraints. Media do not always force themselves onto their consumers; they do not always attempt to draw them in by constantly showing the crossing of borders and making the intimate public. They also have a tendency to invade every niche of everyday life, thereby blurring the conventional borders between the private and public spheres.

This process of mediatization began after the end of the Second World War. Portable and ever cheaper transistor models replaced the cumbersome tabletop radios. Television established itself as an instrument of mass media in the 60's. Since then, we have approached a situation in which everyone has his or her own set and that several hours or more of leisure time are spent connected to the electronic world. This process is accompanied by the decay of broadcasting in programs, which cater to ever-smaller social groups with ever more specialized programs. The withdrawal from the streets and the squares, the urban public media, is accompanied by a withdrawal from social ties. Coupling to the media, which is especially evident in the case of walkmen and interactive media, leads to an uncoupling from the immediate surroundings, which springs from the tendency to uncouple from the immediate surroundings.

This uncoupling last involves considerable consequences in the urban areas characterized by unemployment, although it may be possible that this will occur only in a time of transition as

a change is made from industrial to the information society because the street, the public space, is becoming more and more dangerous: One no longer knows his or her neighbors; fluctuation is greater and unemployment hinders the formation of a common social identity; the apartment becomes a place of retreat; a person's close, personal sphere is being substituted by the media's public sphere, which is becoming more and more fragmented. The windows no longer open to the outside; the screen brings the distant reality into the room: an immediate spatial coupling at long-distance and herald of a tele-existence which is being ushered in by the expansion of the networks.

The real contact with the "other" world, which takes place in the impoverished suburbs, are often maintained only by the school, social workers and police officers. Some people hardly ever leave their neighborhoods, while the residents of the rest of the city avoid those areas and close themselves off more and more from public life in social niches and barricaded homes, workplaces and shopping centers rolled into one. Regarded socially, these enclaves give birth to the autonomous systems on which "Biosphere II" is modelled in an ecological sense. "Security is one of the most important features of an apartment or an office, and furnishing it with the appropriate technology has already become a status symbol: armed response. The formerly open city is being equipped with doors, gratings and observation cameras." Increasingly, public places are being monitored, if not transformed, into fortresses: "The new architecture is oriented entirely towards creating bunkers, towards strict separation of the public and private … More and more activities (hotel, theater, restaurant, shopping) must take place indoors; mingling with unmonitored groups is to be avoided."[3]

The division of the cities, their centrification, makes networks seem to be bridges spanning the growing urban "black holes" and, in so doing, they intensify the exclusion. In their report on the "black holes" of the French suburbs, Dubet and Lapeyronnie, present an exemplary characterization of the dire situation of the youth brought about by the lack of an organic everyday culture and the failure of social integration. "The 'galère' (Fr., slang for suburb) is born of the destruction of a certain way of life. It consists of the ruins of the old world, and its pieced together nature prohibits understanding it as a subculture … Youths who grow up in the 'galère' are uprooted. Whether their parents are native French or immigrants has no bearing; there are no cultural contrasts between these two groups. The experiences of both are based in an unstable world of assorted props in which local ties are more vital than national or ethnic roots. In the world of the 'galère', distrust, hostility and fear burden interpersonal relationships. Racial conflict expresses itself there in social and economic competition and not in irreconcilable cultural differences. The result is not confrontation between various cultures and communities, but a war freefor-all."[4]

Although, when examined from a superficial perspective, racism and the ethnocity seem to characterize these new ways of life, the disintegration of the cultural identity as a result of a levelled global culture is revealed in the book "Aus der Vorstädte". Ethnic props, ethnic discrimination and ethnic alliances play a certain role in it, but only as an Ersatz for the expected participation in the global culture visible everywhere in the media images. As an example, a type of transitional culture develops in the urban suburbs, which could, of course, also be located in the center. This transitional culture, showing here its desperate and brutal side, participates in those processes which set a standard for the networked global culture and all its racist rejections - dissolution of traditions and the bonds to localities and regions through increasing mobility and global telecommunications leading to the creation of new ways of life and a future tele-existence which uses and radicalizes the free areas established in conventional urban life. Regional bonds and identities prevent the transition to the age of the networks. The present flare-up of national and ethnic ambitions is only one last desperate

struggle before the disappearance of cultural diversity in the network of systems, in the system of the networks.

1 Trans. note: In this text, "suburb" refers to the German "Vorstadt" or French "banlieue" rather than the middle or upper-class American suburb.

2 Josef Brauner/Roland Bickmann: "Die multimediale Gesellschaft", Frankfurt 1994, pp. 123

3 "New York. Strukturen einer Metropole", Edited by H. Häußermann and W. Seibel, Frankfurt 1993, p. 18

4 François Dubet/Didier Lapeyronnie: "Aus der Vorstädte. Der Zerfall der demokratischen Gemeinschaft" Stuttgart 1994, pp.118