Philosophy of the Internet

A Discourse on the Nature of the Internet

László Ropolyi

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Dedication

This convict-age can subjugate youse
but you become free if not
to build inside a house
in which a landlord settles down

—(A fragment of the poem „Consciousness” by Attila József)

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Theses about the reformation of knowledge

1. There are similarities between the intellectual challenges faced by the unhappy inhabitants of the 15th and 16th centuries and of our age: the citizen of the middle ages and the "netizen" of our age are participants of *analogous processes*.

2. It was the *crisis of* religious *faith* which unfolded in the late Middle Ages; in our age, we can observe the *crisis of* rational *knowledge*.

3. After that earlier crisis – with the efficient support of reformation movements – we could experience the rise of rational thought and the scientific worldview; nowadays, 500 years later, this scientific worldview itself is in crisis.

4. Today, the question is how we can become liberated from the power of decontextualized, abstract rationality which gained an absolute power over life.

5. Using the possibilities offered by the Internet, today the *reformation of knowledge* is taking place in the emancipation process leading out of the crisis of our days.

6. The reformers of knowledge diagnose the transformation of the whole of human culture: the possibility of a *direct relationship between the individual and knowledge* pushes into the background the power of the institutional system of abstract knowledge (universities, academies, research facilities, libraries and publishers) and their experts (qualified scientists, professors and editors).

7. We can observe the birth of a newly born man, who, having freed himself from the rule of *abstract emotions* in the Middle Ages, now wants to throw off the yoke of *abstract rationality* as well, but whose personality, value system and thinking is still unknown and essentially mysterious to us.

8. Perhaps we can ferret out certain secrets of our unavoidable progress by comparing the processes of the late middle age and our age, with the help of the *analogy between the reformation of faith and knowledge*.

9. The events of the 20th century we have just left behind heavily damaged the reputation of sciences and all kinds of institutionalized scientific thought.

10. The scientific results and institutions serving war machines, the usage of scientific discoveries which enable exceptional capabilities for the mass murder of unarmed people, the unbearably antihuman practices of political systems asserting the principles of rationality, the real closeness of environmental catastrophes which are the result of modern technological processes thought to be scientifically based and which are threatening us with the destruction of life on Earth – perhaps all these illustrate the critical state of modern knowledge sufficiently.

11. It is quite obvious that we do not simply talk about the inadequacy and insufficiency of the devious nature of scientific knowledge, but it is the nature of the social embeddedness of knowledge, its role in legitimizing modern power, and the system of the conditions of creating and using knowledge, which are responsible for the creation and development of the crisis.

12. *Postmodern* thought appeared as a – more or less conscious – reflection on the critical circumstances, as the eminent version of the philosophy of the crisis.

13. The postmodern standpoint clearly perceives the disintegration of the modernist worldview built on abstract rationality. What is more, it evaluates it as a necessary and desirable development, but essentially, it does not have anything to say about the perspectives of overcoming the crisis.

14. The postmodern standpoint literally means standing: it is the position of standing in the crisis.

15. The Internet developed and became widespread *simultaneously* with the propagation of the postmodern standpoint.

16. It can be demonstrated that the Internet realizes precisely the postmodern values in its structure, organization and way of functioning: *the Internet is a postmodern being*.

17. It seems that the crisis of modernity created a tool which is in accordance with its value system, which, as a result of this accordance, is worth keeping and even developing further.

18. However, this tool, the Internet, at the same time seems to be useful for performing activities which are built on the postmodern world but which nevertheless transcend it and can be used for studying the search for the way out of the crisis.

19. It is well-known that as a consequence of the consistently developed pluralism of the postmodern, the modern values are also part of the postmodern value system, so it is also understandable that a great part of Internet use follows modernist aims (commerce, correspondence, administration, etc.).

20. Nevertheless, we can regard the creation and study of various *websites* and the maintenance of and roaming in these worlds, that is, networking and surfing, as the typical forms of Internet use.

21. Essentially, organized on the basis of radically different value systems, and in an infinite number of individual versions, the whole of human culture is represented on websites which are multiplying with an incredible speed.

22. Most of the knowledge of mankind can be found on websites, but knowledge represented in this form is not available for the visitors of the websites adjusted to the value system of modern society and of the modern scientific institutional system. We do not encounter it ordered according to a universal rationality, but it can be studied mostly in a particular form, through contents and structures determined by individual values and contingencies.

23. The paths leading to truth are individual, and of course, it is a question whether the truths which can be reached this way are not too individual.

24. It seems to be obvious that the knowledge represented on websites is fit into a context which is essentially different from its social embeddedness which can be observed in modernity. Indeed, the goal of such "epistemological" activities is often the creation of new contexts.

25. Knowledge acquires a new form on the Internet.

26. The spread of postmodern pluralism unfolding in recent years as a result of the crisis of modern knowledge led to the outbreak of the so-called "*science wars*".

27. As an intellectual reaction against the pluralization of knowledge, the modernist warriors of the "science wars" declare the unity of the scientific worldview and the need to make the interpretation of scientific truths exclusive, and they aggressively attack the "loosening" institutional system and publication practices.

28. The "science wars" facilitate the return to the traditional social embeddedness and modernist form of knowledge.

29. The processes sketched above unfolding in the social-human context of knowledge in recent decades display many similarities with the changes of religious faith in the late Middle Ages.

30. *The crisis of religious faith* developed 500 years ago.

31. The religious worldview lost its earlier stability in those times. The trust of people in the contemporaneous religious institutional system and the official experts of faith faltered.

32. At the same time, it is also obvious that the people did not necessarily regard divine truths as objectionable. Rather, they condemned their social embeddedness, their legitimizing of political power, and the social system of conditions of the creation and use of religious truths.

33. The *reformation* movements of the age were created as a response to the crisis of faith, as a consequence of which religious faith became plural to a significant degree.

34. The defenders of reformation declared the disintegration of the worldview based on the value system of the Catholic Church. What is more, they evaluated it as a necessary and desirable development.

35. Reformed faith broke with the Catholic approach to faith, which can be characterized as an abstract emotional state, and it fought for the acceptance of the personal versions of the relationship to God. But of course, its "suggestions to overcome the crisis" did not lead out of the world of faith.

36. Through making use of rationality, the reformers made the abstract emotional system of religious faith individual and concrete.

37. It is well-known that printing played an important role in the reformation of faith.

38. Books are tools which are in harmony with the value system of the modern world. They made it possible to experience faith in a personal way, and its reformation was a result of the fact that the modern book was capable of accommodating the value system of the middle ages, and, in the form of the Bible, give it into the hands of the people in significant numbers (and occasionally in national languages).

39. But the typical use of the *book as a modern tool* is not this, but rather the creation and study of modern narratives in seemingly infinite versions. Books express various theories and stories.

40. As a result of the development of the movements of the Reformation, *counter-reformation* activities increased against pluralizing the world of religious faith, and with a need to defend the unity of the religious worldview and to return to the catholic institutional system and forms of religious activities.

41. If we compare the historical versions of the social status of rational knowledge and religious faith, the similarities will be striking.

42. On the basis of all this, our choice of words seems to be justified and we can rightly talk about the *reformation of knowledge* as the tendency of the change of the embeddedness of knowledge characteristic of our age.

43. The *scenes* of the reformation of religious faith were the religious institutions (churches, monasteries, the Bible, etc.).

44. In our days, the reformation of knowledge is generated in the scientific institutional system: in research facilities, universities, libraries, and publishers. (Remember that the idea of editing websites was created by one of the researchers of CERN. Furthermore, a significant proportion of websites can still be found on the servers of universities, libraries, media libraries, and publishers.)

45. The reformation of religious faith was a development unfolding from the crisis of religious faith. The reformation of knowledge is a series of changes unfolding from the crisis of rational knowledge.

46. In both cases, the (religious and scientific) institutional system, and the expert bodies (the structure of the church, schools, mostly universities, research facilities, libraries and publishers, and priests, researchers, teachers and editors) lose their credibility as well as their significance in religious and scientific life.

47. Instead of the abstract forms of faith and knowledge that they represent, and which are valid for everybody, huge masses of people favor concrete, individual forms which are only valid for them.

48. The reformation of faith, getting rid of the influence of the religious institutional system, is striving for developing a direct relationship between *the individual and God*. The reformation of knowledge develops a direct relationship between *the individuals and knowledge*, scientific knowledge.

49. Knowledge can essentially be represented and studied on the Internet independently of the influence of the scientific institutional system. There are no editors and referees on websites; everyone has to take responsibility for their own standpoint.

50. Of course, there are refereed journals on the Internet as well, but they are essentially not different from those printed on paper – they are obviously modernist products and they do not represent the real mentality of the Internet.

51. Being liberated from the rule of abstract emotion, the people of the middle ages became individual.

52. The reformation of faith played a key role in the process of the development of the modern individual: creating a harmony between divine predestination and individual free will, it secured the possibility of personal faith, making the development of individuals possible and desirable in great masses.

53. However, the developing *modern individual* losing her embeddedness in her traditional world, finds herself in an environment which is alien and even hostile to her.

54. Everyone and everything is dangerous, she can only feel safe if she herself controls the conditions of her existence. Thus, control is at the center of the worldview of the modern individual.

55. As a consequence of her fear and desire for safety, the striving for unconditional control will become her nature; the modern individual is *selfish*.

56. Man, participating in the reformation of knowledge (yet again after the events several hundreds of years before), is forced into another individualization process.

57. The development of the *postmodern individual* is taking place through the operation of a personal relationship to knowledge.

58. The postmodern personality, being liberated from the rule of the modernist institutional system of knowledge, finds herself in an uncertain position: she herself can make decisions about scientific truth, but she cannot rely on anything for her decision.

59. How can we decide whether a claim on a website intended to be scientific is true or false? We can only pay attention to ourselves, our own earlier experiences and a few small signs (e.g. the characteristics of the URL address).

60. This results in a quite uncertain situation in an epistemological sense. How can we tackle this difficulty?

61. Back then, the modern individual asked the help of rationality and found some solutions, e.g. the principle of rational egoism or the idea of the social contract.

62. But what can the postmodern personality do today? Should she perhaps follow some kind *post-selfish* attitude? But what could be its content? Could it be perhaps a certain plural or virtual selfishness? Though the postmodern personality was liberated from the rule of abstract rationality, it seems that until now, she has not managed to find a new human ability to help in overcoming her epistemological uncertainty.

63. The *modern personality* is similar to a mechanical body. In order to understand it we can even regard it as a ball. It has its own abilities and capacities, it has both a momentum and inertia, and it even leaves its mark. Its movement has its laws, and its trajectory can be predicted through rational calculation.

64. The *postmodern personality* is subjected to the inflation of personality. The inflated individual is similar to a balloon, rather than a ball. It is seemingly extended, but it is weightless and empty in the inside; it flies away easily and it is very vulnerable. It is unstable and capable of unexpected and fast transformations; it has a chaotic dynamics. As it inflates, all of its pieces lose their value continuously.

65. If we choose a wider historical perspective, we will see that in different ages, people tried to understand their environment and their own selves, and they tried to survive while relying on different abstract human abilities at different times.

66. Primordial societies based their magical explanation of the world on the *will*, and we successfully survived.

67. After the will, the *senses* were in the mythological center of Antiquity – and the normal childhood of mankind passed, too.

68. The religious worldview of the Middle Ages developed by taking into account the dominance of *emotions* – and this ended, too.

69. In the age of shining *rationality*, the scientific worldview served the rule of man – until our times.

70. Today even the trust in the scientific worldview seems to falter; the age of Internet culture has come.

71. However, the problem is that for its creation and usage, we cannot utilize yet another human ability since we have tried all of them. Or have we? Do we still have hidden resources?

72. Or perhaps we can finally say goodbye to the useful abstractions, and a new phase of development of mankind is waiting for us, taking place in the *realm of the concrete*?

73. Fellow netizens! Let us turn on our computers! 500 years after the reformation of faith, the age of the reformation of knowledge has come.

Introduction

When Martin Luther formulated his polemical essay titled *Disputation on the Power and Efficacy of Indulgences,* declaring his lack of satisfaction with the prevailing system, and posted his 95 theses on the gate of the church of Wittenberg on October 31, 1517, he obviously could not foresee the attack against the World Trade Center in New York on September 11, 2001, demonstrating a lack of satisfaction with the prevailing world order and carried out with the help of fanatic believers. How could he have thought of anything like this? For nothing suggested this in the world of the middle ages known by Luther. There were no airplanes and the city of New York did not exist either, and perhaps it also seems to be obvious that an event so distant and horrific would have been impossible to relate to the religious practices of either the church –debated by Luther – or the version reformed on the basis of Luther's criticism.

However, this discourse was made in an age in which both Luther's demonstrative deed and that of al-Qaeda, as well as their far-reaching consequences, play an important role; it is an age in which we have some experience in the application of the stake and airplanes as tools of ideological justice, and whether we like it or not, striving for understanding of the current state of the world, we have to consider all these (and of course many others), keeping in mind their possible connections. In what follows, we will try to achieve this by attempting to follow the ideological and cultural changes of the period between the beginning of reformation and our days and to identify the tendencies unfolding in this process and becoming visible currently.

Unfortunately, we cannot present the whole 500 year process of change in one or two volumes; thus, we will only attempt to compare the *age of church reformation* and the ideological-cultural ambitions of *our days* while concentrating on the beginning and the end of the historical process. Our choice is motivated by the conviction that we can point out essential similarities between the significant circumstances and processes of these two ages, and by paying attention to these similarities we can contribute to a better understanding of both ages.

The period between the age of reformation and our age is the age of the rise, booming and decline of *modernity* in western civilization. Thus, we will compare the beginning and end of modern European culture in our train of thought, and we will pay little attention to the intermittent period which seems to be much more homogeneous from an ideological point of view. On the other hand, perhaps it would be better to stay that we are looking for similarities between the pre-modern ideological-cultural changes which *led to the development of the modern value system,* and the *formation* of the current *value system after modernity* (amodern, or rather, postmodern), since we are not only trying to evaluate the current state of affairs, but to describe the development and formation of the social-cultural state of affairs. In this context, it is also the goal of our book to sketch a few characteristic social and cultural processes of the near future.

Knowledge is a determinative factor of the culture of the modern age. A sharp antagonism towards beliefs of the middle ages and scholastic thinking, a commitment to developing a new worldview which is based on modern science and the rational construction of the skeptical and experimenting man are inseparably a part of the self-understanding of modernity. Since modern knowledge (together with the institutional system built in the recent centuries) is obviously generated and functions in the value system of modernity and deeply permeated by this value system, it loses a lot of its explanatory power, validity, credibility, and usefulness with the decay of the modern value system. The *crisis* of modernity also clearly presents the modernist ideas concerning the nature of knowledge and its social functions as doubtful; the critics of modernity often also diagnose the crisis of modern science. In this situation, it seems to be obvious that for a better understanding of the crisis situation of the scientific institutional system, we have to make use of the lessons of earlier crisis situations. What we will present later on is crucially based on a comparison of this kind: *on the comparison of the crisis of faith in the late middle ages and the (late modern) crisis of rational knowledge*. One of the interesting aspects of the comparison is the fact that it is the modern scientific worldview developing from the crisis of religious faith which got in to a similar state of crisis 500 years later. This situation – at least in principle – makes it easier to identify the paths leading out of the crisis. *The crisis of religious faith led to the reformation of faith during the decades of the European Renaissance, the current crisis of knowledge leads to the reformation of knowledge during the decades of the existence of the postmodern*.

It is an interesting and important fact that during the development and existence of the crisis situations, we can observe essential changes in the dominant information technologies of the ages. *Printing* appeared in Europe in the period of the crisis of faith, and during the unfolding of the crisis of knowledge, electronic information technology

appears and becomes widely used, including the most characteristic technology of the age, the *Internet,* as a worldwide information network. It can be shown clearly that printing played an indispensable role in the unfolding of the reformation of the church, and we can rightly assume that the existence and peculiar usage of the Internet will inevitably be necessary for the process of the reformation of knowledge. As a result, the analysis *of the nature of the Internet and its social and cultural* role will be an important component of our train of thought predicting the reformation of knowledge.

It is obvious that the Internet cannot exist without the cooperation of a multitude of computers. In this way, we have to pay much attention to the analysis of the nature of computers and to the way the separated are organized computers into networks. Studying the principles of the structure and functioning of computers, we can undoubtedly point out that the computer is a modern tool, that is, it realizes the values of modernity in its structure and functioning. At the same time, we will argue that the worldwide network of computers follows a different value system, that is, the organization and structure of connecting computers into the network, and chiefly the way we use them in the network, follows and realizes postmodern values. That is, while *the computer is a modern tool, the Internet is a postmodern one*. According to our assumption, similarly to the age of the Renaissance, when *modern books* significantly contributed to overcoming the crisis of faith of the Middle Ages, in our days we will be able to overcome the crisis of knowledge of the modern age through the use of the *postmodern Internet.*

*

We would like to contribute to all problem areas mentioned above in two volumes, and sketch a scenario of the transformation of culture and society taking place in our days which seems to be plausible to us. For an adequate presentation of the topic, we did not find it indispensable to discuss the history of the reformation of the church in detail, since the details of the history which are important to us can mostly be regarded as part of general education. If necessary, other sources written by expert authors are easily accessible for all readers. However, the case is different with the Internet. Though many people have experiences about the usage of the Internet and many guides and manuals are available, only a few can access the sporadically presented, theoretically demanding discussions which systematize the experiences. As an illustration, we would like to overview the situation in Hungary – and the state of the affairs visible from Hungary around 2005. Though the *e-column* of the journal *Replika* (http://www.replika.c3.hu) regularly published writings of this kind in Hungarian, and we can find numerous interesting studies on the website of the Institute of Philosophy of the Hungarian Academy of Sciences (http://www.phil-inst.hu/) only a few books were published which *analyze* the Internet until recent years. In this way, perhaps it is understandable that we would like to deal with the analysis of the formation and characteristics of the Internet relatively in detail, since without knowledge of this kind, our ideas about the problems of cyber culture and the reformation of knowledge would be incomprehensible.

For this reason, we will devote this *first volume* of our treatise to the analysis of the development and the nature of the Internet. We will try to present the technological, communicative, and cultural processes which led to the development of the Internet within the social-ideological context characteristic of the age, and we will attempt to clarify the more important features of the nature of the Internet determined by these. In fact, we could also say that we are looking for a social historical explanation of the nature of the Internet. In the *second volume* of our treatise, we will discuss the analogous features of the church reform of the late middle ages and the cyber culture of our age (especially knowledge represented and utilized on the Internet), furthermore, – comparing the lessons of the nature and usage of the Internet and the similarities between cultural-historical situations – we will attempt to present the processes of the reformation of knowledge taking place in our days and its foreseeable perspectives. Moreover, we will try to sketch the most important characteristics of a new, unfolding form of human existence, *web life*. The reader is holding the first volume of the treatise in his hands. The second volume is being prepared and will hopefully be published in the near future.

Since the analysis of the Internet is a part of the area under discussion, the treatment of our topic required the study of unusually diverse sources. The extremes of scale were probably represented by the multi-volume monographs produced through conventional publishing methods and the short but succinct messages written by self-appointed saviors and published for the education of web citizens; of course, a lot of things are in between the two: philosophical treatises accessible in libraries or on the web, printed and online journals and collections of papers, Internet discussion lists and newsgroups, institutional and personal websites, scientific and popularizing newspaper articles, real and virtual conference presentations, and even experience gained in connection with the warfare of educated hackers and system managers. The history of scientific work on the Internet is approximately one decade long, thus there are not yet any clear and widely accepted methodological rules (of either research or publication). The

method of research we chose is mostly reminiscent of certain philosophical methods (we will talk about this issue in detail in the first part of the book); and in case of methods of publication, references, and source citation, we logically tried to follow the habits spreading in this area. The difficulty is obviously taking into consideration the characteristics of the sources appropriately (source citation and identification, availability, stable accessibility and characteristic technology and content). Bearing this in mind, and for the sake of an easier understanding, we divided the bibliography into two parts: the list of *traditional*, offline literature printed and published on paper (or occasionally, on CDs) available in libraries and media libraries, and a separate list of the online literature *accessible on the Internet*. We followed the traditions of citing offline sources; and in case of online citations we adopted the recommendations of the APA (*American Psychological Association*) with slight modifications (http://webster.comment.edu/apa/apa_index.htm), an essential part of which is for example giving the date of accessing the website. We usually listed the sources which are accessible in both forms only on the list of directly available literature.

As a result of the novelty of the experiences and knowledge connected to the Internet, we thought it to be justified to compile a separate collection titled *Websites about the Internet on the Internet* as well. This list mostly contains the details of websites which can be visited continuously and which are accessible to anyone, and they themselves are useful collections supplied with knowledge, resources, and further references about the Internet.

The references to the literature are placed in the text in square brackets, for example: [Castells, 2005, 27] where the page number stands after the comma. In case the *page number is lacking*, we refer to the whole of the work. In case of sources featured without an author (this is frequent in the case of websites we refer to) we usually abbreviate logically, thus for example we refer to the "Community Guide to Y2K1999" place as [Community Guide 1999]. References which *lack the year of publication* (e.g. [a.o.i.r.]) pertain to the items of the collection "Websites about the Internet on the Internet" and not to the Bibliography (logically, in an abbreviated form).

Preparation of the list of references was closed in the Fall 2006. Thereafter, of course, a huge amount of further contributions to the topic was published, but paying attention to these publications was not possible - and perhaps it was not necessary, at least within the framework of the research required for this book.

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Finally, let me add a few personal remarks. I have presented numerous lectures on the topics discussed in the book and I have published several papers which I could use while compiling this book.

My first public attempt to understand the nature of computers was presented in one of the round table discussions at the LMPS conference in Moscow in 1987, and in spite of the fact that *Imre Hronszky* helped me a lot in articulating my ideas appropriately, it was clear that the topic requires further elaboration. This job was performed when *Kristóf Nyíri* made it possible for me to participate in the joint Austrian-Hungarian research project, Philosophy of Culture and the Politics of Electronic Networking, led by him and *Peter Fleissner* between 1995 and 1997. The claims of my lectures presented at the events organized in Edlach in May 1996 and in Otterthal in November 1996 – in which I already tried to articulate my ideas about the nature of the Internet – were thoroughly and usefully criticized by the participants. *Bogdán Zaválnij* and *Márta Fehér* helped me a lot in the process of developing the "final" versions of the papers based on these presentations. I would like to express my thanks to all of them for their help. The lecture was published in the following volume containing the results of the cooperation: *Philosophy of Culture and the Politics of Electronic Networking, volume 2: Cyberspace. A New Battlefield for Human Interests* (Eds.: P. Fleissner, J. C. Nyiri, StudienVerlag, Insbruck-Wien and Áron Kiadó, Budapest, 1999) and in the collection titled *Philosophical Studies on Science and Technology* (Eds.: I. Hronszky. P. Tamás, É. Tóth, B. Wöran, Arisztotelész Stúdium Bt, 1998-1999). On the basis of further work on the problem area, I gave a talk at the conference *Science, Technology and Society; Science and Society – Technological Turn* in Tokyo in 1998, the talk was published in the journal *Artificial Intelligence and Society*, and in Hungarian in the e-column of the journal *Replika*.

Though the idea of the reformation of knowledge occurred in my talks and papers mentioned above, it became more emphatic only in the talks of the following period: in the talks given in Rome in 1999 at the *ETHICOMP99*, *Look to the Future of the Information Society. Conference on the Social and Ethical Impacts of Information and Communication Technologies* and at the first conference of the researchers of the Internet, *Internet Research 1.0: The State of the Interdiscipline* in Lawrence in 2000 (Kansas, USA). (The texts of the talks were published on CD and on the website of the conference in Lawrence, and a short discussion was published in Hungarian in the journal *Korunk*.) Later on, I tried to formulate the problem in numerous similar talks, thus for example at the conference *postmodern de/construction* in Erlangen in 2002, in a seminar of Vrije Universiteit in Amsterdam in 2004

and at the congress of the history of science in Beijing in 2005. The interest of *Peter Fleissner, Péter Egyed, Charles Ess, Martha Rios* and *Hans Radder was* an important support in researching the topic. I am grateful to them.

I gave talks on the principles of a possible philosophy of the Internet first at the conference of the researchers of the Internet, *Internet Research 5.0: SUSSEX: 2004: Ubiquity* and in Budapest at the *Information Society Professional Days* in 2004.

My participation at the conferences mentioned above were usually possible with the support of the various grants of OTKA (T 025406, U 28745, T 037575, T 046261), the grant of the earlier OMFB Mecenatura (90531/97) and with the help of a research project of the Ministry of Culture. I am grateful for all the financial support.

I gave university lectures together with Zaválnij Bogdán titled *The Philosophy of Computers* in the academic year 1996/1997 and beginning with the academic year 1999/2000 – without Bogdán's contribution – titled *The Social and Cultural Effects of the Internet* roughly in every year at the Faculty of Science of Eötvös University, Budapest. I have learnt a lot from giving the lectures, from the ideas and papers of the students of the courses and the published lecture notes of Péter Egri and Viktor Fornai.[1] I am grateful for all of their interest.

I presented the first sketch of the discussion of the topic in a book at one of the meetings of BuDi (Budakeszi Disputa) at the end of 2000 and at the beginning of 2001. I am grateful to the participants of the dispute – especially the hosts, *Barbara Mihók* and *Csaba Pál* – for the inspiring atmosphere of the discussion and their useful comments. In fact, it is thanks to them that, after several attempts, I finally managed to finish the book. It was an evening spent together with them which eventually helped me in this.

The manuscript of the book has been in preparation for several years. Some parts of it had been completed years before, and some parts were published in journals and collections. Nevertheless, I hope that I have managed to make the current version of the treatise unified, and I have been able to erase the unevenness which reflects the impressions of the years passed. My friend, *Sándor P. Szabó* attentively followed my work throughout. His continuous interest and encouragement meant a lot to me.

While working on the book, I received assistance in finding the sources and in discussing each issue from *Günther Fleck, Andrea Ritter, Helena Kafkova, Mária Farkas, Szilvia Kárpáti, Lilia Gurova, Péter Szegedi, Eszter Hargitai, Nikó Antalffy, János Boros, Péter Érdi, Mattia Miani,* and *Peter Burke*. I am grateful to all of them for their help. Without knowing him, I can thank a lot to *Phil Agre* whose *Red Rock Eater News Service* (http://polaris.gseis.ucla.edu/pagre/rre.html) led me to a huge amount of important and interesting information.

I was lucky enough to have the first draft of the book read and commented on by two reviewers, *Márta Fehér* and *Tibor Schwendtner*. I would like to take this opportunity to thank them for their comments. And last but not least, I would like to thank *Hywel Griffiths* for his valuable language corrections.

The Hungarian book published in 2006 has got several valuable criticisms and comments. Deliberating these reflections and continuing my research work I gave many lectures, published several papers, and gave courses at different levels, etc. in the following years. (Some of them can be found at my webpage: http://ropolyi.web.elte.hu/) As a consequence my views on the Internet have changed a little, but not essentially. In certain cases they become perhaps clearer, or at this moment I could perhaps present a more elaborated version of them. However, I do hope that the ideas in this book are still important and interesting and will be important and interesting for many years. For those who are interested in my "actual" position I attached to the end of the book a "postscript" with the title: "Prolegomena to a Web-Life-Theory".

[1]The course materials are accessible here: http://ludens.elte.hu/~is602ep/pub/CYBER.TXT (2000 August 10) and http://people.inf.elte.hu/fornaivi/interneteloadas.html (2002 June 10).

Chapter 1. The appearance of the Internet in the late modern age

How to survive the Internet? – asks the reporter of *BBC News* already in the title of his report. Then he covers the case of Jessica Nicholas, a 17 year old student, whose too intense relationship with the worldwide information network almost cost her her life. Jessica, who had earlier lived the life of an ordinary American young person, recently became a complete homebody: she continuously sits in front of the screen of her computer from six in the morning until eight in the evening; if her former friends call her to go somewhere, she simply hangs up – it seems she uses an ISDN line – and she displays the symptoms of physical and mental decline. We can learn about another case: as a result of his intense need to be on the Internet, a young man gradually stopped attending his classes at the university, and his last online session, which lasted for 36 hours non-stop, was ended by a nervous breakdown. Though we do not have to worry about the young people featured in the report any more since they are being treated by psychologists specializing in curing Internet addiction (as a consequence of which Jessica is online only for one hour a day), we have to see that many of their fellow sufferers live their lives in a constant struggle with similar difficulties. According to the psychologists of our young friends, 10 percent of American Internet users (whichever way we calculate, this means millions of people) are addicted to the Internet.

Of course, it is not necessary to go to America for problems similar to the above; we could have used examples even from Hungary. However, the idea about the social construction of facts and knowledge seems to be true here: a case presented to us by the media seems to be more valid and more valuable than the experiences which we can directly gain. It is almost natural that those who live in the northwestern part of the United States have a bigger chance of being featured in the media than those who live in Central Europe, thus, reluctantly, while studying our own chances of "survival", we have to rely on reports about American young people. And it is quite natural that such knowledge is (also) presented to us through the global medium, the Internet. (For example, in connection with the report above, we can see that besides having been broadcasted in a program of the BBC, it was also uploaded to the website of *BBC News* in a written form (http://news.bbc.co.uk/) and then it somehow reached one of the active members of the mailing list, "Cyberculture" (http://www.cyberculture.zacha.org) who published the web address of the article of the BBC on the list (http://news.bbc.co.uk/hi/english/sci/tech/newsid_18870000/1887467.stm) and a short summary of it. After this, only a few minutes and a few dozen clicks were needed for Jessica's story to end up on the pages of this book, hopefully, at least, for the education of some of our readers.)

Is the Internet really such a dangerous tool that for many, it is only safe to use it with the support of psychologists? And if yes, what makes it so dangerous? The possibility of Internet addiction suggests that for many people, the Internet is a source of such intense experiences that they cannot detach themselves from it and they are willing to give up their everyday world for long periods of time for the sake of existing in it. But how can such intensity be created in a technological environment, in the network of interconnected computer networks? It is understandable that the worldwide information network is a useful and efficient tool, but can a strong emotional tie be developed in connection with this usefulness and efficiency? Or rather, is it a matter of content, and we may become addicted because of the concrete contents of Internet activities (role games, chat, etc.)? In this case the question is whether similar activities done independently of the network (since for example we can practice role games and chat in a more traditional environment) cause a similar addiction, or whether there are significant differences in the nature of these addictions. We might suspect that perhaps it is not the result that we can achieve or the special content but the activity itself, being on the Internet, the *online form of life* which is the basis of the intense experiences.

Perhaps it is true, perhaps it is not. Let us not decide it yet. However, it is already clear from the mere listing of the problems raised in connection with Jessica's case that the Internet probably cannot be regarded as a technological tool in the simple traditional sense (though it is built of technological elements), and that the Internet can include special contents and/or it can support forms of activities which seem almost vital for many people. All this might make us think that the Internet is probably a quite complex entity which is difficult to understand and which has many features, though the outlines of its complicated nature are hardly visible yet.

For the sake of exploring *the nature of the Internet*, let us perhaps leave our friends with their psychologists (and with the hope of a cure of their Internet addiction) and let us look at other spheres and examples of Internet use. If we apply the Aristotelian methodology (earlier proven to be successful many times) for understanding the nature of an entity, at first it seems to be suitable to rely on lists which summarize easily observable versions of the ap-

pearance and usage of the thing in question. However, this method is difficult to follow in our case since nowadays Internet use has almost completely permeated social life: it would be difficult to leave out anything from the list and as a result, listing itself would become difficult. Nevertheless, perhaps it is still useful to name a few *typical* Internet features and activities. These are the following:

i) Downloading and uploading files (ftp) through the safe data traffic between computers and websites, and all administrative, financial, business, stock exchange, production, consumer and cultural file transfers;

ii) Electronic mail and other similar services (earlier called postal);

iii) Sustaining and supporting self-organizing activities and communities (news groups, discussion lists, forums, chat channels, role games, and social networks) supported by automatic data and information systems;

iv) Editing institutional and personal websites, journals (blogs), radio programs (podcasts), browsing them and surfing;

v) The development and utilization of virtual and mega-computers, a "worldwide" computer through the coordinated functioning of interconnected computers.

Of course, a practical list such as this one in necessarily contingent and it is not clear at all which function is more natural or more essential than the others. Perhaps it is correct to keep following Aristotle's method of revealing the nature of entities, thus, for understanding the nature of the Internet, we will utilize the categories of matter, movement, form and purpose he used regularly for examining the nature of things. Of course, we will use reinterpreted concepts thought to be adequate for understanding the currently examined object, the Internet, that is, technological tools, participants of communication, freely shaped medium and organism.[1] Thus,

1. Above all, the Internet is the *system of computers* which are made capable of fast and safe data traffic and which are connected into a worldwide network. The global network which secures the connection between the computers of different types and performance and the local computer networks have a redundant structure, that is, many types of connections can be established between the individual computers, and the way of forwarding data is not completely prescribed in individual data transfer situations. A bigger amount of data is processed by splitting it into smaller packages which are treated and forwarded separately. As a *technological tool*, the Internet shares the fate of other technological tools and it supports the satisfaction of varied human and social needs from shopping through working from home, distance learning, various administrative, political, cultural and religious activities to even international financial and stock exchange maneuvers. It is mostly *engineers, IT technicians and programmers, as well as lawyers, sociologists and philosophers of science and technology* who are familiar with the technological tool aspects of the nature of the Internet.

2. In case of the Internet, we can also see that it is an indispensable *participant* in the most varied *communication* situations. In this respect, the Internet manifests itself as an active agent in some sense, in other words, as a hermeneutical tool which itself is the participant of the interpretation of the communicated contents. Through the Internet, voice based (speech and music), written text or image based (or performed with a combination of them, that is, multimedia based) communication become possible between partners separated by huge distances. The connection between the parties can be indirect or direct, one-directional or interactive, personal or impersonal, fixed or mobile, simultaneous or non-simultaneous. Communication through the Internet inherits numerous important methods of earlier communication machines and systems (postal services, telephone, telex, radio, television, press and computers) and it tries to operate *all these together* and make them available for its users. The actually unrealized possibilities are essentially a part of the realized communication situation, that is, the communication system is open and self-evolving. It is experts of *communication theory* and *the philosophy of communication* who know a lot about the communicative aspects of the nature of the Internet.

3. But the Internet is not only the system of interconnected computers or one of the participants in the communication situation which make communication possible but a peculiar *shapeable medium*, *culture* understood in the widest possible sense in which varied human ambitions, intentions, values, plans and products can take shape. In this process, culture is created in its full variety: the products of sciences, arts and religions; activities and the economical and political circumstances connected to them, and their forms of activity in the medium of the Internet (of course, often in a virtual form). The Internet is a universal medium, a separate sphere of the universe where,

[1]Here we will not justify the way we reinterpreted the Aristotelian concepts. Hopefully, what we will say later will make the reasons of our choice clearer.

besides the natural and social spheres earlier accessible to man, man can find a new world, or at least a new area, a new home where he can try new possibilities and where he can realize new aspects of his familiar values and activities. The cultural aspects of the Internet are perhaps analyzed in *psychology, ethics, the philosophy of culture, anthropology, social theory and social philosophy* the most often.

4. Finally, the Internet is an independent *organism* which can be identified separately from the machines included in its structure, the communication which can be performed with its help, and the human content which shapes its media. The worldwide organism evolves as other evolutionary systems, following the methodology of evolutionary tinkering. The people themselves, together with their thoughts, actions and ambitions are part of the organism. It is experts of *systems theory, philosophy of systems, network theory and meta-philosophy* who work on the organism features of the nature of the Internet.

To sum up (and simplify somewhat), we can perhaps say that the Internet is a self-evolving, complex technological tool, which, as a result of its characteristics, on the one hand plays a central role in the communication processes of our days, and on the other hand is a cultural medium which is capable of accommodating, representing, preserving, and operating essential human values, relations and ambitions.

Of course, a definition such as this is not sufficient for understanding the nature of the Internet. Through mentioning it, our aim was only to demonstrate the characteristics of our task and the possibilities of solving it. The definition is obviously too general and empty (by way of excuse, all definitions are) and it will be filled with concrete contents in the following pages. In what follows, we will attempt to do so. The book also wishes to present the cultural-historical process of the development and evolution of the Internet, among other things, with the aim to make the historical social tendencies and relations which determine the real nature of the Internet clear. As a result of the discussion, we will try to summarize our claims about the nature and basic characteristics of the Internet again.

The complexity of the nature of the Internet demonstrated above makes our task difficult and solvable in a somewhat roundabout way. In order to understand the technological aspects of the Internet (and make them understandable), we would need engineering, information technological and programming knowledge and the application of the viewpoints of the philosophy of technology and science. Later on, these would have to be complemented by making use of the viewpoints and results of legal studies, sociology, psychology, information, communication and media theory, anthropology, ethics, social philosophy, the philosophy of culture, systems theory and who knows what other disciplines. That is, we are talking about a real multidisciplinary task. (The mixed make-up of the conferences of scholars studying the Internet demonstrates this well, see e.g. a.o.i.r.) Unfortunately, we cannot claim that we are preparing to solve our task while being familiar with all these areas. In the end, it seems to be an acceptable solution in this situation to use chiefly a philosophical viewpoint and follow the methods of philosophy besides some hopefully acceptable digressions into the various disciplines.

In our view, the viewpoint of *philosophy* as such is multidisciplinary by nature. As Aristotle would say, philosophy, paying attention to all characteristics and features of an entity, tries to understand an "entity as an entity". This is what we will try to do: we would like to understand and characterize the Internet in its entirety, in all its aspects and relationships and not only in one or another.

We can also express this by saying that we would like to create and operate a "*philosophy of the Internet*". A philosophy of the Internet developed on the basis of Aristotelian intentions collects and systematizes the available versions of the use and description of the Internet, and with the help of their critical characterization, it studies the four aspects of the nature of this entity (of what it is built, what it is, how and with what results it is created) and the relationship of these to each other. It can be suspected from what we said earlier that in the version of the *Aristotelian philosophy of the Internet* we develop, we will characterize the nature of the Internet through the aspects of technological systems, cultural medium, communication tool and independent organism. As a result of this choice, in some way, our philosophy of the Internet will include many elements of the views which attempt to interpret and describe these aspects, that is, chiefly numerous ideas from the philosophy of science, technology, culture, communication and systems theory as well as certain results of sciences regarded as relevant (e.g. the ones mentioned above).

Striving for uncovering the nature of the Internet, a procedure such as this also seems to be justifiable from a *historical* point of view: in the initial stages of scientific examination (the Internet is a brand new subject of scientific studies), a certain understanding or definition of the nature of the examined object is one of the most important

questions, and the detailed analyses (often quantitative by nature) can be carried out based on an understanding of this kind. Aristotle himself ordinarily used this method while examining a certain topic.[2]

Now, as regards the characteristic aspects of the Internet, whether we look at *technological tools*, *communication*, *culture* or *organization*, we can ascertain in each case that their existence goes back to the ages before the creation of the Internet. Studying their story reveals that to some extent, these stories were developing independently of each other, though probably not completely so. Thus, for example, though it is obvious that it was the progress of technology which led to the development of programmable electronic computers in the mid 20th century, we can observe that facts of cultural history and the historical versions of various organizational principles also evidently played a role in this process. In this way, we can attempt to *interpret the development* of the Internet *in two ways*: in a functionalist, and an organizational way. The starting point of the *functionalist* interpretation is that the spheres of technology, communication, culture and organization representing the characteristic sides of the Internet exist and develop in society independently of each other and in a certain phase of their development. It is their interaction and *cooperation* which develops the Internet. In contrast, in the *organic* interpretation, our starting point is that all social constructions developed by the people of a given age, thus, technology, communication, culture, and artificial organisms, are all equally the products of the ambitions characteristic of the age, and since they come to existence in the context of the same value system, there are necessarily common characteristics in their nature, which in fact are not the basis of the cooperation of the separate spheres but of their *coexistence*. According to this interpretation, the Internet is developed by coexisting technological, communicative, cultural and organizational mechanisms which change together.

Thus, assuming that technology, communication, culture, and organization exist *independently of each other*, taking into account their occasional *interactions* might help us solve our current task, the description of the many-sided nature of the Internet. In principle, the methodologies which describe the individual areas might be diverse. However, in order to interpret the spheres in question and their interactions, we may take into consideration that such processes do not usually take place in a vacuum but they operate in a certain human context; they work in the medium of a definite historical-social reality. In other words, fit into a given historical-social context, technology, communication, culture and organization are capable of cooperation. Thus, it seems to be suitable to choose interpretations of technology, communication, culture and organization with the use of which their embeddedness in a social context also becomes apparent, and as a result, we will be able to take into account their interactions. A similar viewpoint is represented by *social constructivism* used in the philosophy of science and technology (Barnes – Bloor – Henry 1996; Collins 1985; Collins 1990; Haraway 1991; Haraway 1997; Knorr Cetina 1981; Latour 1987; Latour 1999; Latour – Woolgar 1979; Pickering 1995; Radder 1996; Shapin – Schaffer 1985; Bijker – Hughes – Pinch 1987). Though the social constructivist viewpoint, understood in a narrow sense, attempts to describe science and technology within a social context, the diversity of the aims and versions of constructivism as well as the generality of its philosophical point of view (Biagioli 1999; Pickering 1992) makes it possible to represent communication, culture and organizations in a similar spirit.

Another argument for social constructivism is that, from this viewpoint, we can easily develop an organic approach to the development of the Internet, inasmuch as without forcing it, in social constructivism we can assume that the objects of the various spheres of existence have characteristic *common* features in each given age, that is, we can identify the *common characteristics* of technology, communication, culture, and organization which reflect the same values, and also their individual consequences. Through observing coexisting objects which change together and their intertwined development, the connection between the elements which make up the Internet – independently of the existence of the Internet – can be revealed, and we can show more clearly what the circumstances were as a consequence of which *the way* of their coexistence which led to the development of the Internet could have been realized and with what characteristics.

Thus, whether we have functionalist or organic assumptions, that is, whether our starting point is the independence of the four spheres above and the interaction of independent entities or the common features determined by social interests and values and the possibilities of their particular coexistence, both assumptions can lead us to an explanation of the development and functioning of the Internet, and we can utilize the viewpoint of social constructivism in both cases. The essential difference is that in the first case, the social environment basically only mediates the

[2]We can also mention an example from the history of physics: it is well known that the knowledge of the nature of "energy" was missing from physics. While doing research in this age, physicists related the "examined phenomena" to the most varied natural and artificial processes (from venous bleeding to steam tables) and ideas (e.g. speculations of the philosophy of nature or conservation principles regarded to be scientific), and only when in this way the nature of energy became clearer for physicists, and as a result the difference between energy and force as well, did the countless concrete physical situations become intelligible and interpretable and could the science of thermodynamics start to develop.

interactions of the four separate spheres; however, in the latter case, it participates (with its own values) in a decisive way in shaping the individual spheres and their interactions. The message of a philosophy of the Internet presented in a functionalist way can be explained and understood more easily, but its conclusions might seem to be too bold. Thus for example we can easily present a separate philosophy of technology, communication, culture, and organization, but it is difficult to find the system of the social conditions of their peculiar interaction which leads to the Internet. However, an organic philosophy of the Internet is more established in its conclusions, but it is complicated from the start; at most, explaining it repeatedly can help clarify its message. No matter how much we sympathize with the assumptions of the organic interpretation, in order to express our message in a more understandable way, we still choose a mixed form here and we will strive for balancing the two viewpoints in our trains of thought about the philosophy of the Internet.

In this way, we will shortly review the most common philosophical viewpoints and most important results while analyzing technology, communication, culture and organization successively and independently of each other. But at the same time, we will pay attention to stressing the specific features of the examined spheres which have a great significance in the development of the Internet. In connection with the latter, we will try to follow a peculiar social constructivist viewpoint, a version in which we can find elements from the sociology of knowledge, social constructivism *per se,* and hermeneutics (Ropolyi 2000d). We have already mentioned a few arguments for making use of the viewpoint of social constructivism above. The application of hermeneutics follows from the acceptance of Habermas's suggestion according to which we perform our task cautiously if "we imagine societies as the unity of a system and the life world" (Habermas 1985; 151), that is, if we observe it both from the "outside", as a system of actions, and from the "inside", from the point of view of acting individuals. Thus, it is suitable to occasionally complement the "purely" social constructivist viewpoint, which prefers the mechanisms of the social system, with the hermeneutical aspects, which are sensitive to the circumstances of the life world. We hope that this will be a fruitful method in case of interpreting the Internet, too. In any case, the philosophy of the Internet is such a young discipline that it would be difficult to find and follow any traditions in this area.

The recent three or four decades are the phase of the formation of the Internet. Perhaps it is not an exaggeration to say that these decades undoubtedly have a certain special character, the only disagreement being about how to grasp the most characteristic features of the age. For example, the series of frequent, unexpected, fast and worldwide ideological, political, and technological transformations of the age are conspicuous. The frequency of the changes and the nature of practically all the changes suggest that the stability of the earlier world order has faltered or perhaps even disappeared, and even if it comes back and stabilizes a little, the belief in its finality has been lost. If nothing else, the collapse of the twin towers of the World Trade Center in New York buried this belief. Paradoxically, even Fukuyama's thesis about the end of history strengthens this feeling when in fact it wanted to announce the final victory of the modern civic world order. "I came to praise this age and not to bury it" – perhaps this is what the author had in mind, but he was mistaken. Perhaps he should have stuck to the classical version, and that solution would have fitted an analytic strategy.

Perhaps we should refer to another classic. In his Physics, Aristotle found it suitable to declare the principle we forget so often: everything has a beginning, a middle part and an end. Let us be Aristotelians here again and notice that historical-social formations also have a beginning, a middle part and an end. (Of course, we could refer to the theses of thinkers who think more radically in this matter, but for now – at least in this introduction – we set them aside, especially because the Aristotelian version is perfectly suitable for our current discussion.) The social formation in question is the world order built on modern values. The frequent profound changes of the last few decades – think for example of the "revolutionary" ambitions of 1968 and 1989 – unambiguously demonstrate the unfolding crisis of the modern civic world order (shortly, modernity) and the approaching of its final stage. Trains of thought which identify the symptoms of the crisis can be formulated on the basis of various ideologies – green movements, political and religious fundamentalism, anti-globalism, feminism; and of course, the official thinkers of the topic, philosophers, sociologists, political scientists, literary critics, historians, and artists, also provide interesting additions to the scenario of the endgame. We can find these all together in the wild versions of the postmodern worldview. Besides the various versions, or perhaps even preceding them, the *existence* of the postmodern worldview has a great significance. The appearance of the postmodern itself is a symptom of a profound crisis.

The postmodern is not the era after modernity, but the ideology of the end, the final stage of modernity (Szilágyi 1992). As a part of itself, it contains the modern value system as one of the alternatives. The modern value system is still in effect, but as something which can be chosen, and not as the only way without an alternative. The alternatives for the future become apparent at the end of modernity and can be chosen in a virtual or a real sense - of course, quite probably the future which can be chosen will prove to be unknown and incomprehensible in its details.

Later we will have a few attempts to describe the order of the world following modernity, but it is the processes of our age and the recent past which are in the center of our analysis. As a result, perhaps it is a good idea to use the term "*late modernity*" for characterizing the age. (Others use the names late modern (Tillmann 1994) or late capitalism (Jameson 1991; Jameson 1997) as well. The expression "late modernity" is widely used in literary criticism, and it was popularized in the thematic part of issue 30 of the journal *Replica* published in June 1998.) At the same time, we would like to emphasize again that the typical idea of late modernity is embodied in the postmodern worldview. The expression "late modernity" is used to name an age – in our case, the recent few decades – and not a value system.

Thus, in order to explain the creation of the Internet, we have to understand and describe the technology, communication, organization and culture of late modernity. We have at our disposal the philosophy of technology, communication theory and the philosophy of communication, the modern and postmodern philosophical systems and their philosophies, as well as ideas about culture and man in various disciplines. We will develop a useful picture of late modern technology, communication, organization and culture by sampling from these and also taking the necessary historical relations into consideration.

Chapter 2. Late modern technology

Without any doubt, the Internet is unimaginable without computers connected to a network. The components of the Internet, that is, the computers, network components, the infrastructure that makes their functioning possible as well as the software used and the professionals securing its appropriate functioning (network managers, system administrators, and web masters) are all the components of a technological system. What is more, since the components that make up the technological system of the Internet are themselves technological products, the Internet can be regarded as an advanced technological system. (The widespread nature of this view is suggested by the fact that most of the literature on the Internet focuses on the technological aspects of the Internet.[1]) The creation and usage of technological systems is a key part of human activities since technological systems are *tools* which, mediating between man and his aims, help man reach his aims. It is a question of great significance whether the technological tools change the situation itself during the mediation. Are the original goals of technology-using man realized, or does technology, representing its own value systems, influence the actual processes being realized during its application? Can we claim that technology is value-neutral and if not, what kind of values does it support? All these problems can be studied through the study of the *nature of technology*.

Discussions of the philosophy of technology focusing on the nature of technology adequately clarify the *generally* valid characteristics of technology. However, in order to describe the Internet as a technological system, it is necessary to analyze those *special* features which belong to information technology, characteristic of the Internet. We can understand the peculiarities of the technological procedures connected to the creation and usage of information only through revealing the *nature of information*. As a consequence of the methods of *interpretation* necessarily used during the creation of information, the information technological situation becomes *open* and *virtuality* becomes crucially important. Emphasizing the presence of openness and virtuality in the world of the Internet raises a question. Can we regard the Internet as a modern technology based on information technology or is it more suitable to talk about a postmodern technology? Of course, it is also unclear whether there is a real difference between the modern technology of the late modern age and the technology of the postmodern, and if there is any, what exactly it is.

In order to characterize the Internet, we have to answer all these questions and numerous others connected to them. In this way, in what follows, we will first discuss the nature of technology in detail and then we will study the characteristics of information technologies. While describing the nature of technology, we would also like to discuss the *relationship between technology and science,* and in the discussion of the characteristics of information technologies, the analysis of *information*, *virtuality* and *openness* will have an important role, since all these problem areas provide important additions for the later parts of our train of thought.[2]

2.1 The nature of technology

It seems to be unquestionable that the *history of technology* reaches far back in history; in fact, we can rightly claim that it is actually of the same age as mankind. Of course, we have to interpret the concept of technology sufficiently widely for a claim like this, widely enough to include primitive tool use or primitive tool making as well. A wide interpretation like this can be justified by the fact that primitive tool use is after all *tool* use; that is, inserted between man and his aims, primitive tools are already capable of performing the function of *mediating* between man and his aims. At the same time, it is without any doubt that such mediating role can be performed by many other material and intellectual achievements created simultaneously with the development of mankind, above all language and thought, but we can also think of the fantastic ideas and ritual practices of the magical worldview characteristic of prehistoric times. In reality, all factors mentioned above (and many others) made up the tool repertoire of primitive human communities together, supporting their survival. It would be interesting to contemplate what common and different characteristics these mediating tools had, since with the help of such a comparison, we can develop a picture of the characteristics of technological tools.

[1] This means a few hundred volumes at least in the current selection of an average American book store.
[2] We used some parts of our paper, "Technology and Ethics" [Ropolyi 2004a] for the discussion of these topics.

2.1.1 Tool use and tool making

If we would like to uncover the history of tool use and tool making, it is obvious that the examination should begin with animal tool use. Tool use was regarded as exclusively human even a few decades ago; what is more, it was regarded as one of the most important factors that shaped mankind. However, recent ethological research has made it clear that several animal species use tools, mostly for the goal of finding food. We can see especially developed versions of animal tool use among primates (Csányi 1999). Thus, we should rather say that it is not tool use which is a special human feature but the peculiar way of using tools characteristic of humans. Csányi says the following about this question: "numerous animals use objects, tools, and some even make them (…) However, animal tool use is quite special. Each species uses a tool for a certain goal. Their abilities are genetically coded and at most, learning improves them only to a small degree. In case of humans, the usage and making of objects is *isomorphic* with linguistic competence and abstract thought." (Csányi 1999, 132). To summarize the differences briefly, we can in fact say that while animal tool use (and occasionally, tool making) takes place in special situations, exclusively serving specific aims in a genetically determined way and essentially in an unchanged form, human tool use is *no longer* tied to *specific* situations, but is involved in *various* situations, and *learning* significantly contributes to the genetically fixed methods and capacities.

It is also important to stress the significance of the fact that the development of human tool use did not take place *in itself* as an independent process of becoming human but it happened simultaneously with the development of language, abstract thought and the characteristic human cooperation with the help of these. The common background and condition of all these simultaneous processes is the advanced reconstructive ability of the human brain. The animal brain is also capable of a certain representation of its environment and of influencing it to a degree based on this representation. However, in case of humans, mental representation is typically multi-level. The so-called secondary representation (Csányi 1999, 85) makes it possible for a physical or mental object to mean something apart from itself, at least temporarily. It is notable that it is not the perfection of the representation but its indeterminacy and openness which plays an important role here. As a consequence, the fixed connection between the object and the representation of the object ceases to exist and a conditionally existing "as if" universe can develop in which symbol and language use will be the characteristic forms of tool use. The possibility of secondary representation is crucially important in all processes of tool use and tool making. This is what makes it possible that a stick or a stone is presented to man not only as a stick or a stone but, inserted into a different context, as a tool as well. A tool can always be presented as a tool in an appropriately chosen context; otherwise it is only a physical or a mental object. At the same time, this is the basic situation of all technological activity. *Technology is a form of human activity in which we use the (physical or mental) objects at our disposal as tools determined by the chosen goal.* As a consequence of secondary representation, it becomes possible for the objects to signify other objects or relationships between objects, and as a result, the problematic nature of the relationship between signs and the signified objects appears, which in turn will become the basis of *information* and the use of information technologies. We can interpret the process of the development of consciousness and language in a similar fashion.

We can talk about the functioning of a level of representation beyond secondary representation in those equally typical human situations in which somebody represents the "representations" of *someone else* for himself.It is these representations that make cooperation between individuals and successful common activities possible. It is notable that cooperation between individuals also creates a situation in which such basic moral and political dilemmas come to the surface, as for example the problem of using someone else as a tool. In this situation one of the parties creates a representation of the other, taking into consideration the representations of the other not only as a specific "object," but he also considers his cooperating partner as a tool which is destined to realize the goals (which he identifies as his own). That is, the possibility of the *power* of one man over others appears. The possibility of discrepancies between individual representations and the mutually problematic nature of the relationships between them in turn becomes the basis of *communication* and the usage of communication technologies.

Thanks to the cooperation of the mind and the hands, or more generally, to the cooperation of human capacities, man became able to recreate the numerous observed (and imagined) elements of his environment in a mental or in a physical form, as well as to change them, as a consequence of which the *natural* environment, *originally given to him* is replaced by the environment influenced and developed by him, that is, by material and intellectual *culture*.

To sum up all these, we can say that technology is the self-activity of man which creates his own nature.

A few important components of the nature of technology become apparent even from the brief discussion of tool use and tool making above. Firstly, it is clear that even primitive human tool use displays a certain undefined, un-

determined nature – both as regards its aims and circumstances – which we could also call context changing. Secondly, note that in its primitive, primordial form, technology belongs to *a community*, that is, "the essence of human technology is foreseeing the activities of the other or the other participants and performing the appropriate complementary action (…) It is important to stress that a technological activity is always *social cooperation*. (…) Thus, it is not the created object or the complexity of the manufacturing process which differentiates human technological activity from the animal one (though it also does) but mostly its social nature (Csányi, 1999; 186). Thirdly, we also learn that as a consequence of the social nature of human tool use and tool making, *the peculiar relationships between human individuals* (opinions about the others and their ambitions, the full or partial identification with the common goals) also become a part of the primitive technological situation. This characteristic points to the *political and moral* dimensions which unfold in the later stages of the development of technology.

2.1.2 Techné and technology

As we could see above, primitive tool use could even be regarded as a technological activity with certain limitations, though it is undoubtedly a very distant relative of the technological practices widespread in our days. However, *primordial technologies* (fishing, hunting, agriculture, beginning to use fire, cooking, pottery, primitive metallurgical methods, building shelters, organizing the life of the community, fighting techniques, etc.) already include activities familiar to people of our days. In fact, we could say that regardless of the apparently fast technological development, these technological activities rooted in the distant past are recognizably still present today though in a form changed several times. As a result, perhaps we can claim that though the evolution of technology continuously produces newer and newer technological tools, methods and products, it has a certain degree of stability besides its changeability. All this means that technology is permanent and changing and we can develop a picture about the *nature of technology* by taking into account its necessarily and contingently effective characteristics (that is, the features and characteristics which make it technology). In what follows, we will attempt to do precisely this.

If now we begin to describe the nature of technology, it seems to be suitable to start with the views on technology in Antiquity, since the statements of Greek thinkers decisively contribute to understanding technology, too (here we primarily take into account Aristotelian philosophy again). The word "technology" itself is of Greek origin. The meaning of the Greek word "*techné*" is quite complex, it perhaps mostly meant *skill,* the *art* of producing something, the human capacity which follows the laws of "*poesis*", that is, it has a *creative* nature (Talbott 2001). Thus, "techné" is knowledge which makes it possible for man to produce tools, machines or works of art, or even to realize some kind of "beauty". The "skill" or "art" we talk about is primarily the *possession* of creativity and as a result, it contains the *knowledge* of what and how a craftsman, artist or orator can produce something which could not come to existence without his contribution ("by itself", more precisely, in a natural way) Furthermore, the *operation* of creativity, that is, the actualization and practical realization of creation, also includes the created *product as the end result.* What is more, it does so in a way that encompasses the whole creative process, that is, at first as imagined and later as a realized goal.

Thus, in the Greek understanding, technology is *creation* which realizes a certain chosen end; an entity which includes the possibilities, abilities, knowledge, processes and results connected to the creative process. Its scope is not limited to the creation of useful objects, but it also includes works of art and speeches (obviously, these are not natural entities either). It is knowledge, agency, and an object at the same time. As knowledge and ability, it is the *possibility of creation*; as a practical act, it is the *realization of creation*; and as an "artificial" entity produced in a practical way, it is the *realized product*.

It has to be emphasized that in Greek thought, there was a clear differentiation between natural entities (which come to existence in nature), and entities created by man. The causes which play a role in the creation of natural entities and the nature of the objects of nature can be revealed by cognition and knowledge ("episteme"); the nature of the entities created through human activity can manifest itself in technology ("techné"). In other words, science and technology are clearly differentiated spheres for the Greeks both as regards practice and theory. The history of Greek science and technology unambiguously proves this view. Greek science and technology (contrary to the occasionally held view, Greeks did not only have philosophy and science but technology as well) essentially developed independently of each other, and they were only connected in certain short periods and in case of certain people (as for example in the case of Archimedes). The separation of science and technology expressly existed even in later ages up until the beginning of the 19th century, from when the borderlines between science and technology started to fade. The wearing away of the borderlines was probably closely connected to the contemporary ambition of utilizing science as a direct force of production (which has been effective until our days). In order to

understand this historically changing relation, it seems to be suitable to continue our train of thought about the nature of technology with a more detailed analysis of the relationship between science and technology.

2.1.3 Science and technology

Both science and technology are based on some kind of knowledge. However, on the basis of Greek philosophy, we can differentiate between scientific and technological knowledge by taking into account the principle that knowledge about *natural* objects created by nature and knowledge about *artificial* entities created by craftsmen is different. But besides the types of knowledge represented by "episteme" and "techné", there are other types of knowledge in Greek philosophy. Thus for example Plato's and Aristotle's view in the interpretation of "episteme" are different, which makes it possible to identify different types of knowledge regarding natural entities. It is customary to identify the *Platonic* view with the definition "knowledge is justified belief", though it is only one of the views in the writings of the great master which analyzes this subject and it is not even a completely accepted standpoint among the diverse interpretations of knowledge (Plato 1984; Feyerabend 1999; Gettier 1995; Goldman 1995; Harman 1995). On the other hand, according to the *Aristotelian* view, knowledge is the understanding of causes (Aristotle 1992). We will come back to the comparison of the Platonic and Aristotelian understanding of knowledge later. Here we would only like to draw attention to the fact that Plato puts knowledge into the category of *belief* while Aristotle puts it into the category of *acquaintance*, which is broader than the category of knowledge. The Aristotelian understanding seems to be more adequate for the characterization of the relationship between science and technology, so we will only discuss the latter in more detail.

If knowledge means knowing the causes, it first of all seems to be suitable to differentiate between *knowledge* and *acquaintance*. Experience can be connected to knowledge as well, but "experience is knowledge about the particular cases, and science pertains to the general … That is, people of experience know the 'what' but they do not know the "why", and theoretical scientists know the 'why' and the causes" (Aristotle, 1992). On the basis of Aristotle's quoted definition of knowledge, we can say that acquaintance is more general than knowledge. Acquaintance is a simple reflection about the relations of existence, that is, a certain mutual relation in which the object and its environment is expressed, a relation between the thing that exists in the world and the world, between the individual and the continuum. Its environment is presented to the object; the object is present to its environment. The *content* of acquaintance is the *existence* of this coexistence of separated things and their existing coexistence. Acquaintance refers to the given, to what exists. Aristotle also says that "since thus among existing things there are those which always necessarily exist this way, which is not to say that they exist this way as a result of external force but because they cannot exist any other way, and there are those which do not necessarily exist and do not always exist in a particular way but only usually – this latter is now the principle and the cause that there are incidental, contingent things. That is, we call something incidental or contingent if it exists but does not do so always or most of the time." Furthermore, he points out that "the cause of the things that exist or will exist contingently is contingent itself" and thus "there is no science about them, since "the objects of all science are eternal things or things that exist for most of the time". On the basis of all this, we can say that knowledge is also reflection about relations of existence, but it is a relation in which for example the environment of an object is presented necessarily and *vice versa*; to put it in a more general way, the *content* of the relation is the existence of the *necessary* coexistence of separated things, that is, the knowledge of causes and results. In other words, knowledge is a variation of acquaintance; it is *acquaintance with the necessary*. Both acquaintance and knowledge represent something, that is, they reflect what exists, but only knowledge is *the* representation which is reflected upon, that is, in knowledge the representation itself is an object of reflection.[3]

Acquaintance is not an exclusively human relation, but knowledge is. Everything that exists in a separated way relates chiefly to the thing from which it is separated and with which it coexists during the existence of its identity; its identity is determined and recognized in this relationship. In the sense above, any creature, however primitive, knows its environment, since it is able to pursue the material interactions necessary for its survival – at least during the duration of its existence loaded with contingencies. For this there is no need for consciousness, but at most only for a *structure* and *memory encoded* in it. Consciousness is only needed for the creation of knowledge, that is, for the recognition of the relations of necessary coexistence, and above all, for generalizations (for noticing things that exist "for most of the time" or the "eternal"), and its peculiarity is revealed precisely in this. Experience is in between acquaintance and knowledge. The contingency of existence can be present in acquaintance; it is the necessity of existence which is expressed in knowledge.

[3]These questions are discussed more in detail in my paper [Ropolyi 2006].

What a creature is acquainted with has a value valid in a concrete, given moment. During its operation, a living being is capable of a coexistence with its environment, it is able to function and survive; it is capable of being *present*. The actual environment of a living being is always concrete, complex and unstable. This is the world of contingency. The knowledge of man has a value which provides him with a selective advantage; foreseeing the changes of life conditions, it makes it possible for him to prepare for changes, and it facilitates survival. During its operation, as a result of its timeless and general nature, knowledge prepares man for future existence and for the existence as something *different*, it prepares him for changes and for changing things. The conceived environmentis abstract, simple and eternal. It is the sphere of necessity. Man is the citizen of two worlds: he operates both his contingent acquaintances and his knowledge. He is equally able to preserve and change his identity. As such, man is an evolutionary unity since it is precisely the coexistence of these two spheres and capacities that we can observe in evolution. Contingency and necessity, preserving and changing, being present and becoming something different, are connected to each other in a specific way in all kinds of evolution, both in the evolution of knowledge and of man.

We can learn more details about the relationship between acquaintance and knowledge if we include the dimensions of *the particular* and *the universal,* and *the concrete* and *the abstract* in our analysis. We call something which is shared universal, and we can call the features which differentiate something from all other cases particular. According to Aristotle's statement above, it is possible to talk both about being acquainted with the particular and the universal. Experience is knowledge about particular cases and science is the knowledge of the universal. A regularity, relation, characteristic, or feature can be regarded as abstract if we try to understand all these in a way in which we ignore their sensual complexity and empirically given diversity. A concrete entity is always the unity of many characteristics, features and relations. Acquaintance can either be concrete or abstract: contingent acquaintances are concrete, knowledge can either be concrete or abstract; in the sciences it is usually abstract knowledge that is discussed.

After recalling these philosophical ideas, perhaps we can try to characterize the relationship between science and technology more successfully.

First of all, note that when we differentiate between scientific and technological knowledge on the basis of the Ancient Greek understanding, it is not only the difference between naturally created and artificially produced entities that can play a role, but for example the distinction between contingent and necessary acquaintance as well. We have necessary acquaintance of natural entities, but contingency unavoidably appears for us in the work of the masters. In the case of natural processes, we are looking for *generally* valid regularities, but in the case of technological processes, we are satisfied if we notice the rules valid in a given situation. Technological situations are always concrete; in contrast, the scientific explanation of nature uses abstract definitions.

On the basis of all this, we can point out that while technology is concerned with *possibilities*, that is, what is possible and achievable in a given situation, science is more concerned with *reality*, that is, what is valid in all situations, eternally and necessarily. Technology is valid in a given situation, it utilizes acquaintance *tied to the given situation*; science collects acquaintance *independent of situations*, that is, knowledge. For technology, the *concrete situation* is determined by the concrete goal to be reached, the process to be realized, or the means; for science, the goal can be gaining knowledge about the world imagined as the *infinite set of situations*. Knowledge understood in a scientific sense is not necessary for the operation of technological processes. It is not necessary to know the causal laws influencing the realization of the chosen goal in their generality, it is enough to register their operation in the concrete situation. (To take a well known historical example, there was no need to know the laws of thermodynamics for building a steam engine.) Thus, it is not abstract, general scientific knowledge *technological knowledge* is close to: from the point of view of science it rather seems to be a *set of contingent acquaintances*. Nevertheless, many concrete experiences can come together in connection with a given situation, and through their generalization, we can reach abstract, general regularities either staying inside the situation or pointing beyond it, that is, technological acquaintance can be transformed into scientific knowledge. Technology and science are also in an "everyday" contact with each other, since, strictly speaking, scientific experimentation is a quite technological activity and not scientific. Sciences can be fit into a *unified* worldview, that is, regardless of their differences, the various scientific disciplines are built on similar principles and philosophical assumptions, at least within the limits of a given culture and historical period. They often follow quite *different* principles in different technological situations, even in the same age. Science is contemplative, comparative, *analytic* rationality; in contrast, technology is interested in operating a (calculating) rationality directed at a concrete *goal*. Science is looking for the *truths* about reality; technology can achieve the *efficiency* of realizing certain possibilities. Science is striving for understanding reality independent from man, and for the development of a non-anthropomorphic worldview; technology always serves certain human aims and making reality independent from man "anthropomorphic". Scientists are

close to the attitude of philosophers, while engineers are close to the attitude of craftsmen. Perhaps we can characterize the relationship between science and technology in the most concise way as follows: science = technology + philosophy (Ropolyi 2004c).

We have tried to summarize the differences listed so far in table 1.

SCIENCE	TECHNOLOGY
Naturally given entities	Artificial entities
"Episteme"	"Techné"
Acquaintance with the necessary (knowledge)	Acquaintance
Knowing why	Knowing how
Abstract and general laws	Concrete and particular rules
Situation independent truth	Situation dependent validity
Eternal and global	Temporary and local
Unified	Plural
Contemplative	Goal rational
Directed at reality	Directed at possibilities
Truth	Efficiency
"Non-anthropomorphic"	"Anthropomorphic"
Created by "philosophers"	Created by "craftsmen"

Table 1: The comparison of the characteristics of science and technology

Of course, regardless of their differences, science and technology are connected to each other at several points, partly by having similar characteristics and partly by "reaching into" the territory of the other. As a result, it might not be easy to determine whether we are talking about a technological or a scientific achievement in a given situation. For example, a complex measurement of particle physics in a large accelerator can be rightly regarded both as a scientific and a technological achievement. Obviously, both science and technology has theoretical and practical levels. However, the *practical and theoretical levels* of science and technology display different degrees of abstraction (as we will see in table 2). Comparing the scientific and technological areas on a certain level of abstraction, we learn that various levels can be found in both spheres, but they are not "overlapping", that is, technology as a whole is more concrete than science.

LEVELS OF SCIENCE	LEVELS OF TECHNOLOGY
Philosophy, the philosophical basis of the sciences	---
Theoretical sciences	The scientific basis of engineering science
Practical sciences, experimental technologies	Engineering science
---	Practical technologies

Table 2: The relationship between the theoretical and practical levels of science and technology

We can see the numerous transitional possibilities between science and technology from *table 2*. For example, sometimes it is difficult to differentiate between the point of view of a solid state physicist working on metallurgical tasks and a metallurgical engineer working on the same problem, or between the theoretical electricity taught to engineers and a lecture in electrodynamics given to physicists. However, the analysis of such similarities does not have any significance for our current topic.

Nevertheless, it is important to note that the way a given form of activity, tool system or knowledge system is connected to technology or science *develops historically* and often changes. This happens when accumulated technological knowledge leads to the development of an (occasionally independent) scientific discipline, or when

a method or a result that earlier belonged to the sphere of science (for example, the synthesis of a complex molecule) becomes the part of a production process in technology. The natural interaction between science and technology is facilitated or hindered to a great degree by the given historical-social circumstances, the value system of the age, and the relationships of interests. Most of the so-called scientific research in our days is technological in some sense.

Of course, the interpretation and the use of the concepts that play a role in the differences between science and technology historically change. The concepts of the concrete and the abstract, the particular and the universal, or the ideas about the extent of the relevant "situation" may have different meanings for the different ages, and as a result the borderlines between science and technology are drawn differently as well. We can see differences of this kind for example in the points of view of different philosophies of technology.

2.1.4 Man and technology

Most philosophers of technology agree with the claim according to which technology is a human product. People, following certain (according to different philosophers, different) aims operate technologies in order to satisfy basic human needs (Agazzi – Lenk 1998). As we mentioned earlier, the rise of man from the animal kingdom is connected to tool use and tool making, to such an extent that according to many thinkers, these can be regarded as basic human characteristics. According to the definition of Benjamin Franklin, man is a tool making animal. According to Karl Marx and his followers, the historically-socially determined relations of production play a key role in the production and change of human life circumstances. Henri Bergson refers to man as *Homo Faber*; Karl Jaspers identifies technology as the main problem of the modern human situation and so on. According to the traditional view about man and technology, technology is a complex tool and an act which make the forces of nature serve man. As a result of technological activities, we intentionally transform the physical world to make it function according to our aims and to achieve a certain result.

Note that we do not only change the material, "physical" world during our technological activities, but our own point of view and worldview as well, since in the use of technological tools, we separate certain *objects* from their original, natural environment and we recognize them *as tools* that can be used for reaching a desired aim. We change the (material or intellectual) context, sense, and meaning of the object. It is characteristic of technological activities that we fit the (natural and artificial) objects at our disposal into a new situation where they will support the realization of the goals created by the situation, and meanwhile their original situation is pushed into the background or even ceases to exist.[4] As we mentioned earlier, technology utilizes situation dependent knowledge, but it is also one of its important characteristics that it is technology which *creates the situations*. *Technological activities involve changing the situation, context, sense, and meaning of natural objects*. This means that technology regards objects as *open objects*, since the concept of openness refers precisely to reality understood as involving possibilities. In other words, we can regard a given object as something different and use it as something different, and this is a significant possibility. Rapp also discusses this aspect of technology (Rapp 1999). He draws our attention to the fact that technology creates a different nature, more precisely, a different world, through the continuous "reinterpretation" of natural circumstances, or to use his words, it creates culture. Thus, besides satisfying the basic needs of man, technology also participates in the creation of culture, indeed, it is an inherent element of it.

Technology is the field of situation-creating activity. The situation-creating man is a craftsman or an engineer. He is the "engineer of the wonders of the given world"[5] (since in a way, poetry is technology as well, and technology is art, too), standing on the ground of reality, he casts his eyes on the sphere of possibilities and he operates the program of realizing the possibilities. Engineering abilities function successfully when they are able to create situations in which a given possibility can be realized (or one which is close enough to it). Engineers are the depository of *man's control over situations*. Of course, the success of technological methods, that is, the control to be realized in relation to a concrete aim, is situation dependent. Obviously, the success of technological processes has natural, social, and even economical, political, and cultural conditions. The occasional difficulties of exporting

[4]Heidegger analyzes this question in one of his famous papers, "A question concerning technology" (Heidegger 2004), though his train of thought is difficult to follow and is loaded with peculiar ideological assumptions. The connection of his ideas to the view we choose becomes clearer (and as a result it also makes it easier to understand) if we consistently substitute Heidegger's concept of "Ge-stell" (Enframing)) for the concept of "technological situation" used above. In this case perhaps we will also notice that our standpoint in the characterization of the historical forms of technology is significantly different form Heidegger's. According to Heidegger, there is a sharp difference between Ancient and modern technology (the earlier is creative, the latter is related to power), however, we believe that this differentiation is unjustified: creation and power can only characterize any kind of technology together.

[5]From a poem of the Hungarian poet, Attila József (1906-1937) . (Note of the translator.)

technologies make conditions of this kind clear. We can also say that the situation-creating activity of technology necessarily includes all characteristics of situations (natural, social, economical, cultural, etc.); that is, *the natural, social, political, economical and cultural factors which secure the existence of a concrete technological situation are indispensable components of the nature of technology*. Thus for example without economical and cultural conditions, an ingenious machine – say for example Heron's steam ball – can at most function as a curiosity or a toy and cannot become a product of technology.

We can identify another group of characteristic problems if we take into account the possibility that human individuals, groups and communities can themselves become a part of technological situations, not as the creators who make the situation ("engineers"), but as components used (and used up) in the maintenance of the situation. For example, this is the case when we think about technology as a sphere of existence evolving independently of human ambitions. In this case, the role of man is limited only to some contribution to the autonomous technological evolutionary process; it is not man who uses technology, but technology which uses man.[6] It might seem strange to assume an autonomous technological sphere, but perhaps it is more obvious to connect the development of the *division of labor* to the participation of man in technological situations. In the so-called technological division of labor, individuals participate in the technologically separate parts of the complex production process. The differences of their roles are determined by the situation. Nevertheless, a social division of labor is built on the technological division of labor in which the roles of the individuals who divide their work are fixed through social means (through the power of habits, morals and politics). A division of human capacities which displays the duality of the roles of the creator who is in power, and the "part of the machine" at mercy and used for the maintenance of the situation, is the product of the social division of labor; that is, it is not the characteristics of the technological situation which dominate in this situation. Making use of the division of labor, a given community can continuously produce the necessary life circumstances for its survival and development through the complex multitude of its technological activities; the purely naturally given circumstances are replaced by artificial social circumstances created by *production* in this process.

However, the human, social, political, economical, and cultural factors which contribute to the nature of technology are not only interesting in the sense that they necessarily contribute to the characteristics of technology, but also in the sense that often, these spheres of existence themselves can be characterized as technological. Whether we examine the whole society or its political, economical, or cultural subsystems, we are satisfied with utilizing the contingent knowledge describing the area, the treatment of problematic situations that occur, and following the rules which help us find our way in complicated situations. That is, we use technological (and not scientific) procedures. In other words, besides technology in the traditional sense of manipulating objects, we can also talk about *social technology* which *uses* the objects of the social sphere as tools. In this sense, lawyers and politicians dealing with social situations or economists experienced in economical situations are obviously engineers, since a technological attitude to social situations is in the forefront of their activities. Of course, concrete social situations are determined by many factors, including the multitude of natural conditions or even a technological environment in the traditional sense. Thus, certain technologies themselves can become factors which determine the situation for other technologies. (Obviously, such relations do not only occur in the relationship between technology and social technology, but they are also frequent in the historical development of technology when people follow a certain *technological tradition* for a longer period of time.)

Since we can equally find natural and social circumstances among the characteristics which make man human, natural and social technology provide *control* over our life situations together. Nevertheless, it is worth emphasizing that in this form only life situations "dissolved" into situations can be controlled, what is more, perhaps it is also not unimportant that in fact all kinds of control are tied to situations. In any case, insofar as we identify our world as a multitude of situations, control over situations can become the basis of our control over our own world. In this sense, *technology is a tool serving the power of man*; through its usage, man can follow his aims and he can control his own life circumstances to a significant degree. Technology is a human product, one product of which is man himself. People are both the authors and the characters of their own drama.

Politics, law, and economics readily use the methods of social technology in the interpretation and treatment of everyday social life; indeed, on the whole, they would not like to follow aims beyond the control provided by technology. We can characterize the relationship between an individual and the situations of his everyday life in a similar way: we readily use such technologies (of existence) which help solve concrete life situations, and meanwhile we pay little attention to the universal justifiability of the methods used; we are already satisfied if we find our way and succeed in individual life situations; in other words, we are often in a peculiar technological re-

[6]This point of view was featured in for example in the very successful film of the Wachowski brothers, *The Matrix*.

lationship with the problems of our lives. Looking at our life circumstances as dissolved into situations on the one hand makes it clear that we use specific technologies in our everyday life, on the other, it also makes it clear that we also believe that we follow specific moral values in the same situations, that is, in this point of view the close relationship between certain technological and ethical problems becomes obvious.

The question of moral philosophy ("How shall I live?") and the question of technology ("How shall I reach certain goals?") are necessarily similar in the sense that we try to answer both of them in concrete situations, and hoping to solve situations successfully, we are satisfied by knowing and applying the rules at our disposal. The product of a successful ethical life is a good life or a good personality, which is analogous to the technological object produced through a functional technology (Ropolyi 2004a).

2.1.5 Machines and technology

Jacques Ellul begins his famous book (Ellul 1964) by trying to clear up the widespread but false view which identifies technology with machines. He stresses several times that though machines have played and continue to play an important role in any prevailing technology, this role today is not so essential any more. What is more, nowadays there are more and more technologies in which machines do not participate at all (Ellul here refers primarily to social and "human" technologies.) At the same time, we could also observe in the past decades that the concept "machine" plays a more and more important role in the description and interpretation of epistemological processes. In such discussions, the concept "machine" is often used in a remarkably abstract manner or even as a metaphor. Think for example of the understanding of the concept of mathematics as a Turing machine or the usage of the machine metaphor in psychology (Pléh 1998) or cognitive science (Kampis 1997/1998).

Perhaps recalling the traditional concepts of machines will serve a better understanding of the relationship between technology and machines. First of all, we would like to remind the reader of Hegel's approach: machines are autonomous tools. According to Reuleaux's classical "dynamic" definition, "machines are the combination of parts which perform special tasks complementing each other and which work through the use of energy" (Mumford 1986, 49). A few important features of machines appear even in these simple definitions: they are not created and they do not work in a naturally given way but through human contribution, they have a well planned structure and a relative autonomy and (as a "gentle animal") they serve man. If we compare these characteristics with what we said earlier in connection with technology, it becomes clear that machines are a part of technology. In agreement with Ellul, we could say that though each machine is a part of technology, not all technology uses machines.

In many languages, the expression "machine" (similarly to the expression mechanics) has developed from the Greek word "mékhané" (meaning a smart device, artful intrigue or outwitting) (the obsolete Hungarian words "masina"[7] and "machináció"[8*] probably also come from here), and in different ages different things were regarded as machines.

The modern concept of machines became a basic category of the whole modern word after the 16th and 17th centuries, as an emblematic component of the so-called mechanistic worldview. The mechanistic worldview imagines all entities, what is more, the whole universe, as a kind of automaton: our whole world and almost every creature in it individually are similar to well functioning *clockwork*. This basic model of the mechanistic worldview reveals the "most secret" intentions of the age: if "there is no essential difference between nature and the products of the crafts" (Rossi 1975, 130) the control of man over nature is already complete and effective. While for Aristotle nature is the ideal which the crafts have to follow if they want to reach their goals, the relationship here is the reverse: they adapt the concept of nature to the products of the crafts. What is more, they do so for the reason already cited many times so far: so that man can reach his goals and control his world.

Bacon already emphasized that human creation does not imitate nature, and the product of the crafts are not inferior to those of nature. Descartes says that "I do not recognize any difference between the machines created by craftsmen and the various bodies which are assembled solely by nature, except that the manifestations of machines only depend on the arrangement of certain tubes, springs and other tools, which, since they have to be proportional to the hands of those who created them are always so large that we can see their shape and movement, while those tubes or springs which cause the manifestations of natural bodies are usually too small for our senses to perceive them" (Descartes 1996; 130-131). All these are also valid for the bodies of the animate and the inanimate world. Plants

[7] An obsolete Hungarian word for "machine" (note of the translator).
[8] Approximately "intrigue" (note of the translator).

and animals are machines, since they do not have a thinking soul. Man is more than an animal, since his soul (for Descartes) is not a machine. However, de la Mettrie writes that "The soul …is only a vain word, there is no concept connected to it and the wise use it only when they want to name the thinking part in us. Once we have established the principle of movement, animate bodies have everything they might need for moving, feeling and thinking … The body is clockwork. Its clockmaker is the fresh nourishing fluid. … Finally, let us point out bravely that man is a machine and that the whole universe consists of one single substance which was modified in various ways" (Benedek 1965, 192-196).

The *clockwork world* can be completely understood; all changes follow laws that can be known, the processes taking place are calculable and foreseeable. The shining mind also creates a rational order in the human world. We can base human relationships on the clear ethical principles of *rational egoism*. The functioning of human communities according to the principles fixed by the *social contract* secures the undisturbed functioning of the machinery of modern society. In this way, the developing modern individual secures his control over the circumstances of nature, society and his own life (with the help of machinery built in a rational way). The modern clockwork world is the age of fully realized, total technology, in which each entity automatically appears as a machine, in which all activity automatically becomes technological, in which the world exists as the multitude of situations that can be controlled and in which each individual can regard himself as the ruler and lord of his own world.

Perhaps this is the point where one of the common characteristics of machines and technologies not mentioned so far becomes visible, that is, their *finiteness*. In other words, that sooner or later they necessarily fail, break down or lose their efficiency. The situation-creating power of man and the stability of situations is limited; the necessarily changing circumstances make a technology (for example a machine) which has been functioning so far unsuccessful, we do not experience the realization of the desired goal, and our power suffers damage. Of course, strictly speaking, this is what always happens: technology and the functioning of machines is never perfect, we never reach the desired goal exactly, but in case of technologies regarded as successful we treat occasional differences as unimportant; they do not have any practical significance. In this way, the efficiency of technology is largely a practical issue, that is, its functioning proves to be efficient "only" in practice; the perfect realization of our goals is supposed to be "theoretically" impossible. Thus for example we can claim that not only it is impossible to find two identical leaves, but no two identical "chips" have ever been manufactured either. However, this does not cause any problems since the small differences between "chips" do not have a significance effect on their functioning (for most of the time of their use). We can observe similar processes in case of modernist social and moral technologies as well: the idealized modernist aims were able to keep the technologies of modern life alive for centuries, but their imperfections and drawbacks have presented themselves, and are presenting themselves, more and more irrevocably, thereby generating a need for new technologies (for the sake of simplicity, let us call them postmodern from the mid 20th century).

Besides the machines that function in a physical form, in recent decades we often also talk about machines when we describe the functioning of certain algorithms. In these situations we talk about abstract automatons (for example, Turing machines), the material realization of which is not important or is even impossible. This turn makes another characteristic of technology clear, namely its feature (which was already significant for the Greeks) that not only the possibility and the result of technological processes but the processes themselves, the procedures which make the realization of the goal, also belong to *technology*.[9]

Another interesting question is to what extent machines (and technologies) are similar to each other. To what extent do the mechanisms of clocks mentioned earlier share common characteristics? Are there any traditions of building machines and technologies which are effective in given situations or ages? Similarly to the example of following a model in normal scientific activities in Kuhn's sense, are there any *technological paradigms* (Hronszky 1997)? The answer is slightly different in the case of technology as practice and technological knowledge (if it is possible to make such a distinction clearly at all). In the case of technological knowledge and the basis of engineering sciences, it seems to be justified to talk about paradigms, while it would be more problematic to make such assumptions in the case of technological practice. The explanation is straightforward. As a result of its situation-dependent nature, the efficiency of technology might change in different situations. Perhaps an engineer might regard various situations as similar, but the concrete practical realization of a technological process is very sensitive to the differences between situations.

[9]We can translate the English term "technology" into Hungarian both as "technika" and technológia". Though these are used synonymously most of the time, the former suggests the existence of a certain technology, while the latter implies the functioning of this existing technology. (The note of the translator.)

Studying the relationship between machines and technology, another important characteristic becomes visible, namely the *extension* of machines and technologies. In this respect the two extremes of technology are the local technologies operated by the activities of the multitude of craftsmen and masters (e.g. agriculture), and the operation of the global *mega-machine,* mobilizing the whole society for achieving a single goal and organizing its activities (e.g. building pyramids) (Mumford 1986, 93). Mumford's concept of the mega-machine presupposes the coordination of huge masses of people, which makes it possible to set aims which can only be achieved with cooperation at this scale, and which makes the realization of these aims possible through using primarily social (political, economical, cultural) technologies. The parts of the mega-machine are the people in the given community; the role of the "engineer," whose task is to organize their algorithmic cooperation, is fulfilled by the ruler of the community.

2.1.6 Technology and society: the autonomy of technology and its value content

We have been characterizing the various aspects of the nature of technology so far. Though we have used the results of different philosophical approaches on the way, we have tried to avoid the dominance of a single point of view and thus we have given a perhaps not quite coherent but hopefully all-round description of the essential characteristics of technology. Now we would like to briefly review those characteristic philosophical views and problem areas which collect in various concrete versions the features and characteristics discussed above in connection with the interpretation and explanation of technology. Of course, we cannot give a comprehensive overview of the philosophy of technology here; we are satisfied by recalling the approaches and problem areas which are closely connected to the general nature of technology. There are numerous books, journals and electronic sources of information for a more comprehensive review of the philosophy of technology.[10]

Furthermore, all philosophies of technology take a stand on the question whether technology is value-neutral or value-laden. In other words, are the goals and means which are necessarily a part of technological activities separable from each other? If we assume their separability, given technological tools can successfully contribute to the realization of the most varied aims, that is, the tools themselves do not follow any goals, therefore in a certain sense they are neutral. Obviously, we can reach the same conclusion if we note that a given goal can be realized with different types of tools. In contrast, if we assume that tools have their own values, these are unavoidably built into the value system of the aim since they will influence the goal that can be realized. That is, technology cannot be regarded as value-neutral but it is "value-laden" and we have to take its value content into account while using it. The question of the value-neutral or value-laden nature of technology is closely connected to the question of the autonomy of technology – in fact they are different sides of the same relationship between *technology and society*. While during the interpretation of technology we paid attention to the circumstances which connect and separate technology and society, in connection with the value contents we examine a certain identity of technology and society and the possibilities of their appearance in each other. Obviously, both aspects have to be revealed for a successful description of the relationship between technology and society: their differences and their identity characterize their relationship appropriately together. We can also express this by saying that *the basic question of the philosophy of technology has two sides*, namely the standpoints regarding the autonomy of technology and the value content of technology, which must both be found in any consistently constructed philosophy of technology.

Following Feenberg, we can differentiate between the following main groups of classical philosophy of technology as regards their standpoint on the basic question: determinist, instrumentalist, substantivist, and critical points of view. We demonstrate the relationships between them in *Table 3* (the table also contains some illustrative examples as well).

TECHNOLOGY	AUTONOMOUS	UNDER HUMAN CONTROL
VALUE NEUTRAL	*Determinism* Traditional Marxism	*Instrumentalism* Pragmatism
VALUE LADEN	*Substantivism*	*Critical theory*

[10]The sources on the Internet are the most accessible. Frank Edler's collection contains approximately 200 papers which can be regarded as basic [Edler 2001]. The electronic journal *Techne* published by the *Society for Philosophy & Technology* is an important source of ideas (http://scholar.lib.vt.edu/ejournals/SPT). Durbin's two comprehensive papers are especially interesting [Durbin 1998; Durbin 2000]. Among printed books, perhaps books by Ellul, Borgman, Latour, Haraway, Feenberg, Ihde, Pitt and Lem are the most significant (see bibliography).

	Anti-utopist views Ellul, Heidegger	Anti-utopist views Marcuse, Foucault

Table 3: the classification of the philosophies of technology on the basis of their standpoint on the basic question of the philosophy of technology

The main characteristics of the philosophies of technology classified above can be identified on the basis of what we said earlier, but perhaps the choice of the names and the typical versions of the classes might require some explanation. The *determinist* view has high hopes about the autonomous development of technology insofar as it regards technology as the key moving force of social progress. Technological progress is crucial in creating social progress, but the direction and the characteristics of social development are not determined by the values hidden in technology (since technology is value neutral), but by the goals chosen by people. A view such as this is in complete agreement with many versions of the modernist value system, for example the idea of the clockwork mentioned above or the traditional views of Marxism. The *instrumentalist* view completely eliminates the connections between (technological) tools and (human) goals, for example the idea that technological development necessarily generates social progress, and it interprets technological tools as means which can be freely utilized by man. The philosophical assumptions of instrumentalism are usually based on the ideas of liberalism or pragmatism (Pitt 2000). *Substantivism* agrees with determinism in that man is not the ruler of technology but rather is at the mercy of technological progress; what is more, according to this approach this is true in a very important sense. Technology is not neutral; it unavoidably expresses its own values during its usage, that is, technology necessarily modifies the goal to be reached and even man himself. In this way, through enforcing the contents in themselves, technological tools shape the life of modern society as a determining factor (think of for example the effects of cars or television). Substantivist philosophy of technology (we could also say "factual", "essential" or "content based" as well) usually notes the negative social effects of technological progress and it often predicts anti-utopist scenarios. The emblematic figures of substantivism are Jacques Ellul and the famous philosopher of the 20th century, Martin Heidegger. Heidegger's late writings are especially significant (written in the 50s and 60s). The characteristic figures of *critical* philosophy of technology (Mumford, Marcuse, Foucault, and Feenberg) developed their point of view under the influence of Heidegger and the Frankfurt School. They accept the fact of the connection between the value content of technological tools and social aims. At the same time, they emphasize the possibility of human control over this interconnected conglomerate. In other words, though the technological and the human spheres are inseparably interconnected and this has numerous dangers, the unfolding processes can theoretically be handled through adequate political, economical or cultural means.

The inseparability of technological and human spheres, that is, the human values built into technological tools as well as imagining technological tools which influence human aims, have become more or less completely accepted in the endeavors of the philosophy of technology. Thus in fact we can say that the popular views of the philosophy of technology nowadays are either substantivist or critical philosophies of technology or a certain mixture of these. Nevertheless, they might diverge in several details. For example, if we compare the views of contemporary philosophers of technology such as Pickering, Haraway, Latour or Ihde, it becomes clear that the analysis of the problematic relationship between the human and the non-human are centrally important for all of them (though they use different concepts). Thus for example they characteristically make a stand in connection with the possibly symmetric nature of the relationship between the human and the non-human, the nature of the activity of technological tools, the possibility of the incarnation of human intentions in non-human entities and the incarnation of non-human strivings in humans and in similar connected questions.[11]

If we look closely at the philosophical assumptions of such emblematic figures of contemporary philosophy of technology as for example the earlier listed Pickering, Haraway, Latour or Ihde, we will notice that the philosophical views they follow and develop are not only applied fruitfully in the philosophy of technology, but also, for example, in the philosophy of science, social philosophy or other philosophical problem areas. The most important of these philosophical concepts and principles which can be used efficiently nowadays are philosophical hermeneutics (phenomenological hermeneutics or hermeneutical phenomenology) and certain combinations of the tools of the postmodern standpoint. For this reason, philosophies of technology built on such complex philosophical background are usually not characterized by the too general substantivist or critical label but rather, they are called

[11]We would not like to deal with the details of such a comparison here. For a detailed analysis see for example [Ihde – Selinger 2003]. The works of the authors mentioned in the analysis can be found in the bibliography.

hermeneutical, social constructivist, feminist, etc., which labels obviously signify special versions of the general categories.

The dominance of the philosophical ideas of *hermeneutics, social constructivism* and the *postmodern* point of view in the philosophy of technology is basically connected to the nature of technology. As was already discussed, technology can always be interpreted in a certain situation, that is, it is a situation-dependent entity. Entities and forms of existence of this kind are difficult to interpret for philosophical systems such as positivism or the whole tradition of analytic philosophy since these points of view precisely concentrate on researching and describing entities and knowledge which are situation-independent. However, hermeneutics, the postmodern approach, and social constructivism precisely deal with the interpretation of entities and forms of existence embedded in a situation (world, life-world, social environment), that is, as a result of their basic philosophical assumptions, they are more appropriate for describing and interpreting situation-dependent technology. Consequently, we can also say that hermeneutics, social constructivism, and postmodern philosophical systems are systems of the philosophy of technology as well since they necessarily include the possibility of interpreting technology philosophically, though of course only in an implicit form, or using a Hegelian term, in an unhappy form.

We can utilize the mentioned philosophical points of view not only for interpreting technology but also in the interpretation and description of the sciences. In fact, it is our experience that hermeneutical, social constructivist, feminist etc. points of view have also developed in the philosophy of science. In these philosophies of science, they try to understand science (either the whole of science or some of its problems) by placing it into some kind of (human or social) situation. The consequence of this is that the methodology of interpreting technology and science is necessarily identical in the mentioned approaches. As a result of the identical points of view, the differences between technology and science might be blurred or might seem insignificant since we understand all of them chiefly as a certain being-in-the-world, as something which fits into a context. In recent years, the outlines of an independent entity called technoscience have been developing from the common characteristics of technology and science which we identified with the situation-dependent point of view described above. The interpretation of technoscience is more and more popular worldwide, and it is gradually taking over the roles of "traditional" philosophy of technology and philosophy of science which were earlier regarded as separate.

The complexity of the relationship between society and technology, the human intentions and values embodied in technological tools, and the intentions and values mediated during the usage of these technological tools and their interrelatedness with the value of the original goal of the usage and further possibilities of interactions often do not make it easy to understand the nature of the applied technology, the consequences of using or disregarding them, and the factual aims that we can achieve or avoid. Of course, it would be dubious to draw solely on technological knowledge in this understanding. It is quite obvious from what we have said so far that we can only solve such a task successfully if we take into account both technological and social circumstances. These requirements are effective for example in the case of the *experts* who develop their opinion in connection with large-scale technological projects (e.g. Bős-Nagymaros)[12]. Of course, the often radically different opinions of technological experts in certain questions are not based on the differences of their technological knowledge in the narrow sense but also in the diverging evaluation of certain elements of the mentioned complex state of affairs. Thus, the often emphasized "objectivity" of the experts is far from being a simply definable and achievable state and as a result, they often cannot realize it.

2.1.7 Technological optimism, pessimism and realism

Though the use of technology is only a part of the whole history of mankind, discussions about the socially useful or harmful effects of technology surface over and over again, as a regularly recurring problem. Each age raises the classical question whether technology is a blessing or a curse for mankind and tries to give an up-to-date answer to it. The special importance of the relationship between technology and society, and the significance of the basic question of the philosophy of technology becomes apparent solely from the fact that the dilemma of the usefulness or harmfulness of technology surfaces over and over again practically in all ages and in connection with basically all significant technologies. Nevertheless, the usefulness or harmfulness of technology does not always follow in a straightforward manner from the point of view taken in the *basic question* of the philosophy of technology; we might also need the acceptance of further principles or aspects for such a decision. These principles and aspects may also play a role in determining the specific values of *situations* tied to certain technologies (think, for example,

[12] A reference to the Gabcikovo – Nagymaros Waterworks, a large barrage project on the Danube between Slovakia and Hungary. (The note of the translator.)

of the special cases of modern medicine) and the characteristics of *specific technological procedures* (e.g. the use of radioactive material).

Naturally, *technological optimism* is also connected to the determinist approach. Since technological progress is the driving force of social progress, those who believe in progress regard technology as something that plays an indispensable role in the satisfaction of the society on the given cultural level. The disturbances of technological processes, such as longer electricity blackouts, obviously point to this connection. Man has not lived in a naturally given environment for a very long time; what is more, he would probably be endangered by total extinction in such circumstances. With the help of technology, man creates an artificial environment, civilized natural and social circumstances, and the world of culture which provide him with suitable life conditions; that is, the unquestionable value of technology follows from its indispensability in sustaining a civilized human life.

Instrumentalism regards the role of technology as more questionable and it ties its positive or negative evaluation to a given situation and technology. Since concrete technologies are tied to concrete situations and the situations are under human control, it is the evaluation of the chosen human ambitions and aims which is decisive in judging technology blissful or harmful. (Think for example of the possibilities of using nuclear fission in nuclear power plants and nuclear bombs.) In fact, in this approach, it is not the examination of the internal connections between technology and science which yields the results, but the anthropological and social philosophical examination of the production and usage of technologies. Since instrumentalism does not originally contain any assumptions which would lead to obviously optimistic or pessimistic conclusions, it makes an occasional critical examination possible, that is, the development of a point of view of a certain technological realism.

Of course, because of the nature of the question, many different versions of *technological realism* can be developed, not only in the framework of instrumentalism, but also in that of critical philosophy of technology. However, its defenders are striving for a moderate and supposedly impartial point of view in each case, avoiding both optimistic and pessimistic evaluations, and ideas of technological utopia or Neoluddites (more recent destruction of machinery), which seem to be extremists from this point of view. For this, we need to develop and follow an adequate critical point of view, in the same way as in the case of critics of literature and film. In the case of works of art, we find this completely natural, but recall the Greek understanding of technology: technology itself is a work of art of some kind. For example, a group of American technorealists developed and popularized similar critical principles in 1998, and since then several thousands have joined them.[13] We can read the following among their principles: "1. Technologies are not neutral. … 2. The Internet is revolutionary but not utopian. … 4. Information is not knowledge. … 5. Connecting schools into a network does not save them … 8. Understanding technology would be essential for the citizens of the global world", etc. Many "freelancing intellectuals" are followers of technorealism who, especially in the United States of course, regularly publish writings of technological criticism in a multitude of daily and weekly papers, journals, and books.

Pessimistic conclusions follow from substantivism and some critical philosophies of technology. The substantivist point of view takes into account the consequences of the nature of technology, and the pessimistic viewpoint of some critical philosophies of technology takes into account the consequences of unfavorable social circumstances. The followers of substantivism regard all technology as essentially of the same nature. According to their view, the common essence of all technology is its position of power which is necessarily mobilized in order to reach its goals that is its nature of efficiently controlling the situation. Man can at most be the participant or the servant of technology functioning in this way, or as McLuhan puts it: man is forced into functioning as the sexual organ of machines. It is really easy to see individuals in this situation who, without a choice, are forced to consume the products of, say, the car industry, entertainment, or mass culture, and for whom even the natural environment is only accessible through the mediation of complicated technologies. The typical ideal of substantivism is Ellul's technological imperative: the possible technological tools come into existence and start to function in an autonomous way and necessarily, independently from people's intentions. Obviously, this technological imperative is about the situation in which man's own action serves his subordination instead of his freedom, that is, we face a typical manifestation of alienation.

From the point of view of the critical philosophy of technology, we can equally develop an optimistic, pessimistic or realist approach. The nature of our standpoint in this case depends on our opinion about the possibilities of man's control over his own circumstances, and above all about the conditions of the realization of human freedom. This is because the usefulness of technology does not necessarily follow from the social control over technology,

[13]Technorealism Overview. http://www.technorealism.org/overwiev.html (Retrieved on January 2, 2002) and Technorealism.*MEME*, 4.02. http://memex.org/meme4-02.html.

since a lot also depends on who those participants of society are who operate and control technological systems and what interests they serve. Think for example of the problem areas of military industry, or the generally observable phenomena of pollution. In these cases it is clear that various interest groups of society are able to use technology for their own goals even if they harm the life conditions of others, or even make them impossible. In other words, the nature of social systems is decisive in connection with the usefulness or harmfulness of technology. Though the progress of technology can increase human freedom, as a result of the underdevelopment of social systems, the division of freedom becomes unequal and less efficient for the whole of society or can even lead to harmful consequences. The possibilities of freedom and alienation equally persist, and technological progress often contains both. Technology built by man but getting out of man's control (who might be careless or have bad intentions) is represented by the Golem of mystical teachings or the independent robots of science fiction, but in fact it is unfortunately not necessary to refer to imagination while looking for illustrations, since for example the biotechnology of our days or the organized genocide methods of fascist social systems of the recent past are practical examples of such states of affairs. Nevertheless, we can hope for the progress of social systems and for the development of freedom, and thus, for example, work on the realization of democratic control over technology (Feenberg 1999) which may give a reason for optimism.

2.1.8 Philosophy and technology or the philosophy of technology

We can think about the relationship between technology and philosophy in different ways depending on our point of view on the basic question of the philosophy of technology. If we accept the idea of the autonomy of technology, our natural task will be the analysis of the *philosophy of technology* as regards the *relation* between technology and philosophy, that is, the value system of technology, while if we follow the view of the social embeddedness of technology, the relationship between technology and philosophy may stay somewhat external, and in this case we can separate the value systems of *philosophy and technology*. At the same time, following these diverging standpoints also includes joining different traditions of the philosophy of technology.

However, it is of course obvious that many characteristics that can be connected to the nature of technology might be interesting for the whole of philosophical thinking. We could also say that the analysis of these characteristics significantly contributes to the validity of philosophical systems of thought. It seems especially fruitful to examine technological processes and characteristics thoroughly in three problem areas: *power, practicability and virtuality*. Technological situations are eminent forms of controlling a situation; being operational, effective and efficient are characteristic of all technological activities. Furthermore, it is also obvious that technology is an important sphere of the function of practicability. As a result of the differences between the planned and actual unfolding of technological processes, the interrelatedness of the calculated and unpredictable nature of practicability becomes apparent. Finally, we would like to mention that since technology can be identified as a mediator between the spheres of possibility and reality, it also works in the sphere of virtuality. From another angle, the basic openness of technology, that is, its feature that it contains the reality of a given situation together with its possibilities, what is more, that it leads to the realization of certain possibilities, means that technology is the realm of the realization of possibilities, that is, it is the realm of virtuality (Ropolyi 2001b). Therefore, the philosophy of technology leads chiefly to the analysis of the interconnected problems of control, practicability and virtuality; and so the concepts of control, practicability and virtuality can naturally be connected with the analysis of technological situations.

2.2 The nature of information technologies

Contemporary society is a complex system of various technologies. Besides traditional technologies of production, economy and politics, culture, thinking and even everyday life is becoming more and more technological. An important symptom of becoming more technological is giving up on a comprehensive philosophical worldview. The perplexity of philosophical thought in the last 20-30 years and the declared lack of a "big theory" encompassing all human experience have led to the rise of *postmodern pluralism*. The nature of postmodern thought is essentially similar to the nature of technology. The point of view of the postmodern leads to truths tied to situations; it would be a meaningless and harmful ambition to unify these as situation-independent and to construct a unified worldview. Only a power that rules over life dares to do so (for example modernist rationality), but this type of power is not acceptable any more. Postmodern ambitions question the modernist practice of constructing one single reality and they are trying to follow an attitude which accepts and maintains a multitude of realities. Modernist power is universal, postmodern power is particular. For the postmodern individual, power is only acceptable as power over

one's self. A postmodern individual is the master of his own life and world; perhaps we could also say that he is the master of his own situation. He is the "creator" and maker of his own self and of his own world – and of course he also refuses the universal rules of creation. A power over one's world is also some kind of power over one's own self: a postmodern individual is extended (at least in a virtual sense); there are no sharp boundaries between the self and his world. Virtuality plays a basic role: all possibilities have to be taken into account together with their realization. The boundaries of realities are malleable.

If we can call the *modernist worldview scientific*, we can call the *postmodern worldview technological*. Through developing a scientific worldview, the modernist point of view strives for dissolving the situation-dependent nature of human knowledge, and creating a unified universal interpretation of them. The development of the modern worldview, involved looking for and marking out a place for man. The *searching* modernist activity is *scientific*; the *result* of the search is *technological* by nature. This is because the final aim of modern scientific activities is putting man in a position of power; as a result of modern science, man (understood in the general sense) can get into a situation which he can efficiently control – that is, the modern human world itself represents the technological "situation" for man as a "genus". The 17th century metaphor is indeed very apt: the world is machinery. The postmodern pluralizes this situation, which we, if we please, can regard as a return to the system of the "pre-scientific" situation-dependent knowledge (and activities), but it can also be regarded as the system of the "fully realized" modernity in which the technological, situation-dependent "world domination" of man as a "genus" *is now clearly given in reality for each individual and social group*, namely as control over one's own self, that is, over one's own world. Whatever we think about this issue, it seems to be unquestionable that the ambitions characteristic of the postmodern point of view are close to the value system of technology. This similarity can be complemented by further details if we recall the analysis of the nature of technology and review the concepts in *Table 1*.

We can interpret the transformation of the modern production system as a development that made the spreading of the postmodern point of view possible. In the decades after World War II, the large-scale industry built on mass production and the social system connected to it were obviously pushed into the background more and more, and in its place, new types of structures of production and society were shaped which are sometimes described as *postindustrial* or *information* or occasionally *knowledge-based* or *network society*. All interpretations of the transformation of production and social circumstances reflect on the loosening of the all-encompassing material and intellectual structures, as well as on the pluralization of the production and social system, though they characterize the moving force and the organizational principles of the emerging new structure in different ways. We cannot discuss in detail these developments sketched here; however, it seems to be by all means necessary to examine two basic factors of the processes, on the one hand, the phenomena of the marginalization of material technologies and the spread of information technologies, on the other, the change of the social role of knowledge.

2.2.1 The technology of producing information

Already in the 1970s, when the postmodern Lyotard pointed out that the state of knowledge had changed in developed societies, he referred to information technology and the usage of computers as an important factor in this process (Lyotard 1993). Lyotard proved to be a keen observer. Knowledge has really changed partly as a result of computer use and it is actually being transformed today. In its new state it is becoming plural and this process is crucially made possible by information technologies. What is happening today to knowledge and information fundamentally shapes our world: it makes it postmodern. Perhaps the two *most important postmodern values, virtuality and plurality are embodied day by day* in the transformation process of knowledge and information of our days. Information supports virtuality and knowledge supports plurality. The widespread social use of information technologies as well as the social ambitions to transform knowledge trigger the post-modernization of social circumstances by "putting" virtuality in the life of communities and "keeping it there".

The nature of *information*, which plays a fundamental role in the whole process, is not easy to understand at all (Capurro – Hjørland 2003). A patient reader counted no less than 134 different definitions of the concept of information. Others think that the problem can be solved easily: we only have to recall Shannon's definition from 1949 (Shannon – Weaver 1986) and everything becomes clear. However, Shannon defined the mathematical concept of information, and the mechanisms of information technology work in a completely different context. The multitude of options could also tempt us to search for a unified theory of information (Hofkircher 1999; Flückinger 1995) or to start developing a philosophy of information (Floridi 1999; Castledine 2002) or perhaps to develop an obvious view which suits us. Here we choose the last of these options. We will try a quite simplified description, made especially for an easy understanding.

The difficulty in understanding the nature of information is probably connected to the fact that the condition of the existence of information is the coexistence of two processes of different levels (language and consciousness has a similar nature). The process on one of the levels consists of the events capable of expressing information, but at the same time, we can also identify events on a different level which can correspond to the events of the first level, in other words: information exists as a "relation". As a result of the correspondence, the events of the second level become the signs of the events of the first level (or of the relations between them). In this way the signs of the second level can express knowledge about the processes taking place on the first level, provided that we know the rules of the correspondence. We can also express this by saying that signs of the second level "contain" some information, for example that a detail of a process taking place on the first level has changed. That is, we can claim that *a sign that we can observe on the second level can be regarded as information by virtue of its correspondence to the changes of the process of the first level,* and it will inform us of what happened on the first level and this will be its "content". For example, we can represent an increase of voltage in a circuit on a second level, say with the help of flashing a photo diode. In this case, the appearance of the light becomes knowledge about the increase in voltage provided that we know the connections between the processes of the different levels. We can also describe this basically very simple situation by saying that what we need in order to interpret the information is on the one hand *the coexistence of two processes taking place on separated levels*, on the other, the *interpretation* itself through which the correspondence of processes taking place on different levels can be established. Information is a *hermeneutical product*, which is created through a direct mediation between two "worlds" (the two levels, the level of the sign and the level of the signified)[14]. In other words, *information is interpreted being*. It is created in a process in which we regard an entity as another (a sign) at the same time.

The reason that we discuss the problem of the nature of information is that if we recall what we said about technology in connection with tool making (in technology we use the objects at our disposal as tools determined by the chosen goal), we can notice that information is created in a similar "technological" process. The *technology of producing information is interpretation, or more generally, hermeneutics*. It is the point of view of hermeneutics which makes it possible to regard the events of a process (taking place on the second level described above) simultaneously as a given event (for example a flash of light) and a tool (sign, in the example the sign of an increase in voltage) which plays an indispensable role in the production of the knowledge (about the increase in voltage). That is, *information* itself is an *(epistemological) technological product*. Note that we talked about the technology of producing information and not about the content of the information, that is, not about what the product is like, whether it is valuable or without any value, intelligible or incomprehensible and so on.

The close connection between *information and virtuality* becomes visible in the process of producing information. Though material processes are necessary for the "production" of information, the existence of these only implies the possibility for the information to come into existence. For the information to actually come to exist, a mental act, interpretation, is needed as well. In the process of the creation of information the active agent is without any doubt the interpreting man. Simplifying the matter somewhat, his activity of interpretation consists in considering an event as a sign of another, that is, on the one hand he assumes that the chosen event includes *the possibility of a sign*, on the other, he interprets the *realization of this possibility* by developing a system of signs, for example. (If necessary, this takes several rounds between the two levels). After a successful interpretation, he can infer the processes of the signified world, just "as if" he were trying to find out about them directly on their level. This simple sketch of interpretation (in reality this applies to a much more complex one) points out the role of virtuality in the production of information. Virtuality is essentially a possibility considered together with its realization (Ropolyi 2001b), it is the realm of the "as if". The *sign* used in the process of interpreting information *becomes a sign if we consider the possibility of signifying with it together with its realization*. This is the sole reason why signs can represent the signified processes in an "as if" manner. If we did not regard a sign as something which can be a sign of something, it would not be a sign. Furthermore, if we did not regard this possibility as something which is actually realized, it would not give us any information. It is obviously not enough to consider an abstract possibility, since that can be a sign of anything; that does not provide us with any knowledge. Thus, a sign used in the production of information is virtually the signified. If a sign is virtually the signified, information cannot be interpreted without this virtuality. That is, *information necessarily includes virtuality*.

We hope that the train of thought presented above offers some explanation of the recurrence of various problems of virtuality in the usage of information technologies. We will discuss the further problems of understanding virtuality in detail in the next section. We could characterize this discussion of ours about the production of information

[14]In order to make our explanation easier to understand, we have intentionally ignored the possibility that in reality, the mentioned levels can be supported by one single physical process provided that our point of view is complex enough, that is, if we are able to regard something simultaneously as an entity of two different kinds (sign and signified). In any case, this possibility does not change what we have said so far.

in a somewhat elevated tone as a sketch of the *hermeneutical concept of information*. We will present a more detailed discussion on a later occasion which will feature, among other things, aspects from semiotics, information theory and the philosophy of information which are omitted here.

Besides Lyotard, many other postmodern authors have described the other crucial process of the development of the postmodern, that is, the transformation of the status of knowledge which can be observed in the recent few decades. In this transformation process, scientific knowledge loses its earlier universal nature, it becomes differentiated and fragmented, and it is no longer adequate for establishing comprehensive worldviews. Following the reduced ambitions of its believers, its validity *becomes limited to certain situations* (which still seem to be transparent). As a result of this process, it becomes more and more difficult to differentiate scientific knowledge from technological knowledge. Contemporary society radically values finding our way in natural and social situations; the hero of our days is the chivalrous manager and not the scientist bending over his microscope.

The Internet also plays an important role in the change of the social status of knowledge. In the near future, all human knowledge and cultural products will appear on the websites of the Internet, not in the structure of the modernist system of knowledge, but following the individual curiosity, interests, tastes, that is, personal value systems of the millions of web designers. This process predicts a radical change of the social status of knowledge. Similarly to the reformation of religious beliefs 500 years ago, the reformation of rational knowledge is unfolding in our days in which the scientific system of institutions (universities, libraries, scientific associations) are losing a significant portion of their influence, and individuals can directly relate to all knowledge (Ropolyi 2001a). The knowledge that can be acquired this way is of course fragmented and situation-dependent, that is, it is technological in nature. The pressure to adapt to new social systems opens a new era of personal development: the birth of postmodern personality is about to come. To sum up, we could say that we are witnessing a radical *individualization and pluralization* in the creation and usage of knowledge as well. We will discuss the further changes of the status of knowledge in detail in the second volume of our treatise.

2.2.2 Information technologies and postmodern technologies

Since information technologies are technologies as well, it is obvious that what we said earlier about the nature of technology and all of its consequences is also valid in the sphere of information technologies. What is more, if we may say, our earlier claims are valid to a greater extent. This is because we have to consider that, in the spirit of what we said above, information technologies express postmodern values (above all, virtuality); what is more, the case is in fact that information technology is *the* postmodern technology. We call a technology *postmodern* if it expresses postmodern values, and values of this kind are realized during its functioning.[15] Since the postmodern worldview as such is technological in nature, the technologies expressing postmodern values are technologies in an eminent way, that is, information technology today, in the postmodern age, can be regarded as *technology per se*. Interestingly, even the names are revealing. The often used expressions "computing" and "computer" express the essence of the activity: we have an interest in the "computation" of processes. (For this reason, we do not talk about calculators but computers.) In our opinion, the emphasis is not so much on the *calculations* which lead to the result (these are simple practices which follow rules) but on the need to make the result *computable*, predictable through following rules. This need itself is *the* technological need, expressed in a quite obvious and clear way. Thus, nowadays computing represents technology in its purest form. It is the technology of our age, as we say. But let us also add that this age is the age of technology, that is, this is an age in which the technologies effective in the treatment of situations determine our worldview; that is, this is the postmodern age.

The unconcealed presentation of the problems of *control* and the *central position* of the maneuvers of power which permeate all technological activities can be regarded as clearly identifiable characteristics. It is easy to notice that among the social, political and ethical questions of information technologies, the question of securing the control over data, information, actions, and even whole spheres of activity and disposal plays a key role. Perhaps it is enough to refer to the fact that in many countries, they are trying to regulate the area legally, and are even establishing offices focusing on data protection.

[15] According to Bergmann's notable observation, modern technology is "hard" technology and the postmodern one is "soft" [Dreyfus – Spinosa 1997]. If we accept Bergmann's opinion, we may conclude that information technologies equally utilize hard and soft components, that is, they are all *partly* postmodern by nature. But it follows from the nature of the postmodern that if something is postmodern to some extent, it is completely postmodern, since, for example, if something is partly pluralistic, it is pluralistic on the whole. In this way, our claim about the postmodern nature of information technology also seems to be acceptable on the basis of Bergmann's definition.

As we saw earlier, the goal of all usage of technology is control over situations, thus it is quite natural that this also pertains to information technologies. However, *if we compare information technologies with traditional technologies*, the differences are apparent. On the one hand, traditional technological situations are clearly identifiable and well defined. That is, traditional technologies operate their power within clear spatial and temporal limitations. On the other hand, traditional technologies are markedly "hard" by nature, that is, the components which create the situation, processes, and means of the technology, as well as technological products, are basically material. *However, virtuality always plays a key role in information technologies*. Thus, the boundaries of technological situations are virtual as well; that is, the "actual" boundaries are malleable, and the *situation* can be *open*. This equally appears in spatial and temporal relations and of course in circumstances of power which become extended and unstable. (As an illustration think for example of the problems of on-line banking.) To put it simply, we can initiate virtually mediated transfers or cash withdrawal within wide and variable spatial and temporal limitations, and thus our control over our own financial goods becomes fully fledged, while at the same time, as a result of several factors, it also becomes loaded with uncertainties unusual in traditional technologies.) Furthermore, it is also clear that as a consequence of the virtual features of information technologies, even though the creation and treatment of situations depends on material conditions (for example on computers that can be connected to the network), its essence is not this but the *simultaneous* imagining of the various possibilities of these and the realization of these possibilities, that is the way of their interpretation and realization which follows the laws of virtuality. It is obvious that Tim Berners-Lee who thought about the appropriate storage and mediation of large amounts of information did not "discover" any new types of material processes or tools when he developed the idea of websites, but he created "a new world out of nothing" noticing the virtual characteristics of existing tools.

Perhaps the careful reader has noticed an apparent contradiction: on the one hand, we said that the postmodern is *against power* and only accepts a power over one's own self, on the other, we also claimed that information technologies which express postmodern values are eminently *oriented towards power*. How can we solve this dilemma? In our opinion it is possible and in reality the case is that *information technologies are technologies which are always tied to certain subjects, that is, to certain communities or individuals*. Think for example of the fact that while the technological components and tools used in traditional technologies are usually given by objective natural regularities, that is, they are essentially inter-subjective by nature, the components and tools of information technologies – above all, information itself – are necessarily based on subjective interpretations.[16] We (or I) will interpret a given material process in such and such a way; of course, natural regularities or the points of view of other subjects can be featured in this interpretation process, but the final result is created *only* when a subject commits himself to something and he holds on to the interpretation which he regard as *his own*. Without this, information and all tools built on it become unclear or are lost. *Thus, interpretation, that is, the personal participation of those who operate and use the technology in a given process of interpretation, is indispensable.* In this way, power appears in information technologies as the power of someone (an individual or a community) over *his own* circumstances. This is because the boundaries of the postmodern personality (and community) are virtual; that is, they are disconnected from "physical" boundaries, extended, malleable, apparent, uncertain, and weightless. The postmodern personality involved in information technologies can regard the whole technological situation and the tools operated in it as *his own* situation and *his own* tools. This is understandable since he creates them through his own interpretation. No one else has anything to do with it – his creation is his property. If someone visits a distant website and understands somehow the contents presented there while looking at it and reading it, he "acquires" it. That is, he will use what he saw according to his own understanding and not that of the creator of the website.

The case is similar to *works of art*: they become the "property" of the audience; the creator, once he has presented his work to the public, cannot prevent this anymore. In the case of works of art, it is also personal interpretation which creates the work of art in the audience. The boundaries of a member of the audience become virtual, extended, weightless, and apparent. Thus, we could also say that information technologies can be interpreted most easily according to the *laws of aesthetics,* and not those of the philosophy of science and the philosophy of technology. Recall the Greek concept of "techné": technology and art are relatives, and their laws of creation are similar (Heidegger 2004). Of course, some aspects of the similarity already appeared in earlier technologies as well, but they are presented in a clear and pure form in the technology "*per se*", that is, in information technology.

The extended and endless discussions taking place in the world of information technology about the rights connected to the products and procedures of the technology (personality rights, copyright, property rights, right to use, etc.) are to a significant degree derived from this situation, that is, from the fact that people who become "worldwide"

[16]In connection with the interpretation of signs, Frege already noticed the difference between the *meaning* of the sign and the "*idea*" connected to the sign [Frege 1980, 161]. According to him, the idea is necessarily subjective, individual and has several meanings – in contrast with the meaning of the sign which can be objective, intersubjective and unambiguous.

virtually can regard any information created by themselves (that is, created through their own interpretation), and anything constructed of them as their own without any doubts. How could something which I experienced and understood personally belong to someone else? However, the various virtual people often come into conflict with each other since they are sailing on the same sea of information and a need for extending personal boundaries and for trespassing actual boundaries are part of the form of life here. A "hacker" or a friend who cracks copy protection is proud of his own expertise; they are proud of understanding things better than someone at the company entrusted with protection. As a result of having knowledge of information technology and interpreting the intentions of the protection, he acquires this knowledge and uses it as his own, and finally his intentions are effective and he can extend the boundaries of his world and his personality.

Such acts can of course be judged "from the outside" as well, that is, from the legal and moral position of modern society. In the modern understanding, information can be owned as anything else, say for example as a bicycle can be. According to this value system, someone who acquires some information in an "unauthorized" way, that is, someone who steals it, can be blamed both from a legal and a moral point of view. Theft is blameworthy, but is this theft? Can we regard downloading and playing mp3 files as theft? If yes, this gives the worst character reference to millions of Internet users. Are we so bad morally? In reality, in questions like this, the *ethics* of information technology and the *traditional ethical point of view of the social environment of information technology* are opposed to each other. They understand good and bad differently. The ethics of technology is more understanding and lenient and it often pays respect to the achievements or even greatness of those who crack codes and evade prohibition. However, those who follow the value system of the social environment would use the evaluations of rights and illegality successfully used in other spheres of society here as well, but in doing so they would ignore the peculiarities of information processes. It seems that currently this is also an important battlefield: we are talking about a battle between the postmodern value system and ethics of information technologies and the modern value system and ethics of the social environment in which many battles have already been fought with alternating luck but the war is still going on.

Another important factor in comparing traditional and information technologies might be that in the case of information technologies, the role of the *intentions delegated* to the technological tools increases to an extreme degree. In fact, it is not only the *significance* of the delegation which increases but its *complexity* as well. Thus for example a computer program can mediate intentions complex to any degree and realize them in the appropriate environment. It is notable that computers are different from traditional machinery in this respect. Other machines are automatons with a special goal and definite characteristics, but computers are automatons with universal aims and indefinite characteristics. The indefiniteness and universal nature of computers becomes definite and special through programming the concrete task. The presence of human intentions delegated to technological tools appears in the clearest form in programming computers. *Interactivity* plays a role in numerous information technologies. This method makes possible the continuous expression of our intentions, their adjustment to changing circumstances, their correction, change, and withdrawal. In this way, technological situations come close to real life situations, which is naturally an important development in many respects.

If the interactive representation of our intentions is continuous, we can talk about "*online*" presence. It is the "online" usage of information technology which makes participation in virtual communities possible (chat channels, news groups, discussion lists, games, etc.). Virtual communities have a peculiar political, psychological, and moral order; the norms of presence and behavior especially contain many special rules. These are mostly declared and written down, but there are many unwritten norms as well. Essentially, behavior has to be regulated because of the consequences of *anonymity* which is made possible by the virtual nature of presence. Anonymous presence obviously permits evading the consequences of our (virtual) actions and statements and can even provide us with an excuse from responsibility for the consequences of our intentions. This practice is quite widespread and essentially permeates the whole of "information society," from the companies that fill our electronic mailboxes with unwanted "spam," through students acting in the name of various imaginary persons, to agents who manipulate political surveys with messages using pseudonyms. All these often make online life uncomfortable, but essentially only the online community is willing to do something against them; the "offline" world, the wider society, is not interested in it very much: there is no money involved in it, unlike in copyright and so on. Certain information technology managers (system administrators, post masters etc.) occasionally invent various "semi-official" solutions to regulate those who are too annoying, but currently libertinism dominates. It seems that this is an open question and nobody has an idea about how to solve the problem (Wallace 1999).

Of course, something essential is expressed by this libertinism: some of the *anonymous guilt* that permeates the whole of modern society is revealed through the deeds of those hiding behind anonymity (fraud, the use of violence,

lying, abuse, etc.) (Ancsel 1981). Interestingly, it is not the ethos described by Ancsel which helps us in the identification here, but information technology.

Of course, information technology not only makes it possible to evade taking responsibility, but also generates a higher degree of responsibility which would not be possible without this technology. The problem of the so-called *digital chasm* belongs to this category. We are talking about the problem that information technologies make developed countries and regions even more advanced while the underdeveloped can expect an increasing lag which will eventually lead to the technological (and economical) split of the world. In fact, even 15 years ago, there were more telephone lines in Tokyo than in the whole of Africa. Since then, the chasm has obviously become even deeper. A future without a perspective and the responsibility for the fate of our fellow humans keeps the problem on the agenda worldwide, and civil organizations and state aid programs are being organized for bridging the chasm.

2.2.3 Open technological situations in cyberspace

In cyberspace, "discovered" by William Gibson, the American science fiction author (Gibson 1999), virtual and real entities and actions shape the relations between things and events together. This has such trivial realizations as the mathematician programming his computer, and such complicated ones as submerging one's self into a virtual reality generated by a distant computer. *Virtual and real circumstances can develop an information technological situation together*. Nevertheless, the presence of virtuality necessarily modifies the nature of the situation.

It is of crucial importance that the appearance of virtuality makes the situation *open*. The openness of the situation means that we regard certain possibilities as also necessarily part of the situation; and the optional realization of these possibilities make the components and the structure of the situation changeable and its boundaries easy to cross. This is what makes all forms of "online" presence possible, since "online" presence precisely works this way: the possibility of (realizable) presence is a part of the technological situation. (For example, I am in a situation in which I can communicate with the members of my virtual community, the network is functioning and I can write to them and read their messages.)

In reality, it is the openness of the situation which is behind all *communication processes mediated by computers* as well as behind the various *virtually* maintained and supported *human relationships*. The possibility of virtual relationships – for example, friendship or love of this kind – raises numerous psychological and moral problems. If we compare a virtual relationship to real relationships, its limited nature is apparent, since we cannot smile on our virtual friend, we cannot go hiking with him and so on (Cocking – Matthews 2000), but it includes and always will include these not yet realized possibilities. If we do not do such things with a real friend, it suggests a defect in our relationship, but the case is different in case of our virtual relationship. It is natural there. The question is how valuable reality and possibility are for us. Which shall we value more? Which is proper, to value a possibly problematic real relationship more, or a virtual relationship which has so far been without problems? The valuation of reality and possibility is quite unstable: in certain periods or situations we value one of them more, and on other occasions the other. For example, youth or wealth are often regarded as important values, probably precisely because of the possibilities they involve; in other situations what is real can be more valuable than anything, for example concrete material goods or a word which is really meant. From an ethical point of view, the transitions between the reality and the possibilities of a given situation are especially important.

In connection with the relationship between reality and possibilities in traditional ethical (and technological) situations, when we examine the question "What shall I do to realize the right possibility?" we expect that the situation which provides the framework of our actions will remain stable, and after having made our decision, we also expect the realization of the chosen alternative and its consequences. However, the case is different in the typically open ethical situations of information technologies. On the one hand, the situation can change, and as a result something which seemed to be a good decision in one moment might lose its practicability and goodness. On the other hand, following a moral decision, we cannot be sure that it is the chosen alternative which will be realized. In reality, we do not "see well" the end of a process; the outcome is obscure or unknown for us. As a result, we have to trust the validity of the chosen values to a greater degree; therefore, *trust* can be regarded as the key concept of information ethics. We need a trust in technology, experts, programmers, the intentions of our virtual partners, etc. (Nissenbaum 1999). This is an "open ended" ethics, not in the sense that there will be no consequences, but in the sense that we have to make our decisions without having unambiguous knowledge about them. The uncertainty of the consequences of decisions might tempt us to take advantage of the situation, since one can explain the unfavorable consequences as the effects of changes in the circumstances. The uncertainty of the consequences puts the emphasis

on the application of the principles of the ethics of intention, but the openness of the situation might even make it difficult to judge intentions correctly. From the point of view of traditional modernist ethics, all this can be evaluated as an unpleasant postmodern pluralism; at the same time, it is undoubtedly closer to the real complexity of everyday life.

The openness of the situation is revealed in many other forms, thus for example in connection with the tools involved in the situation, the computers, computer programs and network components as well. We would like to remind the reader that computers are universal automatons with an indefinite nature which we develop into tools that follow a concrete system of rules through programming. However, computer programs are usually quite imperfect creations. For example, according to a survey made in 2002, in the United States, it is the defects of software which cause the biggest loss. Nevertheless, the *imperfection of programs* does not have to be necessary. This recognition led to the appearance of a programmer movement, "professional programming" (van Dael – van Lieshout 1999). A professional programmer takes full moral, financial and legal responsibility for the functioning of his program. (Recall that while using most programs today, we usually accept through a click, often without paying attention to the details, that the manufacturer of the product is not responsible for any damage caused during the usage of the program.) It is a peculiar dilemma in connection with the predictability and unpredictability of software whether the given program permits many or few *user settings* or modifications. It is a frequent problem that such "openness" of the program causes problems and prevents one from achieving the desired result. The question here is whether the user needs expertise or can be successful as a layman with an average mind. What is more, the boundaries between laymen and experts might be different in various cultures. Varied development strategies and various software companies are experimenting with all kinds of solutions.

Without software, the computer is only a piece of "iron". In order to revive it we have to furnish it with an appropriate operating system which operates the basic abilities needed for the computer to function as a machine. But is it morally acceptable to sell basic software for money? This situation is as if we had to pay for using a food store or for using our mother tongue. Though this view can be disputed, many people accept it. The movement which spreads *open source software*, developed and published by volunteers, exists and is flourishing. Linux, developed by the Finnish programmer, Linus Torvalds, has become especially popular. The *development* of such software is *open*, anyone can contribute to it and improve or damage it, and it is a worthy intellectual challenge for the generous knights of cyberspace.

Hackers, as well as those who spread viruses and worms, contribute to the openness of the information situation in a peculiar way. The activities of "network burglars" demonstrated the relativity of the closed nature of confidential information, databases, and network spheres, but at the same time they also make it the case that the functioning of the whole information technology system becomes unpredictable and unstable to a certain degree. Spreading computer and network viruses and worms has a similar result. Nevertheless, the two types of activities are of course judged differently. "Hackers" usually accept and follow some peculiar moral rules. They usually differentiate between "hackers" who test their own abilities, expertise and desire recognition for their activities but who do not cause any damage, and "crackers" who are interested in misappropriating information (Hackers: Computer Outlaws 2001). Hoping for a positive judgment, we can connect the principles of "hacker" ethics to the principles of the open source software movement (Johnson 2001). The case is different with those who create and spread viruses. Their intentions to cause damage are obviously habitually condemned, in a milder case with the suspicion that they can be regarded as the agents of companies selling antivirus software. In this case, they are motivated by a desire for profit and not by an undifferentiated ill will. Nevertheless, as a result of their similar technological methods and goals, it is not always easy to differentiate between "hackers," "crackers," and virus spreaders.

2.3 Virtuality and reality

In this chapter, a historical and philosophical analysis of the concept of virtuality will be presented. As is well-known, one of the main themes of philosophical thinking has been the identification and characterization of reality. Since the beginning of this tradition, a special aspect or version of reality has been considered as virtuality. Both reality and virtuality have been explored or constructed by the human senses, emotions, imagination, cognition, manipulation, etc. During the historical development of thinking, there have been two essential turning points, namely, the emergence and the decline of modernity. As a consequence, we can distinguish a premodern, a modern, and a postmodern virtuality (and reality). Characterizing these different versions of reality and virtuality, our ana-

lysis will concentrate on the relationships between the different concepts of virtuality, presence, worldliness, and plurality. Applying these ideas to the present virtual reality, its three aspects will be specified.

There are numerous descriptions of virtual reality (VR for short), which intend to characterize and understand its constituents, functioning, versions, use, significance, and perspectives [Rheingold 1991; Durlach & Mavor 1994; Isdale 1998; Yahoo! Computers and Internet; Links2Go; On The Net Resources, etc.], but there are relatively few philosophical analyses [Haraway, 1991; Heim 1993; Turkle 1995; Kramarae 1995; Nunes 1995; Lauria 1997; Haraway 1997; Heim 1998; O'Donnell 1998; Hayles 1999; Wertheim 1999] which, for a deeper understanding of the real nature of this new phenomenon, put it into a broader historical, cultural, and social context. Due to the fundamental role of philosophical analyses in the progress of the understanding of a new technological-human-social complex, we would like to contribute to this process with the present paper. Because of their essential contribution to the interpretation of the phenomena connected with VR, our description is centered around the concept of virtuality with a special emphasis on the relations between the concepts of virtuality and plurality.

If we try to identify the object of our present analysis, one of the most accepted definitions of VR is the following: "Virtual reality is a technology that convinces the participant that he or she is actually in another place by substituting the primary sensory input with data produced by a computer ... The 'as-if' quality of virtuality becomes a pragmatic reality when the virtual world becomes a workspace and the user identifies with the virtual body and feels a sense of belonging to a virtual community. The definition of VR includes the three key factors of immersion, interactivity, and information intensity." [Heim 1998, 221]. On the basis of this (or a similar) definition (and incidentally with a complete harmony of the public opinion), one can think that VR is a very new phenomenon, since it is closely linked to the computer technology of the last few decades. However, this is not completely true. Moreover, it can be shown that in the history of culture VR has had many earlier (not computer-related) versions. The study of these old (or at least more traditional) VRs can contribute to the better understanding of the specific nature of the present-day, computer-produced VR.

On the other hand, we can find a large number of studies not only about virtual reality, but also about virtual space (or cyberspace), virtual community, virtual self, virtual culture, virtual world, virtual activity, virtual picture, etc., and even about virtual physics or virtual computers. It seems to be a hidden presupposition that in all these cases the attribute "virtual" refers more or less to an identical concept of virtuality. Let us cite again Heim's vocabulary: " Virtual: A philosophical term meaning 'not actually, but as if.' It came into recent vogue with the use of computer techniques to enhance computer memory ... Similarly, something can be present in virtual reality without its usual physical limitations. The ancient Roman term virtus, from which virtual derives, meant the powers of a human being. The later Christian meaning of 'virtue', as Nietzsche pointed out, inverted the Roman value system and eliminated the overtones of power". [Heim 1998, 220] This explanation is perhaps an acceptable starting point, but a further clarification of the meaning of 'virtual' seems to be necessary, and a historical and philosophical analysis of the nature of virtuality would perhaps be useful to better understand what it means to be a virtual "something," as well as the virtuality of virtual reality.

First, accepting a rather naive and flexible concept of virtuality, we shall outline a (very) brief history of VR. In this history three different versions of virtuality (premodern, modern, and postmodern) will be distinguished and characterized. Referring to these historical versions of virtuality in the second part of the paper, we shall present a short philosophical analysis to show the special role of presence, world-making, and plurality for a better understanding of virtuality. Finally, applying the results of our analysis, we shall conclude with a characterization of the scientific, art-related and philosophical aspects of present-day VR.

It can be stated without any doubt that one of the main themes of philosophical thinking has been the identification and characterization of reality. In this tradition reality can be described as the complete collection of beings, as the realm of existence, as the world, or as a specific realm of beings in the world which is discovered (or created) by human senses, emotions, imagination, cognition, manipulation, production, etc. Of course, our choices between these (and many further) alternative approaches and perceptions of reality depend on our value systems, i.e. on our ideological preference. The nature and the borders of reality, a valid demarcation between the real and the non-real (apparent, imaginary, unreal, fake, non-existing, meaningless, etc.) as the fundamental questions of ontology have been the permanent sources of ideological and philosophical debates. The specificities of virtuality and virtual beings can be originated from this intellectual context. The fundamental problem is the right characterization of the versions of the reality-virtuality relationships.

It is quite obvious that reality can be considered as the totality of beings. In this case, we have to understand the nature of beings and the nature of totality. For this understanding we have to make a decision about the appearance

of unity and plurality in and of the beings, and in their totality, as well. Based on these presuppositions, every single being and its unique universe can be described as a specific unit, as a complete whole, as an organized system, especially if we are able to disclose their appropriate organizing principles, the organizing principles of reality. However, if we accept the Heideggerian criticism of the above mentioned metaphysical tradition, and prefer the existence of Being to that of the beings, our task will change, but not in every respect. After this turn it will also be necessary to find a description for the structure and organization of Being as reality.

In search for the organizing principles of reality, we shall follow a partly hermeneutic and partly social constructivist approach. According to this view, in a specific historical period, all the characteristic elements of a specific world system of a period are imbued with almost the same system of values and interests (ideology, for short). These ideologies emerge from the socio-historical situation of the given society and they define in large part the essential aspects of the construction of different kinds of entities. [Berger & Luckmann 1966] Considering and comparing the different regions of beings in a society, it is possible to identify and describe the common rules of construction and find the preferred organizing principles of the age. Of course, this is also valid in the cases of reality and virtuality and their relations. In short, we could say that we shall try to contribute some ideas to the social construction of virtuality.

However, in this construction process there have been two essential historical and ideological turning points at the emergence and at the decline of modernity, so we can speak about premodern, modern and postmodern reality and virtuality.

2.3.1 Premodern virtuality

The premodern period had many, although slightly different ideas concerning the reality-virtuality problem. In the magic world view it is not very easy to point out a significant distinction between reality and virtuality. The magic reality was constructed by will, in this way the mere construction of interrelations between the observed phenomena or between the experienced situations had an absolute primacy, without making any distinctions between different kinds of interrelations (these distinctions appeared later on, in the mythical world views). In the magic views, the possibility and the actuality of a relationship are coextensive with each other, reality and virtuality overlap each other, and they are indistinguishable aspects of the world. In other words, the indistinguishability of reality and virtuality is a fundamental feature of the magic world view. The magic virtuality is virtuality as reality. As an illustration, we could recall the praxis of the Shamans. According to some interpretations, the Shamans' activities can be compared to the activities of certain artists in cyberspace. [Jones 1997].

When philosophy emerged from the mythological world view, the early distinctions in the evaluation of the relationships of experienced situations had a more fundamental significance. In addition to this development, the structure of human experiences, the composition of beings, the complicated functioning of cognition, the levels and hierarchy of existing entities were studied and disclosed by the first philosophers. This progress produced the ideas of the plural world (inhabited by essentially different beings, which may even exist at different levels of Being) or a plurality of worlds (each of which is inhabited by fundamentally different beings). The different kinds of modes of existence have become a topic of intellectual debates. In this context some definite differences between the different kinds (or levels) of reality can be established and treated. The fundamental question is: how can we identify and reach the parts of our experience or knowledge which are unquestionable, which are real in full, which yield to doubtless certainty. These parts of knowledge refer to the inner core of reality, which is surrounded by less valuable spheres of reality. These outer spheres seem also to be a part of reality for the people who are not learned enough or who are not critical enough in their observations and/or thinking. For a philosopher their full reality is only appearance, which can be destroyed by careful observations or the right arguments. The sphere of reality whose full reality is proved to be ephemeral in light of philosophical investigation is the sphere of virtuality itself. The ancient reality should be an eternal reality; whereas the ancient virtuality is the kind of reality which is able to lose its full reality. (It is quite obvious that the significance of ephemera can also be observed in present-day versions of VR.)

Already in early ancient Greek philosophy, two main traditions were formed to investigate the phenomena of our life, to criticize them, to produce certainty, and to approach the real in full. These are the traditions of the ancient "materialism" and that of the Parmenidean one. According to the "materialist" tradition, reality can be based on the testimony of our perception. In this tradition the main problem is the right coordination and evaluation of the different sensual experiences. In ancient literature there are many interesting argumentations and debates around this problem, e.g. in the works of Heraclitus, Aristotle, or Theophrastus. As Paul Feyerabend emphasized, there

happened a radical turn in the human culture with Parmenides, who rejected the testimony of senses in the question of reality and proposed the use of right (and contradiction-free) thinking as a judge in this respect. Because of the perceptual illusions and the ephemeral feature of any perception, Parmenides declared all the sensual experiences to be appearances. Since that time there has been a dual tendency in Western culture: reality can be constructed following the tradition of compared sensual experiences or the tradition of right thinking. These traditions yield to different kinds of realities and virtualities.

As an illustration, it is perhaps interesting to recall some problems from ancient natural philosophy, namely, the different interpretations of motion, void, or atoms. Within the framework of the Parmenidean tradition, for example, supposing the real existence of motion, Zeno presented contradictory consequences. In this way he rejected the reality of motion. However, this result does not get confirmed by our everyday perceptual experiences, so this radical disharmony between the realities created by thinking and by perception is called paradox. Paradoxes can be considered to be the signs of the appearance of virtuality in the Parmenidean tradition.

There is not enough room here to discuss the contributions of the philosophical systems of Plato and Aristotle to this problem in detail. However, they are very significant.

Plato's two worlds (the imperfect sensual world and the perfect world of ideal Forms) represent the spheres of virtuality and reality in a very clear form. The sensual world is a realm of change and impermanence. It is a complete world, but it has a lower value compared to the true, fully real world of Forms. The world-forming Platonic virtuality is an ephemeral and contingent reality which is an imperfect copy of the true reality. In this world knowledge has a strict limitation. If we are restricted to use our experiences we can only form different opinions about the sphere of virtuality, and it is impossible to reach the absolute truth here.

Aristotle's main contribution to the problem was perhaps his teaching about the clear distinction between the two levels of Being, namely between the actuality and the potentiality. The actual being is a being in full, and the potential being lacks fullness, so they are good candidates for the Aristotelian reality and virtuality. However, according to Aristotelian thinking, both the actual and the potential being are due to every entity, which means that reality and virtuality are distributed among the beings of our world instead of their concentration into completely separate worlds. In this way the Aristotelian virtuality is an individual property of entities. On the other hand, Aristotle described and analyzed the transformation of potentiality to actuality and vice versa and he interpreted the concept of motion in this way. This means that both the Aristotelian reality and virtuality have a dynamism, they can transform into each other, so the Aristotelian virtuality has a changing nature.

The Middle Ages presented a further version of premodern virtuality. While in the ancient time the construction of reality and virtuality was performed by the senses or right thinking, in the Middle Ages reality and virtuality were created by emotions, primarily by religious belief. In this era both perception and thinking played a subordinate role. Perception was considered a typical source of illusion. The most perfect reality, God, had no perceptible aspects (however, the idea of the Trinity as one God created a rather complicated situation in its details); he was accessible only by strong emotional efforts. The world was inhabited by creatures at different levels of perfection and in the hierarchy of beings (e.g. think of the arguments of the realism-nominalism debate). The life of human beings is performed in the "vale of tears", in the shade of the world. In this way medieval virtuality had many features in common with the Platonic one, but it had a more complex structure arranged along a gradual hierarchy of perfectness. The complete earthly life takes place in the realm of virtuality, or in other words, everything is virtual in some sense - the only exception is God. From this point of view, the miracles (similarly to the ancient paradoxes) had a very specific ontological state: they were considered as a direct appearance of the divine will, that is, they disclosed the full reality in the realm of virtuality.

In summary, we could say that the different versions of premodern virtuality were the dominant components of premodern ontologies. The typical premodern ontology depicted a plural world or the plurality of worlds. In both cases reality is a structured construction, and its constituents have different grades or measures of certainty, perfectness, contingency, permanence, value, etc. A constituent, a part, or a version of reality, which has no maximal measure in socially given reality-determining factors, or which is able to lose its maximal value, can be considered as virtuality. Premodern virtuality is a kind of reality; it can be an uncertain, or an imperfect, or a contingent, or a changeable, etc. reality. The premodern reality is an open reality, it is open for constructing many possible worlds by virtualizing different components of reality.

2.3.2 Modern virtuality

The emergence of modern ideology and world view created a radically new context for ontological thinking. This is the age of the formation of the modern individual, the autonomous personality. Because of the historical conditions of this process, the fundamental aspiration of the modern individual was to gain the ruler position over his world [Fromm 1969]. The medieval God-world relation has been reproduced in many individual forms. However, the modern individual wanted to wield a real, unquestionable, certain, effectively functioning power, that is, he/she wanted to rule over a full reality. As a result of these developments, the basic structural elements of the power situation have been considered as reality in full, such as the individual, his/her power, and the object of this power (nature, other individuals, property, etc.). For the other constituents or aspects of the collection of beings a lower reality-measure was allocated, they constituted the sphere of virtuality around "the secret object of desire". (Thanks to Buñuel.)

During the development of modernity the distinction between the objective and the subjective reality became possible and significant. The distinction between these possibilities, i.e. the declaration of the full reality of the 'external' or the 'internal' world of perceptive human beings, lead to the second fundamental schism in the ontological tradition (similarly to the emergence of the Parmenidean tradition in the ancient time). These controversial tendencies created the formation of modern materialism and subjective idealism, which are two different positions in many respects. However, the most important feature for our current analysis is the fact that in these traditions the active, determinant elements of the power structure are different. In the materialist tradition the 'external' world, nature, society, the body, the objects of our power, are the active agents of the situation, while in the subjective idealist tradition the 'internal' world, the individual abilities (perception, intentionality, thinking, will, etc.), play the determinant role. However, the intermediate element in the structure of modern power, the acting power, is common in both traditions.

It is rather evident that the active, determinant compositions of the basic structures of modernity can be considered as reality in full, so from this point of view some aspects of the modernist traditions can be different. The creatures of both of these active power-elements (the constituents of the mental world or from the point of view of the other tradition, the constituents of the 'outer' world) without any doubt have a contingent nature, so they only have a contingent reality, i.e. they belong to virtuality. However, the modernist, active reality can only appear in operation, so the active elements and the acting power are definite parts of reality.

The modern personality has a plural nature. Following the materialist tradition, this plurality seems to be the realm of virtuality with apparent individual ideologies, beliefs, goals, life-histories, etc., immersed and performing in the only real world. This is a plural, internal virtuality built up into the only one, external reality. Both of them are created by using scientific experiences and clear rational thinking. The modernist sciento-technological methodology of this creation is a methodology of power, which can be characterized as a selfish methodology [Ropolyi 2000]. The non-scientific methodologies of everyday life, art, and religion are only able to construct virtuality (e.g. naive views about natural processes, works of art, religious praxis), so their roles in modern society are strongly limited. (A widely accepted evaluation of the significance and possibilities of present-day VR - Heim calls it the "naive realism of the Unabomber" [Heim 1998, Ch. 2] - is based on a very similar ideology.) As an illustration we can refer to the French philosophy of the eighteenth century.

Following a subjective idealist tradition, the plurality of individuals apparently means the plurality of reality, but in its consequent, solipsist, version, we have to go as far as the virtuality of others, i.e. we arrive again at a plural virtuality. This is a plural external virtuality, built up into the only one internal reality. The methodology of these kinds of constructions is practically the same as was mentioned in the description of the materialist tradition, but it is applied to a "soft", less known and studied praxis. This is an important field for cognitive science, too. (There is another common opinion about present-day VR - Heim calls it "idealist" - which is based on a similar ideology.) Perhaps the Leibnizian monads which represent individuals in a way, or Berkeley's philosophy would illustrate this tradition in the history of ontology.

Summarizing the main ideas about modern virtuality, it can be stated that in the modern era we can find only one full reality, which is the 'external' or 'internal' world - they are the realms of the objective and the subjective reality. The virtual possible worlds were transformed into the inside of personality and became an important source for its individual and plural character. Earlier we mentioned perfectness, certainty, etc., as the determinant characteristics of reality compared to virtuality, now we would like to add power, the active, creative force, as a feature of reality, to this list. Modern reality is able to create and control itself and to develop its structure in a self-organizing

process. In this respect modern virtuality is a reality which is created, which has no absolute power, or which was able to lose it and which is forced to suffer from the use of power. Modern reality and virtuality form closed, individualized worlds together in order to ensure an absolutely controllable environment for individual beings.

2.3.3 Postmodern virtuality

Postmodern ideology is a critical reflection of the failure of modernist ambitions, first of all, in respect of power. It became transparent that the realizations of modernist power and effective control over the individualized worlds have unavoidable disadvantages and intransgressable boundaries. In this situation postmodern thinkers have described two strategies for present-day ideology. According to some people the deliverance from any ruler-ambitions would be an acceptable exit from the modern crisis, but for many others the presentation of that kind of behavior would be a solution in which the successful operation of the modernist project is demonstrated. These are the strategy to disregard power and the strategy to disregard boundaries. Concerning their difference from the modernist view, both alternatives represent the same, in their images of reality and virtuality.

The fundamental postmodern ideal is a so-called decentered ontology, in which the boundary between reality and virtuality is destroyed. There is not one reality or there is no reality at all, we can only speak about hyperreality [Baudrillard 1994; Nunes 1995]. In the world of hyperreality the distinction between real and unreal is blurred. In this world images and signs, simulations and simulacra, have no referents, they can only be considered as real beings. In this situation (which is approaching the last stage of a cultural crisis) the image masks the absence of reality and takes its place. It makes no sense to speak about external and internal worlds, about materialist and idealist constructions, because the construction itself is the definite, central part of intellectual activity. The significance and the role of place, the body, the distinguishable material and intellectual entities, collapse. They become substituted by their interrelations and networks.

During the construction of the postmodern world view, the different possible worlds in modern individuals got legitimized as natural and exclusive bases in the organization of the complete world view. In this way the postmodern world has a necessarily plural nature. Perhaps it could be stated that the postmodern world view in respect of the relation to reality-virtuality simulates the images of the magic world view about the question. The postmodern view about reality and virtuality is an individualized (and evidently plural) simulation of its magic ideals.

It is possible to accept a less radical image of postmodernity. In this way of thinking, the postmodern world can be considered as a complex of the modern world and its critical alternatives. In this view modernity is able to preserve its coherence, but is unable to preserve its dominant position; it is just one of the many alternative systems of value. This less radical alternative does not change our images of reality and virtuality fundamentally. However, this version of postmodern thinking simulates the mythological rather than the magic ideals about reality and virtuality.

The postmodern reality/virtuality is created, perhaps, by imagination, which is a specific and concrete mixture of perception, will, and reason, and it has a strongly individualistic nature. The postmodern world is open to include everything and to exclude nothing. The postmodern personality is an inflating personality, it extends worldwide without gaining more weight.

In short, postmodern virtuality can be described as reality and vice versa. This situation is created partly by a radical proliferation of reality, and partly by the disappearance of the reality-virtuality boundary. So there is no boundary between reality and virtuality, moreover they have basically lost their independent meaning and it would be better to substitute both of these concepts with something else, perhaps with the concept of hyperreality. This means that instead of reality or virtuality the construction itself is significant for the postmodern person.

Our quick overview of the history of ontology in respect of virtuality sheds light on the various ideological contexts of the concept of virtuality, and its outcomes constitute the historical background for the philosophical analysis presented below.

2.4 Virtual reality

As a result of a traditional philosophical investigation, if it is careful enough, the real nature of the subject can be disclosed. In our case during this kind of analysis, the distinctions between the real and the virtual characteristics of virtuality became clearer and clearer and finally we can ‘tell the reality’ about virtuality. Perhaps this strategy

would be recommended in the investigation of most traditional problems in cognitive science, however, it seems to be less popular in the treatment of the problems around present-day VRs, where more intuitive methods have been applied recently. Supposing that this practice is more reasonable, let us try to combine the traditional and the intuitive methodologies.

Overviewing the historical collection of virtualities, it is almost clear that virtuality is either a kind of, or a constituent of, or an aspect of, or a part of, or a feature of reality. In the usual context these characteristics of virtuality are not clearly distinguishable, they regularly overlap each other. For example, we can speak about the virtual communities as a kind of virtually existing reality, and at the same time we can identify the virtual constituents of a community in both virtual and real communities. There is no room here for a detailed analysis of all the relevant aspects of the problem, so the following part of our paper will focus only on those features of virtuality which play a fundamental role in the understanding of present-day VR. The three fundamental cooperating families of concepts or conceptual fields are the following: the concepts expressing some aspects of presence, world-formation, and plurality.

2.4.1 Presence and virtuality

According to a commonly held opinion, presence has a fundamental role in the existence of virtual reality. [Lombard & Ditton 1997; Lauria 1997; Stanney, Mourant & Kennedy 1998; Schuemie et al. 2001] Lombard and Ditton's explication of the concept is based on an extensive collection of ideas about presence, and it is the following: presence is "the perceptual illusion of nonmediation. The term 'perceptual' indicates that this phenomenon involves continuous (real time) responses of the human sensory, cognitive, and affective processing systems to objects and entities in a person's environment. An 'illusion of nonmediation' occurs when a person fails to perceive or acknowledge the existence of a medium in his or her communication environment and responds as he or she would if the medium were not there ... Presence ... cannot occur unless a person is using a medium." In this short definition the psychical and physiological aspects of presence are emphasized, but the authors propose to take into account its social aspects, as well. However, because of the primacy of the psychical elements in presence, some scholars say that "psychology is the physics of VR." [Lauria 1997] From our earlier description it is obvious that presence should have to play a fundamental role in the identification of reality and virtuality as well, because both of them presuppose a kind of presence.

Characterizing the specificity of the existence of virtuality, Heim (1993) used the term "erotic ontology" to describe cyberspace experiences. (This is a very interesting idea in the sense as well that the erotic experiences of everyday praxis have a close connection with the presence characterized above.) A further analysis can show some other aspects of presence, for example, it makes clearer the relation between personal and social presence, between full and particular presence, and so on. [Schuemie et al. 2001]

There is a close (but not necessarily direct) connection between the kind of processing system acting in presence, and the active, creative human force working in the creation of reality. Both presence and reality is the product of many different processes, but the determinative factors of presence are basically correlated with the creative factors of reality. For example: presence produced with the primacy of a sensory processing system constitutes the necessary condition for the creation of reality by perception. There is a similar relationship between the presence primarily presented by cognitive abilities and the reality created by reason or by thinking, and between the presence mainly based on instincts and the reality created by will.

At a first glance the person is the subject of presence, and a personal reality can be based on presence. However, there are strong historical arguments for the socio-cultural determination of the emergence and characteristics of the personality [Fromm 1969], including its abilities, perceptual, communicative, and creative preferences. (From a constructivist point of view, it would even be possible to recall Karl Marx's thesis about the historical evolution of human senses.) Moreover, there is a similar historical evolution of the human body: the ancient, the medieval, and modern bodies are essentially different entities. Recently there have been many investigations of the cyborg identity, which is a humanized (or non-human or posthuman) coexistence of biological and technical elements in human beings. [Haraway 1991; Heim 1993; Haraway 1997; Biocca 1997; Hayles 1999] In this way, if we declare the (embodied) person (with his or her personal body) to be the subject of presence, this subject will necessarily be a socio-culturally determined historical being and consequently his or her presence will have a similar nature. Any personal presence is necessarily a social presence. Most of the details of these problems are reflected in visions or elaborated in the theories of personality.

In the historical versions of reality and virtuality some relevant aspects of the socio-culturally determined historical presence can be shown. For example, premodern virtuality as ephemeral, contingent, uncertain, imperfect, impermanent reality is based on a premodern version of presence. This presence has completely similar characteristics to those of premodern virtuality as can be illustrated by the situation of the observer in the Platonic cave. Another Platonic approach to reality, which can reach reality in full, is the remembrance of the soul to the world of Forms. This technology of reality demands a different kind of presence, which has a higher value or degree. It can be seen that even within the framework of one philosophical system there are different kinds of presences and they have different degrees or measures. These presences are experienced or created to establish and support accepted reality-virtuality interrelations; within the same context, a higher degree of presence yields reality in full, but a lower degree of presence yields virtuality.

So far we have only discussed the concept of presence, but in the arts, in philosophy, and in some other fields of culture, many more or less synonymous concepts have been constructed, which can be used in the analysis of virtuality as well. Just think of the Aristotelian actuality - potentiality concepts, of the arguments in the medieval debates between nominalists and realists, of the essential conceptual constituents of aesthetic theories, or of some categories of speech act theory, or the concept of immersion used in many descriptions of VR, etc. One of the most relevant concepts is the Heideggerian Dasein, which can be considered to be a specific unit composed of humanity, of presence, of reality, and of virtuality, etc. There is no room for a detailed analysis, but it can be found elsewhere. [Dreyfus 1991; Heim 1993]

In summary, some kind of presence is a necessary condition for any kind of reality and virtuality. The different versions and degrees of presence experienced in a socio-culturally determined way coincide with the ideas on reality and virtuality. The recent VRs prefer a technologically supported perceptual illusion of nonmediation. In this kind of presence the human senses and imagination have to function in an artificial, or simulated environment.

2.4.2 Worldliness and virtuality

There is no doubt that presence is necessary for the construction of reality and virtuality, but it is not enough. Pure presence, in absence of its - at least temporary or illusive - exclusiveness, unquestionability, and permanence, would be basically useless for construction. These characteristics ensure that one can form a complete unit from the experiences, which is called a unique system of reality; and can consider oneself as part of it. In other words, one can form a world around oneself. However, if the world-making is unsuccessful or incomplete from any point of view (the construction proves to be non-exclusive, questionable, impermanent) it will be declared virtuality instead of reality in full. This means that both reality and virtuality have (perfect and imperfect) worldliness characteristics.

Recently in philosophy there have been many interesting descriptions of the structure and formation of worldliness. All of them seem to be relevant to the better understanding of virtuality. The Heideggerian description of the worldliness of the world, of its components (world, inclusion, involvement, Dasein, disclosing, etc.), and Heidegger's concept of "being-in-the-world" is analyzed carefully by Dreyfus (1991), moreover, Heim (1993) used some of their elements and motifs in his own interpretation of VR.

Another approach to worldliness can be found in Goodman. Cooper (2000) applied Goodman's criteria for ways of world-making in his interesting interpretation of MUD worlds. (According to the Goodmanian methodology, world-making consists of the following practices: composition and decomposition, weighting, ordering, deletion and supplementation, and deformation.)

For Heidegger and Goodman, everyday human praxis has a fundamental role in their systems. Because of this preference of their constructions, it is very reasonable to apply them in the interpretation of a fundamental aspect of present-day VR. However, present-day VR does not only have everyday-relations, but some other aspects, too, and for their understanding we have to turn to other theories. For this purpose, we will turn to the aesthetics of Georg Lukács.

Mentioning the connection between the arts and VR is not a really surprising idea. Moreover, it is known that the term virtual reality came from the theory of the theater suggested by Artaud in the thirties of the twentieth century. (This interrelation returns also in the theatrical analogy of VR proposed by Wong (1996).) Beside the theory of the theater, film theories and, of course, some more general aesthetic theories, and an extended praxis of artists [Jones 1997; Heim 1998] can be considered as relevant context to understand VR.

In Lukács's aesthetics the work of art has worldliness quality. [Lukács 1963] He used this concept to explain the "power" of the works of art on the senses of the recipients. With this "power" during the reception process, the work of art creates a different world for the recipient, different from the real, everyday world; orient his/her immersion in this constructed world, in the world of the work of art; convince him/her about the reality of this world; and govern his/her state and thinking in this way. Every work of art has its own world, which is complete and closed from the point of view of its inexhaustible richness. However, these worlds are also open: they are open to reception. The worldliness of these worlds is supported by the homogeneous media of the work of art. The infinite richness of human reality is represented by a work of art using its homogeneous medium, constituted, for example, from the rhythm, the form, the colors, etc.

The Lukácsian conceptual structure seems to be very useful and effective in the description of the worldliness of VR. The operation of the "power" of the technological environment on the user, which ensures the perfect illusion of reality, can be interpreted in a very similar way to the power of the work of art on the recipient. In this respect the "technology" of present-day VR and its manner of construction play the role of the construction rules of a work of art. The artists of the VR are the engineers and the computer scientists. The homogeneous medium is a technologically mediated presence. The works of art are some kind of totality, they represent the very essence of the human world. VR represents the everyday experiences of human beings using the compositional requirements of art.

Realizing the fundamental role of technology in the VR worlds, the challenges of cyborg-existence, and the specificities of cyberspace, one can think that VR does not have any human, but rather a technological worldliness, i.e. it is organized by technological principles. However, based on our earlier discussion, we would advocate the opposite opinion. In the manner of the Lukácsian aesthetics, this complex of problems (the human-machine coexistence in a technological environment) can be described as a process of the anthropomorphization of technology, technological products, and the technical "space". Going further along a constructivist line, it could be said that the world of VR is neither the world of humans nor the objective outside world, but it is an artificial production of the human-machine relation, a world of the human-machine complex. Directly, but not indirectly. Indirectly, it is a representation of the personality-society, the individual-other individuals, etc. relations, because the machines (including computers and other VR technologies) embody social relations and values (e.g., think of Latour's idea of delegation), they are imbued with these values. [Latour 1993]

As a summary, it can be emphasized that presence and worldliness are correlated determinants of virtuality. They mutually support each other's functioning. The worldliness of reality in premodern and modern virtuality appeared in such spheres of culture as art, religion, science, and philosophy. The specificity of present-day postmodern virtuality is the dominance of senses and imagination in the construction.

2.4.3 Virtuality, openness and plurality

A kind of presence and worldliness of experiences are also necessary conditions for virtuality and reality. However, if we only want to identify the specificity of virtuality, we have to reconsider the reality-virtuality relation. According to the historical tradition of ontology, reality should be considered as a unique entity, which covers the whole universe of beings. This is the concept of reality in full. If this reality is considered as a closed reality, there is no place for virtuality in this world. In this case everything is a specific constituent in the only one reality since within reality there are no different measures or degrees of reality. The differentiation of virtuality and reality becomes possible only with the image of an open reality. The openness means that a being is considered not only as actuality, but as actuality together with its potentialities. [Ropolyi 2000] This means that an open reality can be considered as a complex of the reality in full and its numerous potential versions. (Of course, this is a very Aristotelian idea.) Considering the reality in full and its potentially existing versions together from a quantitative position, it can be stated that reality has a plural aspect: all of these different versions in a certain sense belong to the same reality. If we do not want to take into account the differences between the actual and the potential versions, we can speak about the proliferation or the plural nature of open reality. However, if we focus on the differences between the actual versions and the potential versions, we can use the concepts of reality in full and 'reality less than full', i.e. virtual reality. In this way, the concept of virtuality refers to a structured reality, a reality which is open, plural, and contingent.

According to the further analysis of the relation between actuality and potentiality, it could be seen that openness and virtuality are two conceptual formulations of this relation. While openness can be interpreted as actuality considered together with its possibilities, virtuality can be interpreted as potentialities together with their actualization. Openness is a feature of reality, virtuality is a feature of potentialities. They are inseparable from each other,

their coexistence is the virtual reality. In this way, VR is a reality together with its possibilities, and possibilities together with their actualization, or shortly: VR is the actualization of the potentialities of an open reality.

The actuality-potentiality relation is a specific version of the general one-many relation. The one-many relation has had different treatments in the history of thought, for example, monism, pluralism, reductionism, statistics, etc. In this respect the specificity of virtuality is the permanent transformation from the many to the one.

On the other hand, we can identify the transformations from reality to virtuality and vice versa, i.e. we can consider reality and virtuality in motion. There is no room here to treat the dialectics of these processes, so we just have two brief remarks. The realization of a possibility or the loss of the reality of a being is the very common courses of events. This is the case with VR, too. Because of the above transformations, beside VR we can also speak about RV (real virtuality). This is the postmodern category of simulacra.

The above mentioned plurality was associated with the open reality and its possibilities. However, further important appearances of plurality can also be identified in the problems of VR, for example, the use of plural contexts, the plurality of the personality [Turkle, 1995], and so on.

In short, it can be stated that virtuality cannot be interpreted without a plural reality. The plural reality is an open reality and its openness is deeply connected to its virtuality. Virtuality is a feature of the potentialities of an open reality and refers to the potentialities together with their actualization.

2.4.4 Aspects of virtual reality

Based on the previous philosophical analysis, three aspects of VR can be differentiated: VR as VR, VR as the art of the everyday, and VR as the sign of social crisis.

1. If we consider the VR as a field of study about presence in a synthetic environment, i.e. if we follow a scientific tradition, we can find many interesting psychological, cognitive, social, and technological problems to solve. [Chenault 1998; Sempsey 1998; Stanney, Mourant & Kennedy 1998; Levine 2000; Preece 2000; Utz 2000; Ahuna 2001; Schuemie et al. 2001; Suler 2001] In this case the significant problems (e.g. the measurement and the characterization of presence) are very similar to traditional scientific problems and their treatment can follow this paradigm. In this case the modern virtuality has a dominant role in VR.

2. If we turn our attention to the problems of worldliness in VR, i.e. if we try to disclose the relation between the arts and VR, we can speak about VR as the art of the everyday. Everyday art differs radically from traditional art, because it expresses directly everyday experiences, but in a form which is a form of art. VR as everyday art applies the "technology of arts", but to express very common contents. It is true that there is no catharsis, but there is a very democratic praxis. This is an advantageous and an easy way to construct worlds for everybody. No specific abilities are necessary for this creating praxis, since technology can help us. This aspect of VR can be studied in the text mediated MUD worlds [Fleissner, 1999; Cooper 2000; Utz 2000] and the worlds of Avatars [O'Donnell 1998] and in general [Heim 1998]. Concerning this aspect of VR, premodern virtuality seems to be the dominant one.

3. If we focus on the problems of plurality in VR, i.e. if we want to understand the philosophical and the social meaning of VR, we can realize that VR can be considered as a sign of social crisis. The permanent presence of the plural reality, the postmodern pluralization of the world view is a standard sign of social crises [Ropolyi 2000]. In this situation one cannot create an acceptable and unquestionable unit from many divergent values. There are different fields of social reality where similar signs of crisis have appeared. Parallel to the development of VR, other (chemical) technologies of virtuality have also emerged. The use of drugs for virtual travels started to be accepted on the basis of the struggle of the beat movement against the accepted traditional value system. The beat movement can be considered as a virtual revolution. A hesitation between the utopian and antiutopian position of the eminent representatives of science fiction writers of VR [Gibson 1984] is a significant sign of the crisis. The play elements of culture [Huizinga 1938] become more and more significant.

The appearance of postmodern virtuality can be seen in the philosophical aspect of VR. As is well known, postmodernism is an ideology of a society in deep crisis.

The humanization of technology and the technicization of human abilities run in parallel ways to serve the evolution of the present-day cyborgs [Agre 1999]. Following the VR ideology, the goal is to construct a synthetic (artificial)

environment for real personalities, whereas in research into artificial intelligence, an opposite trend occurs to construct an artificial personality for a real environment. The postmodern personality is pluralized with the hope for a new unit of privacy, identity, and intimacy on the net. [Unsworth 1995; Munro 2001] A network society emerges in cyberspace. Its ideology and philosophy is rather unclear. However, as Lauria (1997) suggested, VR can be considered as a metaphysical testbed, so we are in the right track.

Chapter 3. Communication in the late modern age

It is certainly not a coincidence that most of the institutions that research the Internet or teach Internet studies are places that deal with communication or the media. The reason for this is that the operation of technologies and the technological tools which are the vehicle of the Internet mostly take place in communication situations. Typically, what is realized is communication transmitted by computers, but as a result of the great degree of the indirectness of human participation, our impression might be that communication between machines is also happening. All usual communication situations can be realized through Internet use; we can practice communication through space, time, and context equally. What is more, it is these very activities that are the most obviously identifiable goal and meaning of Internet use. Communication through the Internet can also work through several channels, and it can also take place in considerably varied communication situations. However, the understanding of the communicative phenomena which can be observed on the Internet is made somewhat more difficult by the many different interpretations of the concept of communication. Without any doubt, it can be pointed out that in most versions of the interpretation of communication – for example, if we regard as communication a type of information flow or the interaction taking place as the result of information transfer, or other activities which can closely be connected with these (reality monitoring, changes in our preparedness for problem solving, creating a meaning for things, etc.), certain information technological processes play a key role, above all, the technology of producing information. What is more, we will see that the connection between communication and technology is even closer, and communication itself can be understood as a certain *technology of "producing communities"*. Of course, in this case one might rightly ask the following question: what is the relation between the technology which is the vehicle of the Internet, the technology of producing information and communication understood as technology? It is also a question whether communication as a technology of constructing communities – similarly to other technologies – carries its own values, and influences the nature of the created community thereby. In order to study all these questions, the examination of the nature of communication might be a useful starting point.

Naturally, late modern communication has its peculiar characteristics. These characteristics – similarly to the characteristics of late modern technology – emerge in connection with the dominance of *virtuality* and *openness*. The growing significance of virtuality and openness can equally be observed in changes in the nature of communication and in the communities created through its operation. Late modern communication favors "messages" transmitted through machines using information technologies. Late modern communities are *virtual*, extraordinarily *extended* and unusually *individual*.

To discuss the mentioned problems, analysis of the nature of communication also seems to be indispensable. The connection between *communication and language* will inevitably be mentioned along the way. An outline of the historical development of the technologies of communication provides an opportunity for characterizing orality, literacy, and visuality, as well as the most important communicative procedures connected to them. We will also try to present the similarities and differences between communication transmitted through traditional communication machines and computers.

3.1 The nature of communication

Without any doubt, communication and mankind are at least of the same age, but its scientific description is relatively recent. The philosophical analysis of language has a past reaching back to antiquity (Kelemen 2000), and the examination of some of the problems of semiotics also has significant historical antecedents' (Voigt 1977; Horányi-Szépe 1975; Sztyepanov 1976) but the research of communication itself only started in the 20th century when mass communication became universal. It seems that we can talk about communication research as an independent scientific discipline since the end of the 60s (Lázár 2001). The novel nature of communication research is revealed clearly by the fact that communication theory today does not have any "orthodox views" shared by the majority of researchers. It does not have any principles regarded as universally valid; instead, its rivaling theories, created in large numbers (Griffin 2001; Griffin 2003; Horányi 1997; Béres – Horányi 2001; Buda 1994) often work with radically different models and conceptual background. In a word, communication theory is in a pre-paradigm

state.[1] In this situation perhaps the best solution seems to be to create an understanding of communication with the use of some of the available theories, which will serve our current goal – an acceptable description of the communicative aspects of the Internet. It is in no way our endeavor to create an independent theory of communication, we only venture to formulate and utilize a few basic principles; or rather, we will follow a train of thought of the philosophy of communication.

From a philosophical point of view it is most worthwhile to examine the meaning of the development, functioning, and maintaining of communication. (In other words: if we ask about the meaning of communication, we can hope for a philosophical answer). The most important feature of human communication is that it plays a key role in creating and maintaining human communities. *Communication is a specific technology which creates and shapes human communities and which, using adequate means* (languages, systems of signs and symbols etc.), *reaches its goal through securing the mastery of a given "technological" situation* (here communicative at the same time)*: the sharing of certain mental states of the communicating parties*. Through sharing their experience, impressions, emotions, observations, opinions and thoughts,the communicating parties create a peculiar (temporary, particular, and contingent, that is, virtual) community of opinion, views, emotion, and will. What is more, they possibly create a community of values, interests, and worldview. Naturally, participation in a community of this kind does not entail an agreement of opinions, views, etc; rather, it involves a certain kind of reconciliation, presentation or knowledge. The number of participants in a community and their nature varies on a quite broad scale: two chatting people, or a writer and his reader, are its typical examples, but a theater performance or a conversation broadcasted by a radio channel are usual forms as well, though the structure of these communities is considerably more complicated.

Obviously, such communities cannot come into existence or exist without communication. But actually, something stronger is true*: no human community can come into existence or exist without communication*. The mental or "opinion community" of the participants of a community – which can only be achieved through communication – is a part of each community. A community cannot be identified with the aggregation of individuals who share some common characteristics; it is also inevitably necessary for becoming a community to create belonging, to develop and to maintain an "opinion community" regarding its own characteristics. Communication is exactly a technology to achieve this. Communities are not given by nature; they are always artificially created or constructed. (As the ancient Greek would have said, its creation is not the task of science but that of technology)[2] Thus for example just because some people have brown eyes for natural reasons, they do not yet belong to the brown eyed. Just as others, such a community can only come into existence and people can only become a member of it if this endowment is constituted by acts of communication.

Communication is a necessary condition of the existence of human communities. But is it a sufficient condition? Of course, it is not. The existence of human communities has numerous other conditions: a host of material and intellectual conditions such as for example the existence of "living human individuals", inherited and learned skills, physical, physiological and mental capacities, and so on. If a communication situation anchors such conditions, then, insofar as the communication situation exists, that is, if a given set of conditions is satisfied, communication can occur and the given human community can come into existence. Thus, the characteristics of a *communication situation* are not only of great significance for clarifying the specific conditions of communication but for the understanding of the communities which can be created with the help of it as well. Various historically given situations make different versions of communication and communities possible. Reflection about situations itself leads to the possibility of human *consciousness* and *self-activity* through which the situation-creating man, "the engineer of the magic of the given world", can make the shaping of his own communities subject to his decisions with the help of developing situations.

3.1.1 Communication and community

The historical antecedents of human communication can of course be observed in the behavior of more developed animals. In fact, not only we can talk about certain animal forms of behavior, but animal communication as well, provided that we keep in mind the significant differences between human and animal communication. We can recall a definition from Csányi: "Communication is a behavioral act of the animal which changes the probability pattern

[1]Griffin's book is a good example of this. In the Hungarian edition of this work published many times [Griffin 2001] more than 30 well-known theories are listed, but the author (and his publisher) adds yet more recent examples, so for example the 6th edition popularized on the Internet [Griffin 2006] is extended with further versions.

[2]Actually they said so. Aristotle's concept of a *zoon politikon* who is capable of rational speech can create the highest form of community, a city state.

of another animal's behavior, in a way which has adaptive value for the communicating animal, taking an average of many cases" (Csányi 1999, 231). Through influencing each other's behavior, communicating animals in fact create primitive animal partnerships ("communities") and they regulate their functioning. By means of communication certain animals are to a certain degree capable of harmonizing their neural or physiological models which map their environment, and in this way they are capable of acting in a harmonized way. We can recall the well known examples of chemically or kinematically based communicative practices of ants and bees (Kenesei 1984, 17-34), but if we interpret the concept of communication in the broadest possible sense and include the behaviors connected to reproduction as the technology of sharing genetic information, then all animal species – as a community of reproduction – can be regarded as a kind of community which is operated in a harmonized way through communication.

Since animal communication (and the social activity maintained with the help of it) serves basic needs, in the case of certain species (what is more, if we accept the mentioned broad interpretation, in case of all species) it has also become an indispensable need for the subsistence of the species.[3] In the case of mankind this is obviously so. An "urge to communicate" always prevails in human groups, as a result of which different human communities are formed. However, human communication is in several respects different from its antecedents which can be observed in the animal kingdom. It is an essential difference that while the number of the mostly genetically entrenched patterns used in animal communication is small and constant, the number and content of "messages" that can be conveyed through human communication is not fixed; communication is open and infinitely varied. Animal communication is usually connected to given, momentarily existing circumstances, but human communication can free itself of the persisting situation and it can communicate intentions and goals, real or imagined situations, as well as future or past states. The means of human communication are substantially richer than that of animal communication, and they include various facial expressions, which make the expression of emotions possible, mimesis, which supports the representation of stories and situations, as well as language, which makes it possible to shape any desired content.

We can characterize the differences between human and animal communication in the following way: while animal communication secures the harmonized functioning of animal partnerships only in the narrow range of situations already given, the technology of human communication can create situations that fit the proposed aim (that is, the creation of the envisioned communities), and choose the means and procedures of communication which can be used successfully in a given situation, and attain, or at least come close to, the various aims through their use. Animal "communities" are essentially always the same and work in the same way; human communities are on the other hand changeable and show a great diversity. In other words, we can also say that while certain animals are capable of using certain communicative means, *human communication is technological by nature, that is, it uses the available (physical or mental) objects as tools in accordance with the chosen goal of the communicating parties of the communication situation* – sharing certain mental states, that is, developing shared views. It is obvious that voices, colors, shapes, facial expressions, body postures and movements and countless other things do not simply mean themselves but function as tools adapted to the communication situation.

The characterization of human communication as a technology of building communities is somewhat different from the usual conceptions of communication (and technology). Most communication theories include – though some of them only in an implicit form –ideas about the role of human communication in creating and maintaining communities. However, our proposed approach places the emphasis specifically on this. The shift of emphasis was motivated by two viewpoints, from two very different areas: Csányi's study on human ethology, cited several times above (Csányi 1999), and Carey's views on the philosophy of communication (Carey 1989, Stevenson 2001). Carey – following Dewey – differentiates between two typical understandings of communication, the transmission and the ritual model of communication. According to him, in the mostly cited transmission model, communication is understood with the help of the concepts of spatial transmission of information through signs and messages, information transfer and information disposal. On the other hand, though the ritual model of communication includes the transmission model – a correctly defined ritual view can involve the transmission approach – it does not focus on the transmission of messages in space but on the nurture of society in time, and it does not regard information transmission as fundamental, but the representations of shared beliefs and opinions. Similarly to traditional *rituals*, communication synchronizes our behavior; some kind of "shared reality" is created through its functioning, that is, communication is constructive by nature (Craig 2002; Sells 2002). It can easily be seen that the ritual model identifies communication as a creator and maintainer of social communities. It should be noted that research on Internet communities cites the views of Carey (Jones 1995a) more frequently than any others.

[3] In connection with the evolutionary aspects of communication see [Tóth 1999].

Thinking through the understanding of communication as a technology of building communities can also be encouraged by *Luhmann's sociology*. Luhmann's theory regards communication as a basic category of social systems (Luhmann 1995; Staubmann 2000; Viskatoff 1999; Vanderstraeten 2000; Leydesdorf 1999; Karácsony 1998). Luhmann's concept of communication can be put together from the elements of information, message, and understanding. According to Luhmann, it is the autopoietic (self-generating) interactions of communication processes (Whitaker 2001; Varela 1995) which secure the development and subsistence of social systems. Luhmann's theory is controversial in many respects, but the followers of his view on the constructive role of communication are in a majority, and not its critics. We can of course ask what it is that communication constructs. According to Luhmann, it constructs social systems. However, it is notable that the concept of *social systems* used by Luhmann is rather abstract; it almost "lacks" any content, and in our view, in a typical situation it can be identified with the concept of *community* we proposed above. We have not yet talked about the organization of communities created through communication into a society, but the trains of thought of Luhmann's sociology suggest that such organization can be successfully construed.

At the same time it is also noticeable that, as with tool use and tool making, communication belongs to those fundamental features of human existence which are rooted in animal life. It is commonly assumed that in the process of becoming human tool use, language, consciousness, thought and the development of human society unfolded through simultaneous processes interacting with each other. For this reason it is understandable that technology, which developed from human tool use, as well as tool making and communication, essentially show the same structure and follow the same procedures. This structure is revealed in the clearest form in technology and, as discussed in the previous chapter, it makes possible the manufacture of artificial entities which come into existence with the help of the mastery of situations, fitting the proposed goals of man. Let us call this structure and the functioning of the structure the *structure of "mastery of situations"*. This structure includes the most general features of the "survival technology" of man (or perhaps we should say, his active adaptive strategy), and in fact we can regard it as technology understood in the most general sense. Historically realized technologies are particular examples of this general and abstract structure. Communication is a particular variation of the "mastery of situations" in which the goal is to share the mental states of humans, and the artificial products created through communication are the various human communities. If the structure of the "mastery of situations" is technology in the most general sense, it is not surprising at all that we talk about communication as a specific type of technology.

Naturally, the further elements of the process of becoming human mentioned above (language, consciousness, thought) also participate in the creation and operation of the structure of mastery. We have partly talked about their particular role and we will further discuss them later on. Perhaps it seems unusual that, in striving to reveal the nature of the Internet, we discuss the problem of becoming human while characterizing late modern communication. Such a procedure, though unusual, seems by all means necessary, since it is our experience that the Internet generates such profound changes in human life that only analyses reaching back to the fundaments of the human form of existence can have a real chance to understand the changes which are currently taking place. In this way, we hope that such digressions are not superfluous; indeed, they will hopefully help us present the problems more clearly.

3.1.2 Communication and language

Language is obviously the most important *tool* of the community building technology of communication. Communication usually draws on language or languages, but language also has capabilities not related directly to communication. We can define language as a system of rules of using signs based on a consensus, where the rules (in a written or unwritten form) fix the relations between the signs of the language, as well as the relations between the signs and the entities denoted by them. *Speech* is the concrete usage of the system of rules of language. *Writing* is also the usage of the system of rules of language and thus it is similar to speech, but it is different from speech in several respects (Goody 1998; Flusser 1997). Because of the circumstances of their formation and functioning, it is practical to differentiate between *natural and artificial languages*. The formation of the rules of natural languages is not connected to specific aims and particular persons but develop in the way they do in accordance with the general life conditions of a given linguistic community.[4] The system of rules of natural languages is usually more complex than the systems of artificial languages, which are developed with a specific strategy, and it also includes several contingent elements. The evolution of natural languages unfolds similarly to other evolutionary processes; on the other hand, artificial languages are specific creations of "engineering" which are developed as tools that

[4]It is not our intention with our seemingly emphatic statements to commit ourselves with regards to basic questions in the philosophy of language. Instead, we are only trying to define and consistently use the concepts utilized in this book. This endeavor, of course, cannot go without a certain degree of assumed, but not explicitly discussed, background in the philosophy of language.

make it possible to achieve particular goals, as for example we can observe in connection with the creation of programming languages for computers. In these cases the method of "consensus" which is used in the development of the rules of the language is obviously different as well. At the same time it can also be interesting that not only the rules of a language, but the signs used in the construction of languages are conventional as well.

In linguistic and semiotic discussions, natural signs[5] which are developed independently of an *intention to inform* (as for example perceived smoke being a sign of fire) are often regarded as different from linguistic signs. This is because it is not as a result of the consensus of the community that we regard smoke as the sign of fire, and consequently it is not a linguistic sign (Kenesei 1984, 35-59; Voigt 1977). However, it would be difficult to dispute that a certain kind of system of rules is valid in the case of natural signs as well. However, this is not provided by the usual linguistic conventions, but a (mythological, religious, scientific, artistic, everyday, etc.) worldview. Despite depending on the observed phenomena of nature while developing our worldview, it is by all means remarkable that we do make use of conventions here, too, as for example in the case of a commitment regarding evidence, and in many other questions. We can understand the meaning of linguistic signs on the basis of the accepted linguistic conventions; we bestow meaning on the perceived natural signs. It is true that natural signs do not serve *information* but *orientation*, that is, they are not the product of some kind of intention to inform but an intention to orientate oneself. However, it is in no way negligible that man, wanting to find his way in the world, interprets natural events and processes not only in themselves and for themselves but in connection with others and as signs of others. Man is capable of this practice as a result of the mind's activity of secondary representation. The ability of secondary representation is also centrally important for human tool use and abstract thinking, and also, neither the so-called double articulation of language (Kenesei 1984; Andor1980) nor the existence of metalanguages would be possible without secondary representations. In this way, natural signs can also be *regarded* as linguistic signs in some sense, and the connections between them as linguistic rules. From this point of view a worldview is the objectifying grammar of the signs and phenomena of the world and grammar is the subjective worldview of linguistic signs. In the end, this connection leads to the problem of the classic relationship of language and thought, but we cannot discuss this problem here.

On the basis of the above it seems that besides natural human language – with certain limitations – we can talk about the *"language of nature as well"*. Of course, it is not nature that talks to us in the "language of nature"; rather it is us who "get nature to speak", for example, we "ask questions" and nature "replies" sensibly to sensible questions. In reality, we can talk about a practice of interpretation: man, with the help of for example his scientific worldview, interprets the phenomena of nature. In this situation there are no communicating parties, so this is *not* a *communication situation* between man and nature – we can only call it that way metaphorically. The "language of nature" does not serve the communication between man and nature, but it makes the orientation of people in the world possible, that is, a function of language reveals itself here which is not connected to communication, but which we can call a representational or explanatory function. We can generally observe an aspiration to categorize natural phenomena in systems of worldview. One of the natural consequences of this is that the number of the "signs" of nature – similarly to natural languages – is finite and closed. The language of nature is considerably complex and structured; for example in different natural sciences they follow its different "dialects". In this way we can talk about the language of physics, the theory of relativity, quantum mechanics, or even immunology, nerve physiology and many other disciplines as well. At the same time the language of a discipline should not be mistaken for the language of published essays of a given discipline, that is, for the *language of scientific publications*. Publication languages necessarily contain components of natural language; more precisely, it would be better to say it the other way round: publication languages are natural languages which necessarily contain many components of the language of the given discipline. In our view the language of a discipline (just as the language of nature in general) does not serve goals of communication, rather, it is the publication language of a discipline which is specifically created for this purpose.[6] Using the language of science, we do not develop any kind of community between man and nature but we do through scientific publications (and other similar activities that are involved); publications are obviously important factors in the organization of scientific communities. Thus, the "language of nature" is a human artifact, but one which is not created because of the need to orientate ourselves in this or that

[5]Certain artificial signs – created without an intention to inform – pose similar problems, as is demonstrated by semiotic trains of thought in connection with symptoms.

[6]Hermeneutics applied as philosophy of science is sensitive to such differences. Two diverging views have developed in this area. According to one approach, hermeneutics can primarily be used successfully in the natural linguistic environment of sciences (essentially in the analysis of publications), while supporters of the other point of view argue that it is worthwhile to work in the *hermeneutics of science*; that is, the hermeneutical analysis of the functioning of sciences in a broad sense (the examination of the "language of science" of course belongs here) is useful as well. A more detailed discussion of the question can be found in the debate between Márkus and Heelan [Márkus 1992; Scwendtner – Ropolyi – Kiss 2001] and in certain works of Heelan [Heelan 1997; 1999] Ihde [Ihde 1998; 2001] Eger, Apel, Follesdal [Schwendtner – Ropolyi – Kiss 2001; Fehér – Kiss – Ropolyi 1999] and crease [Crease 1993; 1997].

situation, but, "thrown into the world", for the sake of orientating ourselves in the world, that is, the language of nature is in fact a very prevalent artificial language, a real "world language".

It is an interesting question in connection with artificial languages whether we can regard all coherent systems of signs as languages. What is the case for example with natural numbers, the abstract system of signs of a given geometry or with signs used in digital technology? In the case of using numbers, geometrical shapes, and similar mathematical concepts we can certainly talk about "the language of mathematics". The language of mathematics is developed similarly to the languages provided by worldviews. We can probably also say that mathematics is one version of worldviews – capable of representing relations of quantity among entities. In this way, a situation can arise in which the natural language of phenomena used in sciences can be strongly motivated by the mathematical approach, while other natural languages, as for example the variations used in everyday life or artistic practice, are determined by dispositions of worldview. In information technology and related areas the expressions "*programming language*" or "*machine language*" are widely used instead of, or together with, the expression "the language of mathematics". Do these expressions refer to actual languages or can we only talk about metaphors here? The languages in question are, without any doubt, creations of artificial language; however, as opposed to the languages of scientific disciplines, they specifically serve the purpose of communication. With the help of commands formulated in these languages, we want to influence the "behavior" of the machines used, what is more, we try to do it in a way which makes it more favorable for us. The case is somewhat reminiscent of animal communication, since communication situations between humans and machines are limited as well. For example we cannot communicate emotions directly. But, unlike in animal communication, the situations that can be created are "generative" enough, that is, we can reproduce the communicated contents in infinite variations. A peculiar homology of programming languages and natural languages is expressed in our own, this time apparently useful, version[7] of the famous Church – Turing Thesis: we can program clearly formulated algorithms in (natural languages).

It seems that communication in programming languages takes place between humans and machines. However, in reality it is chiefly a specific form of human communication in which the programmer meets the human intentions delegated to the computers and communicates – in an indirect and often asynchronous way – with the engineers who constructed the computer. It is the people who wrote the program and manufactured the machine who participate in the sharing of mental states created by communication; it is primarily them who are the members of the community created in the process. Insofar as we agree with the claim that technology is loaded with values, that is, if we assume that computers contain their own values, we can widen the circle and complement it with further participants of the social environment. Programs created in "machine code" or "machine language" work in similar communication situations as programs formulated in programming languages of a higher level. However, perhaps it is worth listing a few differences. The expression "machine language" already implies that machines or their subsystems "understand" this language, that is, we are talking about messages that are understandable for the machines directly, without translation. This situation consolidates the impression mentioned above even more and it presents machine language as the appropriate tool of communication between machines. At the same time, it is of course not machines but humans who communicate in machine language – in an indirect, significantly automated way and with a restricted content. Certain commands formulated in machine language show similarities with speech acts that can be generated in natural languages. They are similar in the sense that the "understanding" of a command in a machine language can be the execution of the command at the same time.

Thus, insofar as we do not emphasize the differences between natural and artificial languages and we accept the definition of language suggested above, we can call the "language of nature" a language created through the interpretation of natural signs, as well as the language of scientific disciplines and mathematics. These are artificial languages which we do not create with an intention to communicate, unlike programming languages of different levels which, in certain situations, include a linguistic system of artificially created signs and systems of rules with an intention to communicate. In some cases, the autonomy, arrangement, and openness of artificial languages is reminiscent of natural languages, but they are usually effective only in a relative or partial way. The language of nature, sciences, or mathematics is not spoken by anyone. We can maybe say that experts translate and interpret for us the messages that can be told in these languages. Or perhaps we can put it this way: experts "read" and "make speak" these languages, as readers in antiquity added their own voice to the text found in a book (Cavallo – Chartier 2000, 19). This is because "written texts" are obviously also created in these languages: the ordered multitude of the phenomena of our world is a text to be read. Today, we can already "speak" in programming language or machine code, but this "speech" essentially takes place exclusively in a written form. In the case of programs, writing and reading are the key practices.

[7]Many other versions of the thesis in question are presented by [Hofstadter 1999].

Hopefully, we managed to show above that not all language use is communication, as well as that languages do not only function as tools of communication, but they can have different functions as well. For example, besides the representative and explanatory functions mentioned so far, we can also regard agency as a function. In speech act theories, speech is understood as acting (Pléh – Síklaki – Terstyéni 1997). But as regards the communication situation, speech acts and meta-communication completed through actions and gestures show an interestingly symmetrical structure: they represent the opposites of *speech as agency* and *agency as speech*. Communicative action theory (Habermas 1995), among other things, undertakes the dialectical treatment of these opposites. Perhaps it is also worthwhile to note that we can observe non-communicative functions not only in language use but in *sign usage* as well, that is, not all sign usage is communication. As an illustration we refer to the practice of creating and interpreting signs connected to persons. We can clearly ascertain that these are not directly communicative acts, since while operating them we do not share any views. At the same time, it is also evident that such activities can be a part or element of communication.

If we characterize communication as a technology of building communities and language as a tool of communication, we may face the following dilemma in connection with the relationship between language and community: on the one hand, language is a *tool* of building communities, on the other – as we mentioned earlier – it can also be a product of a community. Do we have to decide whether language or community is the key determining factor, and which one shall we choose? Or perhaps we should accept that language (as well as community) can both be a tool and a product? The dilemma can easily be avoided if we share the point of view widely accepted in different versions in the philosophy of language according to which language is essentially not a product of the community. In this case, the usage of language as a tool of building communities can still be asserted without any difficulty. Nevertheless, the thesis of the tool nature of language can be defended together with the determination of language by a community. In this case, we need to regard both languages and communities of an inconstant nature and to understand their development as a consequence of their coexistence. In such a process of organization the causal connection between the coexistent entities is often obscure,[8] at the same time, a connection of this kind is much more penetrating than simple causality. Simple causal relations preserve many of the differences between the objects regarded as cause and effect, but in the process of coexistence, the cause and the effect role is occasionally switched (what is more, in several respects both can be the case at the same time), and consequently the coexistent entities become "closely connected". In philosophy, we try to describe and understand the process through dialectics, but since this form of organization is very frequent in the human world, it is discussed in many scientific disciplines. We can also clearly observe this in the relation between languages and communities, but we can rightly regard it as a relation which is generally true of human tool use. Perhaps the characterization that fits into the present train of thought does not demand that we deal with any further general interpretation of this type of organization, but we will come back to its concrete versions later on.

We have already mentioned that human communication can make use of *other tools* besides languages. Play of features, mimesis helping the expression of emotions, or clothing and certain patterns of behavior can for example be regarded as such tools. At the same time, we call the use of such tools language use as well, thus for example we can talk about the language of acting, music, film, or clothing. It seems to be beyond doubt that sounds, images, movements, pieces of clothing, behavior, and sets of similar things do not possess the features expected from linguistic systems and thus they are not languages. However, fit into a communication situation the case is different. Certain communication situations – as a type of communicative synesthesia – can add the missing elements to the system of signs, and, fit into the situation, non-linguistic systems can still be regarded as languages. This situation is presented for example by the institutions of theater, cinema, concerts, or fashion. Thus, certain well defined (for example by following traditions), stable communication situations can institutionalize or "embody" the rules of sign use and the given system of signs can essentially function as a language in this framework. In a certain sense we can consider writing and reading as such situations.

The relationship between *language and communication* reminds us of the relationship between *science and technology*. Similarly to technology, communication can be regarded as mastery of a given situation. Technology treats natural and artificial objects as tools that can be fit into a given situation. Communication regards natural and artificial linguistic elements as tools that can be fit into a communication situation. As in the case of technological tool use, for the successful operation of communication, there is no need for a connection between the given linguistic element and the whole system of the language, but only for its validity in the given situation. We can consider science as an infinite series of technological situations, and we can imagine language as an infinite series of suc-

[8]Ludwig Boltzmann thought of a connection of this kind. For example, in connection with Darwinism he wrote that Darwin's doctrine „endeavors to explain the complexity of the whole of the fauna and flora on the basis of the purely mechanical principle of inheritance, which, similarly to all mechanical principles of genesis is naturally an obscure principle…" [Ropolyi 1985]

cessful communication situations.[9] (Using a simple example, we can reveal the meaning of a simple word by considering each possible version of its usage.) Language endeavors to describe reality, communication is directed at possibilities. Language is universally valid, while communication is particular. Language use can be correct and incorrect, communication successful and unsuccessful. The theoretical and practical levels of communication and language are abstract to a different degree. In reality, it is not the factual language which is directly connected to communication but speech and writing, which employ the system of rules of a language. The relationship between language and communication is also expressed by the relationship between the philosophy of language and communication theory. The relationship of semiotics to these reminds us of the relationship between technological-scientific analyses and the philosophy of science and technology.

3.1.3 Communication situations

Communication is always tied to a situation. Communication situations anchor those circumstances and conditions in the presence of which communication can successfully happen. The success of communication means that a certain community of views develops during the communication process between the communicating parties; that is, the sharing of their mental states is realized in some form. The *existence* of the communication situation secures the success of communication, while the *characteristics* of the communication situation determine the characteristics of the community that can be developed this way. Communication situations have many typical versions (interpersonal, mass communication, direct, mediated, etc.), a special historical development, and a fairly complex structure (Horányi 1999b; Buda 1994). A communication situation is given by the totality of the elements of communication (according to Jakobson, in the case of linguistic communication these are the sender, the context, the message, the channel, the code and the receiver, (Jakobson 1969, 216) and further factors that fit the characteristics of a chosen community (the spatial, temporal, and personal relationships between the communicating parties, intentions, norms, roles, physical, biological and mental characteristics of the communicating parties etc.). We can find diverse analyses of the various situations in the literature of communication theory (Béres – Horányi 2001; Griffin 2001; Griffin 2003; Chandler 2002; Buda 1994) so we limit our discussion to only a few remarks.

Communication situations are developed in a way that secures the – probably disproportionally shared – mastery of the situation for the communicating parties. The ability to develop certain situations is given for all healthy individuals on a certain level, but of course there are people who are more experienced in developing communication situations; that is, there are "engineers of communication" as well. This group of people is probably more heterogeneous than the community of the engineers of "traditional technologies". Orators, politicians and priests, artists, such as literary men, creators of theater, film and music, as well as the creators and active operators of mass communication, definitely belong here. Since communication situations necessarily include several participants, we can raise the question of the responsibility of such "engineers". Namely, into what kinds of relationship does the created situation introduce the parties, for example, does the participation in the communication make them free or alienated, equal or unequal? Recognizing the possibilities of mastery, it is customary to characterize mass communication as a new branch of power.[10] This characterization somewhat obscures the fact that not only the situation creation of mass communication, but *all* communication situation creation can be used for gaining a powerful position over our communication partners, including the diverse political, artistic, religious and everyday versions, too. Inequalities of power appearing in communication situations are often built on the natural or material conditions of the situation, as can be observed for example in the case of creative people endowed with artistic talent and their audience lacking such qualities. At the same time, we can develop communication situations in a way that we compensate inequalities of natural conditions through creating adequate circumstances. The use of machines of communication (e.g. eyeglasses, phones, or radios) often serves this aim.

While examining communication situations, we must not ignore the problem of the *autonomy of communication* either. The question is whether, similarly to the autonomous value sets of technology, independent, "in-built" values play a role in the case of communication as well which necessarily influence the result of communication; which, furthermore, conflict with the aims of communication to master the situation from time to time.[11] It seems to be unquestionable that many *traditionally created, stable structures* can be revealed among communication situations, and we can find versions capable of supporting their own values equally in the case of everyday, political, religious, or artistic situations. Such situations shape for example everyday chatting, exercising certain polit-

[9] If we wanted to express ourselves in the most concise way, we could perhaps say that science equals technology plus philosophy, and that language equals communication plus philosophy.

[10] It is worth taking into account the power of mass communication not only as regards the "participating" people, but as regards its relation to other branches of power.

[11] We discussed this problem in connection with the most fundamental question of the philosophy of technology (chapter 2.1.6).

ical rights, praying, or the activities of creating and perceiving works of art which follow a certain artistic style. People usually get these "ready made", their task is to put themselves into the situations and learn the ways of their functioning. Education has an important role, through which we learn the rules of appropriate conduct in communication situations ("Reply politely if you are asked!").

Knowing the rules, individuals are usually capable of controlling their own participation, but this control can disappear, for example, as the result of operating mass communication in a propagandistic way or using violent political, religious, or artistic mechanisms. All kinds of *propaganda*, whether theyhave a business, political, or cultural aim, work this way. The dominance of the communication by the values represented by the situation is characteristic of these situations, even though the values themselves often remain hidden behind the communicated content. Modern society uses these procedures in countless sophisticated forms. For example, the modern man of consumer society, "thrown into the situation" is obviously at the mercy of propagandists (Marcuse 1990). A typical example of extreme defenselessness has been produced recently by the American treatment of the digital data storage (the "year 2000") problem and the crisis unfolding as the result of it. We will describe this situation in detail in a later chapter. Business, ideological, and cultural values equally played a role in the year 2000 problem. Such interlocking makes the job of the propagandists easier, so it is understandable that they use it readily. Nevertheless, "throwing people into a situation", they also happily adopt the procedures of the propaganda of religious fundamentalism or the thematization of public political discourse which serves purely the aims of power. In communication theory, the problems of the intentionality and the conscious or unconscious usage of situations are often discussed in connection with meta-communication (which is regarded as not under conscious control). Various, significant categories of social publicity are for example the value content of certain situations (Habermas 1999; Heller 2001). While shaping and operating communication situations, we necessarily shape and operate our relationships with other people as well, as a consequence of which this activity can also be judged from a political or ethical point of view.

We can consider their *closed* or *open* natureas the most fundamental features of communication situations. Traditional, stable communication situations mentioned above are usually closed, thus the communication taking place during their existence unequivocally and with a great certainty leads to the conceived community of views which was set as its aim. Open situations are characterized by the fact that the result of the communication is not necessarily, or not very well, foreseeable. *Mediated* communication is a typically open situation. If the communication does not take place directly between the parties but with the help of some kind of human or technological mediation, the result of the communication does not become directly and immediately visible. Trust in mediators acquires an important role (for example, in case of correspondence, whether it is through mail or a network of computers). Such communication is necessarily asynchronous, that is, steps in the communication follow each other in space and time. The community that can be developed during mediated communication is virtual. It can also lead to the openness of the situation if we make use of several parallel channels of communication. Individual channels and levels can complement and support each other's functioning, but they can also question or refute each other. The problems of *multi-channel and multi-level* communication are reminiscent of the thoughts of Greek philosophy discussing the difficulties of the cooperation between the different senses. Traditionally, the difficulty is caused by the fact that we often receive "messages" that contradict each other, and we do not have any obviously valid principles for a decision. Which of our senses (or channels or levels) should we trust at the expense of others? Of course, the indefiniteness of the connections between the separate channels and levels does not only cause difficulties but opportunities as well. Cooperation and competition between different "messages" is readily utilized by artistic practice, for example in a form in which the author features his heroes and comments their deeds; indeed, acting would be unimaginable without such a "playing field". We can consider communication performed through *images* as multi-channel and/or multi-level, which can be expressed for example with a reference to its holistic nature. The practices followed in the arts clearly show that the operation of multi-channel and multi-level, open communication situations make us able to develop fairly complex communities.

The openness of communication situations can appear as a consequence of the *blurred boundaries of situations*. For example, the circle of people involved in the situation can be indeterminate. For one thing, is there a guarantee that only the receiver reads our *e-mails*? In the case of traditional letters, we could try to sustain the closed nature of the communication situation (for example by using closed envelopes) and preserve the *personal nature* or *secrets*, and most of the time we learn about the success or failure of this ambition, but communication mediated by machines takes place in a situation the closed nature of which is rather questionable and uncertain. Phone calls can be bugged in an unnoticed way, electronic messages sent in an untraceable and uncontrollable way for the user can easily be read by unauthorized people and this does not have any noticeable effect or sign, thus the violation of secrecy itself becomes a secret. This circumstance generalizes a special version of the relationship between the

public and the personal: the *publicity of the personal*.[12] The personal nature of the postmodern personality is mostly public. Preserving the personal character and closed nature of the private sphere as well as altering them is a centrally important problem of Internet use (Nissenbaum, 1999). Analysts approach the topic by using political, legal, economical, moral and technological aspects (epic.org). The "decisive battle" is taking place in connection with personal control over the private sphere. The struggle between various methods of encryption and encryption cracking often copy real methods of warfare. Despite the fact that in the development of encryption methods they draw on the most recent results regarding the fundamentals of mathematics and physics, hackers and crackers, who decipher secrets, usually readily and quickly demonstrate the flaws and the crackability of more and more recent methods (The Hacktivist; Johnson 2001; Hackers 2001; hax0rslab 2002). The unattainable nature of secure personal control obviously keeps the communication situation open.

The blurred nature of the boundaries of communication can reveal itself in the *spatial* relations of communication. In communication mediated by machines the concepts of place, proximity, global, and local are significantly reevaluated; the physical and the "network" concepts of distance can be radically different. No wonder that a location in the network in Boston seems to be closer than one in Bratislava. The vagueness of places and distances definitely becomes obvious in situations of mobile communication. The typical opening sentence of mobile communication is "Where are you?" In the situation of telephone use, distance is chiefly expressed by money.

Reading and *writing* are traditional communication situations of great significance. In these situations, communication is mediated, asynchronous and asymmetrical. Indeed, the point of creating written texts is mediating the content of the communication for readers who connect into the situation in a different place and/or time. Writing in this sense is an open communication situation which is closed by reading. Above all, it is writing and reading which make it possible to develop communities which transcend spatial, temporal and cultural boundaries.

3.1.4 The autonomy and value content of communication

Earlier, we understood communication as the technology of constructing communities. At the same time, we also accepted the view that communication is always realized in a given communication situation. After all this, the question rightly arises: how do communication situations come into existence?

The most important views in connection with the question can be grouped around the dilemma of the autonomy and social determination of communication, which is *the most fundamental question the philosophy of communication*. We can regard the genesis and development of communication situations as the unfolding of autonomous tendencies of reality, which follow their own laws of organization and evolution, or we can also consider it as a process which is shaped by being subordinated to social institutional systems and aims. Thus, the most basic question is whether structures of society are built on communities created by communication or, the other way round, communication is a practice that creates the various human communities serving social ambitions. Putting the most fundamental question of the philosophy of communication this way is unusual but perhaps useful. Above all, it can help us understand and categorize the numerous assumptions of communication theory better.[13] Another reason why putting an emphasis on the relation between society and communication is interesting is that this way we can stress the other side of the fundamental question, namely the examination of the question whether communication possesses its own values or is value neutral. Of course, what we presented here bears an uncanny resemblance to the train of thought we followed in connection with the analysis of technology, which seems to be understandable, since we consider both communication and technology as "mastery structures of situations"; this is the basis of the similarity of the problems that can be raised. We can group viewpoints about the fundamental question of the philosophy of communication in the same way as we did in case of the philosophy of technology (similarly to table 3. in chapter 2.1.6) and identify four typical approaches (see table 4.).

COMMUNICATION	AUTONOMOUS	UNDER SOCIAL CONTROL
VALUE NEUTRAL	*Determinism*	*Instrumentalism*

[12]The custom of not curtaining off the windows of the houses in certain Dutch cities has probably developed as a result of similar circumstances. This tradition probably formed under the influence of protestant moral ideals, and is not of technological origin. Nevertheless, communication situations created for the same purpose can occur in more traditional communicative areas [Heller 2001].

[13]Since such activity would require a detailed knowledge of the theories of communication, referring partly to the different aims of our present line of thought and partly to the insufficiency of our current knowledge, we dispense with publishing a detailed analysis here, and we only propose the most important categories of classification.

	Carey, McLuhan	Shannon
VALUE LADEN	*Substantivism* Baudrillard	*Critical Theory* Habermas

Table 4: A possible categorization of philosophies of communication as regards their view about the fundamental question

The characteristics of the viewpoints of the philosophy of communication categorized above can be determined on the basis of what we said earlier. While naming the categories, we followed the procedure of the categorization of the philosophy of technology, partly because of the lack of terminology and partly because they are quite expressive. The examples used as illustration are hopefully characteristic as a matter of fact. According to the determinist understanding, communities created by communication are the important drivers of social progress but communication does not influence the concrete contents of the progress. According to the standpoint of instrumentalism, society can freely use communities created by communication for realizing its own aims. According to substantivism, thanks to their own values, communities created by communication are necessarily present and influence social life. These effects often present themselves in a negative light. According to the approach of critical theories, the value systems of communities created by communication and the value system of society are necessarily and inseparably interwoven, but, at least in principle, there is a chance that through appropriate political, economical, or cultural means the processes can be controlled.

We would like to set aside the presentation of the details of the possible relationships between communities constructed by communication and society here with a reference to the extensive literature, and we are satisfied with mentioning a few problems, which are interesting both as regards our further argumentation and a philosophical analysis.

If we accept the thesis of the value neutral nature of communication, we cannot regard the characteristics of a community (e.g. its size, structuredness, stability, etc.) created through the process of communication as the independent characteristics of the society utilizing the community but only as a medium that carries the characteristics of the society.[14] Thus, though in this approach communication determines the nature of the created community, it does not determine the nature of society; it only provides it with a technological background. The nature of society is determined by culture. Thus, in this understanding, *communication and culture* are clearly separable: communication is a factor responsible for the nature of communities, and culture is a factor responsible for the nature of society. The relationship between communication and culture can be interpreted similarly to the relationship between communities and society. The understanding of the relationship between communication and culture is far from being so evident from the point of view of the value laden nature of communication; what is more, even their clear differentiation faces problems (Kellner 1995).

From the point of view of the various *agents* who necessarily participate in communication (persons, masses, etc.), the autonomy of communication as well as its controllability may occasionally seem different. Of course, this situation leads to the construction of a community in which inequality will also be present. The treatment of such inequalities is theoretically possible for the culture that utilizes this community; indeed, it is sometimes an explicitly declared political or moral aim.

Without any doubt, communication has immense social significance. Nevertheless, we can equally encounter optimistic, pessimistic, and realist opinions in connection with its social role, though its evaluation is not as diverse and extreme as can be observed in connection with technology. Rather, they relate the dangers connected to communication only to such special situations as for example certain forms of mass communication (above all, watching television). Again, it is the defenders of substantivist views who excel in emphasizing the dangers of communication.

[14]Perhaps it is worth noting that though the differentiation between the concepts of community and society is reminiscent of the important work of Tönnies [Tönnies 1983], we do not consider justified the adoption of the views he developed in connection with communities and society.

3.1.5 Communication and information technology

If we look at the *processes* taking place in communication situations, we can undoubtedly point out that the creation, transmission, and processing of information always plays an important role in communication processes. It is obvious that all communication necessarily uses information technology, what is more – as emphatically stressed in many communication theories – communication essentially consists of procedures operating the mechanisms of sharing information. We can also put this in the following way: *communication can be regarded as one version of information technologies*. This seems to be a valid and important statement in light of the views of communication theory and the philosophy of technology earlier referred to and discussed. But a question arises: what are the specifics of the communicative version of information technologies?

Is there at all an information technology which is not connected directly to a communication situation? Perhaps there is, since the technological situation of dealing with information is not necessarily a communication situation. For example, the creation of information through interpretation can be separated from the process of communication. Interpretation is a personal technology, while on the other hand communication is social, that is, it belongs to a community, or in other words, in some form, another party always participates in a communication situation with whom we create a community, exchange information, and cooperate while sharing our views. In a situation of interpretation, our aim is to understand phenomena, but in communication our aim is not the understanding of the phenomena but the understanding of the other; interpretation and information are only tools serving this aim. Information technologies are always connected to persons; its communicative version is interpersonal (or rather, taking place between communicating agents), that is, *communication is a social information technology*.

Of course, the personal interpretative situation of creating information recognizably fits into various communication situations or can be fit into them, thus, its independence can easily be questioned. Note however, that the same personal interpretative practice can be part of different communication situations (even several types simultaneously) which seems to be a strong argument for its independent existence. Perhaps an illustration from natural science makes our idea a little clearer. The atoms that make up a molecule can be imagined independently or as part of a structure with different atoms. We can imagine the interpretative situations of information technologies as “independent atomic units of information technology," but we can also recognize them in coexistence with other similar “units” or in a communication situation, that is, in the “molecules of information technology”. (In more complicated material structures like proteins or a piece of metal, atoms are in interaction with several others simultaneously, thus, we could expand the metaphor in this way). Consequently, it seems that in the long run, it is reasonable to differentiate between information technology in a general sense and its specific version, communication.

The interpretative procedure applied in communication is a specific social hermeneutics; it is a special hermeneutical situation in which the hermeneutical circle encircles our communicating partner, “the other” as well. The study of the connection between the various personal, interpersonal or social procedures of hermeneutics is an important area of contemporary hermeneutics (Ricoeur 1992; Crease 1993; Ihde 1998; Fehér – Kiss – Ropolyi 1999).

We pointed out earlier that information technologies represent postmodern values. This statement is obviously also valid for communication as a social information technology. Of course, we do not want to claim here that the postmodern age reaches back as far as the beginnings of human communication; rather, only that postmodern values have natural roots, and they do not represent some kind of evil created by the devil.[15] These roots pervade human life rather deeply thanks to information technologies and language use and they materialize in forms of plurality as well as virtuality such as for example the arbitrary nature of linguistic signs, the variability of meaning, the “playfulness” of meaning and the variations of these. Since communication is an information technology, it is necessarily the vehicle and the representation of *virtuality*. In communication, this can mostly be observed in information processes, for example in the forms we already mentioned in chapter 2.2: during the creation of information, the sign is virtually the signified. We could notice a similar connection regarding other components of communication: the “message” that reaches the recipient is virtually the “message” of the sender, the picture that the communicating parties develop of the other is the virtual picture of the other, the state appearing in the parties while sharing mental states during communication is the virtual state of the other, and so on. The communities created through communication – in fact, this is true for all communities – are virtual communities. Let us also note that the close connection between communication and the “possibilities that can be realized”, among others, appears in the cultivation and participatory approaches of communication as well (Horányi 1997; 1999a). By

[15] We can characterize as postmodern the age in which, among other things, the mentioned values – called postmodern for the sake of simplicity– *dominate* the worldview.

generalizing the concept of speech act somewhat, we can talk about communication as (virtual) agency, as well as agency as virtual communication.

Thus, some type of virtuality is "built into" communication from the start, but plurality and individuality are also its elements, thus it is necessarily a vehicle of the characteristic group of values we (also) called postmodern. As we have already mentioned, and as we will discuss in detail, postmodern values become important in *crisis situations*. Thus, communication – in a certain sense – represents a world of values which harmonizes with crisis situations. On the one hand, the similarities between the values they express may point to the accentuated role of communication in handling crisis situations (of course, theories of communication know about this and they study the role of communication in handling conflicts, problematic situations, etc. (Béres-Horányi 2001), on the other hand it may refer to the conflicts and critical situations unfolding in the process of communication. Perhaps we can also say that the creation of human communities becomes meaningful in the process of tackling crises, but at the same time, it has a role in the development of – other types of – crises. This connection is suitable for humans to transform crisis situations from the sphere of "someone and his world" to the sphere of "someone and the other" and in this way create the complex virtual model of the processes of reality: a human community as a form of existence.

3.2 Communication media and technologies

In what we have said so far, we have taken into consideration the similar features of communication and technology. In the following part of our train of thought we will focus on a subject the discussion of which did not seem to be decisive in the examination of the nature of technology, but is essential as regards the characterization of late modern communication. In particular, we would like to examine the question what "communication medium" communication as a technology of building communities uses for its constructions. Of course, in fact, it is also significant in the manufacturing of the products of technology whether the vehicle of the technological product is say, the soil, a mine, great masses of people or a very thin slice of extremely pure silicon contaminated with great care. The technology of manufacturing given products is significantly different in many respects in these cases, and in general, in each branch of technology. So much so that different universities or university faculties teach engineers of different branches, but the differences – or the similarities – of the branches of technology are not as important as regards our current analysis as in the case of the communication media, where the differences between *speech*, *writing*, and *images*, as well as the circumstances of their usage, are immediately visible.

We can differentiate between two big groups of communication media: media that play a role in the development of a communication situation (these are usually called *channels* of communication) and the *media* of the communication process. The media of both groups contribute to the characteristics of the community which develops through communication. The separation of the two groups is not always justified or important. Often, they are not even differentiated clearly (Béres – Horányi 2001, 115). Since later on communication media will not be interesting for us in themselves but as regards their relationship to the versions of communication technology and their development, we will not emphasize the differences between channels and media either.

Communication media has gone through a spectacular historical development and this development is still going on quite intensively nowadays. The comprehensive history of communication media and technology is discussed in several monographs (Ong 1982, Kittler 1996; Nyíri – Szécsi 1998; Barbier – Lavenir 2004; Briggs – Burke 2004) and is presented on many websites (The Media History 1996; Fang 1996). In what follows, we will only focus on the details connected to late modern development which are interesting as regards the development of the Internet.

The most important part of the development can probably be observed in the dimension of *speech – writing – images*, and consists in the fact that the monopoly of communication based on speech, which prevailed since antiquity, gradually ceased to exist and communication through written texts became important; furthermore, in the recent few decades the decline of the monopoly of written texts and the communicative usage of images can be observed as well.

At the same time, – chiefly as a consequence of the technological tools involved in the communication situation – the *complexity* of communication media has increased as well. This is because, naturally, media which have been pushed into the background have not disappeared from communication, but are still participating in the process with a slightly different role, thus in fact we can observe that communication media shows a more and more complicated structure. The somewhat stabilized consequences of these changes created the forms of media *multimedia* and *"hypertext"* and the various *intermedial* representations.

The separation of the *analog* and the *digital* forms of communication can be related to the technological elements involved in communication. "Naturally given" versions of communication usually have an analog nature, which means that the signs that contain the information are represented by *measures* of certain physical *properties* (e.g. the pitch, duration or character etc. of a note), while in digital versions the signs used in the communication processes are not directly the equivalents of the properties of the signified processes, but their automatically created, convention based, decoded "sign language" equivalents (e.g. a given series of binary signs). The difference between analog and digital forms of communication is also important because, unlike most analog usage of signs, the usage of digital signs is practically impossible with natural human abilities, that is, it is inevitably necessary to draw on *communication machines* while operating it. On the other hand, it also has great significance that by inserting the process of encoding, a new level gets in between the signified process and the information pertaining to it, which makes the communication process significantly more complex, and creates many opportunities for example for interfering with the process, improving sign corruption and the subsequent modifying and manipulation of the signs.

Another important dimension of the advance of communication media is the development of the independent *"tools" of communication* and related techniques. The most important of these are probably books and the techniques of writing and reading. The possibility of copying written texts created writing and reading based communication on the *level of the whole society*, which lead to the increased social role of communication, or occasionally even its proliferation for its own sake. From the mid 20th century, the rise of such new "tools" of communication, (photo, film, radio, television) which use communication media different from written texts has become more and more prominent.

3.2.1 Orality and literacy

According to the widely accepted view, in early forms of human communities speech was the dominant medium of communication.[16] This chiefly means that in the initial versions of social organization the characteristics of the communities were developed through speech. Thus for example mythologies, which play a key role in the identity of communities, exist through *orality*: knowledge of the characteristics, origin and history of the community exist in orally created, spread and preserved epics, mythical stories and legends. Of course, it is the macro communities that have myths and legends, but the oral forms of organizing communities have functioned and function mostly still today in other versions of communities (interpersonal, family, group, etc.). The characteristics of the dominating medium of communication are necessarily reflected in the culture of the given society, consequently, we talk about the culture of orality (and later, literacy). The reevaluation of cultural history from the point of view of the applied communication technology and medium is a regular topic of analysis since the 1960s (Havelock 1963; McLuhan 2001; Ong 1982; Nyíri – Szécsi 1998). For historical reasons, the questions of cultural memory, cultivating traditions and their propagation are in the center of the discussion (Havelock 1963; Nyíri 1989; 1993; 1994). In Hungary, after sporadic antecedents, Nyíri initiated research projects connected to the topic (Nyíri 1993; 2001a; 2001b; Nyíri – Szécsi 1998; Research Institute of Philosophy of the Hungarian Academy of Sciences).

The most important characteristics of the culture of orality, which is based on the communicative monopoly of speech, are *dynamism* and *variability*. The communities that can be developed through speech and the contents that can be communicated this way require permanent "maintenance" and demand the continuous activity of people (practicing, memorizing, reproduction) but they easily change and can be changed easily for this very reason. We could also say that the communities and the culture of orality behave as open communication systems, that is, the condition of their persistence is essentially permanent communication. The functioning of human memory regulates the frequency and methods of recall. Memory is supported by situations, manners of speech and rules of construction and behavior (rituals, rhythms, rhymes, roles, etc.). Memory itself is a dynamic, open system. The products stored in memory and reproduced again and again in communication processes (communities, knowledge and other cultural contents) do not have a very stable structure, meaning or value. All of them are very sensitive to the contexts of memory and reproductive practices. Context and situation sensitivity show the communicated content *close to life* and full of life, fitting into the life world of the participants of the process. Communities and cultural contents do not have some kind of "original" version which could be compared to the freshly created version and which, through its original nature, would "rule" the reproduced versions. In fact, there are no versions either, since each reproduction claims originality; that is, there is no reproduction in the strict sense, only production. Perhaps we could say that the "living" version dominates the "dead" one, thus for example a tradition can be "kept alive" or

[16]Here we ignore the practices of primeval communities. Their discussion (see chapter 3.2.3.) will complement the picture sketched here with a few further details.

a community can be cultivated, "made alive". The circumstances of orality and the European process of switching from orality to literacy are analyzed in detail by the excellent works of Havelock, Ong and Goody (Havelock 1963; Havelock 1998; Ong 1982; Goody 1986; Goody 1998).

It is well-known that various versions of writing already appeared several thousand years ago (Kéki 2000; Flusser 1997; Vilém Flusser; 2001) but the first known versions of writing played a subordinated role for a long time, that is, they helped memory in the circumstances of orality, mostly in administrative and economical situations (Goody 1986; Assmann 1999). A significant change in this situation can be noticed from the 5th century B.C. in Europe, when writing was also often used in other situations.[17] The process of the change can easily be seen in Plato's activity. Plato wrote dialogues, that is, he *wrote down speech*. With this method, he made his views accepted both as belonging to orality and literacy. The solution chosen by Plato fits well into the process of the change in communication in philosophy in Athens: his teacher, Socrates, devoted to conversation, did not write down any of his ideas, but his student, Aristotle, as a follower of literacy, expressed his thoughts in written works, even collected books. His famous library consisted of nearly 400 scrolls. Of course, this was not only the case with philosophy, similar processes were taking place in other areas of culture. It is characteristic of the quick spreading of literacy that the collection of the library of Alexandria created in the 3rd century B.C. exceeded half a million scrolls in one or two centuries. Writing appeared in interpersonal relationships as well: correspondence began. Nevertheless, the fact that writing gradually became more important did not take away the communicative importance of speech. The countless forms of communities, from everyday, family, religious, and various political communities to the community of theatre performances and the communities of education and teaching were still shaped with the help of speech. However, it quickly turned out that writing is not simply recorded language, and as a consequence of its different nature from speech, conflicts could appear between speech and writing.

Of course, among the differences between writing and speech the most important to mention is that written texts are *recorded*. Writing can record and preserve the uttered words, but it can also produce texts of a very different nature than speech. This is because the way of thinking and the structure of the process of natural speech is necessarily rather complicated, since in natural speech (that is, when we do not speak as if we were reading out a written text) there are repetitions, leaps, skips, interruptions, and recurrences. Thus, the process of speech might show a complicated structure in an imagined syntactic or semantic space, while on the other hand, the structure of written texts is linear. Of course, *linearity* is not only a superficial feature of the written form but chiefly a constraint on *written* ideas as regards their content. Thus, the structure of speech is linear only in exceptional cases; on the other hand, the structure of written texts is generally linear. The linear order of written texts is definitely connected to the peculiar circumstances of the development of writing. The "proper way" of thinking was revealed under the influence of the Eleatic School of philosophy in the 5th century B.C., and the tradition of *logic*, securing the consistent nature of thinking, came into existence. The linear order of written texts and the system of logical conclusions built on each other display a similar structure: the "logic" of written texts follows the traditional deductive rules of logic, or the other way round, since according to Havelock, it was actually the usage of the Greek alphabet that advanced the development of the "logical thinking" of the Greeks. The possible connection between the usage of writing and the development of logic is supported by the fact that written texts, in contrast with the continuity of speech, are divided into standard, easily identifiable units (though for example they use space only from the early middle ages). It follows from the fixed nature of written texts that it makes sense to talk about the concept of *originality*. Written texts can have original and derivative (copied, corrupted, corrected, changed etc.) versions. As a consequence, conflicts are not only generated between written and spoken texts, but between the written versions, giving work to philologists, technicians and businessmen.

Spoken words and their understanding are also context dependent. However, to a significant degree, written texts have a *context independent* meaning; more precisely, a text can be separated from the situation of writing and can be read in various situations and contexts. Another consequence of this is that as compared to "live" speech, written texts are "dead" or at least seemingly dead and are waiting for resurrection. While speech is a closed communication situation, writing is open: the speaker and his listener are the participants of the same situation but the author and his reader can be separated from each other (what is more, this is typically the case), and writing is "finished" by the reader, it is he who makes it a real written text. Writing that can be understood separately from the context of its creation (that is, the separation of the context of writing and reading) makes it possible to create abstract, context independent knowledge, and as a consequence, among other things, the *development of science* as well. It cannot be regarded as a coincidence at all that in the circumstances of orality, there were successful artistic, religious or even technological activities, but science did not develop. This is because these forms of activities are possible

[17] We will not discuss processes outside Europe here at all. For an orientation see websites on the history of communication [The Media History 1996; Fang 1996] and Márton Atilla Farkas's interesting book [Farkas 2003].

with the support of communication tied to a context, since situation dependent knowledge is sufficient for their success. Science however, – as we have tried to show earlier – works with situation independent knowledge. Through using written texts, it became possible to transform knowledge between situations from a communication technological point of view, and Greek thinkers did use this possibility: scientific thought (and several scientific disciplines) started to develop intensely simultaneously with the development of literacy. The contemporary interconnectedness of literacy and scientific thinking is well demonstrated by the creation and maintenance of the Museum and Library of Alexandria. What we would like to stress in connection with the functioning of the Museum and Library here is the significant, institutionalized interconnection between scientific work, writing, and reading.

After literacy made the transformation of knowledge between situations possible, the whole status of culture essentially changed. The forms of the preservation of culture which developed in the circumstances of orality (e.g. the memorizing and performance of epics, legends, and rhymes) were gradually pushed into the background and to the periphery by written culture and the operation of "cultural memory" based on writing. The appearance and the spreading of the locations, practices, and practitioners of reading and writing had countless cultural and social consequences (Havelock 1963; Havelock 1998; Goody 1986; Goody – Watt 1998; Assmann 1999; Cavallo – Chartier 2000; Manguel 2001) and became a determining factor of "Western" culture.

From a communicative point of view, it is an important feature of writing that the role of the mouth and the ears is taken over by the hands and the eyes (McLuhan 2001). It is characteristic of all writing that it replaces the *temporal* "extendedness" of speech with "*spatial*" representation. A mutual conversion takes place between temporal and spatial aspects in the process of writing and reading as well, even if we talk about silent reading. Such conversion makes the crossing of the temporal boundaries of communication easier, and in a certain sense, it makes it possible for us to communicate (and create a community) with people of the past and the future. The spatial nature of writing draws our attention to its representative nature. Various writing systems (e.g. Egyptian or Chinese ideographic writing) often keep a close connection with a *picture* representation; moreover, they often abstracted the signs of syllables and alphabets from certain picture representations (Flusser 1997; Vilém Flusser 2001; Kéki 2000; Farkas 2003). Of course, the letters of developed writing systems are forms of representation abstract to such a degree that they no longer mean anything more than the given letter for the users of the letters (and as a matter of fact, they must not mean anything more for the sake of their appropriate functionality), but the whole of a written text still bears a certain picture nature (sometimes they speak about "written form"). Taking into account the picture nature of writing can be observed in a wide range of areas, from graphology to typography.

We could also consider recording speech in a written form as a certain kind of "*digitalizing*" of the spoken word. Consequently, we can consider reading as the analogization of writing, that is, both versions of the analog-digital conversion occur during reading and writing. It is definitely the case in the sense that speech uses physical properties of the articulation of the sounds (pitch, length, their harmonic overtones) in the production of the spoken text, therefore in the spirit of what we said above, it uses "analog encoding", in contrast with written text, where the communicated content is "encoded" through ordered series of a limited number of visual signs created for this purpose.[18] The natural conditions of producing and understanding speech coded in an analog way are given for all people, and we learn the way to use our naturally given abilities from the communities that raise us. In contrast, writing and reading operates different groups of our naturally given abilities. Furthermore, it requires necessarily "materialized" tools as well: writing requires writing implements, and reading the written text. The "tool demanding" nature of writing and reading, and their dependence on tool use take the learning of writing and reading out of the scope of natural communities, and eventually lead to the development of independent institutional systems (clerks, clerics, teachers, books, libraries, presses, etc.). The production of written texts with the help of manual means – similarly to other handicraft techniques – did not develop very intensely (for example, the invention of the pencil in the 16th century was followed by the invention of the rubber only two hundred years later). Though the society-transforming role of writing is powerful, it is significantly limited. Thus for example in Europe – as a result of the lack of the prevalence of writing and reading – it only involved a quite narrow circle until the 13th century, and it accelerated only after writing and reading "left" monasteries (Hajnal 1998). The social cultural changes generated by literacy unfolded in their full depth only with the technological production of written texts, that is, after the "invention" and spread of printing.

[18]On one occasion I participated in a late evening conversation with Bogdán Zaválnij and his friends where the discussion was precisely about this. The debating parties could not agree in the question whether writing itself can already be regarded as the "digitalization" of speech, or it is only justifiable to use the concept of digitalization in case of *printing*, which uses replaceable letters. I cannot remember which of the debating partners defended a view at the time which is the closest to the approach presented here.

3.2.2 Books and reading

Borges claims that "among the various tools of man, books are the most admirable. The others are all the extensions of his body. The microscope and the telescope of his eyes, the telephone of the sounds, and then here are the plough and the sword, which are the extensions of the human arm. But books are something completely different: books are the extension of memory and imagination" (Borges 1999; 59). If anyone's opinion matters in this issue, it is probably Borges himself, so perhaps it is best if we start on the road marked out by him while presenting the nature of books.

Books, as tools helping memory and imagination chiefly consist of *written texts*, as well as tools that support the use of texts: the structure securing the appropriate arrangement, the accessories presenting and sustaining the *identity* of the text, the illustrations facilitating the *understanding and enjoyment* of the text, and of course the continuous functioning of the set of the conditions of the material and intellectual infrastructure that make the *production, preservation, and usage* of texts possible. In this way, books bear the characteristics of written texts, and depending on their historical versions and the prevailing set of conditions, they strengthen, weaken, complement, or modify their success and effect.

The several-thousand-year long history of books show several changes as regards all of the mentioned factors (Febvre – Martin 1997; Cavallo – Chartier 2000; McLuhan 2001; Barbier 2005) nevertheless, it can be divided into two clearly distinguishable phases: the age of *manuscripts* produced through handicraft technology and the age of *printed* books manufactured through printing technology. In Europe, the boundary between the two ages is marked by Gutenberg's printing innovations. The source of the Gutenberg galaxy, which consists of printed books, reaches back to mid 15th century Germany. Handwritten or copied books were rare and expensive "tools", at least until the 13th century. Apart from rare exceptions, they could only be found in a concentrated way (in libraries, monasteries or owned by merchants). The first communication change that was necessary for the increase and spread of books was the spread of the secularized forms of writing and reading in the late middle ages. It seems to be indisputable that the increase of the number of available books, as well as the increase of the significance and frequency of their use can already be observed before printing (Hindman 1991; Johns 1998). However, the decisive change in the production and spread of books was induced by the technological production of books, since books were produced quickly and in better quality, and their mass production quickly decreased their price.

According to the widely accepted view, the changes in the technology of producing books in the 15th century, and thus the use of the books produced this way, influenced the nature of modern culture to a significant degree (Eisenstein 1979; Eisenstein 1993). According to Eisenstein, features of "printed culture" connected to the standardization of printed works, the widespread use of printed books, and the fixedness of the cultural contents, are so significant that we can talk about the "printing revolution" of culture. Standardization meant several things: it chiefly meant that the various forms of handwritten books were replaced by printed copies following the same design. This "uniformization" of books was helped by letter use, text layout and arrangement, and the readily used styles of using indices and covers. As another important manifestation of standardization, many people were able to read *the same* text simultaneously, which meant a completely new form of reading, especially as compared to reading handwritten books which were only available as individual copies. Some standards gained ground so quickly that for example a certain favored type of print almost simultaneously appeared even in the peripheries of printing (as for example in Hungary). As a consequence of standardization, the culture of a given era shows a more unified picture than before. Fixedness meant that the culture of a given era was recorded in a fixed form; it was preserved and became available for people of a later age or a distant place. As a consequence of all this, the *print revolution* was an essential driving force in the development of the Reformation, the Renaissance, and the emerging modernity.

Of course, it is also very important what kind of books we talk about. Printed books were often old manuscripts, or a selection created from them, often calendars, reference books and volumes containing much useful knowledge (often illustrated or specifically compiled of pictures). And of course, works satisfying religious needs: prayer books, hymn books, picture books and above all, the Bible. Gutenberg's "42 line" Bible edition often found followers; many other editions were published, soon in national languages (first in German and later in Italian) and in a rather large number of copies.[19] Borges meditates about the tradition of the divine origin of this book, but he does not mention that not only the Bible, but for a long time (even in the 16th century) printing, too was considered as God's gift, and regarded as a miracle.

[19]Perhaps the situation is well illustrated by the fact that 100 000 copies of Luther's translation of the New Testament were sold.

It is notable that almost all claims of the "print revolution" approach defended by Eisenstein have been questioned recently. Hindman criticized the revolutionary nature of the concept, and argued that the changes mentioned above took place slowly and gradually; furthermore, handwritten and printed books are much more similar to each other than Eisenstein acknowledged in his analysis (Hindman 1999). According to Johns, "printed culture" is more a result than the cause of the changes. He thinks that it is not the fixed nature of books that is interesting, but rather the question why we trust certain printed texts. If there was a "print revolution" at all, he thinks that this means that as compared to manufactures, the conventions of the examination and treatment of the trust in written materials changed, that is, texts were not more trustworthy because they were printed but because of the changes in social circumstances (e.g. pirate editions, plagiarism and other fakes) that surrounded printing. It is not the books that make the revolution but the way books are produced, used, and read (Johns 1998). Johns promises to present the reader the nature of printed books. The basis of his approach is the thesis that books are on the one hand the product of a complex set of social and technological processes, on the other they are the starting point of such processes. If we consider the criticism of the "print revolution" and accept Johns' thesis – supported by the mobilization of an enormous amount of material – perhaps the right thing to do is to distance ourselves from revolutions and ask the following question: what is the nature of modern books in the centuries after the invention of printing?

The *modern book* is similar to an automaton, to clockwork dominating the worldview of modernity. It is built of clearly distinguishable elements (letters, lines, pages, paragraphs, chapters etc.); the relationships between the elements are fixed, and malfunctioning parts can be replaced in an unnoticed way. The whole, built of the elements, can easily be reproduced and copied. Its correct functioning can be calculated precisely. This is also facilitated by the technological circumstances of its production, equally in the case of the press, the editor, the publisher, and the author. In its typical usage, its operation is the task of the reader. For activating the mechanism of the book and keeping it going, usually a small but still indispensable "external" energy is needed – the amount of energy invested by the reader also depends on how "smooth" the style of the author is or what the typography is like. We can interrupt its functioning – reading – and restart it, but we necessarily have to follow the order prescribed by the apparatus. The whole mechanism can be restarted over and over again and it can always be carried out according to the same rules.

Of course, the modern book is not completely identical with other modern automatons, since it has its own specific aims. Following Borges, we could perhaps say that *the modern book is a memory and imagination automaton*. The most important material for building a memory and imagination automaton is the written text. Of course, memory and imagination cannot be tied to written texts, but it draws on them. The usage of a book necessarily takes place on two levels at the same time: on the one hand, on the level of the mechanisms connected to the material which the book is made of, on the other, on the level of the mental mechanisms evoked by the continuous interpretation of the signs and structures featured in the book. The reader is "the citizen of two worlds", and reading is the simultaneous presence in these two (physical and intellectual) worlds. Reading –that is, the continuous mediation between the worlds – connects these spheres of existence in a peculiar way, and, as it were, "finishes" the construction of the modern book, it sets the book going, as a memory and imagination automaton which simultaneously functions in two worlds. The reader of modern books, continuously stepping across the border of two worlds, carries out a permanent hermeneutical praxis.

In the old times, they thought that books have a personality and a soul. The reader of pre-modern books strived for making this soul "talk". The practice of reading aloud fit this striving well. The pre-modern book is the substitute of live speech, and reading a pre-modern book is similar to a conversation. Modern books have a "personality", unique content and message as well. But they have a modern personality and our relationship to them is according to the needs of the modern age. Modern books express stories and theories competing with each other, and in dealing with them we apply the selfish methodologies of accepting and ignoring (Ropolyi 1999a). The modern reader does not converse with a book, but judges whether it is worth *his* attention, trust and imagination. The modern reader samples and chooses, and often makes market-based decisions: what is worth the invested time and energy, what is worth reading? The modern reader rules the book – but of course he does not simply possess it in a physical sense, but he is in a power relationship with it, that is, he can use it for his own aims as he pleases. The typical modern reader works with the book, but of course, not for the sake of the book, as the monks who copied the books did, but he *uses* the book for his own goals and aspirations. In this sense, the modern book is a tool. Its usage, similarly to that of other tools, can have the opposite effect: the multitude of books, or individual books, might rule us. We can indulge and lose ourselves in our readings; we can become dependent on certain books in our activities or thinking, and so on.

Based on even such a superficial argument, it can be seen that the history of the usage of books is in fact inseparable from their social history. Thus, the history of reading is necessarily intertwined with the history of books, but it contains several circumstances which are interesting and important on their own right. Researchers of the history of reading identify three such "revolutions" of the technology of reading which radically changed the situation of reading (Cavallo – Chartier 2000, 29). The first "revolution of reading" made reading aloud silent. The difference between *loud and silent* reading as well as the fact of switching to silent reading is very obvious; however the circumstances and the date of the switch are quite uncertain. Without any doubt, silent reading was already present in ancient Greece (Svenbro 2000), though for several long centuries the loud version prevailed. The switch to silent (or mute) reading can be observed from the late middle ages. Interestingly, this switch preceded the appearance of printing, after which it indubitably became dominant. The silent reader has a more intimate, more personal, and freer relationship to his reading than his loud predecessor had. The next, "technological" revolution of reading can be observed from the end of the 18th century, simultaneously with the industrialization of printing, and it manifests itself in the switch from "*intensive*" to "extensive" *reading*. The intensive reader read few books and he read the same book several times, studied it in its details or even memorized some of its parts. The typical reading of the intensive reader in the late middle ages and in the early modern age was the Bible. The extensive reader definitely follows modern values. He selects his reading from a wide range, and following his own goals, he is disrespectful and free and he has veritable fits of "reading anger" (Wittman 2000). The propagation of newspapers, reading groups, libraries and the mushrooming publishers help satisfy his desires. By the end of the 18th century a convention develops according to which simply everything can be read.

The third technological revolution of reading is still taking place nowadays and it consists in the switch to *electronically* stored texts, which are visualized in electronic devices (displays and screens). It is part of the peculiarity of this new situation that now not only the reader and the text participate in the reading situation but the tools which make the text available for people are necessarily present as well. Besides the fact that many relationships which can be operated traditionally disappear, several radically new opportunities are also created by placing the tools between the text and man. First and foremost, the earlier clear separability of the author, editor and the reader might cease to exist, and the merging roles offer new methods and opportunities. The development of the "final" form of electronic texts often falls on the reader and it also strongly depends on the nature and quality of his "reading devices" (the configuration of his computer, the available software, etc.). It is also a significant change that in an electronic medium, reading itself can become the task of technological devices: we *teach computers themselves to read*. Various "drives and heads" write on magnetic disks or CDs and read the texts written by other computers; while functioning, the operating system of the computer constantly "reads" the appropriate registers, and a "well-trained" scanner or certain notebooks can even "read" decent handwriting. Obviously, automatic reading can only function if, by programming the computer appropriately, we prepare it for the possible interpretations of the perceived signs. The uncertainties of interpreting the signs can be reduced by applying "artificial intelligence" programs which recognize different forms. Automatic reading is an automated form of reading in which man "steps beside" the process of reading.

The "electronic revolution" changes the nature of the "book" created in an electronic form: it becomes possible to suspend the operation of the book as an automaton. Through accidental or voluntary intervention, we can skip or relocate parts, we can insert new parts, or texts found elsewhere, that is, if we please, we can completely transform the structure of any work on the basis of our own needs. Essentially, with a technological support, we can be in the position of the *fully realized extensive reader*.

Not only does the history of reading permit the identification of technologically motivated revolutions, it also makes it possible to present the changes in reading habits in other dimensions. Here we would only like to draw attention to two characteristic versions. One of them is the way of reading which became popular among humanists, in which they were able to be attentive to, compare continuously and easily, and simultaneously use several books at a time, for example through using book wheels or revolving bookstands (Cavallo – Chartier 2000; Manguel 2001). The primary advantage of parallel reading was not primarily quantitative, but the tool of criticism which worked through comparison. In addition, it contributed to the fashionable activity of the age of creating "loci communes" volumes, which were collections of excerpts taken from various books, quotes and thematic summaries (Cavallo – Chartier 2000, 36; Grafton 2000). Compiling "booklets" on the basis of one's own readings became a so beloved "genre" of humanist thinkers, that it already represented a separate publishing category. Their versions facilitating study and teaching are even preserved until nowadays in the form of thematic compendiums, collections of texts and quotes. However, what is even more interesting is that such "pecking" in one's readings is not unknown for the reader of the electronic age, either. Lots of texts created this way can be found on web sites. In fact, we can risk the claim that the structure of web sites bears an uncanny resemblance to the structure of "loci communes"

booklets. Of course, electronic quoting is automated to a large degree, and the reproduction of the quoted text is often omitted and replaced with the *links* that lead us to the texts, placed by the editor of the web site. A web site rich in links is the "loci communes" of our age. The various browsers and search engines represent a very peculiar version of reading on the Internet. "Reading" which can be performed with the help of these is the "inverse" of the reading technique necessary for compiling "loci communes", at least in the sense that the search for a certain term does not collect *various* quotes deemed valuable to *one* place, but it presents us with the collected occurrences of a *single* term deemed valuable in *various* places.

The sociological dimension of the history of reading provides us with a lot of lessons as well. As a result of the religious reforms of the 16th and the 17th centuries, new reading habits developed, too. The various religious denominations equally tried to make their believers read the texts they regarded as appropriate and to orientate their reading habits or to limit their selection. In this way, besides starting to function as an activity supporting religious life, reading also became able to generate and preserve social, cultural, and religious differences through encountering and identifying with different texts. Calvinism and Puritanism emphatically committed themselves to the regular and personal study of the Bible. Nevertheless, the phenomenon of the "democratization" of reading, that is, the joining in of the masses and a wide range of readers into reading can only be observed after the switch to modern reading at the end of the 18th century. Until then there was a situation as regards the various layers and regions of reading which is strongly reminiscent of the situation of the "digital chasm" which can be observed nowadays in the spread of the usage of information technologies, that is, the reading practices of the elite and the bigger part of society were radically different.

In accordance with the nature of communication, reading serves the sharing of views between the author and the reader. The writer and the reader of each communicative situation – as we could see in numerous descriptions above – can actually be very far away in space, time, and context. However, we would like to mention shortly two additional situations: the situation of the reader of the universal library and the situation of scientific reading. Even the leaders of the Museum and Library of Alexandria already strived for concentrating all the knowledge of Antiquity in their library and collecting all the books that could be found. The reader of a library such as this could find himself in a peculiar situation: roaming among the books he could become the member of the most complicated human community possible. Various religious fanatics – through destroying the library several times – successfully prevented the possibility of experiencing such complexity, and insisted on creating communities based on one or a few books. The idea of the universal library lives ever since, regardless of the fact that its establishment regularly failed. The electronic production of books has brought the hope back: though in a different form, but the thousand-year-old dream can perhaps be realized. *E-books* (Cornell Electronic Text 2000), as well as *e-libraries* created from them, available for all web citizens (Project Gutenberg 2002; The Online Books 2002; List of E-text 1999; Literature Resources) follow similar aims.[20] If we complement this ambition with the practices of digitalizing traditional libraries (e.g. computerizing catalogues and borrowing) and their appearance on the Internet, the creation of some kind of "world library" is within our attainable reach through connection resources,. However, it is necessary that the reader of the world library can visit the virtually existing collection of his readings only in a virtual sense. The other version of the universal library can be the whole system of the Internet. Essentially all knowledge and cultural production is already available on the Internet, and its range is becoming wider and wider every day. However, the two universal systems follow a very different order. The system consisting of e-books and traditional libraries is stable and well organized, the Internet on the other hand is built on fragments which are at most partially organized (and as one of its components, it contains the other world library candidate as well). Another important difference is that the library system is necessarily pieced together and operated by specialists; in contrast, the compilation and operation of the subsystems of the Internet is contingent, specialists and laymen equally participate in it. Libraries are visited by the readers (even if it consists of e-books); but in the system of the Internet we can all become readers and writers.

As we mentioned earlier, the appearance of literacy was a condition of the functioning of science, since situation independent knowledge became available with the support of literacy. It is not irrelevant at all that scientific activity largely consists of writing and reading, since it is chiefly these activities that shape the scientific community. The question arises whether *scientific reading*, which is followed in the scientific acquisition of knowledge, has any special characteristics that differentiate it from ordinary reading habits (Johns 2001). In other words, how do scientists choose the members of their community, are scientific communities formed in a way different from ordinary communities? We are probably not mistaken in claiming that the answers given to these questions are mostly settled by choosing the value system of the philosophy of science we follow. Nevertheless, taking into account the

[20]Here we set aside the commercial version of selling *e-books* for money. This is the product of traditional businesses and in our view they are not considerably interesting.

considerations concerning the philosophy of communication might contribute to the extension of the repertoire of the techniques used by the philosophies of science.

3.2.3 Images in communication

We can analyze, discuss and compare the role of speech and writing in communication but we cannot dispute it. The case is different with images. Certain theories of communication liberally ignore the phenomena of image communication, while others hardly acknowledge its possibility and only a very few venture on its detailed analysis, as if images were enigmatic, incomprehensible, or on the contrary, too simple media. For example, it is not obvious whether we can talk about an image language at all, whether there are in fact mental images, and if yes what they are the images of, or whether images are copies of things which are themselves not images, indeed, it is not even very clear what an image is at all. These are mostly open questions, but as regards the definition of the nature of images, we are relatively lucky, since we have the train of thoughts of Vilém Flusser. Flusser's texts are markedly the odd one out within the confines of the "academic style", even so, or perhaps exactly because of this, they offer unique explanations for the understanding of the nature of images. Perhaps the most attractive method to present them would be to quote them at length and in detail. Instead, because of their length, we choose the solution of recommending studying Flusser's readily accessible works (Flusser 1990; 1993; 1997; Peternák 1998; Vilém Flusser 2001) and we undertake to summarize his most important ideas supported by a few quotes.

The most concise characterization of the *nature of images* is perhaps offered by the next few sentences: "An image is a surface with a meaning … When I say 'meaning', I talk about a surface which contains symbols organized according to a code and which makes it possible for the perceiver to make decisions. And when I say 'surface', I think of the fact that the information which the image contains spreads out. It has a synchronous nature, but I, the solver exchange synchronicity for diachronicity. We can call the movement of the eyes which unravel the surface of the image scanning. Eyes follow peculiar ways. Some of these are marked out by the intention of the maker of the image. But eyes also have a certain autonomy, they also project their own way. This is why the message that the image contains is necessarily connotative. Each perceiver can interpret the image in his own way …" (Peternák 1998; 77). The human ability to create and use images is *imagination*. The understanding of the functioning of imagination and its abilities raises a number of psychological (Séra – Kovács – Komlósi 1994), philosophical (Bacsó 1997) and artistic (Janus Head 2000; Bálványos – Sánta 2000) problems. The detailed discussion of the nature of images and imagination would lead too far away, so here we can only talk about a few details which are useful for the subsequent characterization of Internet use.

Defining the image as *a surface with a meaning* seems to be a very useful idea because on the one hand, it emphatically connects the linearly ordered text and the image that "spreads out" on a surface and at the same time it also points out their differences. From this point of view it seems that both written texts and spread out images represent communicative content with the help of "symbols". Though the nature, organization and the regularities of their interpretation are different, the diverging methods of representation also share some characteristics. Thus for example, there are fixed rules of construction in both cases and interpretation is needed in production as well as in usage. What is more, if we compare the methods of construction and interpretation, the nature of both writing and images become clearer. On the other hand, Flusser's definition is also useful because the idea of information spreading on a "surface" used in it can easily be generalized, and besides the traditional, two-dimensional images, we can also introduce the concept of *multidimensional images* to denote information spreading out on a multidimensional surface, which we will treat as a basic concept in the interpretation of the communicative structure of the Internet.

Images can both reveal and mask reality. They can be "true" or "false"; besides imagination, hallucination is also at work. The process of understanding images and judging their content – even in case of simple images – shows a *complex structure*. While scanning, which explores the image, "the glance grasps one element after the other; it establishes a temporal link between them. It can return to a part of the image already seen and in this way, the 'before' becomes the 'after': time, reconstructed by scanning is the 'eternal recurrence of the same thing'. At the same time, the glance also creates meaningful connections between the elements of the image. It can repeatedly go back to a specific element of the image, and in this way, it can make it the vehicle of the meaning of the image. Thus, complexes of meaning are developed, in which one element gives meaning to another, and in turn, it gains its meaning from the other: the space reconstructed by scanning is the space of mutual meaning. This space-time of the image is nothing other than a world of magic, a world in which everything is repeated and everything participates in a meaningful context. A world like this is structurally different from historical linearity, in which nothing is repeated and in which everything has a cause and everything will have its consequences … The meaning of

images is magical" (Flusser 1990; 8-9). Of course, reading a written text follows different methods: instead of "magical circularity", it enforces a "historical linearity" while unraveling the text.

The complexity of "reading" images is on the one hand the complexity of the images themselves; on the other, it is created as a consequence of the considerable interpretative freedom of the scanning person.[21]Compared to an image, the structure and interpretation method of a written text is considerably simpler and more fixed. Images are semantically dense (even a tiny change has a significance) and relatively complete (they have many symbolic, that is, meaningful elements) (Horányi 1999). Writing can record spoken words, but images do not represent speech but established relationships, facts and states of affairs. In this way, images are "closer" to reality that writing is. We can imagine the communicative relationship between speech, writing and images most simply in the following way, created in a simplified materialist approach:

Object ---- image ---- written text ---- speech ---- concept

The structure of the scheme follows the levels of *abstraction* of the representation of reality. (Of course, the historical development of human representation did not follow the same way). Each representation of an "object" is capable of referring to an "object", insofar as we take into account the rules of construction and interpretation corresponding to the representation. Human freedom is present both in construction and interpretation, though its form and degree may be different in the case of individual representations. The *image* as the sensually greatly rich and least abstract representation of the object (though it is still abstract, since for example it functions in a space with fewer dimensions) necessarily still reminds us of the object. Of course, this "similarity" can be voluntary or voluntarily utilized, or only a sign of something, but it is necessarily present, if not in anything else, in the process of perception itself, since the process of perception obviously shows several similarities between the perception of objects and their images. Naturally, an image can refer to things, relationships, and states of affairs significantly, or even completely differently from what is represented, since "almost anything can be accomplished" with an appropriate representation, but the rules of its construction and perception still keep a direct contact with the represented "object", and interpretation has to take this connection into account as well. We can also express this relation by saying that an image is the *analog* representation of reality (Sartre 1997). (To avoid misconception, this is also true in case of digitally recorded images, since we talk about the relationship between reality and images, and not about the relationship between images and technological images). *Writing* represents reality with reduced signs and in a form reduced to an extent (for example further decreasing the dimension of spatial representation) which does not preserve any similarity with the represented object, so written texts connect to the represented "object" only with the help of interpretation. Even so, writing represents states of affairs in a sensory way, what is more, as we mentioned earlier, as a consequence of its spatiality it also has some image features. But since it does not use the features of the represented "object" for its representation but utilizes its own set of signs, writing is not an analog but a *digitalized* way of representing reality. Speech – except from very exceptional cases – is not reminiscent of the represented "object" at all. Not only the usage of the features of the "object" disappears and in this sense, representation becomes digital, but the spatial dimension of the representation disappears as well. We can also characterize the abstraction level of speech by pointing out that we renounce the use of yet another dimension of (four dimensional) space-time and we only stick to time while using representational signs. *Conceptual* representation, as the most abstract available level of representation takes abstraction to a level where it not only sets aside the features of the "object", but even its relations to other entities which make the interpretation of the space-time of the object possible. Thus, the concept of an object can become completely disconnected from the "object"; interpretation achieves complete freedom, it becomes free to an extent that instead of representing the object, it can even be aimed at the "object" itself, and the concept of the object can replace the object, as we can observe in Plato's philosophy. The gradual reduction of dimension places yet other burdens on interpretation, on the other hand it also provides it with opportunities. The interpretation of images, written texts, and spoken words represent various versions of hermeneutics. In turn, the interpretative practice of conceptual representation is thinking itself.

If we summarize the scheme above starting from the other end – say, in a simplified[22] phenomenological manner – and we take a look at the road "reaching back" from the concepts to "things" (of course, this does not correspond

[21]It is notable that the complexity of the images and the eye movement which scans them can *both* be characterized with fractal dimension, the number used to measure complexity. Fractal dimension measures the structural complexity of an examined object [Fokasz 1999]. Its application is fruitful even in case of artistic images [Nyikos – Balázs – Schiller 1997]. The movements of the eye, scanning the image, can be represented with a suitable technology, and in this way, the trajection of the movement can be analyzed.

[22]In this description we try to follow the "simplified" versions of the materialistic approach and phenomenology because we have a double aim. On the one hand, we would like to write in a plain and concise manner; on the other we would also like to satisfy certain needs of the readers who are versed in the philosophical literature. Flusser's works quoted earlier suggest that this double aim – at least in his case – can

to the course of historical development), we get to a further characterization of the relationship between writing and images. In this approach, speech, writing, and images are mental representations of concepts the materialized versions of which can be conjectured as well. While revealing the structure of mental representation, it is showed that *speech* is a representation so close to conceptual thinking that thought could even be regarded as internal speech; furthermore, our concepts and words mutually correspond to each other. We can usually identify thoughts with spoken words; in fact, this is what makes lies possible. Descriptive mental representation distances us somewhat from "concepts", though, since a description cannot refer to itself, but only to something else, thus in descriptions and in their materialized versions, the *written texts*, intentionality clearly takes shape. During the process, writing and the contents of writing becomes clearly distinguishable. Writing becomes an independent mental representation. The discrepancy between the mental representations developed with the help of mental *images* and the "concepts" is so great that we would try to formulate (!) or describe them in vain; on the other hand, we can contemplate them. Even so, mental images are not purely visual in nature but employ all the senses (Mitchell 1997) and as a consequence of the peculiar functioning of their intentionality, they become full in a sensory sense. Mental images and their materialized versions "become disconnected from the concepts" and acquire "their own life". They do not gain their meaning in connection with the concepts but through their own usage, and in this way, they require an independent interpretation (Lehmann 2000b; Nyíri 2000). We can find the "*objectified*" versions of representation in the withdrawal from the "concept", in which intentionality strives for creating a fully fledged "reality", and in this way, it gets disconnected from the "concept". Liberated intentionality can even be directed at the concept itself instead of the object and with a peculiar "phenomenological reduction" we can end up in Plato's empire again. In the case of speech, writing, and images we can encounter different versions of intentionality; and the intentional practice connected to the "object" is agency itself.

The following simple relation obviously seems to be true of the framework of the relationships between communication media: as the similarity between the object and its representation seems to diminish, as well as the number of its dimensions, the role of interpretation increases. Furthermore, as the concurrence of a concept and its representation diminishes, the role of intentionality increases. We do not regard the presentation of the more complicated relations between the media and reality as our goal (Foucault 2000; Dennett 1998; Bacsó 1997; Séra – Kovács – Komlósi 1994; Woodrow 2002).

We have been characterizing images, writing, and speech as different types of representing reality and concepts. It is our experience and it does not contradict the above that all three types of communication media can be made to represent our world fully. These representations are equally possible but they are not of equal value, and in the historical development of communication we can observe a rivalry between the types of communication based on images, speech, and writing. For example, in certain religious systems they favor the marked use of images, in others they favor the prohibition of images and the prevailing of written texts. According to Flusser, the switch to linear writing also made a (temporary) liberation from the magic rule of images possible, and the spreading of writing in Antiquity also helped the replacement of the magic state of the world with a historical process. Nevertheless, in the historical development of communication not only did the differences and the rivalry between the different media play a role, but similarities and cooperation as well. The interpretation of the differences and similarities between the media and their cooperation requires further analysis. At first sight, it seems to be obvious that speech, writing and images often display opposing features. Bearing these in mind, we can try to understand both the *complexity of the media* and the process of their *historical development* with the help of a dialectics that describes the coexistence of the opposites. Based on the earlier discussion of speech and writing, we will chiefly try to characterize images further, and we would like to show that images combine several defining features of speech and writing.

Speech is always tied to a concrete communication situation, but writing intermediates between several situations, and is consequently a form of communication liberated from the concrete communication situation. The production and interpretation of images participating in communication can also be partly situation dependent (as a typical example, think of the communicative play of features or the pictograms of traffic signs) and at the same time, similarly to writing, it is situation independent as well (typically for example in the case of artistic images). However, in reality neither of the features characterizes images effectively enough. In the case of images, it would perhaps be better to talk about *situation creation*, in which dependence and independence equally appear. The situation creating power of images is effective on the one hand as regards the details of the images presented, since the image itself only comes into existence through their mutual reference to each other in the process of creating the image. Individual elements of the image are both independent and interconnected in this process. They continuously

be realized. For those interested in the details of the phenomenological approach, we recommend the issue of *Athenaeum* published in 1993 (I/4) as well as a collection [Bacsó 1997].

constitute the situation of the other elements, and they naturally contribute to their existence and interpretation. On the other hand, the situation creating power of the image is effective in the relationship between the image and its viewer as well. An image can only function as an image if someone looks at it as an image, but the existence of the image can trigger the viewing of the image, that is, it has an active power to create a situation; it "catches one's attention", it "involves one" in the situation and in effect it creates its own viewer. Though the role of the viewer can be active (he can "see an image into" natural formations: for example, according to Borges the Chinese saw a lunar rabbit in the lines of the moon), but in such cases it is not only the viewer who is active, but also the image itself. Writing cannot easily create its reader; lengthy studies and serious effort are required for this, not to mention speech.

Speech is tied to the moment; writing is a fixed "eternal" formation. Images *record one moment* and make it eternal. Writing can be recorded speech; an image can be a description condensed in one moment. Reading makes written texts spoken words again; a description unraveling in a text about an image spreads the image in space and time, more precisely, in one dimensional space.

Speech displays a considerably complicated, disjointed, digressive structure interspersed with repetitions, but writing is a simple, linearly ordered structure. Flusser says that images have a circular structure which we can know from the way we map them, since in this process, our eyes perform quite complicated, disjointed, digressive movements interspersed with repetitions. In this way, the structure of an image is similar to that of speech,[23] but their stability is different, since while images have a specifically stable structure, speech does not have one. Their stable, orderly nature makes them similar to that of writing. Thus, the structure of images equally contains the features of the structure of speech and writing and it can be identified as a separate unit: as an *image structure*. Both speech and writing have their elements, but they do not have clearly separable levels, while images have both their elements and levels built on each other. It is easy for us to imagine and reproduce the picture of the picture of an image, but in the case of speech and writing, we would face serious problems with a similar task.

Speech is *original* in all its forms; writing is always a *copy* of the spoken word, other writings, thoughts, an image, or it can even be the copy of a whole worldview. (This is why it is impossible to examine the question of originality in orality, and it is possible to do so in literacy, since if all versions are original, non-originality makes no sense. On the other hand, a copy is always the copy of an original.) Images are both original and not original. It would be difficult to question the originality, the single and unique nature of an image,[24] at the same time it is obviously always the *image of something*, thus it is evidently not identical with what it is a copy of, but it is its copy or image. Therefore images are – as a consequence of their image nature – original and copies at the same time. But can the original be identical with the copy? Can something be an image of itsself? Yes, it is possible. What is more, all images are in fact of this sort. Each image can be understood by saying that its identity with itsself consists of an infinite number of copies of itsself.[25] In an ontological manner, we can also express this by saying that images have an *independent identity*. Images are such "*final elements*" of existence, which exist in a self-closed way – they are similar to Leibniz's monads. Because of this, images seem to be "semantically dense", or putting it simply, infinitely rich objects. As a result of their ontological exceptionality, they can be appropriate tools of for example the image theory of thought (Nyíri 2000), or other types of efforts to create a worldview. They also have a defining role in shaping the nature of the Internet. Later we will argue that the whole of the Internet itself can be regarded as an image.

As Flusser claims: the meaning of images is magical, that is, the space of mutual meanings is built through the construction of complexes of meaning, from which no details can slip aside, and to which each detail contributes. Meaning partly belongs to the image, but partly does not; rather, it is the interpretation of the person studying the image. Thus, differently from speech and writing, the interpretation of images is always unique, and there is scope for unique interpretations.

To sum up, we can point out that *images unify* the often opposing *features* of *speech and writing*, and they are able to represent them as separate units. We can think of an image in these relationships as a communicative medium that inherently contains speech and writing or which transcends them in a development process. The realization of these two possibilities is the *historical process* of creating and interpreting *images*. It seems to be unquestionable

[23]The structural similarities of speech and writing are discussed in a very interesting manner by [Boehm 1993], who finds a texture of borderlines in both of the media.
[24]While examining the identity of images, Imdahl registers the question of the irreplaceable nature of images and the changes of the self-understanding of the person (connected to the directly appearing look of the image) viewing the image.
[25]This feature of images appears in holography in a material form.

that images were used for representational purposes well before the appearance of writing. What is more, taking into account the cognitive significance of mental images, the communicative role of the human play of features and movements, or even preserved ancient cave paintings, our impression might be that the use of images is of the same age as mankind. Through a hermeneutical analysis of images, Boehm reaches the conclusion that "mankind is *earlier* in origin than the sign and the signified, the internal and the external, sense and concept as well as the metaphysical distinction between form and content" (Boehm 1993, 92), and that in reality, the image "reaches back to *before* metaphysical conceptuality" (Boehm 1993, 94). *Existence and the phenomenon* are inseparable in images; the permanent transition of these is "what turns everything which 'exists' in the image into a phenomenon … Images are neither things nor sentences in a linguistic sense or a word – rather, they can be regarded as representational processes, in which the circumstances of existence always appear as phenomena …we are dealing with a specific representation of existence but, in contrast to 'there is' statements, it is not organized in a linguistic manner" (Boehm 1993, 93). In contrast, language "can separate and connect the existence of the subject and the predicative aspect" (Boehm 1993; 92), in this way, language can speak, but an image "represents a mute or reticent language, but not because it cannot find the words, but because the perfection of its logic lies in it" (Boehm 1993; 98). Besides these ontological differences, images and language display a certain structural similarity, thus for example both are divided into parts by special "borderlines" (breaks, empty spaces, the meeting of surfaces). This similarity helps in the interpretation of images, since though images themselves do not speak, we can "make them speak" in an interpretative process.[26]

Thus, it seems to be a reasonable possibility to talk about the communicative usage of images since the ancient times (Lester 1996). Without examining in detail why and how language use joined image use, we can perhaps risk the statement that this is a process that can possibly be connected with the magical nature of images, stressed by Flusser. This is because the ontology of the magical worldview is very similar to the ontology of images. In the case of images, the inseparability of existence and appearance is the basic ontological structure of images; the "permanent transition" between existence and appearance turns everything that exists in the image into an appearance. In the case of the magical worldview the inseparability of possible and actual reality is the ontological basis of the worldview; the "permanent transition" between possible and actual reality recognizes everything that exists in the magical worldview as real. In both processes the difference between possibilities and (visible and obvious) reality seems to disappear,[27] that is, reality and virtuality melt into each other. Images represent reality in an analog way. Perhaps we could also say that images are the typical communication medium of magical consciousness. However, it would be more precise to say something different: images are the typical *pre-communication* medium of magical consciousness. The reason why we could talk about pre-communication is that for the people of the magical age, the development of communities did not mean the same task as in later stages of communication. The world which appears in magical thinking is differentiated only to a very limited extent, so there is hardly a need or a possibility for the people of the magical age to create communities through sharing consciousness. Rather, communities are given in a natural way; individuals cannot, or hardly can, differentiate themselves from the community. The solid separation of possible and actual reality is naturally connected to the differentiation of the community and to the differentiability of individuals inside the community. The pattern and course of the two processes of differentiation (of the world surrounding mankind and of the community) reminds us of the processes of the early development of babies. In this environment the communicative function of images that have an ontological structure similar to that of the magical world probably is not so much the development of communities, but rather the representation of the *existence* of the community. Mental images probably have similar functions in the regulation of animal behavior, for example in the animals' recognition of their fellow creatures, their enemy, their prey, etc. The magical worldview can be regarded as the result of projecting mental images on the "external world". With the creation of material images we can also record these images.

Images – in accordance with the needs of magical thinking – are excellent devices of "statements", but they do not have, or hardly have, the means of expressing "criticism". Ancient image use rather represents than conceals. However, man, confronting the defects of the magical worldview, necessarily strived for "critically" examining, separating and reconnecting the relationships between existence and appearance, necessary and contingent, real and possible. Nevertheless, the appropriate communication medium of this activity is no longer the image, but language, in which, as Boehm says, the existence of the subject and the predicative aspect can be separated and connected. Its ontological structure – different from that of images – is what makes it able to do this: in language use, the real thing and the linguistic sign referring to it are clearly distinguishable. The transition between reality and the linguistic representation of reality is not continuous and perpetual. In a sense, spoken and written language

[26]For example in the way Foucault does with Velazquez's painting.
[27]In Heidegger's terminology, perhaps we could say "appear" instead of "disappear" (!).

depicts reality in a digital sense. As a consequence,[28] it seems to be reasonable to presuppose a joint presence of the communication media of images and speech in human prehistory in which the "use" of (initially mostly mental) images dominates and speech is only the symptom of the "fragmentation" and "imperfection" of images. (According to this view, speech at the time can be regarded as fragmented and imperfect image use.) The domination of image use is in accordance with the needs of the magical age, since the communities of the magical age are mostly naturally given and they only slowly develop into the differentiating communities of myths, so human communication itself is taking place in a naturally given way. As a result of this circumstance, perhaps it is more precise to talk about pre-communication, and to signify the (gradually developing) domination of language use as the proper beginning of communication.

The development of true communication, together with the change in the "domination system" of communication, that is, with the domination of language use over image use, probably took place simultaneously with the *switch* from the magical worldview to *the mythological worldview*. This is because the worldview of myths is different from the magical worldview insofar as it contains, as *units separated* from the worldview as a whole, such closely interconnected elements (e.g. technological knowledge), the reality of which (by everyday practice) verifiably transcends the reality of the other elements of the worldview. The fragmentation of the world into different parts also goes together with the dissolution of the naturally given communities, and the conscious recognition of this and the need for the voluntary reconstruction of communities necessarily leads to the active, community creating application of communication. This need can be satisfied well with the help of language use. The usage and improvement of their language may have meant an important dimension of the identity of communities. Of course, image use (and the limited validity of the magical worldview) remains important, but the social role and significance of the communication that can be performed with the help of it changes as a result of the emphasis on linguistic communication. In the process of the rise of language, the questions of the relationship between linguistic and image communication, their interconnectedness and confrontation, are obviously continuously at issue. (This process is somewhat reminiscent of the process of the separation of philosophy and the sciences and their later cooperation.)

We have tried to draw attention to the common features of images, speech, and writing above. We can explain the existence of these by identifying both speech and writing as communication media that developed from image use. Satisfying the expectations of primitive societies, the use of the pre-communicative medium (images) became differentiated, and the "fragmentation" and "imperfection" of images led to the appearance of speech, more precisely, speech itself is fragmented and imperfect image use. But images include the possibility of speech and writing as well. A long time after speech, writing, as another independent communication medium is "separated" from the image. In the process of the development of writing we can observe a peculiar way of functioning of image use, but the need and possibility of recording speech obviously also greatly contributed to its development. Thus, the "invention" of writing resulted in a type of "image recording" technology: the technology of recording fragmented and imperfect images. It did so in two senses: on the one hand, because of the nature of the products provided by speech, on the other, because of the method of writing, since writing, created from abstract symbolic imagery and "fragmented" into a linear order led to the same effect. At the same time, written texts still retained their communicative advantage of spoken language over image representation and they contributed to the spreading of linguistic forms of communication with further factors (e.g. stability, context independence, etc.). In circumstances of literacy, the expression and cultivation of the differentiation and complexity of worldviews and communities becomes possible. The differentiation that develops in the mythical age is recorded through writing and conceptual thought. The separation of philosophy from myths, thought with a scientific ambition and later the development and persistence of scientific disciplines is unimaginable without the use of writing. It is obvious that writing is the determining communication medium of the ages that rely on a scientific worldview. Of course, the role of images does not cease to exist with this development. They fulfill a role similar to the earlier: they serve the unified, complex representation of the world, as well as of different kinds of entities, which can stand on its own. The postmodern approach suggests a radical change concerning the usage of communicative media. Refusing the dominance of linear writing, as a result of the experience of "every whole is fractured"[29], facing the tasks of developing a new worldview and building a new type of community, they start to favor the communicative use of images. Many have diagnosed the contemporary medium switch and they have interpreted it in many ways. For example, it became a popular topic to talk about the end of the Gutenberg Galaxy (McLuhan 2000; Eco 1996). Ong talks about secondary orality

[28]Perhaps it is not redundant to stress repeatedly that our train of thought is not based on research concerning prehistory but on philosophical analysis revealing the nature of images, speech, and writing. It is imaginable for example that somebody finds the concepts of magic and myth that we use unusual. We are prepared for this possibility and we recommend accepting the concepts of magic and myth we use as a definition of these concepts.

[29]ote of the translator: citation of a poem by Endre Ady

that developed as a result of the telephone, the radio and other electronic technologies, but in reality, the communicative effects of the television (McLuhan 1976) and the Internet support a shift toward images. The communicative usage of images fits well into the postmodern system of values, since the most important postmodern values (plurality, virtuality, and individuality) are realized through using images. But the images used by the postmodern age are not merely mental images but various technological images. Writing made the recording of fragmented and imperfect images possible; however, the images recorded by technological devices come close to the perfection of mental images. Thus, we can imagine the "abridged history" of communication media as an evolutionary process leading from the pre-communicative mental *images* to the technological *images* of our days.

We have tried to summarize graphically the changes in the communicative role of images, speech, and writing in table 5.

COMMUNICATON MEDIUM VS. WORLDVIEW	IMAGES	SPEECH	WRITING
MAGICAL	typical	*present*	*not present*
MYTHOLOGICAL	*present*	typical	*present*
SCIENTIFIC /PHILOSOPHICAL	*present*	*present*	typical
POSTMODERN	typical	*present*	*present*

Table 5. The presence of communication media in the ages of cultural history

The *history* of *pictures* leading from mental images to technological images is interesting and important in itself, without any reflection about speech and writing. It seems to be evident that we can only examine the part of the history which takes place in the material sphere. Remaining prehistoric drawings, as well as the decoration that can be found on practical and ritual objects, give evidence of the contemporary significance of manufacturing and using images. At first, materialized images were artworks produced (or reproduced) by hand or supported by handicraft technologies. The technological situation and the tools of manufacturing images separated from the technologies of writing and speech in a quite long (and mostly unexplored) process. The problem which was the most difficult to solve probably proved to be the appropriate representation of three dimensional relations. In antiquity, the favoring of sculptures could be some kind of solution (insofar as we consider them as three dimensional surfaces) but we had to wait until the 15th century for the actual solution of the problem, the discovery of the rules of perspective. The application of perspective made the interpretation of images easier, and as a result it contributed to the change of the "themes" of images. It created new possibilities for the makers of images which could perhaps be characterized best with the help of the metaphor of "the open window". (The difficulties in interpreting works of art from the middle ages, lacking in perspective, were not primarily due to the lack of perspective, but the result of the often abstract content of the paintings. Typical paintings of the era – for example icons – did not venture to immortalize the events or states of affairs of the visible world, but carried an allegoric content, and they represented abstract conceptual relationships which could have only been revealed by an advanced level of interpretation. Nevertheless, with the use of perspective, interpretation practices could get closer to the "way of looking at things" of everyday people and – both in a technological and thematic sense – resulted in paintings which were accessible for many.)

It is notable that not only are the study and the structure of the images complicated but so are the rules and regularities of their creation. Besides the geometrical problems raised by image representation, the examination of numerous further *scientific and technological questions* is connected to the task of creating images. The research which reveals the structure of the eyes, explains sight and the spreading of light, as well as the production of various optical devices and their usage in the production of images, has a thousand year long history. Besides mirrors, lenses and their appropriate combinations, the study of the photo production of the darkroom (Ihde 2000) played an important role in the clarification of the theoretical and practical problems of modern picture production methods. (The examination of the properties of sound and especially the examination of the regularities of their production followed an entirely different road, and until the 18th century it concentrated practically only on musical pitches.)

According to Flusser, there is a significant difference between images produced "by hand" and *technological images*. The technological, that is, mechanical, optical, and electronic devices used for producing technological images, as well as the mechanical, chemical and electronic methods used for their recording, necessarily affect the produced image. In this respect technology is not value neutral, though its contribution to the pictures is usually hidden and

has to be revealed separately. Flusser thinks that if traditional images are appearances, than technological images are conceptual by nature. With this claim he draws our attention to the fact that selecting among the natural circumstances of a phenomenon (e.g. being sensitive to light of a certain wavelength), technological devices create their reinterpreted, abstract image, despite the fact that they seem to be "realistic" and "objective" representations. The objectivity of technological images is an illusion which is often difficult to get rid of. Postmodern deconstruction might help us in this striving occasionally.

Classical versions of technological images, engravings and photos make the advantages of technological images obvious: they can be *reproduced* and spread easily in large numbers. The printing of engravings is old; it even precedes book printing a little (Ivins 2001], but most of the printed books feature illustrations of this kind from the beginning. Photographing makes not only the viewing but the creation of images easy to such an extent that it became available for the masses. In the communication of printed and electronic press, photos became participants which are at least equal to speech and writing. The torrent of photos – in accordance with the general nature of images – programmed society to a magical behavior.

Though as we pointed out above every picture is an analog way of representing reality, from a technological point of view it is worth differentiating between *analog* and *digital* image recording and handling methods (Lehmann 2000a). Digital methods – similarly to other digital technologies – make the changes of the "original" images easy, impossible to follow and unnoticeable, and as a consequence, the usage of the concept of originality practically loses its meaning. In this way, digital technology significantly increases the freedom and responsibility of the creator of an image both in a technological and in a thematic respect, and it fully deprives the viewer of the image from the illusion of the objectivity of images. The possibility of manipulating images foreshadows the end of reporter photography, since the question arises why we should accept a digital photo as an authentic and valuable document.[30]

The masters of motion pictures have to face a special version of editing images. From the numerous theoretical and practical problems of producing *films* and their mode of existence – following Andrei Tarkovsky – we stress that the emphasis is on how to handle time. That is, films, striving for representing reality, use the dimension of time, besides two dimensional representation.

"*Hypertext*" is a peculiar transitional form between written text and images. These texts are not linearly ordered but display a complicated structure that follows the intentions of their writers (Kaplan 1995; Bardini 1997). Their simpler versions are image poems known from literature and the citation systems of scientific texts.[31] The typical organizational method of "hypertexts" consists of a system of references – to separate or non-contiguous parts of the text – placed into the text. Though the system of references represents the intentions of the author, the intentions of the reader/viewer also play a role in the exploration of the structure. Depending on the reading/wandering route, the text acquires many meanings intentionally or contingently. Different readers, or the same reader on different occasions, follow a different reading order; skipping, leaps, and recurrences might naturally occur in the process, in the same way as the scanning sight explores an image. Similarly to images, the structure of the hypertext can be characterized with the concept of "magical circularity". Thus, as regards their structure, hypertexts are images, as regards their content they are texts. They are written text images. They are images that represent their object with very abstract symbols, and they are texts which are developed in a very complex way. Hypertexts are neither one dimensional nor two dimensional surfaces, but are usually broken dimensional fractals between the two values. The number of their dimensions depends on the structure of the abstract geometrical object that stretches their structure, and it can be precisely characterized by the dimension of the fractal. Hypertexts satisfy Flusser's criterion of images: they are meaningful (broken dimensional) surfaces.

It is stories that can be told with the help of a hypertext (Murray 1997), rhetoric that can be followed (Haase 2002; Blakesley 2000), works of art that can be "created" (Beehive; trace Online; Electronic Literature) which mostly preoccupy artist or cyberneticists who have artistic aims. There are also ambitions to expand the hypertext into something called "hypermedia" or "cybertext". "Hypermedia" utilizes other media instead of, or alongside, texts in a similar structure. Usually, a similar strategy is followed while developing computer games. The so-called ergodic literature, studied as "cybertext" by Aarseth (Eskelinen 2001; Hayles 1999) transcends the possibilities of "hypertext", chiefly inasmuch as it suggests the use of several methods of cybernetics (the active pasting of texts, feedbacks, non-linear interactions between parts of the text etc.) for producing textual structures. Such endeavors

[30]The Science and Technology column of BBC News draws our attention to this danger referring to the opinion of practicing photographers: Digital photos 'endanger past'. http://news.bbc.co.uk/hi/english/sci/tech/newsid_1620000/1620067.stm (2001 November 1)
[31]Péter Esterházy even experimented with combining methods of literature and science in his book *A Production Novel* (*Termelési regény*).

(as is suggested by for example the term "ergodic") experiment with various combinations of the approaches of *art and science*.

Usually, analyses which follow a postmodern approach have the greatest chance for understanding "hypertext" works. Such analyses are available for interested readers on the Internet in an infinite variety (Alan Liu's Voice of the Shuttle; nettime mailing list; etheory.net; Electronic Literature; Crossings; fineArt forum; www.theory.org.uk; popcultures.com).

Websites, the most characteristic structures of the Internet, have a "hypertext", "hypermedia" or "cybertext" nature themselves. Recall that the language of website design is called "Hyper Text Markup Language" (abbreviated, "html") and it was invented for this very purpose: we can connect certain parts of a website and different websites to a create something with a complicated structure. The link structure of a website corresponds to a "hypertext" structure. Several interconnected websites and the worldwide system of websites populating the Internet can also be described with the same structure. *Websites, and the systems of websites extended in any measure can be regarded as images* as well. These images are also surfaces with a meaning; information spreads over the whole surface; the dimension of the surface can be precisely determined in case of a known structure, and can be measured with the abstract geometrical object of the link structure, the fractal dimension of the fractal of the links. Fractal dimension is the exact measure of the structural complexity of a structure.

And finally, perhaps it is not irrelevant to point out also that naturally, images do not only have communicative functions. Somewhat similarly to speech acts, we can study their active (Mitchell 1994), as well as their representational and other functions.

3.2.4 Private sphere, public sphere and mass communication

Many types of communities can be developed with the help of communication. The features of the desired communities can be determined well through the adequate shaping of communication situations. Numerous factors participate in the shaping of communicative situations: natural conditions, technological endowment, the available media, the abilities, knowledge and intentions of the participants of the situation, the preliminary expectations toward the community to be developed, and so on. The *organizing force*, which unites the various factors can be mainly naturally given (as for example in the community of parents and children), but it can be the result of the situation creating activity of man (as in the case of creating friendships or political communities). How the forces that shape the situation are distributed might also have a decisive significance: do the participants of the situation *control* the situation, or are they subjected to the circumstances that unconditionally operate in the situation? In other words: are the people who participate in the situation forced to communicate in a given way or can they influence or shape the characteristics of the communication with their own decisions and thereby the features of the community that can be created? Usually, the parties participating in a communication cannot directly influence their own position, since the situations are given for them. Communication "engineers", the experts of communication technology (clerics, politicians, priests, certain artists, journalists, intellectuals, etc.) know how to build up and operate situations, and this social mission is mostly theirs. Of course, the activity of communication engineers does not take place in a vacuum; historically given social pressures also operate in the choice of their methods. Thus, the forces which shape communication situations work on the basis of interests and values built on naturally given factors. The applied system of interests and values (in other words: an ideology) necessarily operates in the situation, including the physical and mental activities of the parties participating in the situation. (Think for example of the value laden nature of the situations that secure the regular functioning of political institutions, production processes, artistic styles, scientific paradigms, or religious ceremonies.) Consequently, the development of situations always has *moral and political* dimensions as well. Insofar as we do not regard communication or any versions of it value neutral (our experiences with technological images can for example provide a strong motivation for this), the situation is even more value laden, and it acquires an opaque quality.

Thus, the political and moral questions connected to communication are not new at all, since they are "built into" the communication situation. Communication situations are clearly separable units of society in which the relations of the whole society are reflected.[32] For example, they often take away, reinterpret or fix the political rights of the

[32]At this point, we would like to point out that we are consistently trying to differentiate between *community* and *society.* According to the view discussed above, we create communities through communication, while society is a system of communities in which factors other than communities (e.g. culture) can be found as well. Thus, when we talk about the social values that determine the organization of communicative

participants of the communication (e.g. they prescribe which party can say, show, watch, read what and how, they make continuous participation possible for individual parties or they exclude them from certain phases of communication as well as from certain spheres of the publicity that shape public opinion, they can use secret codes, etc.). The most important question is probably how they *regulate* the exercise of such rights in a given society. Of course, general political rights appear in a specific (concrete and particular) form in communication situations.

From the point of view of the control of the participants over a communication situation the following levels can be differentiated in the modern age:

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The personal - private sphere - publicity - masses
|- the extension of personal issues -|
                    |- the extension of public affairs -|
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We can consider a situation personal if the control of the communicating person is full fledged. Its diametric opposite is the situation of masses, where personal control is completely lacking. (In such cases control over the situation is exercised by a general social or public institution.) In situations of the private sphere and the public we can observe different levels of control. Among other things, this is why the relationship between the private sphere and the public is often problematic, since the level of a certain type of control can be evaluated and interpreted in different ways. A situation of the public sphere constructs the individual who belongs to the given community, and a situation of the public constructs the community which is made up of individuals. At the same time, the borderline (sharp to any degree) between the private sphere and publicity also makes the necessity of their togetherness obvious. The personal and the private sphere is not only different as regards the level of control, but the situation of the private sphere is also larger "in extension" than a personal situation, and it also includes public issues. The case is similar in the relationship of the public and the masses: a situation of the public contains personal issues as well, but a mass situation does not. We can see that the extension of personal issues coincides with the sphere of the total control over personal situations, and the extension of public issues coincides with the sphere of the unattainability of total control over the situation. This is a quite natural connection, since on the one hand it refers to the area of individual activity, on the other, to the sphere of the necessary cooperation with other individuals. Private opinion is public opinion represented by an individual, and public opinion is the totality of private opinions – and both are the result of communicative acts. The control that can be reached in any situation is complemented by responsibility, whether we talk about the individuals who participate in the communication or the institutions that represent public issues. Occasionally, moral discussions can help in solving practical problems connected to the personal, the private sphere and the public; mostly political and legal trains of thought help us figure out matters of the masses, the public and the private.

We get a different division of the "communication field" created by communication situations if on the one hand we consider the "the themes" of communication as aspects of the classification (on the basis of this, we can talk about private and public issues), on the other, if we also differentiate between the public and non-public accessibility of "communicative acts" (Heller 2001). In this case, the following might be the possible spheres of the "communication field": public communication about private issues, public communication about public issues, non-public communication about private issues and non-public communication about public issues. We can see that this classification corresponds to what we said above, though a more thorough analysis might reveal nontrivial disharmonies.

It is also worth mentioning a few further problematic issues besides the classification of communication situations: the historical changes of the relationship between the private sphere and the public and the problems generated by the usage of the new information technologies, which has become obvious by now, thus for example the question of the ownership of the communicated data and content.

Habermas's classic work (Habermas 1999) provides an extensive presentation of the historical development of the public which creates public opinion (and the private sphere necessarily connected to it), especially about the peculiarities of modern civic development and the structure of civic publicity. Here we only point out from this complex question that in its initial stage, civic publicity did not develop in a political dimension but rather in the dimension of literature and culture, and the political dimension became decisive only gradually (for example, in England at the beginning of the 18th century). Perhaps we might also say that the development of the literary "communities" preceded the development of the political "communities", but of course, what happens in both cases is that various

situations, we ascribe a different level of existence to the „force that organizes society" and to the „product" of the situation. We will deal with the characterization of the relationships of communities and society later on in detail.

systems of value (made aware of in various measures) "settle on" the community building based on various communication technologies and shape the characteristics of each specific social group. The technologies that played an important role in the initial development of civic publicity are extensive reading and the communicative environment that made it possible, the radical advance of printing, the proliferation of newspapers, the circulation of popular publications in great numbers, the creation of libraries, clubs, salons and associations.

We can also observe interesting processes in connection with *writing*. Writing lost some of its personal nature with the appearance of printed texts, but with the use of *handwriting* they were able to preserve a significant amount of individuality, mostly in the private sphere and in personal matters. Obviously, in situations of the public and the masses the use of printed text is the typical. At the same time, it is also notable in this respect that handwriting makes the authentication of texts or even their encryption possible. We can observe a peculiar turn with the appearance of *typing* (1880). Texts written with a typewriter – similarly to the processes that we can identify in the relationship of cameras and photos – on the one hand widen the accessibility of the "press" to a significant degree and thereby make printing somewhat more democratic, and on the other hand, since typed texts are technologically in between handwriting and printing and are usually created with the help of a personally operated technology, they are also able to express some kind of individuality. The appearance of *word processors* used on computers effectively meant a revolution. This is mostly because *virtual texts* created with the help of information technology devices can be shaped and changed easily without any trace, and their various versions transformed into a real medium equally seem to be complete, original, and authentic. As a result of digital technology, the originality and authenticity of texts (similarly to what we mentioned in connection with images) becomes questionable to a greater degree.[33] Technical devices which make the digitalization of handwriting possible realize a peculiar transformation between the personal and the impersonal.

Of course, the occasional transformation of information technologies does not only cause changes in the technology of writing, but it significantly shapes the whole context of publicity. We can more or less separate *two* successive *phases* in the reorganization of the modern sphere of communication. As a result of the *first* "structural change", the private sphere and the public "shows a tendency of interpenetration" (Habermas 1999); their differences become blurred, the whole sphere of communication displays the characteristics of the private sphere. It is not exactly the changes of communication technologies which are behind this change but the full realization of striving for power in modern society, which makes the subordination of the public sphere to private interests possible. This realignment of power also develops the communication situations that correspond to its aims. The spreading of *copyright* is also an evidence of the transformation of the power relations of communication situations (Scott 2001), as well as its widespread use, the growing importance of telecommunication devices (mostly the radio and the television) and in general the tendency of the unhindered enforcement of market relations in communication situations. The individual is transformed into the consumer of public opinion (and public resources), and communities are transformed into communities of consumption. The operation of *mass communication*, mostly built on telecommunication devices, goes with the development of the relationships between the masses and the private sphere, which results in the loss of the significance of the public sphere.

We can observe the revival of the public sphere in the *second* phase of the realignment of the sphere of communication, but publicity now reveals itself in a markedly pluralized form,[34] as *publicities* of various levels and various orientations (Heller 2001). This phase of the changes is actually the result of the changing communication technology (mostly the activities connected to the Internet). In contrast with the widely accepted view, according to which Internet use can lead to the dissolution of communities and extreme individualization, it seems that the creation of the Internet might lead to opposite processes, and the Internet might be the tool of developing various publicities. The web citizen who uses the Internet is usually not attached to a single publicity, but, plunging into communication situations, he radically multiplies his personal participation and at the same time he creates or builds various communities. Many studies analyze the role of the Internet in the creation and maintenance of various publicities (Poster 1995a; Dahlberg 2001; Baoill 2000; Manninen 2000; Lafayette 2001). One direction of the changes shows the revival of "*traditional*" economical, cultural and political publicities. Thus for example the possibility of "direct"

[33]A peculiar symptom of this problem is notably present in education as well. Because of the widely used practice of *plagiarism*, examination based on written papers has become practically impossible. According to an American survey, college students "purchase" or "procure" their papers occasionally in increasing numbers (in 2001 more than 70 percent) from electronic databases, the Internet or from acquaintances and friends.

[34]Publicity did have a certain type of plurality before. The criticism and the reflections that followed the publication of Habermas's book suggest so, which – in his foreword to a more recent edition of his book – Habermas himself appreciates.

democracy based on Internet use seems to be viable in many respects,[35] from orientation and administration of public affairs on the Internet, the direct and perpetual connection with the elected representatives, to direct voting on various issues (Democracies Online; Clift 1999; Clift 2002; PROceedings 2002; The Berkman Center; UNESCO Observatory; Pew Internet; Cybersoc; Virtual Society?). Another direction of the changes aims for the development of *new* versions of publicity. The many different types of online communities (Preece 2000) are invigorated by the operation of the various versions and levels of publicity, as can be seen for example in the case of chat channels, discussion lists, and news groups.

In spite of their different structures, which express their different aims, the communication situations of the new type of publicity share some common characteristics. The possibility of the *anonymity* or pseudonymity of the participants of communication is among their most important common characteristics (Wallace 1999; Nissenbaum 1999). The communicating parties can hide their real identity, they can virtually multiply themselves, they can program their presence or make it permanent,[36] and they can use similar tricks – and experience tells us that they do. All these radically extend the possibilities of the structuredness of the private sphere and the public, especially if we take into consideration the possibility of combining the traditional and the new, "online" and "offline" communication. The pursued and the pursuers can hide behind anonymity as well; political refugees, terrorists, agents, policemen, and the prophets of hate speech also readily resort to its help. The question of the possibility of "bugging" Internet activity and monitoring it continuously is often discussed among Internet users. Various news and bits of news spread occasionally about the special devices implanted at the Internet providers by the secret services, with the help of which for example all email traffic can be monitored and analyzed. For instance, it seems that the surveillance system, "Carnivore" developed in the United States serves this purpose, but we could also read about installing similar devices at Hungarian Internet providers. The issue appears to be somewhat enigmatic by nature, but there is no doubt that the laws of many countries permit the operation of this type of system. The case is probably different with the "Echelon" interception system operated by the English speaking countries, which performs surveillance with an even wider scope, and about the lawfulness of which opinions are more divergent. Nevertheless, it is good to know that it is not only the state authorities that observe the area of publicity. Surveillance aimed at gaining business advantage is frequent as well. The biggest part of the torrent of "spams" (most of which are unasked and unwanted) which fill our mailboxes are sent on the basis of such surveillance.

One of the significant differences between the traditional and the new type of publicity becomes clear in connection with the question of anonymity. The Internet users whose aim is to resurrect traditional publicity strive for the secure preservation of the personal and that we can use it safely when needed, the striving of the followers of the new type of publicity is on the other hand the impersonal, the secure preservation of anonymity and its safe (free of the danger of being caught) usage. Of course, in reality the aim of both camps is *the personal which can be controlled* by the person who participates in the communication, the controlled drawing of the boundaries of the personal and its operation, which can be reached through our own control over our own communication situations.

The need to control our own communication situations can be found in other Internet activities, as for example in creating and maintaining our own website, the actions of a movement popularizing free speech on the Internet, spreading tricks that help download texts, music, images, and films freely, preferring open-source software and in many other activities. We will discuss some of these later on.

3.2.5 The medium is the message

The medium of communication is an important element of the control over the communication situation. Even the expression "medium" suggests that this participant of the communication is usually a passive participant of the situation; it simply mediates the "message" in accordance with the intentions of the communicating parties, but it does not participate in its shaping with its own nature; it is not an independent participant in gaining control over the situation. This expectation is usually fulfilled, but it does not work this way without any reservation. While discussing the circumstances of orality and literacy, we mentioned that the *use* of speech and writing also goes with definite consequences as regards content, and in case of images we emphasized their "magical" power to

[35] What is more, their realization is rather advanced in certain countries, such as in Sweden for instance [D'Atri – Marturano – Rogerson – Bynum 1999]. We can read about several further aspirations and results on the websites of the yearly conferences of the *American Political Science Association*, for example at the address http://pro.harvard.edu/index.htm (2002 August 19).

[36] The need for the permanent presence in chat channels leads for example to the hacking of servers. In these cases the hacker who is hacking the computer aims to be present in a distant chat channel permanently through his program which runs unnoticed on the hacked computer. According to the accepted rules, permanent presence provides him with a favorable position in monitoring the processes taking place on the chat channel.

create situations. Thus, it seems that the medium occasionally plays a role in the operation of the communication situation: it contributes to the communicated content and to the consequences of communication. The possibility of the *activity of the medium* and the examination of its consequences is a favorite topic of the Toronto "school" of communication research. The most important representatives of this research community are the already mentioned Havelock, Ong, Goody, Carey and McLuhan (Stevenson 2001). Perhaps McLuhan's opinion is the most emphatic in connection with the question of the activity of the medium.

We can consider McLuhan's enigmatic thesis – the medium itself is the message – as a message itself; that is, let the thesis itself be the message. The reason why this solution seems to be attractive is that opinions about the content of the thesis and the significance of the content are quite diverse, but many theorists agree that that thesis itself is significant. Of course, the recognition and the appreciation of its significance is alternating: the idea which was published in 1964 (McLuhan 1964) induced many analyses until the 80s, then it was forgotten for a time, and then rediscovered in the mid 90s with the goal of interpreting the Internet, of course, together with McLuhan's prophetic achievement and function (Wolf 1996; Press 1995; Doherty 1995; Ebersole 1995). Here we recall two interpretations of the thesis "the medium itself is the message": (communication) technology determinism and the versions formulating the experience of alienation.

As we noted earlier (see table 4.) McLuhan's view of communication is *determinist*, which means that communication is autonomous (people cannot control its processes and changes) and value neutral (that is, it is neither good nor bad in itself). This view of his seems to be interconnected with his more general deterministic view about technology (Andrews 1999a; 1999b; Ebersole 1995). According to this, the relationship between man and technology can be described by saying that man functions as the "sexual organism" of the tools of (e.g. communication) technology, in a way similar to how he serves the transmission and the subsistence of his genes with his life. In this context, the thesis "the medium is the message" can be interpreted by saying that it is *not* the *content* of the communication which is of decisive significance in the process of communication, but the nature and way of functioning of the communication media, since it is these which determine the characteristics of human culture and communities. This view, defended by McLuhan, perfectly corresponds to the standpoint of the Toronto school of communication theory. Though while the work of Havelock, Ong and Goody were directed at the "technologies" of orality and literacy and their consequences, besides these topics (McLuhan 2001), McLuhan also tried to examine the actual communication developments (especially the significance of television and film, [McLuhan 1976] of the age (mid 20th century) in detail.[37] Thus, his point of view necessarily generalizes and rests on philosophical, rather than historical grounds, though it also makes use of arguments from the history of technology. Therefore, the media which can be identified as the message – aside from its content – seems to be some kind of "undefined human medium", a certain shaped medium, which is not human in reality and is not culture in reality, but virtually it is. The communication media is the sphere of pure virtuality and openness.

It leads to a further possible interpretation of McLuhan's thesis if we note that though the separation of the communication media and the content is true, this is not necessarily a happy consequence. Occasionally, some of McLuhan's formulations are put in this sense, and it is easy to understand his famous thesis in the following way: communication media might push their way forward at the expense of the content mediated by them, and in this way, the *medium* might *conceal* the carried *message*, and living its own life, it essentially mediates itself instead of the message: the content of a medium is just another medium (Varga 1999). McLuhan's media (radio, television, speech, writing, machines, electric lights, etc.) are created by man, but at the same time they are also the augmentations or extensions of human organs, and the domination of certain media over the others might be indicative of the disharmonic nature of man and the culture. The separation of the content of communication and the media is also man's separation from his own self, and after all, the man of the electric age is not any less homeless than his nomadic ancestors of the Stone Age. Perhaps we can also formulate this by saying that not only does man not control his communication situations, in reality he is "thrown" into them, at the mercy of the media created by himself and the functioning of the situations established by himself; in other words, he communicates in an *alienated way*. Communication does not serve man, rather, the other way round: man exists for the sake of communication, which can be clearly seen for example in the operation of mass communication. Of course, this is not a "purely" determinist approach any more, but rather, it seems to be a *substantivist* one. It seems that McLuhan vacillates between two kinds of views, and occasionally he contributes to both. Perhaps it is this interpretation which appears when occasionally they refer to Baudrillard, the illustrious defender of substantivism, as the contemporary McLuhan (occasionally he himself does so). However, in Baudrillard's approach to communication the postmodern concept of "obscene ecstasy" replaces the modern concept of alienation (Jacobson 1996), as a consequence of which human

[37]Ong's similar ambition is less emphatic and less successful. Though the concept of „second orality" suggested by him was capable of grasping a characteristic, it still does not seem to be effective enough, for example, precisely in the interpretation of watching television.

closeness and intimacy, which used to be regarded as attainable in communication, now become impossible once and for all. All in all, perhaps we could say that McLuhan's thesis: "the medium is the message" drew attention to the possibility that the media might become factors that determine communication situations. It formulates that this dominance of the media in late modern communication – though he leaves this question open to some extent – has effectively developed. McLuhan's diagnosis had probably contributed to the fact that a few decades later Baudrillard talked about all this as being evident.

The problem of the activity of media can be raised while presupposing completely different communication media and communication situations. The media of Habermas's "critical" approach to communication are *money* and *power* (Habermas 1985; Preglau 2000), so in this case communication situations are capable of representing real social relations. Understood this way, communication media have an important role in the development and operation of social subsystems (economy, state). The situation of the "medium is the message" is not unknown for Habermas's late modern capitalism either, which perhaps could mostly reveal itself in the processes of the colonization of the life world performed with various methods.

The activity of certain special communication media also plays a role in artistic activities (Beke 1997, 102-119). The artistic thinking through of the "medium is the message" type of possibilities is of a decisive importance in the development of individual *genres* and in finding their boundaries. It is easy to find similar phenomena in sciences, religions and politics as well; therefore it seems that McLuhan's thesis – if interpreted appropriately – proves to be valid with a considerable generality.

Almost immediately when the Internet came into existence, the relevance of McLuhan's views was recognized in the task of understanding the Internet. He already wrote in the *New York Times* in 1995 that if "the medium is the message, the message is the web". It was obvious to regard the Internet as the new medium of mass communication. Though the amazing possibilities of the new medium almost immediately became evident in the early developmental stages of the Internet, the content communicated through the Internet was far behind the possibilities, and this dissonance provided an obvious proof of McLuhan's thesis. What is more, further characteristic and popular thoughts of McLuhan could be used for the characterization of the Internet, thus, as a result of the communicative potential of the Internet we became the inhabitants of some kind of "*world village*", and the use of the electronic technology of the Internet ended the expansion of the *Gutenberg Galaxy* once and for all. In one word, the McLuhanian picture of the new communication medium slowly developed by the mid 90s. We would like to note here that by then, McLuhan had been dead for a long time, and according to the news, he died (in 1980) without ever using a computer or the web, thus the task of understanding the Internet awaited others. Such interpretations were made easier by McLuhan's peculiar style (for others, it actually made it more difficult). A striving for well sounding, concise, provocative and strong formulations belongs to the characteristics of "McLuhanism", which is of course more easily quoted than understood. "Academic circles" were always suspicious about the author because of his grandiose and, of course, occasionally unfounded generalizations, and because of the lack of scientific style in his arguments. Nevertheless, Castells, who recognized the social significance of the Internet early, relies on McLuhan's result in his monumental monograph about the development of web society and he calls him a "prophet" (sharing the admiration of others) (Castells 2006), though Castells' understanding of communication has a completely different direction (Varga 1999). We can also obviously take into account the consequences of the activity of communication media for the understanding of the Internet if we utilize the results of the representatives of the Toronto school other than McLuhan (Havelock, Ong, Carey). For example, Nyíri and his colleagues follow this way (Nyíri 1994; Nyíri – Szécsi 1998; Nyíri 2001a; 2001b; Institute of Philosophy of the Hungarian Academy of Sciences). The views about the active role of the media are an important *part* of the understanding of the Internet nowadays, and we will treat them as such later on.

3.3 Information and communication machines

We usually imagine a typical communication situation as an immediate relationship between the communicating parties, that is, as a situation in which besides the parties, only a medium has a role which "mediates the immediacy". However, this naïve idea needs to be reconsidered and complemented in several points. The idea of the *immediacy* between the communicating parties can only be preserved if we think about the medium of communication (in other words, the channel of communication) as an entity lacking in any identity, the only "feature" of which is its extended existence. (Naturally, this idea is reminiscent of the concept of the *ether*, the medium which makes the spreading of physical effects possible but which does not have any actual physical properties. The use of the concept of the *ether* was motivated by similar ambitions: physicists were striving for describing physical situations with

the immediate interaction between physical objects – for example, with the help of the so called "contact forces", which are mediated by the ether – and set aside the "non-contact forces," regarded as mystical.) The "featurelessness" of communication media can be formulated and built into certain approaches to communication (e.g. into the instrumentalist point of view which represents a value neutral position), but in general, it is hardly a tenable position. On the basis of what we said earlier about images, speech, and writing, we can rightly point out that though in a different form and to a different degree, these media participate in the mediation of the content of the communication with their own clearly identifiable nature. Thus, the communicable content does not only depend on the intentions of the communicating parties but on the medium of the communication as well. As we saw in the previous chapter, the representatives of the Toronto school of communication research made the significance of the media's own activity clear with various approaches. We can study the consequences of the activity while staying *inside* the communication *situation* – this leads to a more accurate understanding of the communication process – and in the characteristics of the *consequences* of the communication – this chiefly provides a more precise characterization of the communities created. Recognizing the active role of the media, *we can develop communication situations in which we positively want to utilize the peculiar features of the media*. With this intention, we can influence the characteristics of both the communication process and the community which is created in the communication process. The two most important areas of the conscious shaping of communication media is probably the creation of *multimedia* and *communication machines*.

Multimedia (or multi channel) *communication* searches for solutions which are close to "natural" interpersonal communication situations, since in natural interpersonal communication we usually use several media at the same time: speech, sight, movements, but writing, images, touch, and fondling might also be used. This richness of the media is reduced to one or two in traditionally created "artificial" communication situations, as for example we can see in the case of written texts. (Perhaps it is worth referring to the intimate relationship between scientific thought and scientific writing/reading here. Writing and reading replaces the richness of the natural human situation with the use of one or two media, and scientific thought replaces the richness of an object, understood in an everyday sense, with the study of one or two aspects of the examined object; that is, a radical reduction takes place in both processes. In this way, it is obvious for science to use written text, the medium which is similar to the applied point of view. In religious practices and sometimes in arts –for example in traditional ceremonies or in theater performances – communication that makes use of more media is preserved as well.) Of course, with appropriate methods, the "homogenous communication medium" of artificial situations can be made capable of communicating the complexity of natural situations (using methodological rules, stylistic exercises, and sophisticated interpretations) but this is often not simple, and it requires separate studies and a lot of practice. Of course, the parallel application of recent communicative media can help in communicating the complexity.[38] However, such communication situations are usually not realized by the return to natural communication situations (however, we can strive for this, for example in case of reading out a text while gesticulating) but with the "technological" production of the additionally used media and the continuous support of technology, namely, with the artificially developed and maintained representation of the media in question, that is, with the application of communication machines. This possibility is an important motivation for creating and using communication machines. For example, it obviously played a role in the ambition for creating sound films, or in the development of the television.

However, the support of multimedia situations is only one specific motivation for the creation of communication machines. In reality, this is why it is worth regarding communication as a technology, since, as with technology in the "classical" sense, it readily uses artificial tools for reaching its goals, that is, *communication machines*, with which control over situations can be realized more effectively. The production and application of communication machines became an organic part of the "technology" of communication very early to such an extent that communication without the use of machines is very rare. Since communication machines take part in the mediation between the communicating parties, in fact *they themselves can be regarded as media of communication* (McLuhan considers them this way for example), though their differences from naturally given media can occasionally be important – for example when we study their special functioning that shapes the natural media. Nevertheless, the most important difference between natural and artificial media (communication machines) is that the structure and functioning of the latter is completely clear for man and – in principle – it can be controlled perfectly. This is why we use them, since communication machines are machines after all, that is, they are artificial devices created by man, which are relatively autonomous and which we create exclusively so that they serve our definite aims in a given situation. In this way, we can extend the conclusions of the analysis of traditional machines to communication machines, above all that these machinery are finite: they necessarily go wrong.

[38] László Moholy-Nagy worked on certain aspects of this problem area in the first part of the 20th century.

Thus, the machines used in communicative situations themselves partly belong to the medium, and they partly shape the medium of the communication with their functioning. In other words, the *medium* of the communication that uses communication machines necessarily has a *structure*, that is, it is *not* the naturally given communication media which participates in the communication but the continuously *shaped versions* of these which include various human strivings. Communication machines represent human intentions, interests, and ambitions in the medium itself, as part of the medium, and they shape the natural circumstances in the hope of realizing these. Using an Aristotelian term, we could also say that communication machines form the communication media and they are their *forms*. As a result of the changing values and interests used while forming the media, the developed structure includes, sustains and operates various *ideologies*. Since people necessarily communicate, shaping the media is probably the most effective (and most concealed) form of spreading ideologies[39] since the ideology carried by an artificially formed medium often remains concealed and works as a naturally given system of values, especially in the view which does not differentiate between the communication machines which shape the situation from the naturally given media at all, and similarly to them, it regards their functioning as value neutral. This is why the philosophical analysis of the structure of the media is of great significance, since we can reveal the hidden value system of the formed media through the study of the functioning of the communication machines. It seems that we can regard the following as the most important message of McLuhan: "Pay attention to the medium!" The most important messages of an age are in the medium itself (formed and represented by machines).

If we use the concept of communication machines in a completely general sense and – similarly to the approach mentioned in section 2.1.5 – we take into account the possibility of the metaphorical interpretation of the concept of machines, we can conclude that *the most generally used communication machine is language*. (Language is a machine at least as much as the mathematical Turing machine is.) We can learn about the structure of language; its functioning follows standard rules. Thus, language can be considered as a communication machine which was created by man and which is relatively autonomous, and the function of which is to serve the success of communication.[40] However, language understood this way is a (Turing machine like) *universal automaton*, the concrete realizations of which function in given situations. At the same time, language (as a communication machine) is also obviously a *universal medium* which mediates in communication situations, various spoken and written versions of which are realized in each situation. (Let us note that insofar as we understand language as a naturally given phenomenon, we can perhaps talk about direct communication between people as well, though even in this case, only in a quite limited sense.) Of course, besides language use, many generations of communication machines have been produced during the history of communication, from simple "hand tools", Borges-style tools, books and many electric devices, to the Internet. In fact, we can observe that as a result of the historical development, the medium inserted between the communicating parties has been built into an extraordinarily complex, worldwide, industrially functioning technological sphere consisting of countless machines. The Internet is obviously a good example of this, but perhaps it also provides a sufficient argument if the reader tries to follow (backwards) the fate of this sentence being read at the moment, say for example only until this point.

3.3.1 Communication machines

We can consider the *simple communication machines* developed for shaping and mediating naturally given communication media, that is, rhythm, rhymes, writing, reading, and image making tools, as the most basic communication machines. Of course, these simple machines, which have been improved since prehistoric times, do not facilitate power transfer but information transfer, and they multiply man's natural ability to communicate. The structure and functioning of simple communication machines is still clearly adjusted to natural media, and it operates the basic technologies of orality, literacy, as well as imagery (e.g. the creation, sharing, and transformation of signs). We can call them simple machines because their principles can be utilized by the structural units of more highly developed machines. Thus, we can find *enduring patterns* of the media of various forms and levels of development, created by rhythm, rhymes, and writing and drawing tools (e.g. series of binary signs, impulse voltage, etc.) in advanced communication machines and technologies as well. Simple machines are activated in situations which are determined by other factors of communication and they can be used in them, but they do not have their own power to shape situations. They shape the media in a way determined by the whole situation. The possibility of rhythmical speech, the knowledge of writing, or the presence of a pencil does not automatically lead to their usage; this only happens in an appropriate situation.

[39] Perhaps it is more convincing than any other analyses if we refer to George Orwell's 1984. Orwell found it good to include a detailed presentation of „newspeak" in his novel.

[40] Here we can set aside the non-communicative functions of language. Nevertheless, it is not a problem to take them into account: we only have to keep in mind the experience that technological devices are often used for purposes quite different from their original function.

The history of communication media, based on the complex usage of simple communication machines, is rich the invention of newer and newer devices, technologies, and machinery. (The Media History Project 1996; Kittler 1996; Briggs-Burke 2004; Barbier-Bertho Lavenir 2004) Machines used as media – of course most of the time as the shaper(s) of the media – developed through utilizing the technological possibilities of a given age, and they are also a significant part of the history of technology. The switch from *handmade technologies to modern technologies* was a determining turning point in their history. Of course, there were some changes before this switch Thus for example in Europe, among the early technological developments of writing and reading, we can find parchment replacing papyrus, and later, the production and use of paper or the introduction of cursive writing which uses the small letters of the Latin Alphabet (around the 8th century) and the spreading of eyeglasses (used from the beginning of the 14th century) (Manguel 2001, 301). However, all these changes are dwarfed by the successive waves of modern development and by the innovations produced by the mechanistic and the electronic age. It is probably unnecessary to discuss in detail the significance of the usage of the *press*, which made the mechanic copying of images, books, and other types of texts possible. Photography and sound recording technologies, utilizing classical optical, chemical and mechanical knowledge, were created with a significant lag in the 19th century, but in turn they developed very quickly. Probably the most important consequence of the usage of electronic technologies in the 20th century was the possibility of *digitalizing*. Analog technologies use the changes of the characteristic properties of various natural processes as signals and they work through manipulating these. However, as a result of digitalizing, all properties of all media and the changes of these as well – that is, all the signs used in communication – were represented by the same type of digital sign sequences. The consequence of this, unfolding in our days, is that speech, music, written texts, and images can be represented with the help of a single digital medium and we can use the (earlier unknown or unusual) combinations of these in a given communication situation as we please. The spreading of the use of the digital medium made it possible to develop multimedia situations easily, and it reduced the realization of multimedia communication to a simple technological problem.

The digitalization of communication media radically changed the situation of *digital computers*, and by now the computer is the most important communication machine. According to the history of computers, which dates back to the 17th century, the chiefly hope was to perform calculations quickly and effectively with the help of these machines, but before long, more general aims could be formulated: the need arose for creating a machine which functions as a universal automaton and which is capable of handling and processing optional data (Charles Babbage Institute; Chronology of Computer History; IEEE History Center; The Virtual Museum of Computing; The History of Computers; Goldstine 1972). Programmable digital computers made this idea real. Such computers can be considered as general purpose devices, which we can turn into a specific machine through the programs that run on it. Digital computers have been used for countless data processing and computational aims during the few decades of their history; their application to communication purposes dates back to the 1980s. We can probably regard the spread of word processors which can be run on *personal computers* as a crucial turn. In essence, the use of computers as communication machines became general since then, while at the same time we do not only talk about using personal computers this way, but also about machines appropriately programmed and built into various communication machines (camcorders, radios, televisions, and audiovisual devices) as well. Computers are currently the most perfect communication machines known, since by using them, we can shape the digital medium according to our wishes and our programming knowledge.

After briefly recalling the technological side of the evolution of communication machines, it seems to be useful to have a look at the changes of the communication situations which are taking place simultaneously with the development of the machines. In this respect we can observe that the appearance of machines that have a power to *shape situations* is an important step in the development of communication machines. This development presupposes the *conscious* shaping of communication situations (and community building as well), which was considered attainable through creating and using machines which suit this goal. Thus, the structure and functioning of such machines are no longer only adjusted to the nature of the medium, since they also necessarily have to represent the system of requirements of the situation we want to create. These machines are the agents of the parties participating in the communication, or even of the "outer world" placed into the communication situation, which are capable of developing a situation according to the intentions of those who operate the machine. Since these machines are equally in active contact with the media, the other factors of the communication situation as well as the value system entrusted to them, it is not enough to rely only on one of their characteristics.

Obviously, *books* are extremely important situation shaping communication machines. In section 3.2.2, following Borges, who called books tools which are extensions of human imagination and memory, we described the modern book as an automaton of imagination and memory. And indeed: books give a shape to written texts and images, they mediate between the authors and the readers, and they also represent the intentions and values of the writer,

the reader and the multitude of people who produce and maintain books. Books consciously shape communication situations both in general and in their individual examples, and we can also consider them as proxies, in a greater part, of the author, and in a smaller part, of the reader, which shape the situation according to their intention. Thus, books meet the specifications of situation shaping communication machines, but they are also a good example of how many factors – partly belonging to the situation, partly outside of it – can motivate the situation shaping effect that they can attain. Because of the robust social embeddedness of the situations shaped by books, it is understandable that we can use books to communicate almost any kind of ambition, intention or value system effectively. Books usually mediate between the private sphere of the author and the reader, for which they use the circles of publicity as well, and they are used in situations of mass communication only in exceptional cases, so in this way, we can always sustain some type of *control – shared* by the participants of the situation. The optimist worldview of the modern age according to which our world can be controlled is built into books. The case is different in situations of mass communication (in the area of printed and electronic *press*). In these situations the individual is typically forced into the position of the consumer; the situation is formed for him, but without his active participation. We can find many situation shaping machines of various kinds on the *Internet*, among them ones which are similar to books and the press. Editing personal or thematic websites and browsing among them is reminiscent of writing and reading books, while visiting portals and magazines rather leads us into a situation of mass communication. However, the Internet is neither a book, nor a medium of mass communication, but a very complex machine of communication which – as we will see later – has many other components and functions.

The *camera*[41]is a special communication machine very different from books, and anyone can ascertain its active, situation shaping role, whether he is behind or in front of it (Flusser 1990; Vilém Flusser 2001). In this situation, it is not the rationalizing powers of modernity but the magical power (based on the continuous transition between existence and appearance, possibility and reality, and a circular interpretation) of images that is at work. It is characteristic that this power cannot be connected to the photographer, the cameraman of a film, or the viewer of the images unequivocally, not even in case of modern photographing; rather, they all do the job determined by the situation under the influence of the view. The camera controls the course of events as a veritable modern totem. The situation is somewhat reminiscent of communication situations – especially to the versions which prefer using images – but it seems to be a significant difference that the relations of interest and value can be revealed after all, and they can be grasped well conceptually. Perhaps the reason lies in the complexity of images which is qualitatively different from that of texts: the participants of the situation are “lost” in the complex environment represented by the images, from which it is not easy to get out; thus their defenselessness and perplexity is similar to the defenselessness of the participants of mass communication resulting from their “thrownness” into the situation. It is conspicuous that if we examine the usage of the machines that produce the images and not the usage of the machines that copy them – that is, for example the *photocopier* or the *fax* – we do not see the situation shaping effect characteristic of cameras. This also suggests that we have to look for the secret of the magical power in the representation process of reality.

It obviously follows from what we said earlier that an appropriately programmed digital *computer* is a perfect version of situation shaping communication machines. It is able the shape the media in almost any way or even combine them. As a consequence of the universal nature of the machine, the programmer can build the most varied values, intentions, and ambitions into the process of shaping the medium and he can even adapt himself to the personal expectations and needs of the parties involved in the situation. The personal control over our own situations can be realized completely with the help of a computer; it makes us able to achieve the goal proposed by the worldview of modernity: the control over our own world – at least in communication.

Thus, the most important machines of communication are the simple machines of communication, as well as books, cameras, and computers. However, the evolution of communication media is not limited to the development of individual machines.

3.3.2 Communication networks

Another important stage of the evolution of communication machines is the creation of *communication networks*, that is, communication systems in which the cooperating community of individual machines[42] forms the network

[41]For the sake of simplicity we will not make differentiations and we will include the whole technological apparatus of producing and using pictures in the concept of cameras, hoping that this will not impugn the validity of our ideas.

[42]Communication machines connected to a network are not necessarily the most important individual machines. There are no networks made up of books or cameras, but there are of computers. It seems that books and cameras represent a different line of evolution. At the same time,

as a communication machine. Communication taking place through a community of machines connected to a network, that is, through a network, is a communication process of a different level; it is *meta-communication* in the proper sense of the word. Thus, we can talk about *two types* of communication in the case of networks. On the one hand, it is possible for the individual machines that make up the network to communicate, while on the other hand, we can communicate through the mediation of the network as a whole. The processes of the two levels are obviously not independent of each other, since we could not use the network as a whole properly without the communication between the individual machines. Their differentiation is still important because they involve different communication situations, from which it also follows that they lead to the development of different communities. In case of *communication between the machines of the network,* the parties involved in the situation are the machines, and *the medium* can be many different things depending on the nature of the network, for example, the series of analog or digital signals. The parts of the situation – whether we regard them as belonging to the machines or as separate from them – are the "elements of the network" which establish the connection between the machines, together with their given configuration. *In communication through the mediation of a network as a whole*, the parties involved in the situation are usually the people who make use of the network; and the *medium* is rather structured since it includes the individual communication machines, their media, the "elements of the network", and the specific medium of the network communication as well. To sum up, we can say that the *network* is the organizational form of the communication situation of the meta-communicative level. Network communication can only take place using the communication between the machines, but it can be interpreted without a direct reference to the processes of the level of the individual machines.[43]

The intuitive picture of networks contains a few nodes and the graphs connecting them. The characteristics of a network depend on the properties of the nodes and on the structure of the graphs connecting them. We expect that formations like these fill in the abstract space in which they are embedded quite "discontinuously". The characteristics of a network can be studied with the application of graph theory, but for example its structural complexity, which is proportional to the space it fills in, can be determined exactly through measuring or calculating the fractal dimension of the network graph. We get a real graph if the network displays a similarity on several different scales built on each other. Such a structure would obtain for example if the network which connects the computers roughly copied the connections between the units of the individual computers, especially if the computer units themselves were built of units which were organized in a similar structure to some extent.

Nevertheless, networks are not inventions for communication, since their various versions quite densely impregnate natural and social systems of different kinds. In order to point out their significance, perhaps it is sufficient to refer to the family relationships between people, the networks of settlements, commercial and transportation networks. In all these cases (and in many others) the expressions "*network*" and "*system*" are commonly used in a parallel manner, though the concept "system" places the emphasis somewhat differently in the description of the components of networks and their relationships. At the same time, in individual cases it is the usage of the concept "system" which is the more prevalent, as for example has become familiar in the cases of economy or culture. We will prefer to use the concept of networks when we would like to emphasize *the separateness of the interconnected units of a system, and the connection (in space, time, or context) between separated units of a system*. When these aspects are less important, we will be satisfied by the usage of the concept of systems. To put it simply: a network is a system consisting of distributed units.

Obviously, we can talk about many types of networks, and it is a question what kind of specifications communication networks have. Traditionally, we can regard as communication machines conventional postal networks, as well as the networks of telegraphs, telephones and fax machines, the radio, the television and the network of press associations, perhaps some of the printed press, and last but not least computer networks and their interconnected network: the Internet. The difference between traditional and communication networks is not always significant. Thus for example a postal service that delivers letters and packages or certain commercial transactions may prac-

it is easy to name machines which are almost born for a network form of existence, for example, various telephones, the radio, or the television are like this.

[43]Perhaps it is worth summarizing the relationship between the two levels of communication in another way. The communication situation of the machines built into the network and the *communication situation* of the network are *different*: the communicating parties, the content, and partly the medium, are different. The *medium* of the network level is more complex and more structured, and it includes the media of the level between the machines as well. We do not say that the network situation includes the communication situation of the machines because it is *not revealed directly* for the communicating parties that join into a network situation; it remains hidden so we usually do not refer to it. This hidden connection is important and clear for the „communication engineers" who build the network, since they survey the whole of the functioning of the network, while the communicating people only use the network. In fact, examining things from the point of view of the user, it is incorrect to say that network communication is of a *meta-communicative* level. Rather, we should say that the level of the actual, network level communication and the communication between machines is a *„sub-communicative"* level. Perhaps this would be the correct choice of words, but we decided for the other, because the expression „meta-communication" is commonly used (though in a slightly different sense).

tically be identical, and the theoretical differences between them may be blurred. Actually, *commerce* is the kind of network activity which is probably the closest to communication. During commercial activity, goods are delivered, say, from the manufacturer to the customer, but in the process the product is not only transferred in its physical reality from one place in the system to another, but at the same time, and in the same step, its price is also changed. The place, (context) and the price of the product changes in the same process. All this is quite reminiscent of network communication. The signal that carries the information (say, in the form of mail) gets from the sender to the location of the receiver, where the receiver can read it with an appropriate interpretation. Obviously, the message included in the letter will be reminiscent of the message sent by the sender, but naturally, it will not be the same, since it is interpreted in a different context. The change of context necessarily changes the message; the place, (context), and the interpretation of the signal changes in the same process. Of course, the close analogy between commerce and communication is in reality not a coincidence at all but suggests common roots. In Greek mythology, Hermes and the Roman Mercurius represented the interests of both merchants and thieves, and at the same time they were the fast messengers, as well as the interpreters who could translate the messages of the gods into human language. There is something that keeps together these seemingly quite diverse tasks, something these skillful gods are very good at: they are proficient in changing context. They can recognize in a context some of the content from another and *vice versa*. The products represented as goods, and the message interpreted by the receiver, go through the same process: reinterpretation resulting from being fit into another context. Hermes and Mercurius are the gods of interpretation. In fact, we can also say that commerce is a network communication performed with the help of goods, in the course of which a community of the manufacturers and the consumers of the goods is created. Or even, we could say that communication is the commerce of signs, where the receiver buys the message of the sender, and as a result of the differences of their interpretations, he (over)pays.

It seems that actually, we do not know much about the specifics of communication networks from the comparison of communication and commercial networks, but at least we know that it is reasonable to use the understanding of communication as transmitting information, an approach we have ignored so far. Of course, we do not need to abandon our earlier standpoint, according to which communication is the technology of creating human communities. At most, we can extend it by saying that *in the case of communication networks*, where the separation of the participants in space, time, and context is significant, *the transmission of information between the separated parties* is a *defining* element of the communication situation. (We have not denied the existence of information transmission while discussing the general concept of communication, but we have not regarded it as a factor which significantly determines the situation.)

Setting aside the presentation of the comparison of the other non-communication networks (similar in style and content to the above), but taking into account its conclusions, we can infer that the *transmission of information* can be observed in all communication networks. At the same time, the signal that carries the information, and the structured medium of the communication, can be very different in the case of different communication networks. It is a significant complexity increasing factor that the elements of the communication networks are themselves information and *communication machines*. Note also that the transmission of the information necessarily requires the *multiple production* of the *information* with a hermeneutical technology, what is more, as a result of the separateness of the elements of the network, necessarily in different contexts, that is, in the contexts of the separated communication machines of the network. Depending on the structure of the communication networks, the *hermeneutical circles* operated for reducing the differences of interpretation can be put into operation more easily (for example, in the case of a phone conversation) or with more difficulty (for example while listening to a radio station). The hermeneutical circles are closed through the networks; that is, they are created at a meta-communication level. In a sense, communication networks resemble *abstract images*: they are shaped by information spread over an abstract surface.

Thus, the characteristic types of communication networks are the traditional postal networks, the networks of telecommunication, broadcasting, and computer networks. The separation of *postal* systems developed for sending messages from the systems of transportation and shipment is the result of a long historical process; and besides the completely separated systems various mixed forms endured. The need for interpenetration and separation is understandable: for transporting information with a communication purpose – because of the peculiar nature of information – we necessarily need the material processes which sustain the network (whether in the form of stagecoaches or phone wires), and if this is the case, it is worth utilizing this material transfer because message transmission could practically be connected with other types of transportation. (The reader has probably heard about the “mail trains” going to Budapest from the bigger cities, and perhaps has even traveled by them since they equally transport mail and passengers.) But the opposite relation is at least as important: since material processes have an indispensable role only in sustaining the network, we do not necessarily have to transport material objects

together with the messages, but it is enough to send the receiver the signals carried in material objects. (It is not the electrons launched by our telephones which are haring in the wires of our telephones to the equipment of the called party, only the changes in the state of the sea of the electrons of the wires that reach there.) In Europe, traditional postal networks – following the sporadic initiative in Antiquity – were created beginning from the 14th and 15th centuries, of course, at first only for a small circle. People could already send certified mail in France in the 17th century; they could even throw the letters in public mail boxes. In a word, the system currently operating had already been established by then. Up to the present day, the typical postal delivery is the physically posted, transported, and delivered letter.

Telecommunication, which specializes only in transporting signals that can carry information, essentially began with the invention and usage of the *telegraph* in the first part of the 19th century. The various versions of the telegraph usually transported messages encoded in electric impulses through wires between telegraph stations, and ideally, the tasks of encoding and decoding were preformed by machines, in other words, a fast transfer of text messages was taking place in the typical case.[44] Its somewhat modernized version, the *telex* (in which telegraph stations were replaced with simple equipment) was functioning until the recent past; its usage is being abolished nowadays around the world, which also involves the complete disappearance of this form of telecommunication. Nevertheless, it is interesting that the *mobile* version of the telegraph was invented around the turn of the 19th to the 20th century, which was called *radio telegraph* and was mostly utilized in shipping (and of course, in battlefields), since instead of wires, it used radio waves for transmitting messages.

Asynchronicity is an equally important feature of the usage of postal mail and the telegraph. Since the technologies in these forms of communication allow communication in only one direction at a time, the communicating parties are informed about an earlier mental state of their partners, and their answers also reach their partners with a time lag, who, as a result of the time passed since the initiation of the correspondence might think about, feel, or know something completely different. All this slows down the process of synchronizing mental states, or can even makes it impossible.

It is easy to eliminate the difficulties of asynchronicity by using a *telephone*.[45] The relatively late appearance of the telephone (late 19th century) can perhaps be explained by two factors. On the one hand, the conversion of sounds into mechanical, electric or electromechanical signals and *vice versa* was a difficult task to solve, on the other, many functions of speech can be satisfyingly operated through the use of writing, and thus finding a solution was less urgent earlier. During the one hundred years of its history, the telephone went through a tempestuous history and the telephone network has by now become an indispensable network of communication. Among other things, its indispensability is secured by the fact that all ideas, ambitions, and ideals that have emerged so far in telecommunication have been "built into" it. They made it able to transmit texts (even handwritten) and drawings (fax) quickly, and communication through the telephone network was not tied to speech any more. The *mobile* branch eliminated its stationary nature and its dependence on wires; instead of telegrams and fast radiograms we can send *sms* messages. What is more, we can do this in a multimedia form, and thus, another limitation has disappeared.[46] We can even connect to the Internet through phone networks, or if we wish, we can make calls and use the Internet at the same time with the support of a phone network – and obviously, there in no end or limitation to the possibilities. All these are really very significant changes, and the question rightly arises whether this system that provides complex network possibilities is a telephone network after all, or it is not and we can talk about something completely different? With the growth of its complexity, has not the earlier telephone network become an integral part of the Internet? Perhaps the answer is no, because the individual communication machines that make up the network are essentially telephones even in contemporary networks. Of course, telephones are much more advanced than their predecessors in many respects, but they are still gadgets that perform a certain *specific* (though perhaps complicated) communication task. They are not *active* devices with a *universal* purpose, but machines which are for certain definite functions and which mostly obey the operators of the network. They are not computers, or at least they are not yet today. If telephones became active, universal devices, for example modeled

[44]In this way, the usage of the telegraph can easily be confused with the electronic correspondence taking place on the Internet. On the basis of their similarity, Standage characterizes the telegraph as the *Victorian Internet* [Standage 1998]. Nevertheless, this characterization is correct only if we consider the Internet as a network exclusively serving electronic correspondence. This understanding is possible, but it is unreasonably narrow.

[45]We can consider as a solution used before the development of the telephone network the frequent delivery of mail in certain big cities. There were periods at the end of the 19th century in London when letters were delivered 12 times per day (!). In the same period in Berlin 6 deliveries per day were in fashion. All this suggests that there was already a significant social need for solving the problem of asynchronicity by then.

[46]We do not pay too much attention to the characteristics of mobile communication here. For those who are more interested in the topic, the books based on the material of the conferences organized by Kristóf Nyíri (http://www.hunfi.hu/mobil) are available [Nyíri 2001a; 2001b; 2002; 2003a; 2003b; 2005; 2006].

on programmable computers, the nature of the telephone network would obviously change, and it would become an indistinguishable part of the Internet. Presently, even the network that links telephones is different from the biggest part of the network that makes up the Internet (in its organizational principles, capacity, etc.), but probably this is a less significant difference, especially because in case of the computers that connect the Internet through a telephone network, the elements of the telephone network – at least in a physical sense – become a part of the Internet.

The *radio* and the *television* are seemingly disadvantageous networks, since broadcasting operates permanently *one directional* versions of communication. The listener or viewer of the receiver is at the mercy of the editors of the programs, the mere expression of his own opinion is only possible in a significantly indirect way, and interactive participation is practically impossible. Broadcast networks are trying to compensate for the disadvantageous form of communication with the *content* of the communication and keep their audience following their network. The communication networks mentioned so far can in theory communicate quite varied contents but both correspondence and telecommunication typically take place between individuals or between individual representatives of communities, that is, they are chiefly forms of communication *between persons*. The consequence of this is that the content of communication – being proportional to the competence of the communicating persons – is personalized to a great degree. We can encounter the concentration and selection of information, experiences, values, and knowledge in amounts in the communication situations offered by broadcast networks which qualitatively exceed the communicable content of personal situations. The radio and the television "opens up the world" for the listener and the viewer, that is, they inform him about a *world*, and they place him in it virtually. The mass communication situation of the radio and the television paradoxically sends personal messages to the impersonal mass, messages according to which he himself is also surrounded by a world (which can be shown to have many versions); he himself is a part of virtually. The radio and the television (and to some extent even the printed press) work similarly to *virtual reality*. Of course, it would probably be better to put it the other way round: virtual reality has aims similar to that of mass communication. However, its means and methods (interactive orientation in an artificial environment sustained by computers) are different.

Radios and TV sets transmit human content and culture, and in this way they create a virtual community between man and his world. What matters is not that we are informed that Bin Laden's son was caught in Iran at a certain time¸ but that we know about it. We necessarily hear news about all kinds of events, but it is not the content of the news that matters – what is more, most news is essentially incomprehensible, false, or redundant – but the information that there is news. There is a world in which things happen and there, they inform me about them, I acknowledge them, and *as a consequence,* both the world and I in it exist. *I am present* in the world. The world in me and me in the world: we are tied together; the unbreakable chains of the mass communication media tie us together – perhaps this is the secret message of mass communication. Of course, all this is not the result of the peculiar nature of the news, since programs transmitting other areas of culture have a similar structure.

In connection with the development of telephony, we argued that even the complicated telephones of our days are passive communication machines, and if now we see that the radio and the television – regardless of all of their seemingly aggressive activity – are only a "mirror of the world" which condemn one to passivity, the question might rightly arise: are there at all actually active communication network machines and networks with an active nature? We would like to show later that computers, as communication machines, and communication networks consisting of computers, satisfy such needs, and we can consider then as active participants of communication situations.

3.3.3 The Internet as a communication network

If we compare the evolutionary history of the communication networks discussed so far, an important difference is immediately visible: earlier networks were created specifically for communication purposes; however, the creation of computer networks was initiated in order to facilitate a secure and fast (military purpose) connection between computers. Electronic mail, rigs, chat channels, and especially websites which present the army in a negative light and the like were not included at all in the project founded by the United States Department of Defense at the beginning of the 1960s; what is more, not even the stirring perspective of cyber warfare – at least as far as we can know from studying the publicly accessible data of the secret military research programs (Zakon 2005; Hauben – Hauben 1997; Net-History; LivingInternet; Internet Society; Grier – Campbell 2000). The potentials of connecting computers to each other became clear only gradually. The decisive step was probably when (in 1982, more than fifteen years after the first attempts to connect computers to each other, after ten years of unregulated use) an agreement was reached about the "linguistic conditions" of communication through computers, and the standard

system of TCP/IP (Transmission Control Protocol/Internet Protocol) was accepted, developed by Vinton Cerf and Bob Kahn, through which secure data transmission became possible between *various computer networks*. As a consequence, computers immediately became communication media, and in this role they showed an astonishingly fast and varied development, as a consequence of which the Internet as we know it today was born.

From a technological point of view, the Internet is the interconnected network of computer networks (consisting of various elements with a different purpose, structure and function). The network has an "open architecture", in other words, the structure of interconnectedness "has no center", that is, it can practically be expanded as we please, and the data transmission between the units also does not need to be controlled centrally. This is achieved by the fact that individual deliveries (bigger ones are divided into several parts and the pieces are treated as independent packages) contain the address to be reached – largely as in the case of a traditional letter – and each computer that comes into contact with the delivery decides, on the basis of the encoded address, which direction to forward the package, and finally the receiving computer reassembles the message from the received packages.

From a communicative point of view, the Internet is the network of individual communication machines (programmable digital computers) which have a situation creating power by themselves. The individual units of the network of the Internet are *active* participants of communication (computers make control over communication situations possible); it is notable that their activity manifests itself both on the level of communication between computers connected into the networks and on the (meta-communicative) level of the whole of the network. Practically, this means that we have to prepare our computer connected to the network for communication with *other computers* (by using hardware and software developed for this purpose), but at the same time we also have to make it able to represent the Internet *for us* – which can be achieved by the parallel use of additional hardware and software. With the help of the control operated on both levels, we can determine when, how, and with which other computers we initiate or allow contact, what kind of communication channels we wish to make use of, whether we want to maintain a direct or an indirect, synchronous or asynchronous, one-way or interactive, permanent or temporary, stationary or mobile connection with our communication partner (or partners) and so on. The possibilities of the "settings" of a communication situation are numerous, and perhaps what is even more important, we can control all of them with an appropriate license. Of course, the parties communicating through the network are usually satisfied with the personal usage of a few licenses with a key significance and they mostly leave the control over the possibilities to their "providers" who give them Internet access, but this is not a necessary concession.

Note that situation shaping control has a very peculiar nature. It operates locally, that is, in the connection between our computer connecting into the network and the "network environment" surrounding it. But the network environment has a quite strange structure (in fact, for all computers participating in it). The immediate environment is given for our computer, but as a result of the open architecture of the network, the "further" details of the network are unknown (for each computer). Regardless of this fact, the messages sent to the "realm of the unknown" still arrive precisely at their destination.[47] We could say that, resulting from the peculiar organization of the network, *the communication situation virtually expands*; we can bridge the however extended realm of the unknown with the help of programs which coordinate the delivery of our message, and we can enter into a "direct" communicative connection with the (in the network) distant partner.[48] The (even worldwide) expansion of the communication situation is of a decisive importance in Internet use, chiefly because it crucially contributes to changing the communities of the web as well as the personality traits of the web citizen.

Of course, a certain expansion of the communication situation is characteristic of each version of network communication – think for example of either landline or mobile phone use, or watching television. However, the expansion experienced on the Internet is essentially different. On the one hand, this is because it is solely controlled by the communicating parties, and as a result, it is *independent and free*; on the other, because it is not partial but *complete*. The freedom of the communicating parties is normally significantly restricted in traditional versions of network communication and usually it is limited to initiating or accepting their entry into a communication situation. The communicating parties cannot control the other factors of the situation, because the communication machines at their disposal (e.g. phones or TV sets) are not suitable for such tasks since, from a communicative point of view, they are passive tools. It is the institutions that organize the situations (e.g. phone companies, TV channels) that have influence on shaping the medium that mediates the communication (and on determining the nature of the

[47] Of course, we can venture on explorations. With the help of special programs, we can follow the development of a connection between our computer and a distant one, but we do not learn much even with this method. The knowledge obtainable in this way is completely useless for a person who only wants to use the network and not to study it.

[48] We can represent the functioning of the network for example with the help of cellular automatons, say in the expressive form of modeling the delivery of the message similarly to the configurations of the popular Game of Life moving in an orthogonal grid of cells.

communities that can be created). In communication through the Internet, all controllable elements of the situation essentially depend on the decisions of the parties participating in the communication (if they want, they can even hide or change their identity), and they are essentially independent from the influence of the other participants of the network that "remain unknown". Networks are organized in such a way that the activity of the elements of the network is limited to the intelligent transmission of messages; they can determine the direction of the transmission and a few other parameters, but they do not participate in shaping the contents.[49] Thus, the activity which shapes the medium of network communication on the Internet is concentrated in the communicating parties, who can, *with a significant degree of freedom*, shape their situation with the support of an active communication machine, the computer.

The expansion of communication situations through the Internet and traditional networks is also different in the sense that while in traditional cases this only refers to *one or two* features of the medium, in the case of communication through the Internet it can affect *all* characteristics of the medium. For example, in the case of phone use or TV broadcasts it is realized as regards speech or the contents selected by the editors of the programs, but it is not as regards the other features of the situation. However, Internet users expand the situation itself together with all of its features and limitations, since they have an opportunity to chat and to accept the offers of "content providers" as well, but even if they refuse all of these, they still remain in the Internet situation and have several other choices.

In fact, the communication network of the Internet is capable of unifying all functions of network communication mentioned earlier and realize them separately or even in different situations. Of course, the operation of individual functions is not simply a copy of the methods of other networks, but their reproduction created by taking into account the new medium shaping possibilities, sometimes of better, sometimes of worse quality. (Thus for example making phone calls through the Internet is a little more complicated and occasionally involves worse sound quality). The (not necessarily conscious) rethinking and recreating of communicative functions based on the possibilities of computer networks resulted in the appearance of important new features in the case of most of the functions (and of course as regards the whole of the network).

Electronic mail unifies the functions and methods of traditional *mail* and *telegraph* use. Technologically, it resembles telegraph and telex use, with the perhaps not insignificant difference that we receive messages on a screen and not on paper. (Though our mails are easily printable, it is not usually done). On the other hand, as regards their content, our emails are quite similar to traditional letters. The topics, style and often the form of our message resembles the practice of letters sent on paper. What is more, we like to use special characters, signs, signature samples, and send other texts or images as attachments to our mail in the same way as we did in the case of traditional mail. (The use of the past tense is probably justified, or it will be soon. In any case, it is striking that if someone becomes a skilled email user, he essentially abandons traditional mail). Electronic mails are also similar to traditional correspondence, inasmuch as we mostly use them in personal and private situations. The personal nature of handwriting can be substituted by linguistic, stylistic and editing ideas; it seems that computer use can represent a personal character more successfully than traditional typed texts can. Electronic mails are very effective from a technological point of view. We can send our messages to many places with the same investment of energy; it is very easy to forward received messages or attach them to other messages. At the same time, electronic correspondence can be very fast, thus if we prefer, we *can reduce the effect of asynchronicity to a minimum*.

The "*talk*" or "*phone*" function realizes this option which can be operated in most network environments. With the support of these programs, we can practically exchange real time written messages, that is, we can in fact chat by using writing; thus, this is a practice that resembles traditional *phone calls*. The so-called "*instant messaging*" programs have a similar function; for example, one of the programs regarded as the most successful is *ICQ* ("I seek you") (ICQ Inc2001), with the difference that it is more active, that is, it helps find the called party.

Perhaps it is exactly the instantaneous (depending on the state of the development of the network and the expertise of those who supervise it, but in normal cases instantaneous) sending of emails which is the principal reason why *internet telephony* is not very popular. It might also be significant that specific hardware and software are necessary

[49]Of course, such ambitions sometimes appear in reality, but these create significant storms (in connection with the Internet) and they try to eliminate them. Thus for example, on one occasion it turned out that the *Yahoo* system can in some cases replace certain (rude, racist, etc.) words in the letters transmitted through it with other words with a similar meaning, but as a result of the outcry they have probably terminated the "screening". A similar problem can appear if a search engine – the popular *Google* for example was accused several times – simply "does not find" certain websites because of their (mostly political) content, that is it essentially censors them for the users of the given search engine and excludes them from the represented web. And of course monitoring correspondence or the analysis of the content of letters (theoretically serving criminal investigation) occurs as well. Though these motivate the possibility of freely shaping Internet situations, they do not question them.

for making phone calls, but the most important difficulty is obviously that we can only reach our partner when he happens to be "online", that is, if he is ready to contact us. Traditional telephony depends on the presence of the called party at the other end of the line (in case of mobile versions this is a very natural assumption). We can initiate calls at any times and – at least in a technological sense – we can carry them out with a certainty. In the case of Internet telephony, the called party is more at the mercy of circumstances. Most users do not run all the communication programs at their disposal continuously – for example exactly because they are participating in other communication situations – thus, they are often unavailable even when they are online. Of course, we can utilize a separate monitoring program (as for example the mentioned ICQ) but – as a result of the technology used – it is the called party who determines the communication situation decisively anyway. The case is just the reverse in case of traditional telephony, that is, in case of traditional phones it is the caller, in case of internet phones it is the called party, who dominates in the communication situation. It seems that we do not like to become subordinated in a communication situation, and we prefer traditional telephony.

This case is not changed significantly even by the fact that software such as *Skype*, *Klip* and others, which make phone use easy and even possible with video transmission, are readily available and quite widespread. Internet telephony is only popular in certain easily definable situations (for example in the case of regular and long conversations to other countries or continents). From this point of view, the situation with Internet telephony and email correspondence is similar to the relationship being shaped between mobile telephony and sending *sms* messages, inasmuch as gradually some kind of division of labor is being developed between them. The factors affecting the division are very varied (in both cases), and may contain aspects of psychology, technology, cost-effectiveness, comfort, culture and many others.

Chat Channels are a special version of synchronous network communication, which are usually maintained with the support of various versions of the *IRC* (Internet Relay Chat). The communication situation of these resembles the traditional situation of a *conversing group* consisting of several participants, of course, with the difference that the parties being interconnected online communicate with each other with messages sent through the network (IRC TUTOR 1998). The conversation can be connected to a specific topic, but in reality, the topics only serve to initiate the creation of communities and to shape them. The participants of a chatting community – especially the members who get more extensive licenses – *shape* the communication situation *actively* and thus, the characteristics of the community as well (Latzko-Toth 2000). Shaping (online) communities is a considerably complex process (Beißwenger 2000), it requires varied strategies and lengthy and regular care. It is not surprising at all that a significant part of internet addicts are participants of chat channels. Chatters are mostly young people, who anyway also face the problems of shaping and choosing (offline) communities. While participating in a community, the participants of the chat can hide, choose or multiply themselves; they can try to follow different personality traits and ambitions. It is frequent to continue an acquaintance established in a virtual community in reality, and so to combine real and virtual relationships. Experience shows (Leidlmair – Stumpf 2002; Turkle 1995) that chat channels do not exist for conquering "the empire of virtuality", but function on the borderlines of virtuality and reality, which also has the consequence that it is easy to become addicted to chatting. Of course, the community shaping and maintaining power of chat channels can be utilized in other ways. One of the most convincing examples of their usage can be observed in distance learning (Murphy – Collins 1998).

Certain role-playing games that can be played on the Internet and other similar virtual forms of activity represent a communication situation very similar to that of chat channels. A traditional version of these is *MUD* (Multi-User Dungeon or Multi-User Domain), several versions of which are known: *MOO, MUSE, MUSH,* etc. MUDs are text-based virtual realities with several participants (Cooper 2000). As with chat channels, they are capable of creating virtual communities and personalities (Utz 2000), hiding our real personalities, building new personalities and multiplying them, with the difference that in these games, the relationships between the participants usually remain in the sphere of virtuality (Turkle 1995; Fleissner 1999). More developed versions of MUDs are virtual realities which are capable of representing spatial relations as well. Stepping out of the world of texts into a three-dimensional space brings new possibilities both for the players and the designers who build the virtual environment (even following their artistic ambitions). The participants of this virtual reality are represented by icons, the so-called *avatars*[50] (Heim 2001; O'Donnell 1998).

Discussion lists and *news groups* are a special form of Internet communication. In these communication situations they do not deal with actively developing communities but with (the online) shaping and maintaining of already existing (online or real) communities. The individual lists and groups (there are many thousands of them) exclusively

[50]According to Hindi mythology, *avatars* are terrestrial incarnations of Vishnu. The naming obviously suggests that the avatar (a multi-dimensional icon developed according to one's own taste) is the incarnation of the player in the virtual reality.

use text-based asynchronous communication corresponding to their subjects. The communication engineers who supervise the normal functioning of the network regard hate speech and rude, abusive tone and digression from the subject as acts violating netiquette (except for "*flaming*" sites reserved for these purposes), and they sanction the perpetrator by excluding him from further discussion. Using pseudonyms, or hiding one's personality can occur even in such places, but they are not frequent at all, since what the members of these communities want is precisely to express their opinion to the others. Many kinds of associations and professional or recreational organizations manage their communication with their members in this form. Lists and groups are typical forums of *publicity*. The only essential difference between lists and news groups is that the texts sent to a list are automatically distributed among the subscribers of the list, while the messages sent to a news group are not; those who are interested in them have to reach the computers or the web space storing the news group in order to read them. Thus, in case of a list, we can exclusively send and receive email messages; however, in order to follow a news group, we also need additional software.

Working on *websites* (creating them and studying them in different ways) is an internet communication situation of decisive importance. On the one hand, this internet situation resembles the network situations of *mass communication* (printed press, radio, television), on the other hand, it is also important that the websites participating in the situation also represent the nature of the *book* as a communication machine. These elements, superficially not fitting together, somehow still create a unity; in a peculiar form in which a TV set seemingly broadcasts a book continuously, and in which a world constructed for us is seemingly included in a few pages of a book.

The situation of websites is reminiscent of the situation of network *mass communication*, inasmuch as, similarly to program providing networks, websites provide the service of content (determined by the editor) in a continuous, one-directional way. The visitor viewing (seeing, reading, and possibly listening to) a website is at the mercy of the situation to a significant degree; the expression of his own opinion is only possible indirectly, for example, in the lucky case in which he can comment on the website in a message sent to the editor. However, at this point an important *difference* from the mass communication situation becomes apparent: the personal messages of the visitor play a role in the "scanning of the image" of the website and in the exploration of its link structure. Of course, these are not decisions about the content in the strict sense of the word, but they unavoidably influence the viewed content. In other words, we could also say that because of the necessarily "image-like" characteristics of the website, a certain degree of *interactivity* and a certain degree of *freedom* and *active* contribution of the viewer is present in the process. Of course, similarly to mass communication situations, the freedom and active role of the *creators* of the website – though possibly we talk about a person and not an institution – is obviously present.

At he same time, *the nature of websites* is reminiscent of *books*, chiefly because websites are *situation shaping communication machines* similar to books. Websites give a shape to texts, hypertexts and images, they mediate between the operator and the visitor and they represent the intentions and values of the operators, users, and other people. They shape the communication situation consciously and explicitly according to the intentions of the creator (and to a smaller degree, according to the intentions of the visitors), and we can use them to communicate almost any kind of value system and ambition. Websites – similarly to books – have a personality. The personality is the alter ego of the author and it is his construction. The various contents used for the construction (information, declarations, own or quoted ideas, texts, images, methods, etc.) are significant primarily because someone or some people find it important to group them in a given way and represent them continuously for the public. Though internet websites *transmit contents* similarly to mass communication networks, their content is not impersonal, but actually original and usually personal. (To some extent, this is a requirement even in the case of institutional websites. Developing original institutional websites gives well paid jobs to many graphic artists, IT technicians, and web designers.) Web design gets close to artistic activity, and it is taught as such in many places. Shaping the contents in an artistic way is a decisive factor in the "world-like quality" of websites since even if involuntarily, we regard personal websites *as if* they represented a world – the magnificent and superficial world of the person or people who design it. The "*world-like quality*" of websites is not content dependent, but on the one hand, it is based on assumptions about the person or people who create the website, namely that (similarly to us) they also have their own world, and they reveal this feature of theirs thereby;[51] on the other hand, the compactness of the construction also influences success somewhat. Even in the case of mass communication, it is not the contents of the news or the cultural contents that makes us feel part of a world; similarly, from a communicative point of view it is not the content that matters in the case of websites either – in fact, it is in most cases redundant, meaningless or incomprehensible – but their existence. They inform us about the fact that someone or some people created and maintain them. Someone or some people are *there*, since they ventured to shape situations; they created and

[51] In other words, we are using the assumptions of folk psychology and we follow its procedures.

maintain a given situation for us. While visiting a website, we leave our own reality behind and get to a *different* place virtually, and (in a process similar to reading) while being absorbed in the strange situation, we can get to know its *virtual reality*. In the moments of our presence, we prove that this can be a world as well. Thus, websites always chiefly inform us of other worlds. The contents that express the message of the existence of their world become interesting only after this. The world shaping effects which function in web design and browsing do not coincide with any of the methods of the earlier mentioned world shaping procedures (Heidegger, Goodman, Lukács), but they utilize their components.

The similarity between communication situations developed through websites and mass communication situations can perhaps be seen most clearly in the case of *blogging* and *podcasting*. Of course, with the important difference that it is not abstract, impersonal institutions (newspapers, radio stations, television channels) that are responsible for the communicated content but concrete individuals (though they might hide behind pseudonyms). Above all, blogs, web journals or *LiveJournal* are personally edited, written, and published newspapers and magazines, the contents and form of which is greatly varied, and can be quite personal (Gurak – Antonijevic – Johnson – Ratliff – Reyman 2005; Blood 2000). Most web journals are text based, but a smaller proportion of illustrated versions exist, too, as well as journals which are specifically based on images. Podcasts (perhaps we could call them web radios) (Podcast.net) use similar methods and have similar aims with the difference that it is audio media, that is, spoken texts and music, which express the personal content. (For the time being, video journals and personal web televisions are rare, but nothing can hinder their spreading in the long run). Of course, personally operated web radios and personally written newspapers inform us of a world completely different from that of the institutional ones: this is a plural, individual, fragmented sphere, which is trying to rid itself of all external constraints. Thus, the aims are quite clear, and the methods are being shaped (Herring – Scheidt – Bonus – Wright 2005; Bibliography on Blog 2006; Orihuela 2003).

We can see that the communication network of the Internet may contain many different kinds of elements. What is more, the elements listed so far do not always function independently of each other, indeed, they cooperate in the typical case. Thus, for example, many websites contain email addresses or the addresses of news groups, so we are close to these situations during browsing; or for example our email system might contain instant messaging programs, it can offer us the opportunity to join a chat, and many other combinations can be realized as well. Big software companies are developing and spreading programs which collect all known ways of communicating through the Internet into one system, thus, even the simultaneous use of all functions seems to be possible. The complexity of internet communication is growing, and it is exposed to fast transformations both in its details and as a whole. Even the "most ancient" technologies are not older than 20-25 years. The dysfunctional usage of communication networks originally developed for solving military problems has led to far-reaching consequences that are radically transforming our lives. For the time being, it seems to be unquestionable that this is the more favorable alternative.

3.3.4 Machines, communities and society

On the one hand, the control over a communication situation leads to successful communication (from a technological point of view), on the other, (as a result of the successful operation of the technology) it makes it possible to determine the nature of the community that can be developed through the communication. In the previous chapter we specified two "parties" as active participants of the communication situation: the *persons* participating in the communication and the *medium* of the communication. First, we differentiated between the situations of the person, the private sphere, publicity, and mass communication on the basis of the level of control that the communicating persons have over the situation. Then we described the active communicative role of the medium, as a result of which the medium itself may occupy a dominant position in determining the situation. Communication machines participating in the situation produce a typical form of the activity of the medium. The concrete form of control over the situation and the nature of the community created thereby develop *as the common resultant* of the two "parties", that is, *the ambitions of the communicating persons and the communication medium (shaped by machines)*.

Though *communication machines* participate in the shaping of the situation according to their own nature – similarly to other machines – their nature is not controlled and shaped by them but is produced by their creators, and in principle exclusively serves the realization of the values and interests given to them by their creators. Communication machines strive for controlling the situation on our behalf, representing the communicating persons. The human intentions delegated into machines conflict with other intentions and shape the situation thereby. Our communication machines are our faithful servants, occasionally equipped with individual features, which behave in accordance with their programmed nature and achieve our ambitions – or they face the failure of these ambitions.

An unsuccessful book, photo, printing, file transfer, or email message urges us to check the intentions we gave "to our machine", to examine the functioning of our machine, the parameters of its settings, and the conditions of successful execution, and we can give it a command to repeatedly develop and replay the situation with the newly established conditions.

The possibilities of control of the *communicating* persons may be different even to a large degree. Thus for example in the case of following the programs of a commercial television or visiting a web portal, it is almost impossible for an everyday viewer or user, whatever he might do, to avoid an encounter with advertisements. Such helplessness can obviously be diminished if the communicating persons can participate in the communication by using *active machines that follow their own intentions*. This is precisely the essential value of internet network communication: we gain almost unlimited possibilities in shaping the situation through the adequate use of our own computer.[52] This kind of freedom is demonstrated in a peculiar way by the activity of hackers. The position and the possibilities of hackers are essentially the same as the position and possibilities of ordinary web citizens, but as a result of their *expertise*, they can exploit these possibilities. Thus, a hacker is some kind of "hero of freedom" of the Internet, who shows ordinary people the broad borders of their freedom in a demonstrative way. In principle, his aim is not to destroy (other) computers, but actually, the taming of (his own) computer and asking for its help. Hackers – in spite of the fact that usually they are not professional programmers – learned the language of computers. In contrast, ordinary users are at the mercy of official experts, and they can only formulate what "user friendly" programs make possible for them. Since most communicating people are not prepared to acquire the language of communication machines, some kind of interpreting between the computers and their users is indispensable, but at the same time, this has the consequence that experts represent their own interest as well and they enforce them in an uncontrollable way. (Furious attacks against various software companies and spontaneously organized counter-campaigns are based on the recognition of their ambitions.)

While discussing the problems of literacy, orality and the communicative role of images, we have already tried to characterize the community building possibilities of people who use *simple* communication. In the broadest outlines we have also discussed the questions of community building between the authors of *books* and their readers and between the makers of *images* and their viewers. We have recognized the characteristics of communication mediated by *computers* in its universality and in the possibility of total human control over the situation. These characteristics appear in the features of the communities that can be developed, both in case of individual computers and computers in a network. For ordinary users, communication through individual computers or networks is often not separated. Communicating people are usually not interested in whether their message is transmitted through an individual computer or through a network of computers. (For example, it has no significance for them whether someone shares a file with others on a magnetic disc or through a network). However, it is important to take into account that the values built into individual computers and the values represented by the network do not necessarily coincide, thus they can actually introduce different values into the communication situation. Different values lead to different communities. Later, we will show that while individual computers represent modern values, computer networks represent postmodern values, from which we can infer that modern communities can be developed through individual computers,, while postmodern communities can be developed through computer networks.

At this point, perhaps it is worth shedding light on a social constructivist point of view of the philosophy of technology (and science). On the one hand, communication machines are built as *technological tools in the traditional sense* and work as such, on the other, *they are also technological tools of communication* and the creation of communities takes place with their contribution. There is a close connection between the two types of technology (the one that leads to definite material processes and states, and the one that results in the development of communities): in a certain age, people apply *the same principles* in order to understand and solve *scientific, technological* as well as *social and political* problems (Shapin –Schaffer 1985). This can be observed in the case of communication machines perhaps even more clearly than in the case of other machines, since these machines are directly utilized in the creation of communities. It is characteristic of communication machines that *the same* parts of the machine and the same processes participate in both technological situations. The same parts and the same processes can be in a material-technological and in a communication technological relationship with each other. A computer or the whole Internet can be a material-technological and a communication technological tool at the same time. Consequently, it seems evident that they represent the same values in both technological situations. Essentially,

[52]It is instructive to recall the social consequences of phone use. The discussions focusing on this topic [Pool 1977; Fischer 1992] suggest that though countless local and partially significant effects were observable in the whole of society, on the whole it still did not trigger a transformation of the whole social system. Rather, it facilitated the faster and more effective functioning of traditional social practices. We can explain this situation by the fact that the telephone is not an active situation shaping communication machine, and thus, it is poorly suited for initiating radical changes, in contrast to computers, networks of which are indeed capable of this.

the same value community manifests itself in the material technology and in communication, thus, this time Latour's "parliament of objects" (Latour 1999) and the "parliament" of the communicating people are in session together.

It has been well known for decades that there are significant differences between the communities that can be developed through communication machines and their networks and the communities that are essentially based on material-technological production. Preferring to use communication machines and networks creates communities that make the development of the so-called *information society* possible (Masuda 1988; Nora – Minc 1979). The first descriptions of information society noted the increasing significance of information in the reproductive processes of society, production, and culture, but they did not take notice of the peculiar technology of *producing* information and its decisive significance. In fact, the name "information society" is not quite appropriate, because if we use it exclusively, the consequences of information and communication technologies become blurred. (Recall that we characterized communication as a special type of information technology, and we described it as a community version of information technology.) The consequences of information technology are the openness and virtual nature of the created product, and the consequence of communication technology is the open and virtual community that is created. Furthermore, the communities created by network technologies are also scattered by nature. Recently, societies consisting of such communities have been identified as *network societies* (Castells 2005). Nevertheless, the unfolding changes seem so profound that we find it better not to use the expression "society", since its use could possibly obscure essential differences. Taking into consideration all this, we will call the human form of existence built on scattered, open, and virtual communities *web life*. The second volume of our study will characterize web life in detail.

3.3.5 World and community

It is notable that communication situations can develop as a result of the existence of situations which serve inherently non-communicative aims. What is more, this is not rare at all, but very frequent, since most human situations are complex. Complexity chiefly means that a real situation can be regarded as different types of situation, for example a technological, communicative, moral, cognitive, business, etc. situation, and we have to take the consequences of all of these into account during our analysis. Thus for example while reading an email, we are in a special technological situation, while at the same time a communication situation obviously exists, and we are also in a business connection with the internet provider. Additionally a certain cognitive situation existing in a parallel way makes the understanding of the message possible, and so on. We can also express all this by saying that real life situations of humans are complex, composite, and "infinitely rich" and though for the sake of analysis we can decompose them into simple, clearly identifiable, intelligibly functioning, easily analyzable abstract situations with predictable consequences, we have to know that such situations are abstractions. Consequently, they are always realized in concrete life situations and almost never in a "pure form," that is, separated from other simultaneously existing situations, but necessarily in a "mixed form", i.e. together with other situations.

Thus, from a higher level of the examination, real communication situations appear as embedded into a complex situation. This broader context is not necessarily created by our identifying yet other participants (persons, things, relations, etc.) in the environment of a communication situation; rather, the case is often that we evaluate the factors that determine and maintain the situation (certain people, objects, connections, intentions, and tools) *in different ways*, partly as the components of a given communication situation, and partly as the components of other (technological, ethical, cognitive, etc.) situations. Our method obviously assumes that neither the situations themselves, nor the components which make up the situations are homogenous, with a nature fixed once and for all, but they are complex and open, thus, their analysis is necessarily complex and plural, too.

It seems to be useful to look at the problem from a somewhat broader perspective as well. First of all, note that the "decomposition" of complex life situations into controllable situations is an inalienable part of all *human practices*. This is due to the basic survival strategy of humans – which we identified as the structure of "the control over situations" in chapter 3.1.1 – and it has a determining role in shaping the relationship of mankind to his natural and artificial environment. Following this strategy in individual situations, man is capable of survival based on control here and now in fact, in a long series of "here and now"; that is, he is capable of making it happen that his goal is realized instead of the naturally given one. To use Heidegger's words, it seems to be certain that man wishes to be *the ruler of existence and not the shepherd of existence* (Heidegger 1994), at least here and now. Of course, the real life situation of man is different: *in the end*, man obviously always loses something in a life situation which is divided into controllable situations. At first he loses the situation, in the end life itself. If the complexity of life situations is dissolved into a multitude of situations, their continuity, fullness, density, completeness, and finally their identity disappear; the texture of life breaks up into things, relations and states, and instead of life, only hours

come.[53] Things, relations, states, places, and days are not the components of life (and death): they are neutral, timeless and indifferent. This is why they are controllable. But control always *ends*. The separability of situations, the stability of the separability and the power of the will maintaining the separation is finite. In the end, all situations and results of control disappear – but there is a chance for us to escape into a seemingly infinite chain of situations through yet another controllable situation. The life situation of humans is this struggle itself, "If the world perishes/ let there be flowers on its grave".[54]

The "dissolution" of complex life situations into controllable situations is a necessary topic of *human thought* as well: the activities and the reflections about the activities are essentially inseparable from each other. Thought identifies and describes activities connected to a situation as a certain kind of technology. However, conceptual reflection about human life situations is the task of philosophy. Philosophy does not dissolve human life situations into other situations, but it develops them into a world, a universe which is accessible to man in some way; it develops it into *the world of man*. It identifies the world present for man as *reality*. Reality is the product of human life; the sciences, arts, and religions have equally tried to explore it. The worldview of sciences can be more or less objective; that is, with appropriate procedures we can set aside the characteristics of life situations of individual people, ages, and cultures, and we can identify a factual reality that exists in abstraction as the common content of the various realities. The idea of reality as independent from mankind can be created in this process of abstraction and generalization. We set aside some human characteristics in each step of abstraction and generalization, and – continuing the process infinitely – we can reach the boundaries of the human sphere of existence and we can decide whether we can transcend it or not.[55] Without any logical constraints, we can freely decide whether mankind can transcend human dimensions and reach a reality independent of mankind or whether at most it can only be approached asymptotically. If we gradually set aside all that is human during a human activity, and finally, we add the setting aside of *the* human itself as a step, we can reach a reality independent of mankind, but if we follow a different logic and we cannot differentiate between the infinite series of human characteristics and *the* human, we can never step into a reality independent from mankind. Our decision is free from a logical point of view, but it is a decision of worldview, that is, it depends on our philosophy.

As a certain principle of "meta-philosophy", we accept that we are interested in the world of the "survivor" man, that is, we are trying to develop a philosophy which necessarily reflects the survival strategy practices connected to situations. Here we have to understand the role of control over situations, that is, the various technological activities, in shaping the human world. Individual philosophical traditions try to solve the problem in different ways, and in different versions. The function of technology in the production and exploration of reality may be different in different worldviews (as a result, the connections between sciences and technologies may be different as well). The degree of the separability of individual situations and its significance, the stability of situations, the place, role and possibilities of man in the situations, and thus the world shaping effects of all these, might be different as well.

On the basis of all this, it is easy to understand that the *communities* created through communication situations are themselves connected in various ways to the diverse entities that make up the human world. It seems to be unquestionable that communities as such have a value, and the role of the factors determining their characteristics discussed earlier is uncontroversial as well. Nevertheless, the exploration of their broader context can make our understanding of communication more nuanced in both questions. As a result of the embeddedness of communication situations in life situations, we can keep communities alive, that is, we can "keep them inside" life. Everybody can easily differentiate between a flourishing, strong, *alive* community, and one which exists in a forced, constrained, cold way. With the help of this embeddedness, we can also easily understand the degree of *strength*, *robustness*, and *stability*. The *size and changes* of a community, its growth, decline, and the dynamics of building communities, crucially depend on the nature of the embeddedness, as well as on the development of the connections with other aspects of the life situation. It is often difficult to judge the degree of *reality* of a created community. This is understandable since its reality also depends on the world present for the human, that is, its character leads out of the communication situation. It is not surprising at all that the reality of communities, as well as their virtuality, varies

[53]From Endre Ady's poem „Hours instead of life." Translator's note.
[54]From Attila József, *I'll be a gardener.* Translator's note.
[55]Thought has to face the same problem here as in the interpretation of movement. Tóth Imre's interpretation of Zeno's paradoxes superbly reveal the possibilities of thought. We have to make a decision here, too: will the fast Achilles overtake the tortoise? There is no *logical* constraint to decide one way or other, we can *freely* decide whether we add one more to the infinite number of positions of the runners (the position of overtaking), and we say that Achilles is only asymptotically approaching his competitor but he can never reach him completely. Both standpoints are logical and intelligible, but their logic and meaning is different: if there is no actual infinity, the number of the set of positions is not growing, movement is impossible and Achilles cannot reach the tortoise; if there is an actual infinity, the number of the set of the positions of the runners is growing, movement is possible and in this case Achilles overtakes the tortoise [Tóth 1990].

socially and historically as well – essentially in a way that can be connected to what we said while analyzing virtuality.

Several communication situations can exist in a complex life situation at the same time. Think for example a lesson by a teacher in which his own child is a student, or when we exchange a message with a colleague sitting next to us. The interactions between the various types of communities created in this way can structure our communities and endow them with *a complex and changing structure*.

The development of communities is often *secondary* in cases in which the existence of given life situations or special situations also shape a community creating communication situation. In such cases, the necessary interpretation of the situations and the special situations can happen as a result of sharing views and activities, and a special type of community is created. Of course, we can often speak about very special media in this secondarily existing communication situation, such as for example money, power, material or ideal objects, and similar things.[56] For example, this situation often occurs in countless variations in economical or political situations. Production, consumption, exchange, and execution of power are typical forms. In these cases the basic characteristics of the community are determined by the dominant situation. As an illustration, recall Marx's concept of money community, the community forms created by various relations of consumption and ownership, and the special communities of hackers, crackers, or even those who favor the usage of free software.

Last, but not at all least, it is also important to notice that communication situations can contribute to the existence and operation of other situations; the community created through communication can be the passive or active agent of other situations. Since almost all human activity is necessarily social, this connection is so essential that it serves as a basis for the existence of communication.

3.4 The communication of knowledge

All communication transmits knowledge, since the sharing of the mental state of the communicating parties necessarily goes together with the transmission of their knowledge. Therefore, we can unquestionably talk about the communication of knowledge. The communication of knowledge seems to be unproblematic from a methodological point of view since both communication and knowledge are bound to a situation, thus, their validity can overlap with each other. But what about situation independent knowledge and knowledge which is necessarily regarded to be true in all situations? The most important condition of creating knowledge is the sharing of ideas with others, since situation independent knowledge can only be formed from shared ideas. Knowledge is based on a community of ideas, since the necessary validity and justification can only be interpreted in a community of ideas. Ideas sanctioned by a community of ideas break away from their own situation and lay claim to a certain situation independent validity. The community of ideas created through a communication situation pronounces individual ideas as independent from their own situation and as general and necessarily effective ideas or knowledge. *Ideas exist and reveal themselves in their own situation and they are justified in a communication situation*. Thus, knowledge is necessarily created in a communication situation. It follows from our point of view that there is no knowledge independent of communities. (In a certain sense, situation independent ideas created through the comparison of certain experimental situations and seemingly lacking any communication can be regarded as knowledge as well, but note that in such cases the experimenting scientist is "communicating", partly with nature and partly with his own scientific tradition, through which he chooses the appropriate experimental situations.) The process of communication is capable of justifying or refusing ideas because it creates a new situation (which can be regarded as the idea's own) for the given idea. The new situation has significance in two respects. First, it fits the idea into a new context and represents it in it (we can consider this as the function of *publicity*), second, while fitting the given idea into a new context, it evaluates it (we can consider this as the *critical* function). In other words, communication secures the two basic conditions of justifying ideas: publicity and a critical approach. These statements seem to be true for the practical, theoretical, rational, emotional, etc. versions of knowledge, that is, for all of its versions. However, in what follows we will mostly discuss scientific ideas, that is, the versions of knowledge that can be found in the sciences.

Above all, the possibility of a situation independent existence of scientific ideas is connected to the appearance of *writing*, since written texts are the first medium capable of mediating between any situations. (To a certain degree, speech preserved by memory is also capable of performing the same function, but only in case the speech preserved

[56]Here are some very irreverent examples: "money talks…", "you can see who the boss is at home", "I do not understand the language of violence", "take that!"

in memory is as if it was a written text. This "polished" way of speech is on the borderlines between writing and live speech, approximately where we can find written text which truly follows the structure of live speech.) Obviously, written texts which convey ideas are capable of operating the functions of publicity and critical evaluation. At the same time, through recording the ideas, written texts radically expand the possibilities of both functions and widen the dimensions of space, time, and context. As a result of its favorable characteristics, writing has been the leading communication medium of the sciences until our days. During the centuries of the development of the sciences, the standards of scientific communication developed with the institutionalization of scientific activities, as well as the communities created by communication. The publicity and the publication of scientific ideas has always been one of the key factors of modern European development. It is chiefly those ideas which successfully survived the criticism periodically formulated in the medium of scientific publicity which could achieve and preserve their scientific character. Nowadays, the extensive development of modern science built on similar traditions is still going on, but the changes in communication that we can observe in recent decades, above all the relocation of scientific communication onto the Internet, created a new situation for scientific ideas as well.

3.4.1 The technologies of communicating knowledge

Undoubtedly, the most important medium of scientific communication is writing; at the same time, it is also obvious that other communication media also have a role in performing scientific activities. *Scientific schools* have a great significance both in the development of the branches of science and in the functioning of scientific communities. Obviously, varied forms of direct communication function between persons in such "institutions". They often do not write down the scientific methods, procedures, or even the results characteristic of a school, but they transmit them through the various channels of personal communication. Similar procedures are customarily followed in the more developed forms of passing on knowledge, as for example in lessons, laboratory practices, and seminars, that is, it is presentations, practical demonstrations, and debates which transmit the ideas. It is characteristic of all these communication situations that the scientific leader or teacher who embodies the traditions controls the situation. Consequently, these situations are suitable for the reproduction of knowledge, and for its creation. There are hardly any elements in the whole procedure which are characteristic of scientific activity; basically the process of passing on any kind of knowledge might take place in a quite similar way. It is not surprising at all that this description can even be applied to the methods of anthropology (Latour – Woolgar 1979).

Of course, it is written ideas which are presented to a wider audience, spread in a more or less fixed form, and which have to confront other ideas which have a key role in the creation of knowledge. Nevertheless, written scientific texts have numerous versions with different functions and structure. Though the language of handbooks which mostly follows the practices of lessons, course books and notes is fixed and usually stable, these texts were not created with an intention to discuss ideas with the members of the scientific community, that is, their authors undoubtedly control the communication situation. *Popularizing* educational works created for a wider audience are usually created from a similar position as well. Scientific criticism occurs in the case of textbooks and educational texts, too, but such criticism chiefly focuses on the competence of the author, and they only deal with questions of knowledge secondarily.

For centuries, the primary form of scientific communication, serving scientific publicity and also making criticism possible, was *correspondence*. (Some people – for example Leibniz – could write an astonishing number of letters even in one day.) Besides correspondence, consulting certain books (or visiting libraries) was also fashionable for a long time. Printing, and the possibility of owning printed books, essentially changed this situation, not immediately but in a process lasting for hundreds of years. The crucial change was the appearance of *scientific journals* from the mid 17th century, which largely replaced correspondence. The publicity and the opportunity to criticize ideas published in scientific journals radically increased; and it is this situation which crucially contributed to the fast development of modern science. The publication of *scientific books* – depending on the discipline in a somewhat different way and to a somewhat different degree – mostly served the summarizing of scientific results, and, through the summaries, the creation of a presentable scientific worldview. Books also often contained new scientific results, but they were not necessarily written for this purpose. This peculiar nature of modern scientific communication (short, quickly published, and possibly also quickly outdated papers in journals about concrete ideas meant to be scientific, as well as summarizing monographs about the current state of the sciences presenting these ideas in a structured way) has stably persisted for centuries. The changes that we can observe are mostly quantitative. There were already complaints at the end of the 18th century that it is impossible to process the great amount of scientific information (about 50 scientific journals existed at the time); nowadays, the tens of thousands of journals published for a scientific purpose publishes several million scientific papers a year. The continuous differentiation of areas of science, the startling number of published books and papers, and the publication pressure – formulated as a

financial threat – on the people who work in the sciences, as well as the aggressive business ambitions built of scientific activities, are forcing a certain transformation of the content of scientific activities and communication nowadays besides the quantitative changes (Leydesdorff 2002). This appears in the spreading of dissatisfaction with the industrial functioning of scientific activity, pervaded by business interests, and it manifests itself in publishing scientific material on the Internet – besides, or instead of, traditional journals.

Of course, besides speech and writing, *images* also participate in scientific communication. However, their significance is unnoticed or remains in the background. Scientific publications and books are practically unimaginable without figures, diagrams and tables, but these are habitually regarded as units of communication inserted into the text and subordinated to it, even though they clearly have an image nature. At the same time, it is by all means notable that throughout the history of thought the optical devices that produce images were often referred to as "epistemological tools" (Ihde 2000) which can be used to explore and represent problems, and as a necessarily image-like representation of scientific problems (Nyíri 2001) when the complexity of the examined problems made their linear discussion difficult to a significant degree. For example, modern science regards the structural complexity of the organic and the inorganic world, the mind, and society as such complex phenomena, and it readily utilizes images or metaphoric imagery in order to represent them. The language of many scientific disciplines quite clearly suggests a continuous, hidden usage of images. From this point of view, the popularity of the expression "picturing" perhaps indicates the continuous usage of our mental imagery.

Special versions of communication situations work in scientific *institutions*. Modern science libraries, laboratories, research institutions, universities, publishers, museums, associations, and academies all represent various versions of scientific *publicity*. From a communicative point of view, the researcher who reads a scientific paper or book can feel himself in the same position as the author. However, the whole of the scientific institutional system and some of its important parts function as factors of power over the individual who works in the sciences. As regards communication, this consists in for example the contingent opportunities of participating in the work of the institutions, opportunities for individuals to speak up and do so with equality, the regulation of opportunities for publication and orientation, and providing or withdrawing countless other opportunities to communicate. Scientific publicity is also permeated by the nature of modern civic publicity (described by Habermas) and we can clearly identify the phases of its transformation mentioned earlier (in section 3.2.4.).

3.4.2 The communities of knowledge

The communication taking place in varied communication situations which creates knowledge also creates various communities of knowledge. The activities taking place in a scientific school develop a community between the teacher and the student, or in more traditional terms, between the master and the disciple. A slightly different relationship exists between the whole of a scientific school and its individual representatives. Internal communication taking place inside closed scientific communities separated from the wider public can lose a significant part of its critical function besides publicity, and can create a peculiar inclusion of science.[57] Of course, in a certain sense, each scientific community finds itself in a similar situation. In the normal Kuhnian periods of its functioning (Kuhn 1984), science prescribes the following of the paradigm for the members of the scientific community; talk in a manner different from the paradigm cannot be present in the community. Of course, this procedure leads to the proliferation of anomalies and eventually to replacing the paradigm accepted so far with a new one. Kuhnian scientific revolutions happen unexpectedly and in an inexplicable way as regards their details, as an explanation of which we might mention Kuhn's disregard of the real influence of broader publicity. That is, members of a scientific community obviously necessarily participate in other communities and in other communication situations and they bring these relations of theirs into their paradigm following situations. Thus, the reputation of the work of a scientific community can never be based on completely closed circles of publicity.

The diverging critical evaluation of the wider and narrower spheres of publicity (belonging to a given scientific community) can often be seen in connection with the public reputation of the results and achievements of the scientific community. The public reputation of science (and its results) can be rejected, but not in a justified way because scientific achievements which can only be proven in the narrow circle of the initiated and in the style of speaking developed there cannot in fact be regarded as knowledge – since they are not completely situation independent – but only as ideas with a technological nature. Knowledge created of ideas proven to the highest possible degree is at the same time developed in "the most democratic" way. The broadly popularized idea according to which there is no democracy in science is based on an unfortunate error and is only valid for technological ideas tied to a situation.

[57] An apt expression by Vera Békés.

The scientific nature of scientific knowledge is provided by the highest possible degree of situation independence, which in turn can only be judged on the basis of a publicity developed in the widest possible way. It does not follow at all from this that each opinion matters in the same way, only that each opinion matters. The position of the scientist and the layman does not become identical, only equal. From a communicative point of view, *knowledge is not power but certainty*.

A special community of knowledge can be developed between the scientist and his subject, for example nature or its certain aspects. Obviously, the community between nature and the scientist who communicates with nature in the "language of nature" exists in a metaphorical sense, but perhaps we can even claim something stronger. Man, who is a natural creature himself, utilizes his own natural features in order to understand the examined natural process, and a community like this does not seem to be simply metaphorical. In case of researchers in the social sciences, hoping for a certain abstract objectivity, they often try to abolish or ignore communities precisely like this. This procedure is strongly questionable, especially because it is probably responsible for countless antihuman conclusions which were deemed scientific.

3.4.3 Science and knowledge on the Internet

The communication methods of the sciences started to change even before the appearance of the Internet (Odlyzko 2000b). The changes partly took place in the contents of scientific activities, and partly in the social and economic processes connected to scientific publications. It seems that in the long run, the significance of individual scientific achievements decreases and (even in mathematics and philosophy) the number of papers written by several authors increases. At the same time, the number of conferences which make personal encounters and thinking together possible, personal contacts, and fellowships significantly increase. On the other hand, we can also observe that even big Western universities (not to mention research facilities in Hungary) cannot afford the increasing number and price of scientific journals. What is more, most of the journals do not perform their task very well, and are often published with a significant delay or irregularly. The protests and spontaneously organized movements against the profit oriented behavior of scientific publishers (real or otherwise) have existed for decades. With the appearance of the Internet, the solution of the "crisis of journals" immediately seemed to be obvious: we have to relocate scientific publication on the Internet. The technological conditions of the change and the possibility of accessing publications on the Internet worldwide have been basically given for decades. However, the social conditions of the change have only permitted a little progress so far.

People, groups and institutions following various strategies are working on developing an appropriate solution. It seems to be a common need to ensure that each author is able to publish his papers and continuously make them available on his own website and/or on a website created to collect such papers, even without the permission of the journal that published the paper in the traditional form. For example, the movement *Public Library of Science*, the initiatives created by Stevan Harnad (Hernád István) (Skywriting, Open Archives Initiative, etc., Harnad 1998a; 1998b; 1999) and many others, have similar aims. Harnad's objective is that only those papers should be published on the web which *survive professional criticism* organized with the help of experts and which use some elements of the traditional system of references. With the help of this selection method, he would like to avoid presenting papers together on the web which lack any scientific value or are mistaken, and papers which are valuable (Harnad 2002). Obviously, such selection can only have a local effect, since nobody can prevent the authors of the papers refused by the peer reviewed websites to publish their work on their own website. According to this approach, we can develop sites in the whole of the Internet which are worth visiting for those who are interested in scientific truth. On other sites, they provide an opportunity to publish without any *content based selection* (see for example the website of the Los Alamos Physics Archive, which accepts papers in physics: http://xxx.lanl.gov). There were many debates about publishing on the Internet and there are still many today in journals and websites like *Nature* (Harnad 1998b; Odlyzko 2001), *Science* (Bachrach et al. 1997), *American Scientist* (Harnad 1998a) and several others and on their mutations on the Internet. Meanwhile, as a consequence of all this the habits of publishing science are slowly transformed (Thagard 1997). The reason for publishing online is not only economical and financial, but chiefly the fact that many more people read and cite papers available on the Internet (such papers are cited 3 to 5 times more often than papers published on paper, (Lawrence 2001)). Slowly, papers which are not published on the Internet will remain unnoticed. Recognizing this, even traditional publishers – nowadays almost compulsorily – create online, internet versions of their journals published on paper. Meanwhile, they use various business strategies from free downloadable volumes to download permitted only for subscribers and to versions which only publish contents and abstracts. The publication of scientific books is quite similar, but with changes of less intensity.

We can collect further arguments for publishing on the Internet based on the ideological ground of the principles regarding the nature of intellectual property, its inalienable nature and the right to share it freely. Such ambitions are anyway always present in Internet use, for example in the creation and spreading of freely distributable computer software (Kelty 2001). Activists with a background in information technology invent various tricks in order to acquire downloadable programs, songs, or films freely. These causes are not (or not only) motivated by financial gain but rather, they represent the struggle between the personal knowledge of the "the poor," and the immensely rich, impersonal multinational capital. Scientists who publish their scientific results freely are in a similar situation: through their activities, they are trying to damage the property rights that scientific publishers have regarding scientific results and they are trying to preserve their free control over their own intellectual product for themselves (and for the whole scientific community).

At the same time, publishing on the Internet is presented in a quite peculiar light by its online environment because most of the ideas presented on the Internet are typically *not* situation independent *knowledge* but rather, ideas *tied to situations*. In this way, we might easily have the impression that scientific knowledge published on the Internet is practically lost in the sea of "unscientific", practical, or even completely useless ideas. Two strategies are usually attempted in this situation. On the one hand, we can try to establish sites which contain certain scientific ideas in a concentrated way, as for example Harnad suggests, or as the above mentioned Los Alamos Physics Archive or countless online journals do. On the other hand, we can develop sufficiently sensitive search techniques, with the use of which scientific contents can be sorted out effectively. Regardless of their dynamic development, search engines are presently still working with a low efficiency, what is more, judging the scientific quality of a text is not only a semantic task but requires philosophy of science as well. We are hardly mistaken in expecting a significant development in this area in the near future. Certain internet pages such as *Yahoo!* are trying to combine the two strategies somehow, and they are striving to maintain continuously renewed thematic collections and to offer sensitive search methods at the same time.

Chapter 4. The transformation of culture in late modernity

It was easy to identify the technological and communicative aspects of the Internet; their significance is so obvious that it was impossible to forbear from analyzing them. The difficulty only consisted in choosing useful conceptual tools and methods of analysis of the philosophy of technology, communication theory and the philosophy of communication. However, the case is somewhat different with the "cultural aspects" of the Internet. It is more or less clear that Internet use has certain cultural aspects but it is often doubted that these aspects have any significance for the state and evolution of culture. Such point of view usually points out the fact that the Internet does not substitute any traditional cultural sphere, medium or form of activity; at most it complements their versions and makes them more colorful or even more complicated. The situation is made more difficult by the multiple meanings of the concept of culture. Earlier we discussed a similar difficulty in connection with the concepts of information and communication, but facing the task of interpreting culture, the difficulty obviously gets more serious: many disciplines involved in understanding culture (cultural anthropology, literary theory, semiotics, critical research of culture, communication theory, sociology, philosophy, etc.) work on hundreds of definitions of the concept (Márkus 1992; Wessely 1998; Niedermüller 1999; Geertz 2001; Lévy 2001; Alan Liu's Voice of the Shuttle; popcultures.com). Even a simple review of such an abundant collection (not to mention its analysis) would be impossible here merely for a practical reason and thus we do not attempt to do so. Nevertheless, since in what follows we would like to argue that the cultural aspects of the Internet are crucially important both for understanding late modern culture and the nature of the Internet, we are forced to realize another – intellectual – difficulty, namely: to develop and apply a useful sketch of a concept of culture. Meanwhile, we will of course necessarily utilize numerous available theories and understandings of culture, but we will ultimately set aside a systematic presentation of the connections between our approach and the theories used.

The understanding of culture used here is strongly connected to the problems of technology and communication discussed earlier. We described communication as a community creating activity in earlier chapters. We derived the most important characteristics of the communities created through communication from communication situations. However, we did not say much about what kind of *aims* communities (of different levels) might have, what kind of particular ambitions and *ideologies* communities might express and represent, what features are characteristic of communities as regards their *form* and *content*, and whether features of form and content can be separated at all, and so on. We will discuss all these questions as problems of identifying culture. It is the common interpretations of culture of a similar basis which offer an opportunity for this solution the most obviously. The principles which make a common interpretation possible usually follow a *semiotic* approach and they regard culture as a "system of signs organized in a particular way" (Lotman 1973, 274) and as a certain interpretation of this (Andor 1980; Eco 1998; 1999; Kellner 1995). At the same time, we also find the more traditional point of view in which the appropriately shaped *media* (e.g. texts) are regarded as the common basis of culture and culture is identified as the shaped medium or the contents expressed by it.

In what follows, taking chiefly into account the results and problems of the mentioned semiotic and media theory trains of thought, we will describe the relationship between communication and culture through applying a computational simile as a relationship between the social hardware and software. More precisely, we will try to find arguments showing that the *communities* that can be developed through communication can be characterized as the *hardware of society* and *culture* can be characterized as the *software of society*. By this simile, we would like to stress that in our view, communication and culture, the existence and way of functioning of communities and the components of form and content of social systems can be differentiated clearly and they come to existence mostly through processes independent of each other; at the same time, their simultaneous presence in the social system and their harmonious functioning are indispensable for the whole system of society. *Thus, culture can be understood as a program which operates communities*. If needed, we can successfully identify the programming languages, programming rules, the commands that we can store and execute, the goals to be reached, and so on. To put it in a more traditional way, culture is a system of interests and values followed or chosen by the given community and which is preserved in the communities and made effective in the social system, that is, it is the content of the social system. Perhaps it is not surprising that in what follows we will try to avoid traditionally used phrases since while using them, we would necessarily be forced to use additions and dissociations continuously, as a result of which putting our ideas in a clear form which can be followed easily would be completely compromised.

The possibility of various versions of culture obviously follows from the characterization of the nature of culture. In order to clarify the processes that led to the development of the Internet, we have to examine the characteristics of modern culture, the symptoms of its crisis as well as the possibilities and perspectives of overcoming the crisis. *Modern culture* obviously realizes the "program" of modernity. However, the unfolding of the program of modernity led to unbearable social consequences and as a result, there was a need for a radical reexamination of the program. The postmodern point of view reflects on the modern problems of various kinds and depth of the late modern age. The "program" of the *postmodern culture* of the late modern age clearly dissociates itself from the modern program. The most obvious sign of the dissociation is the "revaluation" of the interests and values connected to power, the restructuring of building the world individually and in community and exerting power and a radical break with certain situations of power.

The culture of communicative communities is characterized by the coexistence of virtuality and plurality in a pure form which is expressed by information technologies. Thus, *cyber culture*, the culture of the communities based on the usage of advanced information technologies, is necessarily postmodern by nature. The content of the communities created through the Internet, the "program" which operates these, the multitude of the stored, displayed and utilized interests and values obviously belong to the sphere of cyber culture as key components of it. That is, we can characterize the Internet as the empire of cyber culture, as a new human world in which the human communities maintained through the support of information technology are able to understand and virtually realize human ambitions, aims, values and interests of a great variety. As a further important difference between cyber culture and traditional culture, we can identify the *abstract and impersonal* character of the creation and usage of traditional culture and the *concrete and personal* character of creating and using cyber culture. In this way, the Internet is the virtual empire of concrete and personal freedom.

4.1 The nature of culture

In order to understand the nature of culture, we above all have to examine the connection between culture and nature. Obviously, such discussion also necessarily touches upon the principles of *human nature*, that is, we have to make a stand in this question as well. In our view, in order to characterize human nature, we equally have to take into account the process of becoming human, and the practice of man in which he continuously creates himself. It is notable that human nature seems to be *changeable* in both respects, it seems to be an entity the characteristics of which are equally shaped by naturally given and man made factors. Nevertheless, human nature is *open*: it is determined together with its possibilities. These possibilities, being realized and realizable, are the basis of human *freedom*.

Out of the crucially important factors of becoming human, we have already discussed some important questions of tool use, tool making, communication and language use in sections *2.1.1., 3.1.1.* and *3.1.2* and we also tried to show what role they have in shaping human nature. We pointed out that thanks to these "technologies" built on natural endowments, man became able to operate a "strategy of control over situations"; he could make it happen that most of the time, instead of the naturally given consequences, certain situations lead to the realization of goals set by man. Thus for example we are able to sustain particular human communities through operating our control over communication situations. The predictability of the possibility of the strategy of control over situations exempts man – at least temporarily – from being necessarily at mercy of natural conditions; that is, he himself can become a participant in shaping his own life. Without any doubt, this is the essential characteristic of human nature.

However, note that so far we have concentrated on the usable technologies of power and we have paid little attention to the examination of the results of the control over situations, that is, to studying the quality of the aims set in the situation and thus to studying the quality of human life. At the same time, it seems to be unquestionable that besides the ambitions to control life circumstances, human nature is also expressed by characteristic human features as well. In other words, through his own activities, man does not only strive for survival but for survival in a certain particular way. The difference between the two possibilities is culture itself. In this sense culture is the real human content, the sum of those characteristics which differentiate human life from the naturally given form of existence.

Thus, in what follows we will first of all try to identify the circumstances of the development of culture (as another factor to take into account in the process of becoming human) then we will characterize the relationships between human nature, communities, society and culture.

4.1.1 Culture and human nature

Though it is risky, perhaps it is not hopeless if we start in the middle, and, sailing on the waters of philosophy, we set out towards our current destination, that is, towards a presentation of the relationships between culture, nature and human nature.

The infinite multitude of natural entities exist is a way determined by natural circumstances, the system of conditions of their existence is given once and for all. This naturally given system of circumstances – we often call it simply nature – presents itself as a single, all encompassing, self-preserving, self-moving, unreflective definiteness for all relatively autonomous natural entity. Nature identified in this way is not yet the "world" since we believe that entities having mere natural existence are "without a world" or perhaps, using Heidegger's term, they are "poor in world". Worlds are created by people, namely two of them: a natural world for the entities existing in a merely naturally given way and an "artificial" world for themselves. World creating human activity is based on reflection. Through reflection, man continuously connects his various impressions, incentives and the results of his contemplation and activity. The reflected representations of man's environment recorded in a material and mental form come together into a world, an all encompassing system. The systems of worldview shaped from the whole of human experience become indispensable accessories of human life, they help us orientate ourselves in our present and future on the basis of the widest possible set of experiences and they show us the meaning of any existence or entity, human issue, ambition, act or idea.

The most important common value of all worldviews is their completeness since only those systems which are shaped from the whole of human experience are able to give a meaning to any kinds of human issues. Besides completeness, our systems of worldview also express countless further specific and characteristic values which prove to be useful. A certain accepted system of values – that is, a certain ideology – which carries the fullness of human experience as a "skeleton" makes up the basis of our systems of worldview. Each system of worldview takes into account all knowledge in some way (perhaps it is useful to note that most of them exist in a religious or everyday and not a conceptual/philosophical form).

Each worldview, together with the ideologies which make up their supporting structure, the experiences organized and evaluated on the basis of the ideologies and the accessible knowledge is the product of culture. Culture is the source of the values expressed in worldviews. Culture produces and sustains values; the worldviews find, collect and use them. (In reality, the worldviews are also culturally created products and they chiefly express completeness.) The value systems of cultures develop through the material and mental activities of people; the process of their creation is the most important expression of human freedom. Culture is the construct of man. Man relates himself to everything, to his environment and to his own self through the mediation of culture; that is, through making the necessarily used evaluations effective. The universe kept together by evaluations is the human world. Man is his own world, since only man has a world.

The value system of culture is a final system which cannot be reduced to anything and which cannot be based on any basic idea. It is factual humanity which is expressed by a value choice, by man's own standpoint about his own world and his own self. This process does not follow any external goals but it is autotelic: man's choice is free. Of course, it is obvious that our choices are influenced by an infinite number of factors, possibilities and constraints. But the decision is man's own even if it happens to be impossible to make a good decision or when the decision itself seems to be impossible. Though human life is limited by a given system of necessities, it does not take away his freedom, rather, it makes it definite; it endows it with a certain quality. We also know it well that "man" usually does not practice his value choices "personally" but through his representatives who have a closer relationship with human possibilities, and he personally only meets the possibilities mediated by the institutional system of culture. But whichever way the mechanism of participation and choice is organized, *all* people necessarily participate in the creation and sustaining of culture. The role of individuals might seem to be infinitely small or even negligible, but still, the whole of culture would not exist without it. The case is similar to mathematical analysis: though infinitesimal quantities are infinitely small, we could not have (various) finite values in our calculations without them.

The human world and the world of man become visible in the most clearly if we relate it to the "world" which lacks any humans or human quality. A world without man is an abstraction; it is the common minimum of the deconstruction of all human worlds. This is the "world" of natural entities, a construction in which the entities are "deprived of world", thus they have an (objective) nature independent of man and this is precisely the evaluation which holds them all together. Both worlds are the product of culture but the values present as affirmed in the human

world are only present in a negated form in the natural world. Affirmation and negation presuppose each other –in this way, culture not only separates from nature but it also includes it.

We find other connections if while analyzing the topic, we approach the relationship between culture and nature through the worldview of natural science, which is more common than what we said above. In this case, we can take the unquestionable primacy of the existence of nature and natural circumstances as our starting point and we can sketch the conditions and processes of the development of culture and man from this point of view. First of all, it seems to be suitable to take into account the alternatives of cognition, that is, the methods of reflection.[1]

Cognition – if we interpret its concept widely enough – can result in acquaintance and knowledge. Acquaintance and knowledge are different mainly in that acquaintance represents the object of cognition but it does not necessarily reflect on it; on the other hand, knowledge is reflected representation, that is, it is a special version of acquaintance. The necessary and contingent characteristics of the object are usually not separated in acquaintance; however, as a result of reflection, this separation necessarily appears in knowledge. Thus, following Aristotle, it seems to be justified differentiate between the knowledge of the contingent and the necessary. Acquaintance implies only knowing the contingent, it is about what exists. Knowledge involves knowing what is necessary; it is about what exists and cannot exist in any other way. Acquaintance is not necessarily conscious; typically, consciousness is not even needed for it; a certain sensitivity and perhaps memory are sufficient for it. In fact, all entities are acquainted with some things, at least during their existence since their existence, among other things, consists in representing their environment in a peculiar way; in other words, they are different and can be differentiated from their environment. Using reflection, knowledge, which is necessarily conscious, limits our being at mercy of our environment and creates the possibility of an active relationship to it. Obviously, human cognition uses both versions of cognition.

These versions of cognition follow different strategies of representation. While acquiring acquaintance, the *bound* strategy of representation is useful; however, we can only acquire knowledge through following the *free* strategy of representation. The bound strategy offers an accurate, unambiguous and stable representation of the object of cognition quickly without conditions and changes, and this representation is individually accessible at any times. In contrast, the free strategy disconnects the representation from its object and it represents its object while operating flexibly, with multiple meanings and inaccuracy. Meanwhile, the access to the representation is a slow process loaded with conditions, changes and community relationships. Any kinds of material mechanisms can represent acquaintance created through the bound strategy; however, there is a need for a consciousness for knowledge which requires a free strategy.

Acquaintance gained through the bound strategy is directed at contingencies and circumstances and through the representation of the situation, it serves the "control" over the situation directly, "now and here", that is, they serve the persistence of the existence of the cognizing agent and its separation from its environment. The knowledge which can be produced through the free strategy can at most be utilized in an indirect way, since it only represents certain existing elements of the concrete situation (which exist necessarily, that is, in other situations as well) and in this way, it is oriented towards the "not here and not now". Knowledge does not serve the "dasein" or the existence of the agent "here" but his existence "not here" and it makes his existence as "an other", that is, the expansion of his environment (into a world) possible, and it makes the evaluation and understanding of his endowments and possibilities available for him.

Representation is obviously the representation of *something* in both strategies of cognition (e.g. the environment of the agent) and as a result, it necessarily requires a connection between the representing entity and the represented. The representing entity replaces the represented entity – it is *as if* the former was the latter, the representing entity is virtually the represented. We can also describe this connection by utilizing the concept of information, provided that we notice that it is only the entity identified and understood (interpreted) as a sign which exists *as if* it was the signified, that is, it is virtually the signified. Information itself is a virtual entity which comes into existence as a result of this identification and interpretation process, that is, when an entity proves to be the sign of another and when we regard it as such. In the end, both representation strategies could be characterized through the analysis of the development and understanding of information as well. In this case, we would have to concentrate on the characteristics of the correspondence between the sign and the signified (the representing entity and the represented entity) and we could take it into account that in case of acquaintance produced through the bound strategy, the interpretation of the sign (the representing entity) is essentially determined by the signified (the represented entity) while in case of knowledge achievable through the free strategy, the interpretation of the sign (the representing entity) is essentially free.

[1] In what follows, we reproduce parts from our paper [Ropolyi 2006] in our discussion.

In human cognition, we can identify typical forms of representation connected to each strategy. Thus for example technologies understood in the widest possible sense (that is, the methods which provide a control over concrete situations) are usually satisfied with using acquaintance connected to the given technological situation, while in the sciences (situation independent) knowledge operates. In the end, the ancient Greek terms "techné" and "episteme" refer to such differences.

We collected the most important characteristics of the bound and the free strategies of cognition in *Table 6.*

BOUND STRATEGY	FREE STRATEGY
The representation	*The representation*
Accurate	Indefinite
Unambiguous	Multiple meanings
Stable	Flexible
Its accessibility	Its accessibility
Fast	Gradual
Unconditional	Conditional
Individual	Community
Standardizing	Changing
Typical medium of representation	*Typical medium of representation*
Biochemical, physiological, physical and other material mechanisms	The mechanisms of consciousness, communication and culture
The content of the representation	*The content of the representation*
Acquaintance	Knowledge
Contingency	Necessity
Circumstances	Causes
Situation	The World
Purpose: control	Purpose: understanding
Typical form of representation	*Typical form of representation*
Technology	Science
"Techné"	"Episteme"

Table 6. A comparison of strategies of cognition

Man does not simply exist, but he is also able to sustain and change his existence. He does not only operate his representational abilities in his relationship to his environment but also his reflective representational abilities. Man is the "citizen of two worlds" in several senses: he is subjected to natural and "cultural" limitations, he is the impression of his environment and he also shapes it, he is both "a character and the author of his own drama". The concrete and historical coexistence of the bound and free strategies presents human cognition as a never ending, complex, multipurpose, changing process which develops special methods, structures and organisms.

The typical example of the mixed strategy is the special ability of the human brain through which it can represent the object of the cognition in two ways simultaneously: on the one hand, following the bound strategy, as an object represented with its most concrete characteristics, on the other, following the free strategy, through the so-called secondary representation (Csányi 1999, 1985) as something completely different, for example as a tool which makes it possible to attain a goal. Secondary, tertiary, etc. representations are indispensable conditions of becoming human and they already appear in the development of primitive tool use and tool making, speech and conceptual thinking, consciousness and communities.

The complexity of human cognition, the mixed form of acquaintance and knowledge which intricately permeates human activities (think of for example the technological elements which can be observed in scientific activities) and the multitude of the levels built on each other contingently (e.g. brain/consciousness/culture) do not make it unjustified to clearly separate the basic cognition strategies, acquaintance and knowledge. Indeed, let us also mention that by taking them into account, the peculiar division of labor of the brain acquires a special meaning: the coexistence of the brain mechanisms following the bound strategy and the mental mechanisms following the free strategy in one system is obviously an evolutionary advantage.

After this discussion of cognition strategies, we can identify a few further characteristics of culture. First of all, it is important to notice that it is the usage of the free strategy of cognition which makes the development of culture possible. In this way, the claim according to which only man, who (also) operates the free strategy, has a culture seems to be justified. It is also important that culture is inseparable from knowledge created through reflexive representation. The development of culture is tantamount to man stepping out of the situation dependent form of existence and building a world from the multitude of situations. Besides the knowledge of situations, he is also interested in knowing the world, since man's activities also become extended: they become worldwide.

We have already mentioned the differences between human and animal communication while discussing the separation of human nature and human world from the animal kingdom. We could have referred to the comparison of human and animal communities and associations there, and now we have characterized man as the sole producer and basis of culture. Obviously, all these are important characteristics but they are not sufficient for developing a complete anthropology. Nevertheless, perhaps we have already tested the patience of the reader interested in the problems of the Internet too much with presenting trains of thought not obviously connected to the topic, so probably it is better if instead of further anthropological meditations, we summarize our relevant statements and start to analyze new problem areas.

Perhaps we can summarize what we have said so far in the simplest way by saying that man is the creature who does not only live in naturally given circumstances, but through his own activities, he shapes his life conditions, that is, he *revaluates and occasionally transforms* the naturally given circumstances both in his thought an in his practical activities. We can regard this activity of revaluation and transformation, the *cultivation* of natural circumstances, this world creation as the essential meaning and most basic form of culture. The revaluation does not take place on the basis of definite characteristics – neither its execution nor its execution in a given way is necessary. To a certain degree, man's own possibilities, which he influences through his own decisions, are realized in the revaluation and transformation of natural circumstances and a certain *freedom* of man appears. The whole process, at least to some degree, is autotelic, that is, culture in fact necessarily contains contingency and even superfluous things. The artificially created and maintained human environment developed through continuous revaluation and transformation is the *cultivated world*. In this way, culture equally exists as a human *possibility* (as a possibility of revaluation and transformation of the circumstances around man), as an actual human activity (as the acts of revaluation and transformation, that is, as cultivation), and as a realized *result* (as the artificial environment containing the cultural circumstances).

Though he puts it differently, Lotman's definition says something quite similar: culture is "the whole of not inherited information, the sum of the methods of organizing and preserving information" (Lotman 1973; 272). Here we can obviously utilize the definition of information favored by Lotman as something which makes the processes of evaluation and revaluation of the environment possible and which manifest itself as information displaying the human revaluation of naturally given circumstances.

A certain degree of freedom of man who lives in naturally given circumstances is a necessary but not sufficient condition of the appearance and existence of culture. The revaluation and transformation of naturally given circumstances also has to be s*teadily sustainable and preservable*. Lotman also points this out and Tomasello markedly stresses its significance by saying that in case of other species, this is precisely the condition which is missing for the development of culture (Tomasello 2002). We can recognize the various communities of people as the medium

which accommodates culture (as a possibility, activity and a result), which makes its stable presence possible and which preserves it.

4.1.2 Culture and community

We develop the varied forms of human communities through communication. The communication situations determine in what form and to what degree can a community based on sharing mental states be established. The situations developing the character of the communities – as we saw it many times above – can often be very complex and they can endow particular communities with a variety of characteristics. In spite of their occasionally apparent interconnectedness and similarities, it would not be good idea to place these *characteristics of communities and the values and methods shaped and accommodated by the communities* (the culture they express) on the same level. (That is, to accept that communication and culture are indistinguishable.) Thus for example the community of the author and the reader of a book represent a different type of relationship than the coexistence of the citizens of the value world which can be developed in the same situation. Perhaps the simplest way to put this would be to say that while in the first relationship the parties necessarily participate as an author and a reader, in the second they participate as the people of a given age. A given community of an author and a reader might accommodate and express countless various human values. Perhaps the traditional terms of *form* and *content* can be used successfully for characterizing the differences. However we also have to introduce the concepts of *society or social system* for their appropriate interpretation. Society or the social system is the entity the form of which is created by the communities and the content of which is created by culture or cultures. We would like to note that out standpoint is similar to Luhmann's inasmuch as we agree that it is communication which develops the form of a social system, but we do not find Luhman's derivation of culture or the content of the social system from communication acceptable. Perhaps it is not redundant to point out again that though communication situations are necessary for creating and sustaining culture, culture itself is *not* created by communication. Communication is a necessary but not sufficient condition of culture.

In a detailed presentation of the relationship between communities and culture, it is worth recalling Tomasello's standpoint as well (Tomasello 2002). *Cultural learning* analyzed by him is learning through "the other"; it can be realized through identification with the other person and his intentional and occasionally mental states. Therefore, the condition of cultural learning is the development of a certain community with the other. Though he does not expressly stress the role of communicative acts in the mechanisms of the creation of communities, he obviously does not exclude them, thus, the idea of building culture on communities can well be kept in harmony with his understanding of culture.

Though learning is a very important cultural community mechanism, it is certainly passive, that is, it is only suitable for passing on cultural evaluations which have already been developed. Obviously, it is also an important question how new cultural evaluations can be created. Lotman's ideas might help us in this question. Lotman's semiotic understanding of culture (Lotman 1973; Kovács – V. Gilbert 1994; Lotman 2002) seems to be a simple, profound and at the same time valid description. The semiotic understanding of culture treats communication in a wide sense which incorporates interpretation and value choice as its inalienable parts, that is, the process shapes communities and meaning simultaneously. Perhaps we could also say that in Lotman's case, it is the content which determines the form, that is, culture determines communities or at least the two aspects are balanced. Lotman's communication situation is the special version of communication situations in which we create a *community of value*. The participants of communication are not abstract agents but creatures with a concrete human nature. In this way, Lotman differentiates between *I – he* and *I – I* types of communication situations. In the I – I situation, the person gets into a communication situation with his own self in which he interprets his own "message", and the text of the message becomes a code in this process, that is, the meaning of the text can be changed and does actually change. Messages can turn into codes and *vice versa*. In fact, we could also say that what Lotman talks about is a very peculiar type of hermeneutics. It is a quite free interpretation of hermeneutics in which the text of the message (and the code) is not originally given but can be chosen. It represents a certain transition between Biblical (text based) and Greek (text constructing) hermeneutics. In their analysis, Kovács and V. Gilbert point out (Kovács – V. Gilbert 1994, 29-30) that the I – I (or auto or inner) type of communication is akin to poetry. Auto-communication is the situation of *thinking* understood as "exploration", "inspiration", "suggestion" (Lotman 1973; 321) or simply Vigotsky's inner speech (Kovács – V. Gilbert 1994, 25), an eminent form of creating a community with my own self and the revaluating practice of the culture expressed by this "community". Lotman profoundly differentiates between cultures which are oriented towards the message and those oriented towards auto-communication. *Cultures oriented towards the message* (where learning and attaining are the most important) are dynamic, more changing but the participants of communication are often passive: they simply wait for, and consume culture. *Cultures oriented to-*

wards auto-communication prefer intellectually active participants of communication but they are less dynamic in the social production of information. Actual cultures realize certain combinations of these two types.

According to another definition by Lotman, culture is "the shared memory of mankind or a certain narrow community (nation, class, etc., (Lotman 1973, 281)). Perhaps it is worth to note in this respect that Assmann makes a fruitful distinction between communicative and cultural memory (Assmann 1999, 51-56). These ideas support the difference between community and culture and their connectedness on the basis of preservation. A peculiar relationship between culture and community is expressed in the often analyzed connection between *culture and civilization* (Márkus 1992; Wessely 1998). While the concept of civilization refers to the formal side of the social system, that is, to the characteristics of the communities, the concept of culture refers to the content of the system (Bujdosó 1988). In many respects, anthropology also supports the necessarily communal nature of culture (Geertz 2001).

In order to characterize culture further, it is suitable to step outside of the communication situation and examine whether the wider environment of communication situations can be a source of the revaluating and transforming ambitions of culture. Looking at the wider environment of the communication situation, we see that the order of the reproduction of a given form of life circumstances, that is, material and intellectual *production* is the universal organizing force which creates a given reality for us. (This is precisely what we can call the order of production, which is sufficiently wide and general for this task. In case of developed social systems, this can be well defined through Marx's conceptual system which is analyzed in detail by (Márkus 1992, 93-137). Both typical human situations discussed so far, that is, both technological and communication situations fit well into the situation of production, using a Marxist term, into the "mode of production". Production is simultaneously a technological and a communication process; the production situation includes both situations. Through analyzing the production situation, we can possibly identify the elements of the content of technology and communication. The production mode can be the wider context in which the meaning of cultural revaluation and transformation can be revealed. Following Aristotle, we can say that nature bears and culture is produced. Culture is the shaped medium, something which was produced and not born. As regards content, culture is a part of man which is not naturally given, that is, it is cultivated, transformed humanity. It is expressed by human communities but in the end the human community itself is culture, albeit in a different sense: it is a meta-culture, more precisely, it is a subculture.

4.1.3 Culture and society

Community creating communication situations are partly shaped by naturally given circumstances and they are partly "produced", that is, they are circumstances revaluated and transformed by communities. Thus, communication situations are simultaneously a product and a producer of communities. But can communities be a product and the creator of a product at the same time? Can we avoid this dilemma, and do we have to avoid it at all? (Before we answer, we would like to remind that we raised a similar problem in section 3.1.2. while discussing the relationship between language and community. Our solution will be the same here.) On the one hand, we can dissolve the dilemma easily if we regard the activities of revaluating and transforming as done by individuals and not by communities. Interpreting Lotman's concept of auto-communication with this goal in mind can provide an opportunity for this. In this case, communication situations can be shaped by individuals and the situations can create communities as a result of the appropriate combination of the I – I and the I – he communication types. But we can choose a different solution, namely the continuous *coexistence* of communication situations and communities. As a result of their interaction, the coexisting situations and communities can both go through a process of development. In each phase of the changes, the cause-effect relations can be complex, they can be intertwined; as a result of their complexity, the concrete relations of determination often seem to be obscure. Such interaction between coexisting entities makes them multiply interconnected, it makes their organization complex and it turns the system into a complex system. Nevertheless, the complexity of the relationships by no means implies that the various relationships are equal and indistinguishable. For example, in the concrete case we have just examined, it is easy to differentiate between the community which shapes the communication situation and the community which can be regarded as the product of the communication situation. It is notable that the recognition, interpretation and analysis of the complex relationships can go together with the development of an ontology and epistemology of coexistence. In one version of this worldview, we can replace the objects separated from each other with a system of necessarily interconnected objects, that is, with *networks*. Network science deals with the regularities and laws effective in networks, the characteristics of networks, and the analysis of the functioning of networks. Its separation from philosophy and becoming an independent discipline has accelerated in the recent decades. Differently from traditional logic, in the logic of network science, the above mentioned circularity of determination seems to be solvable "scientifically". Without this, we can stick to the solutions available in philosophy and we can discuss the problem by applying a version of dialectics.

In this way, if we regard the coexistent entities which are in the relationship of mutual interrelatedness as having a *changing nature*, the situation in which the relationship between the determining and the determined is between *the same* entities becomes conceivable. This is the situation of *self-organization* which we characterize by saying that the interactions between the coexisting elements are just like this, that is, all elements are determining and determined at the same time. This possibility does not violate the principle of determinism at all, insofar as we assume the time dependence of the processes of the interactions and the changing nature of the coexisting entities participating in the interactions.

Thus, insofar as we regard communication situations on the one hand as community creating and on the other as shaped by communities, we also declare their coexistence and shared development. Communication situations and communities "exist together" in a social system, and their coexistence of this kind involves their interaction with further elements of the system. The coexisting entities brought together in a social system can occasionally be described as subsystems which are more or less separated from each other. However, while describing subsystems, it is suitable to preserve the possibility of interpreting their relationship with the whole system, that is, it is suitable to treat subsystems as open systems. The interpretation of the whole social system and its subsystems can be quite different in various social theories. To discuss our current problem further, we would like to utilize ideas from Marx's, Luhmann's and Habemas's social theory.

Using the Marxist system of thought, we could perhaps say that the development of communication situations obviously has economical-social and historical conditions. It is a crucial assumption that "points of contact" of relations of production necessarily influence the developing communication situation, and as a result, the development of communities. A more detailed observation reveals that the technological situation of the production process (in fact, the sum of forces of production and relations of production) is a communication situation at the same time, and simultaneously with the production of the product, it also creates several types of communities. This is precisely why the alienating/alienation which appears in production processes is a so serous factor, namely because it "abolishes" *the community of the producer and the product* and it recognizes the producer only as a producer. (Of course, at the same time it also constructs his *community with other producers.*) To put it simply, the production process always results in the creation of communities. *There is also a community in the product*, albeit only in a materialistic form which can unfold in its usage. In other words, the product is the participant of a communication situation which constructs a community. The community of the producer and the consumer is manifested in consumption. It is consumption which produces this community. Let us say that this is similar to books which are produced (written, printed, published, sold) by some people and read by others. Books mediate and products do the same. Marx analyzes these problems in connection with the dialectics of production (Marx 1975): he points out that production is consumption at the same time. It is simultaneously both. This is precisely what the expression "producing consumption" means, namely that it belongs to a community, it is the community of production and consumption; it is simultaneously both. But this does not mean that the two factors are of equal value, the "comprehensive" moment is the production of the community. Product and community are "identical expressions" since the technological and communication situation overlap in production. But they do not necessarily overlap. All technological situations are communicative at the same time but not all communication situations are technological at the same time, at most they are only technological in the sense that communities created through communication technologies are also products. More precisely: the products of technology always have a communicative content since they are interpreted as products, as things which can be consumed; products call us to consume them. It is the advertisement which makes the product to speak. The advertisement is the loud reading of the product. The speaker, that is, the communicating product is the commodity. At the same time, this communication always creates something: a community. But neither production, nor communication is identical with what it creates since it contains other things.

The production process *always recreates its own self as well*. Production is self-reproduction. This is somewhat reminiscent to Luhmann's standpoint. Can we claim that Marxist theory is autopoiesis related to production? Perhaps yes, but it is hardly suitable since it is not the reproduction of the production system which is important for Marx; however, in Luhmann's theory, concentrating on the concept of communication, we only grasp the creation of communities and not the concrete historical social system.

As regards needs and values, man can be described as having two different natures: he can both be characterized as having *a need for a community* (dependence on a community) and as having *a need for self-preservation* (the reproduction of the given circumstances). Since communities are always a part of human life circumstances, we necessarily talk about *existence in a community*. This need is the basis of the overlapping of the technological and the communication situation; this is what already was present in the primordial form of the "control over the situ-

ation". Thus, the relationship between technology and communication is primordial by origin. It is an original connection, which means that since the aim has been the preservation of the community, it has to function accordingly.

Communication is the basic element in Luhmann's understanding of society. He can interpret the creation of the social system (in fact, only that of communities) but if he assumes the communication situation as basic but does not analyze the circumstances which make communication possible, he cannot explain what characteristics communities will have, only in very sketchy and abstract way. The problem is the same with *autopoiesis*, the model of organization which he adopts: it involves the possibility of the creation of identity, but as a result of its abstract nature, it cannot describe the nature of identity. Habermas's communicative action theory is much richer in this respect, too: it is equally based on agency (let it be technological) and on communication, that is, it both preserves and creates communities. This great insight of Habermas connects again the technological and communication situations traditionally coexisting in social systems and in this way, he reaches a greatly effective social theory (Habermas 1985; 152-178).

So far, we have been trying to show that we can find the problem area of creating communities in the various descriptions of society, at the same time, each social theory approaches the question according to its preferences. The creation of communities is closely connected to communities in each mentioned theory (though not completely explicitly). With this, perhaps we have satisfyingly characterized the factors determining the formal side of the social system, and in what follows, we will briefly examine how culture or cultures, which provide the content of the social system are connected to the other elements of the social system and we will look at which phase of the functioning of the social system revaluations and ideologies are connected to. Of course, we cannot venture on giving a summary of cultural sociology, rather we will only raise a few problems which were mentioned earlier and which will be important later.

One of the basic problem areas is giving an explanation of *the origin of values and interests* in cultures on the social level. If we understand culture as a system of further values "deposited on" the communities created through communication, we need to explain what the source of these values is in society. On the one hand, we can say that communication (and technology) is "value laden", thus it expresses values which transcend the values that are necessarily presented in its existence, that is, success and efficiency. In this case we have to analyze communication itself and technology further; we have to reveal the fine structure of the communication and technological situations, their context, their social relationships, etc. The *substantivist* and *critical* versions of the philosophy of technology and communication represent ambitions of this kind. Through varied analyses of this kind, we can identify persons, social groups or even the interpretative ambitions of whole ages as the source of the values. On the other hand, perhaps it is suitable to search for further social needs (that is, needs transcending community, preservation, success and efficiency). In this sense, the ultimate source of needs, and as a result, interests and values is the *prevailing social system*, which they want to reproduce in its given form. We can probably talk about the self-reproduction of the content of the social system, that is, culture(s) or a certain cultural *autopoiesis*. Of course, it is questionable to what extent the separation of the content and form of the social system is justified. Probably it is not. In this case we can ask Habermas's help hoping that content and form are only differences in the way we look at the social system: what is culture "from inside", is community "from the outside" or even the other way round, that is, we talk about different descriptions of the same system.

Countless analyses of cultural sociology are focused on the comparison of the direct value and interest system of the prevailing social system and its forms represented and mediated by culture as well as on the evaluation of the comparison and its consequences (Wessely 1998; Kellner 1999; Wolf 1999; Alan Liu's Voice of the Shuttle). The so-called *cultural studies* is very popular, in which they analyze the phenomena of the social determination of culture mostly following Marxist social theory and the understanding of society of the critical theory of the Frankfurt School. Furthermore, Bourdieu's idea according to which besides economical capital, *cultural capital* is also accumulated and functions in modern societies is also very significant. The area of its functioning is the educational and cultural institutional system. Economical and cultural capital can be converted into each other and though economical capital is more agile, class rule is also manifested in the cultural sphere, and it efficiently reproduces the class structure and domination of the prevailing system (Bourdieu 1997; Lawley 1994).

Similarly to the social system, *culture is a complex, multilevel system with multiple participants*. A given social system is made up of the large number of communities of various levels and complexity and the cultures connected to them. The description of the social system as the sum of communities and culture(s) is more popular in anthropology, while cultural sociology favors the concepts of social and cultural levels, layers, subsystems, subcultures,

which can be identified in the complex structure of society, but in the end they talk about the same complex system. The long-lasting and fixed separation of particular cultural spheres is an obvious expression of the complexity of culture. Perhaps the separation of the so-called *high culture* and *popular culture* (popcultures.com) are the most significant in this respect. The separation of theoretical and practical values represents a further differentiation and so does the separation of arts, sciences, philosophy and religion. Instead of differentiation, the *two cultures* approach declares that culture is torn into "human" and "real" culture, though we can meet this view in the "unhappy" Hegelian form, that is, in a rejected form. The followers of the "third culture" approach (Edge) which teaches that the separation of the "two cultures" is unacceptable, and they are striving for unifying the torn spheres again, bearing in mind that culture is significant for communities.[2]

4.1.4 The autonomy and value content of culture

Of course, society and culture has countless other relationships besides those we mentioned above. Various assumptions of cultural and social philosophy obviously strongly motivate the choice and study of the relationships deemed to be significant. It might help organize and evaluate the various approaches if we try to summarize the ideas regarding the creation and existence of culture in a unified framework. In other words, we assume that the various viewpoints of the philosophy of culture necessarily make a stand in this basic question. More precisely, we will regard the relationship between culture and society (using the terms of dialectics: the difference and identity of them) as the *basic question of the philosophy of culture*. Thus, when we make a stand in the basic question, we decide whether culture and society are the determining or the determined factors in the relationship between culture and society; another aspect of the question is deciding whether culture and society are separable or inseparable. The study of the basic question is facilitated if we take it into account that both culture and society are changing and complex entities, thus we have to notice that we meet cultures of various levels, construction, generality, etc., which have different structures.

In our examinations about the nature of culture above, culture partly appeared as the (self) construction of man, partly as the result of special communication processes (which create a community of value) and partly as a product created embedded in the social/production processes. The participants and processes mentioned in the definitions have different ontological status and they grasp different levels of the creation and the existence of culture. However, it is important to understand on each level whether the processes taking place there *are under human/social control* and as a result of the decisions of people (organized and made effective in whichever way) or they function as autonomous processes independent of man and the people get the circumstances created through their functioning ready made. In this respect, the position of "man" can obviously be different in various understandings of society and anthropologies. What is more, even while staying in one theory, we may face difficulties since if for example we stress the social production of culture, for members of the given society culture might seem to be an ultimately given, autonomous entity which is independent from them and which they completely have to accept.

Since we understand society as a coexisting system of communities and culture, it seems to be necessary to raise the question of the social distribution of freedom and the differentiation/plurality of culture. Communities and individuals have a different degree of freedom in a society with a given level of freedom and as a result, they can participate in the creation and operation of culture and access culture to a different degree. The distribution of freedom in a community involves the social distribution of culture; consequently, the autonomy of culture can be evaluated differently from different points of society. Thus, the autonomous existence of culture is always relative. It is obvious that there is no culture absolutely independent of man.

At the same time, it is an important question whether we can talk about a culture independent from society. In other words, can we imagine a culture which is not realized on a system of communities? Later we will argue that in a certain sense, this is possible: cyber culture realized in virtual communities sustains a form of existence, *web life*, which is essentially different from social existence. We will come back to the characterization of social life and web life.

At this point, perhaps we should also recall that culture can equally be expressed in various social structures and formations. It is not important here to discuss in a systematic way and separately for example the forms of culture based on material and intellectual processes, the forms of culture of everyday life, the social institutional system, morals, politics, religion, science, art, etc. We regard them here as different forms of the expression of the same evaluation in a given culture. This may sound crude but this simplification is suitable from the point of view of

[2]See also: http://www.typotex.hu/h_szalon.html.

our current discussion. While judging the autonomy of culture, we cannot disregard the fact that a given society can include a multitude of cultures. The coexisting cultures create a complex, interconnected system penetrating each other in many ways. Thus, the autonomous existence of a given culture is not only problematic in relation to social factors but it is difficult to identify because of this interconnectedness.

The other "side" of the basic question is also of decisive importance: can we separate clearly the value system of a culture and the value system of the society accepting or creating the given culture? That is, does culture exist in a value neutral way? Or the case is different and each culture necessarily mediates values deposited on the given culture and expressed unintentionally as well, that is, cultures – similarly to technology and communication – exist in a "value laden" way? It might seem to be strange to ask whether culture is value neutral or value laden, but hopefully the usage and meaning of the concept is intelligible. Above all, the existence of a culture means the existence of people who identify with the values of the given culture and realize them in their life situations in some way. A person in a culture which exists in a value neutral way acts in his own life situations preserving "his own" culture and making it effective completely, while a person in a value laden culture experiences that he is unable to preserve and make his culture effective without deformation. As an illustration, think of for example supporting moral, religious or political fundamentalism or the position of someone forced into a decision.

On the basis of the standpoint in the basic question, we can differentiate between four approaches of the philosophy of technology (similarly to the interpretations of technology and communication): determinism, instrumentalism, substantivism and the critical view (see *Table 7.*).

CULTURE	AUTONOMOUS	UNDER SOCIAL CONTROL
"VALUE NEUTRAL"	*Determinism* Sperber, memes	*Instrumentalism* Futurology
"VALUE LADEN"	*Substantivism* Nietzsche	*Critical* Cultural studies

Table 7. A possible classification of philosophies of culture on the basis of their standpoint in the basic question

According to the *determinist* position, culture has a mode of existence independent of human ambitions (e.g. individual intentions) and a mode of functioning which is separable from all additional realization of value. We can encounter similar views in Sperber's naturalist/epidemiological understanding of culture (Sperber 2001) or in the popular ideas about memes as well. According to the *instrumentalist* view, culture is a useful tool in the hands of man in treating the problems of his world, and without any doubt, it can contribute to "humanizing" human circumstances further as it is assumed it in various *utopias* or in their scientific version, in the understanding of the world of future research. The *substantivist* understanding of culture agrees with determinism in that man is not in the position to control culture, rather, he is either at mercy of the cultural system or the beneficiary of it, but it also notes that whatever man does, he is helpless as a result of the realization of the essential values built into culture which are unintentionally and necessarily effective in human practice. This approach appears in various positions of cultural criticism; as an illustration probably it is enough to refer to Nietzsche's philosophy. Finally, let us mention the *critical* view in which culture appears as a *human construction* in which values derived from the circumstances of its construction also appear, but these can be observed and revealed from an appropriate critical position. Though they cannot be eliminated, their functioning can be known and calculated, thus they do not necessarily endanger the realization of man's own world of values. Not surprisingly, the critical approach dominates the viewpoint of the so-called cultural studies. The critical approach is often connected to a postmodern view as well, and its favored targets are the various forms of existence of modern culture.

4.2 Modern and postmodern culture

Following Heidegger, Márkus draws our attention to the fact that (the concept of) culture itself is a something which determines modern age. In this sense, the modern age is the era in which culture "became the object of reflection and a practical problem at the same time (Márkus 1992, 9). In this way, the characteristics of modern culture cannot be blamed on some accidental events and contingent circumstances but they are the consequences of the evaluation and shaping the human world in a way that man chose and believes in. The modern program is

the program of the dominance of enlightened rationality and its universal usage. The questions of man's *knowledge and power* are in the center of modern culture (modernity).

The experiences, ideals and ideas from which the modern worldview was created accumulated for centuries but only the thinkers of the 17th century were able to unify them in a new system of worldview. By this time, it became clear what kind of values the new type of world order can be based on, and scientist and philosophers started to build their variations. The new order unfolding this way – the modern civic value system – declared the personal independence and freedom of individual citizens as essential values. A citizen, standing on his own two feet, basically cannot depend on either his fellow citizens or a certain community of them. His existence is independent of these; the circumstances and rights are the unalienable possession of everyone, they are effective in a naturally given way. Their operation can at most be limited by individual consideration – this can be observed when independent individuals lay down the partial and temporal granting of their rights to other people, institutions or authorities. Built on independence, *individual freedom* liberates the individual from any kind of general power (divine, clerical, worldly or social) and laying the fate of his world in his hands, it sets him free. Of course, the meaning and natural consequence of all this is on the one hand that the development of the civic individual, the modern personality, the unique person becomes possible in large numbers, and the process of embourgeoisement can start in the whole society. On the other hand, it is also very essential that the modern individual sees his own existence as secured only if he himself controls his life conditions completely. He feels secure if his control over his own world is unlimited. He subordinates almost everything to this aim: belief, knowledge, strength and senses equally. This intention is so strong that the people of the age readily develop worldviews which describe worlds that can be controlled, worldviews in which individuals have their own worlds and can become the rulers of their own world just as a divinity. The demolition of the hierarchical power structure of feudal society takes place when the hierarchical power gets distributed among citizens, and as a result, it gets almost infinitely multiplied – each citizen can be the liege lord and the god of his own world – in this way, the privileged nature of feudal power is abolished but the power based relation to the world remains. Of course, power is no longer exercised over the citizens but in fact citizens exercise it over everything which they accept into their own world.

The world building technology of the modern personality is ignoring. He only accepts entities, relations and processes into his world and recognize as existing which do not jeopardize his rule over his own world. During his world building activities, anything can be ignored; only ignoring cannot be ignored. Ignoring is the *methodology of egoism*, thus, the construction of the modern world follows an egoist ideology. We can also express the principle of modernity in the following way: *I ignore, therefore I am*. The "products" themselves created through the egoist methodology inherit this feature. The modern personality, the modern community and modern culture is based on egoism.[3]

4.2.1 The modern and the postmodern in culture

The most important component of modern culture is modern science. Science provides the modern means of control and knowledge. The modern scientific viewpoint (the mechanistic worldview) is based on studying the building and functioning of controllable machines. Modern scientific knowledge becomes general and situation independent by looking at the world as an "infinite series" of controllable situations.

The most important result of the modern understanding of the world is that it turns the medieval view into its exact opposite and provides a worldview in which individual objects dominate their environment. This change, in which the object is emancipated, set free and liberated from its environment and even, in which the object itself becomes dominant is the radically daring, revolutionary content of the modern worldview. In the relationship between the individual and his social environment, the huge sacrifices in the political struggle for individual independence and freedom and an unflagging revolutionary spirit characterize this situation well. But the new value system gradually unfolds in its relation to human nature as well. While the humanists and artists of the Renaissance aimed only at a control over man's own, inner nature, the thinkers of the 17th century are about gaining control over nature which is external for man. While in the worldview of deism God's generally effective role is still preserved in setting aims and man can only replace him in quite concrete activities (e.g. as a craftsman), later developments make the providently calculating active man the determinant of all aims.

It is suitable to differentiate between three clearly separable phases in the spread of the modernist, mechanistic worldview as the authentic basis of the modern civic world order. In the beginning, this worldview is an abstract, ideological, philosophical program; this first phase can be observed at the beginning of the 17th century. However,

[3]The papers [Ropolyi 1999a; 2000c] provide a more detailed analysis.

at the end of the 17th century, we see that the mechanistic worldview appears in more concrete problems, it becomes a scientific program and it appears more and more obviously in the background of scientific principles, hypotheses and theories. Finally, during the 18th century – in the third phase – the rapidly developing industrial activity, as the motive of the Industrial Revolution becomes a practical program.

Even already the movements and figures of the *Renaissance* clearly committed themselves to the new worldview, but they often expressed their opinion in a religious or artistic and not in a philosophical form. The need that individuals should be able to shape their relationship to God without any mediation by the church was expressed in Luther's and Calvin's teachings; furthermore, the possibility of individual freedom is revealed in Calvin's idea of predestination. The representation of a joyful, harmonic relationship to human nature – of course chiefly to our own nature –, free of any subjugation was an important ambition of Renaissance art. The engineering geniuses and polymaths of the Renaissance represent individually the unlimited possibilities of human will and knowledge and the mighty power and victory of man. The Renaissance is also significant in the historical process of the development of the individual. Though elements of the civic world order appear in the Renaissance, they are not put together into a scientifically systematized idea or philosophical system. We can see a conscious, organized discussion of the civic value system from the 17th century.

Bacon puts the desired goal very clearly: man can be the ruler of his world if he possesses the appropriate knowledge. Knowledge is important because *knowledge is power*.

"… Man's advantage lies in his knowledge, this is without any doubt. There are a lot of things in knowledge which cannot be bought even on all of the treasures of the kings, over which their orders have no power; about which their spies and messengers cannot provide any news, and their shipmen and explorers cannot sail to their source. Today, we only rule nature in pure imagination and we are subjected to its force; however, if we could have ourselves led by it in our studies, we could command it in practice, too." (Horkheimer – Adorno 1990, 19-20). In other words: "Human knowledge and power are one and the same because if we do not know the cause, the effect will not occur either. For nature can only be defeated through obedience … In practice, the only thing that man can do is bringing closer certain natural bodies or taking them apart; nature does the rest of the work alone" (Bacon 1954, 27). In his new methodology, which secures gaining knowledge, Bacon gives an important role to experimentation. Note that in the experimental situation, the experimenter rules the experiment, he decides in what sense the given part of reality is interesting for him and he does not submit to it.

The power factors of the new worldview are also clearly revealed in Descartes' methodological principles. The subjective evidence connected to the individual is the basis of all understanding: I may only accept things as true which are evident for me, which are clearly presented to my mind. That is, the individual, the 'I' wants to decide in the question of truth. But perhaps this does not apply to the 'I' as a whole. Note that Descartes' famous principle, "I think, therefore I am" treats thinking as more important in connection with certainty than existence, and in this way, it provides a basis for understanding thought as an activity which is outside life, directed at life and which makes life its own object. Now, this treating as an object clearly expresses the relations of power: rationality wishes to be a factor which rules over life. Descartes summarizes the technology of treating problems in a general form in his well-known methodology. During its analytic work, the rationality favored by Descartes takes possession of and controls reality, just as Bacon's experimenting scientist. It seems that in this sense, empiricism and rationalism understand each other well. Thus, based on rationality, we have to gain power over nature, society and our own nature.

The trains of thought above became a part of the philosophy of the Enlightenment. We know it well that "the essence of the Enlightenment is the alternative the inescapability of which is the inescapability of power at the same time. People always had to decide whether they subject themselves to nature or they subject nature to their own Self". (Horkheimer – Adorno 1990, 50). In this situation, the standpoint of the philosophers of the age is clear: "in the general sense of progressive thinking, it was always the aim of the Enlightenment to liberate them from dread and make them rulers". (Horkheimer – Adorno 1990; 19). Voltaire, Holbach, Diderot, Rousseau and several of their lesser known contemporaries played an important role in the concrete naming of the towering obstacles to this liberation of people and in the creation of the concrete programs of their destruction. They launched powerful attacks on the hierarchical power structures that could be observed in various spheres of society: their philosophical, literary writings and journalism was characterized by a strong opposition to the church and religion and the radical rejection of feudal privileges. They developed a philosophical program sketching the possibility of civic development which turned into a revolutionary action plan resulting in the transformation of the whole society. The unfolding modern civic society recognizes its citizens as independent, free and equal.

In its explanation of the world, the mechanistic worldview utilized a rational idea based on observation. The whole world can be constructed of simple elements, it is a system which can be reviewed, completely understood and calculated. While studying the system and its elements, in principle, we can always choose *one* correct method, *the* correct method, and if we follow it, *the* truth about things is revealed. The modern civic circumstances in society and the rational ambition in science secure the universal prevailing of the civic value system, that is, man's control over nature, society and his own nature. Man can become the ruler of his own fate. "However, the completely enlightened Earth is glowing in the light of Misfortune" (Horkheimer – Adorno 1990, 19). For besides the signs of man's power, the symptoms of his lack of power and alienation soon appear.

Perhaps the sustainability of the control situation based on the unlimited activity of man and the ultimate passivity of nature seems to be doubtful for the careful observer. It was even already clear for certain thinkers of the 18th century that matter cannot simply be regarded as a passive factor but it has self-movement and "senses", and consequently change and development can be observed in nature. It becomes clear soon from the results of various sciences that the living world, the Earth, even the whole Cosmos has an evolution and a history. This characteristic cannot be fitted into the mechanistic worldview in any way – the interpretation of evolution urges to transcend this conceptual framework. The limits of man's activity also appear more and more clearly. The destructive technologies based on a lack of knowledge and caring already caused problems in 18th century England.

During the practical operation of man's control over nature and society, it becomes clear that science which develops serving man's power does not fulfill the expectations and does not make us powerful since it is completely insensitive to many things, above all, to anything which does not promise any profit. This is clearly shown by the fact that in a somewhat later stage of the development "…occupying the judiciary position of enlightened rationality, not only it simply prohibits excursions into the intelligible worlds, but it regards them as a meaningless banter … The estrangement of thinking from its factual working through, that is, leaving the magic circle of the actually existing (…) seems to be insanity and self-destruction for the scientific sentiment…" (Horkheimer –Adorno, 1990; 43).

As a result of the pressure to control the actually prevailing circumstances which determine our actual existence, in fact *submitting to the actually existing becomes the main principle of the modern world*. We cited the book co-authored by Horkheimer and Adorno several times and it clearly shows that the modern world helps the hidden totalitarian nature of the Enlightenment unfold; not only in connection with control but in this unwanted sense, too, and it can even turn the splendid ideals of the Enlightenment into a support of fascist ideology. Knowledge taken out of its context, modern science separated from its concrete social environment can easily lose orientation, and thus rationality operated merely for the sake of power realizes the possibility of insane rule.

Horheimer's and Adorno's book can be regarded as one of the first documents of postmodern thinking. The disillusioning social processes of the years of fascism which they diagnosed along with others, the inhuman consequences of the dominance of abstract rationality broken lose form the realm of life and ruling over life circumstances did not cease to exist. From the 1960s, the long lasting working through of the events and consequences of the Second World War and the Cold War urged many thinkers to give up the modern program at least partially, even though at the time, the outlines of a new value system which could be chosen were not visible. Thus, in this unfolding intellectual situation only the rejection of the monopoly of the modern value system and a need for alternatives appeared emphatically; the character of the alternatives were quite varied, uncertain or obscure. The ideology of the "movement" which rejected the *monopoly of modernism* was expressed in the varied value systems of postmodern views. The viewpoint of postmodern ambitions cannot be unified if we take its principles seriously, since otherwise they would replace one monopoly with another, which would obviously question the meaning of the whole activity. Nevertheless, we can point out some common characteristics in the standpoints (Almási 1987; Babarczy 1998; Erjavec 1992; Érdi 1992; Jameson 1991; 1997; Lyotard 1993; Nagy 1991; Vajda 1990; 1991).

We can clearly observe the emphatic declaration of diversity as a basic value and respecting and following its various versions and their manifestations (playfulness, absent-mindedness, chance, situation dependence, etc.). Contrasting *the many* with *the one* and its cultivation appears in various contexts, thus for example the rejection of the only *correct way of thinking*, the only *truth* and the only *reality* and the acceptance of the plural versions of these. Consequently, postmodern knowledge cannot be universal, only situation dependent (that is, technological). The pluralization of reality necessarily leads to the value of *virtuality* and the relativization of any kind of unity and wholeness. The postmodern is not the excluding opposite of modernity, instead, it represents an order in which modernity has alternatives; that is, it only rejects the *exclusivity* of modernity but does not reject modernity itself. We could also say that the postmodern includes the modern as a part of itself (though they sometimes claim the

exact opposite) but it is a much wider system and there is room in it for other value worlds. Postmodern views can be compared but without any conclusive consequences: one standpoint cannot be truer or more valid than another; referring to such hierarchies is a characteristic strategy of modernity. The opposition of the postmodern to power can be put in the simplest way in an *anarchist* political philosophy or philosophy of science.

The consequences of the postmodern standpoint can partly be realized, though Habermas advises it otherwise (Habermas 1993) and Latour draws our attention to the fact that actually, the modernist project has not been realized either (Latour 1999). Perhaps the beat movement, flourishing from the 50s of the 20th century and certain artistic ambitions which have developed since then, illustrate best that the postmodern project can be realized. However, the actual flourishing of postmodern culture is connected to the spread of information technologies in our days.

For drawing further conclusions, it seems to be suitable to take a look at the circumstances of the development of postmodern ideologies. In what follows, we will try to show that the postmodern attitude is a crisis product.

4.2.2 Crisis development and the postmodern condition

First of all, we would like to characterize shortly the worldview of a society in a crisis. Our starting point is that in a crisis, all processes and elements of the social system become connected and commensurable and can come into an interaction with all other processes and elements of the society. The whole society becomes similar to a huge, infinitely sensitive body. Very small and very distant effects can produce strong and quick reactions. The value of independence and individuality wavers, the value of uniformity, conformity and cooperation increases.

The most important aim in a crisis is shared and essentially clear for everyone: to put an end to the process of the crisis as soon as possible; this is what mostly motivates the actions of the members of the society. During crises, most people easily accept that some kind of universal power (God, the state, law, the Big Brother) can rule over the individual.

The main challenge of crises is choosing well from the various presented alternatives, possible aims and value systems. Perhaps we could characterize this situation by saying that the concept of *the many* plays an essential role in the worldview of a society in a crisis. (Again, we use the concept of *the many* and later the concept of *the one* following the Ancient Greek philosophical tradition.) In order to understand the worldview of a crisis, we can talk about worldviews dominated either by *the many* or *the one*. *The worldview of a crisis is the worldview of the many*, at he same time, the mechanistic worldview is the worldview of *the one*. There is no freedom in a world dominated by *the one*, there are no decisions; this is the realm of absolute necessity. Necessities are not effective in a world of *the many*, decisions can be taken; this is the realm of absolute chance. Of course, we do not encounter these rigidly separated versions in reality but their transitions, that is, crises can be characterized as processes displaying levels of development. During their progress, the relationship between *the many* and *the one* is characteristic (Ropolyi 1992).

During the unfolding of crises, the *totality organizing effects* which have functioned well so far (production circumstances, ideologies, worldviews, paradigms, styles, etc.) lose some of their efficiency; the belief in a single worldview wavers and worldviews become plural. The earlier accepted version of the relationship between *the one* and *the many* in which *the one* dominated in a certain way loses its validity and temporarily *the many* is in the forefront until they find new, unifying forces. The crisis of the modern state of the world, just as in case of all other crises, can be approached through at least three clearly distinguished viewpoints. The crisis can be contemplated following the teachings of Aristotelian philosophy, and it can be described by using the concepts of possibility and actualization. We will call these viewpoints critical, crisical or postmodern and finally dialectical or hermeneutical.

The viewpoint of the *critical* attitude is still strongly connected to that which still persists and dominates the understanding of the world and which it wants to criticize. The critical viewpoint is interested in and kept alive by the *changes* of the prevailing views *which have already became possible* while pluralizing is still only a possibility here. It is easy to notice that in times of crisis, *philosophies* called *critical* multiply and there are only a few treatises. Such kind of thinking is usually insensitive to the multitude of obstacles which the changes following from the criticism have to face. A more detailed analysis of the critical attitude can reveal its romantic, absurd and *utopist* versions. The viewpoints which critically evaluate the modern state of affairs are still a part of modernity.

However, the sensitivity *to the changes in progress* disconnects viewpoints from the prevailing views. With this, the reference, the stable point, the control of reality also disappears. Reality is dissolved, pluralized and made rel-

ative. Thus, the world of the many, which cannot be unified, starts to speak. The spectator of the crisis cannot look out of the process; he is drifting in it; the meaning and possibility of all comparison is lost. We call this standpoint *crisical* since it is a product of the deepest crisis; its typical form is irrationalism. Its version forging ahead from modernity is the *postmodern* attitude. Pluralization is an important value here and precisely this is what is happening; it is only plurality which exists without any doubt.

The changes which took place, the crisis which run its course present the prevailing view as something changed, something different. If we notice and follow the tendencies unfolding from the processes, the discordance and inequality of the chances, alternatives and values and compare what can be compared we get out of the attraction of *the many* and we construct a single reality from this infinite world going to pieces, then we will transcend this contemporary pub through this *dialectics* and we reach another world from this one. The world of reality, developed and understood as the realization of possibilities is open, complex and changeable.

4.2.3 The crisis and reformation of modern knowledge

On the basis of the characterization of the crisis above, we can raise the following question: what is the essential crisis which is revealed in the postmodern ambitions of our age? Our answer will be the following: it is the crisis of knowledge, the crisis of modern human knowledge is revealed in it.

We would like to make our statement more nuanced and justified with the help of an analogy. We believe that we can discover a great and significant similarity in the situation of the people of the 15th and 16th centuries and the situation of the web citizens of our age. People of the late middle ages had to observe the crisis of faith, and people today have to observe the crisis of knowledge.

People in the middle ages lived in a strongly restricted, hierarchical and closed society. This medium provided a safe, familiar and habitual environment for the various individuals of society, but there were significant and occasionally insurmountable obstacles to becoming a personality. The changes of historical circumstances soon made the start of individualization possible in great numbers. Initially, the ideological background and supporting structure of the development of the individual was created in a religious form in the movements of reformation. They were chiefly striving for leaving the shaping of man's relationship with God in the hands of each individual and making it a personal relationship; perhaps we could also say that they strived for making this *the* personal relationship and abolish the influence of the religious institutional system in this matter. Individual freedom was created in the context of faith; or rather, an individual freedom was required in matters of faith. They wished to relate to God in a personal way, if possible, without the mediating activity of priests, the experts of faith. Obviously, the "technological" background of this decisive change was provided by printing and the printing of the Bible in a large number of copies.

Nevertheless, the individual that developed this way found himself in a world which was alien and hostile to him and which was full of unknown dangers including the unknown ambitions of other individuals, and nobody defended him from these dangers. Anxiety, fear, and the lack of an essential security belonged to the basic experiences of the primitive individual, and he could only rely on himself. These circumstances determined the basic traits of the modern personality and they created an alienated world filled with a multitude of egoist individuals (Fromm 1993; Szilágyi 1992).

This ancient crisis of faith resulted in a new age in which the knowledge of man acquired a determinative position, and now this modern knowledge itself displays the symptoms of crisis. Historical progress based on modern knowledge has lost its credibility. Served and justified by knowledge, the various horrors of modern history became obvious; the creations of the rule of abstract rationality endanger the whole of human existence. But how could we liberate ourselves from the rule of abstract rationality, which in this case is out of control? The relationship of the modern individual to knowledge has become similar to the relationship of medieval people to faith. The reformation of knowledge is necessary and has become possible. Fortunately, the appropriate tool is at our disposal at the right time: the development of computer networks and their worldwide proliferation creates the conditions of this reformation in a "technological" sense. The reformers of knowledge, the builders and the developers of the network are attempting to develop a direct, personal relationship between individuals and the whole of knowledge. In this process, they limit or eliminate the influence of the scientific institutional system (universities, academies, publishers, libraries, etc.); if possible, they do not want the power of the official experts of abstract rationality. The task of postmodern individuals, the followers of the postmodern reformers is not easy. They have to bridge the gap between life and knowledge personally, and recognize themselves as "web citizens" who are being born.

Perhaps it is understandable that a person who is surfing on the web feels himself to be in an uncertain situation (in an epistemological sense). Roaming in the network, lacking the help of the experts of the scientific institutional system and the mosaics of knowledge, he has to evaluate all elements of knowledge directly and personally. Facing the whole of human culture, this task presses heavily on us with an enormous weight; unprepared, we are thrown into this immense freedom and nobody will help us. We are left alone with the whole universe of knowledge on the Internet, an alien world unknown to us, created by other people and threatening us with fatal personal misconceptions. What is happening? Is alienation increasing? Is a new version of uneasiness leading to a new type of egoism? Let us switch on our computers! We can experience the birth of a new type of personality. 500 years after the reformation of faith, the age of the reformation of knowledge has come.

4.3 Late modernity and cyberculture

Thus, late modern culture is a culture of crisis. In the late modern age, people have lost their faith in the further validity of all traditionally applied *totality creating* effects, *world building principles* and *practices*. This is *obvious* to a great extent; it is "in the air" so much that any kind of recall or listing can only spoil the full experience and understanding of the situation. Nevertheless, we cannot do without a short reminder.

The ruling *relations of production* and the social-economical world order went through numerous radical transformations during the 20th century. Perhaps it is enough to refer to the worldwide economical and political changes following the socialist revolutions of the century, the boom and fall of socialist regimes, the restructuring and decay of the imperialist colonial system or the successive waves of globalization. The frequent changes of the ideologies ruling in the 20th century partly displayed and partly actively supported the mentioned economical and political changes. In the grip of the multiplication and changeability of the coexisting ideologies, some thinkers even seriously propagated the paradoxical standpoint of choosing an ideology without an ideology. No doubt, the activities of avant-garde movements facilitated the radical pluralization of artistic *styles*, which is so large-scale that we can talk about the cessation of styles. As an illustration, think of the dissolution of traditional *religious systems* and the prominent multiplication of religions and religious associations. Ruling *scientific paradigms* continuously face challenges, and they have often been forced to change from the first years of the 20th century. Perhaps it is enough to recall the scientific revolutions of the theory of relativity, quantum theory, Freudianism or genetics. The traditional *worldview* built on classical physics became plural even from the second part of the 19th century, and at the turn of the century, worldviews created successively and piling up on each other were trying to create the scientific worldview of our age (Ropolyi 1985). Perhaps the situation has changed in this area inasmuch as because of the interpretations of the meanwhile developed philosophy of science, they pay more attention to the social context of scientific activities. However, science understood as fit into a social context looks even more "disillusioning" since in this way, the necessary relativity of its evaluations, practicability and usefulness become clear.

As a result of all these factors – and numerous others –, the late modern man is forced to admit that he cannot find any useful world building principles and methods which would function with an unconditional validity in his concrete everyday existence, or ideologies and thought systems which would be able to support him intellectually in building his world. However, man cannot exist while being "deprived of his world", since the existence of man is being-in-the-world. (It is obviously not a coincidence that Heidegger's ideas, so expressively put in this question, developed in the critical years of the 20th century) (Vajda 1990; Dreyfus 1991; Fehér 1992; Ropolyi 2000c) Without world building methods which could be used with a hope in success, man either diagnoses his helplessness and exists in the despair of "being thrown into freedom" and deals with the analysis of human existence,[4] or he satisfies his need to build a world by expanding his identity into being worldwide.[5] However, this latter method is clearly different from the egoist methodology of the modern personality built on ignoring. First of all, it is different in its relationship to reality: the world of the modern personality is real, while the world of the above mentioned postmodern personality is necessarily virtual.[6] *Thus, the late modern answer to the failure of traditional world creating principles and methods is the creation of personal, individual and virtual worlds and submerging or withdrawing into these worlds.*

[4] Many figures of existentialism who face similar problems can provide him with useful help.
[5] Here we deliberately ignore the otherwise often used solution in which man, for want of something better, still tries to operate the unreliably operable traditional methods of world construction for a while.
[6] We will develop a more detailed analysis of the structure, characteristics and functioning of the modern and the postmodern personality in the second volume of our treatise.

This solution is obviously postmodern. In light of what we said above about the development of crises, it is clear that the postmodern personality of the late modern age can only rely on his own self, and as a result of the complete relativization of reality and the contingency of reaching actual reality, he can only build on his own self. "I am a barrier next to the river: hold on to me those who can. But I am not your crutch. – Thus spoke Zarathustra." The postmodern man of the late modern age is holding on to online barriers and he is surrounded by a virtual reality.

4.3.1 Culture and cyberculture

The nature of late modern culture is also transformed as a result of the peculiar world building practice of the late modern age. Among others, we identified the reinterpretation and transformation of naturally given circumstances as the factual meaning of culture. However, reinterpretation and transformation is by far not an easy task in a crisis situation. We necessarily need some kind of "world" for the reinterpretation (in fact, for the transformation as well), that is, a coherent system (a "meaningful whole", a semantic universe, a world view encompassing the whole of experiences and views, etc.) in which the meaning of the thing to be interpreted can be revealed by fitting it in it. However, in case of a deep crisis, it is precisely the world which can be identified as a coherent whole what disappears, becomes uncertain or unattainable. (This is why in situations of crisis, "culture fells off us"[7], since the reference which gives a meaning to things disappears.)

When the citizen of the late modern age is forced to expand his own personality and extend it into a whole world, his own world becomes the reference of all things at the same time. As they used to say a long tome ago: the measure of all things is man, of the existence of what exists and of the non-existence of what does not exist.[8] In order to create our own personality as our own world, we need to reinterpret the once already reinterpreted naturally given circumstances yet again, that is, the revaluation and transformation of the social environment is the task here and this is precisely what the late modern citizen does: he revaluates and transforms the circumstances of the individual *given by society*, and he regards the thus created new world of values as *his own culture.* Of course, such revaluation is possible without a crisis – artists often practice it – but in the circumstances of a deep crisis, it is emphatically needed and it presses down as a real necessity on the person who exists in the crisis. The world of values developed this way in the late modern age is *cyber culture*. Thus, cyber culture is significantly different from culture understood in the "traditional" sense. On the one hand, traditional culture is created through the revaluation and transformation of *naturally given* circumstances and forms the content of the *social system as such*, while cyber culture is created through the revaluation and transformation of *social* circumstances and it forms the content of *web life*, a new form of existence. On the other hand, culture is based on the *real* practice of revaluation and transformation of human *communities*, but cyber culture is based on the *virtual* revaluation and transformation practices of human *individuals*. Culture is created by people, cyber culture comes into existence; culture develops world-like creations, cyber culture explores virtual worlds.

We can regard several arts as the historical "antecedents" of cyber culture (for example, poetry) or any other "individual world creating" activity. In individual artistic creative processes, virtual, "world-like" works of art are created. For creating world-like circumstances, the artist has to revaluate and recreate the social circumstances. During the creative process, the situation of the artist is otherwise very similar to the situation of an individual in a deep crisis; think of for example the requirement of disconnecting from real circumstances and other creative artistic techniques. True, the artist usually puts his own self in the situation into which the late modern individual is "thrown", what is more, for the artist this is a life situation which only exists during the creative process, while for the postmodern individual, this is *the* life situation.

However, the web citizen, the late modern postmodern personality that creates cyber culture and lives in it, uses other tools for the virtual revaluation of the world than the artist. It is the use of information technology what makes the web citizen capable of revaluation; on the other hand, the artist applies artistic techniques which are adjusted to his genre. Therefore, the world of artistic creation and cyber culture can be very similar as regards their content so their differentiation might seem somewhat unjustified, but because of the different nature of their production technologies, it is still suitable to separate them. At the same time, it also has an immense significance that the use of information technology essentially makes *everyone* able to understand a practice very similar to artistic activity and as a result, it decreases the "elitist" nature of artistic work and artistic tasks, and leads to the "democratization" of the whole sphere of art and makes it available for the masses.

[7]From a poem by Attila József. (The note of the translator).
[8]The Ancient Greek Sophist tradition worked with this radically worldview. It would not be surprising at all if the popularity of Sophist teachings increased significantly among the followers of cyber culture.

In this way, cyber culture is popular art and *vice versa* (popcultures.com). But it is an artistic activity which the web citizen is forced into. Cyber culture – similarly to traditional culture – is supported by something. Traditional culture is supported by communities, and cyber culture is supported by the virtual cyber community sustained by web citizens. The cyber community is created by the countless web citizens expanded into a worldwide form, what is more, in a peculiar form of organization and mode of existence in which their own world-like quality does not suffer any damage. Earlier we said that society or the social system is the type of entity the form of which is created by communities and the content of which is created by culture or cultures. We can add here that *web life is the kind of entity the form of which is created by cyber communities and the content of which is created by cyber culture*. We would like to draw attention to the fact that the circumstances of web life are not social circumstances but re-valuated and transformed social circumstances; consequently, *web life represents a new human form of existence*. In order to explain its development, we had to study the social context of scientific and technological knowledge, however, for we will probably have to analyze the processes of artistic world creation its detailed characterization.[9]

Cyber culture in the strict sense of the word is a relatively new phenomenon: we could not claim about many of its versions or followers that they are older than 10 or 15 years. The understanding of its characteristics and novelty is quite varied (Lévy 2001). The following websites belong to the inexhaustible sources of studies focusing on its discussion: [Alan Liu's voice of the Shuttle; Cindy Grant Creative Hat's; Cyberculture; .netculture.; Resource Center for Cyberculture Studies; popcultures.com; Silver 2000].

4.3.2 Culture on the Internet

The primary and natural source of cyber culture is the Internet. (Here we do not discuss its occurrence in other environments, e.g. pop music or computer games.) Nevertheless, *traditional culture* is of course also present on the Internet, indeed, its presence is important and plays a significant role in Internet use. We can identify such representations of traditional culture on the Internet as for example books, newspapers, magazines, consumer goods, official administration, scientific publications, works of art – but we can think of for example participation in religious ceremonies or electronic correspondence. The cultural services that are available and can be used through the Internet regard the Internet as a modern tool. Without any doubt, the Internet can function as a modern tool and satisfy the needs of such people. Of course, the characteristic features of the Internet appear and are effective in these cases as well, for example its speed or communicative complexity through which it treats traditional cultural values in a somewhat, but not essentially modified form. For example, electronic mail, apart from a few of its characteristics, essentially expresses the same values as traditional mail.

We can also observe the presence of cultural activities on the Internet which consciously utilize the opportunities offered by the Internet and as a result essentially change traditional activities and value worlds but which are connected to the prevailing social circumstances and can be characterized with the possible goals of this social environment. The program of the *conscious transformation of culture* (Agree 1998) is probably closely related to Habermas's standpoint in the modern-postmodern debate. We can mention the initiative of the MIT in Boston as a characteristic and significant illustration of such ambitions. One of the most famous universities in the world displays *all of its teaching activities* on the Internet since 2002 September (MIT OpenCourseWare 2002). Anyone is free to join into the education process through the Internet free of charge. The leadership of the MIT is hoping that their initiative will find its followers and soon everyone can access the most authentic sources of university knowledge. The ideal of using the Internet for cultural purposes played an important role among the motives of the decision of MIT. As one of the officials said, it is unbearable that only selling T-shirts is realized from the possibilities of the Internet when the cultural state of society could use more than that. Though they do not give a degree – people still have to pay for that – they give knowledge. In fact, they have been trying to utilize the Internet in education since its appearance. The idea of the so-called virtual university is quite old and we could see many versions of the realization of the idea. It seems that the method followed by MIT will encourage other initiatives to do something similar.

The third cultural sphere represented on the Internet can be categorized as *cyber culture* in the strict sense of the word. The eminent example of cyber culture is the World Wide Web itself. The multitude of websites and the links which create connections between them are the two determinative components of it. The characteristic form of cyber cultural life is the creation of *personal* (and institutional) *websites* and the active and passive activities con-

[9]Several postmodern thinkers stress the "aesthetical" nature of the postmodern age [Jameson 1991; 1997; Kroker – Cook 1991; Clark 1996], the consequence of which is that the viewpoint of aesthetics fulfills a significantly more essential role in understanding our worldview in late modern age than in modern age.

nected to them. A new type of cultural unit is represented on the websites based on personal choices and decisions and built of fragments of traditional culture. This version is most often deficient and bleak but without any doubt, it is personal. The personal contents are quite prominent for learned visitors, even though they often exclusively contain popular elements. The culture of the postmodern personality is reminiscent of the popular and not the "high" versions of traditional culture. It seems as though the democratic nature of cyber culture did not only put an end to the gap between popular and high culture, but it also revaluated and put an end to high culture. The spread of the so-called "blogs", "weblogs" and "podcasts" points to this direction (Jarvik 2002). The "blogging" or "podcasting" person does not (only) publish his scientific or artistic results on the web but his short, contingent or occasional notes, ideas, thoughts and associations, to put it shortly, his opinion about anything what makes him concerned in connection with the current natural, social or web processes. The "blogging" or "podcasting" web citizen is the web citizen *per se*, a full member of the web standing in front of us in his full armament and he is the eminent creator of cyber culture.

Chapter 5. Late modern organisms

While we were discussing the technological, communicative or cultural aspects of the Internet, we did not particularly stress that besides all these characteristics or together with them, the Internet is a more or less clearly identifiable, independent organization as well; that is, it is an organism not only the components, functions and content of which is interesting but its organized structure suitable for realizing its peculiar goals and its own mode of existence as well. In other words, the Internet has a particular integrity; it is an entity with a special, independent nature. This view is accepted nowadays to a degree that it is reflected in everyday language – think of for example expressions as "I go on the net", "I check on the Internet".

The peculiar goal of creating military *networks of computers*, which are a part of the history of the Internet, was the development of a technological system of connections which does not require any central interference for its operation, that is, using Baudrillard's expression, which is an organism "without a center". The model of networks with an "open architecture", in which the connection with computers in their environment is sufficient for the individual computers, is able to realize this goal. The meta-network of the Internet has similar characteristics. A system as this remains functional even if some of its parts are not functioning. We often experience that our electronic mail arrives in large quantities while sometimes we do not receive anything. In such cases usually there is a breakdown "somewhere" in the network and our messages are roaming somewhere in the network for a longer period of time, but usually they do not disappear and sooner or later, they reach us somehow. It is notable that not only a network as this can defend its functionality efficiently against supposed hostile military attacks, but it makes any kind of control of its functioning difficult, including the possible ambitions of its own "center". To a significant degree, the rights which make control possible and their practical and technological conditions also display a distribution without a center.

Essentially, we need a comprehensive regulation only in the development of the standards which make it possible to connect into the network and in registering and administering the addresses which secure the identification of the computers connected into the network; this is mostly done by the organization called ICANN (Klein 2002). In theory, this organization is independent, but the government of the United States has a significant influence on its functioning. Business policies of the telecommunication companies which operate the telecommunication networks are further "external" constraints which influence the organization of the Internet.

Perhaps communication through the Internet began when in the 1960s the operators of the first interconnected networks spent their time with sending short, whimsical messages and entertained themselves this way. The idea became quite successful: today communication is a determinative function of the Internet. Characteristic communication technologies have developed in a fast development process which does not lack whimsicalness even today. Tools were created which make the total control of individuals over their communication situations possible. The communicative abilities of individual laymen operating completely digitalized media with communicative equipment have transcended all boundaries. The methods of speech, writing and reading which have been fixed for thousands of years are being dissolved and a communication practice sensitive to the organizational principles of images is emerging from their dissipating wreckages.

Various forms of Internet-based *communities* are created through the operation of the new technologies. The boundaries of the worlds of web citizens virtually expand to any degree, and the person expanded this way can essentially be active freely, build connections and face confrontations in the whole universe of the Internet. It is notable that regardless of their peculiar characteristics and functioning, virtual communities which utilize online connections are in an intensive connection with traditional communities as well. As a result of their interactions, the traditional social structure of society and its function has to confront unusual challenges and it is being transformed in many areas. Direct democracy almost seems to be attainable; the issues of communities can be made transparent and public for the masses; data fishers and the millions of "zombie" computers connected into "botnet" networks are spying on us influencing our personal habits and relationships, and so on. Without the Internet, we would probably have a quite different relationship to viruses and worms as well.

The case is similar as regards the *content* provided on the Internet: essentially, no "central" control can be operated. The Internet accommodates the whole of contemporary culture, basically without any selection. Perhaps the only things that they try to defend Internet users from "officially", that is, with a legal regulation, are hate speech and pornographic actions, but partly because of the flexibility of the Internet, with a limited success. Of course, there is some police activity on the Internet, which equally includes the investigation of classic and Internet crimes, but

we can by no means call such control significant. The representatives of financial interests connected to the property rights of intellectual products, that is, to publishing rights and copyrights are striving for limiting contents on the Internet. A serious war is being waged in this issue as a probable final result of which we can expect the partial or complete limitation of these rights.

The nature of the organization of the Internet is essentially determined by the circumstances of the late modern age in a technological, communicative and cultural sense equally. The late modern age is an age of crisis. This characteristic is clearly expressed by the fact that to a crucial degree, the entities populating this age are still modern by nature, that is, they express the values of modernity; but now it is possible, what is more, practical to organize these modern entities into a postmodern system and utilize them for creating postmodern values. For as a result of the crisis of modernity, the exclusive usage of modernist tools disappears (and their other possible uses appear), that is, we interpret the tools in a changing context (theoretical and practical).

In case of the Internet, all this is manifested by the fact that though the computers connected into the network are unambiguously modern tools, fit into the network of the Internet, we can also use them in a postmodern way. The use of the Internet in a modern way is possible and customary, but its actual usage obviously transcends modernist practice, that is, it is essentially a postmodern practice.

One (exploratory) way of developing new tools can be when man, lifting out a *given entity* from its naturally or socially given situation and fitting it into a different type of situation, recognizes that the given entity can be used according to the goal defined by the new context, and as a result, it acquires a new meaning as a tool. Another (inventing) method of creating tools can be when man develops tools originally in order to use them in a *given situation*. The "exploratory" method is a playful and accidental activity; "inventing" is a resolute and systematic activity. *Exploratory activities are postmodern, while inventing activities are modern by nature*. We can name the inventors of the digital computer with stored programming but not the explorers of the Internet. Computers are designed, built and manufactured, the Internet evolves; it is being built and created.

5.1 The nature of the organism

The attacks against the buildings of World Trade Center in New York on September 11, 2001 are believed to be organized and performed by the al-Qaeda. During the worldwide investigations following the attacks, more and more information was revealed about the mysterious organization. Its hiding members were slowly identified; their connections with each other and "outsiders" and the structure of the organization seemed to be revealed, together with the technological and communication mechanisms which maintain the structure. The history of this organization can be more or less reconstructed, just as the circumstances of its creation and the aims of its operations. The relationship of this organization to other organizations (political groups, movements, states) is still discussed and opinions whether certain more recent actions, statements and intentions can really be attributed to the al-Qaeda are debated. Whatever the truth might be, it seems to be unquestionable that the al-Qaeda is an organization which can be identified relatively well with the cognitive tool system of contemporary Western Society. It is an organism. It is a relatively structured, autonomous and knowable entity.

Though our picture about the al-Qaeda is a little uncertain and obscure at many points, perhaps this is precisely the reason why it can be used to illustrate *our typical conceptions* about organisms and to present the viewpoint of "folk organism theory". An organism is something which presents itself as such. It presents itself as such for the observing, analyzing and acting man. An organism is complicated or at least more complicated than other things. It is too complicated for the eyes, mind or hands to take it into possession immediately. At first sight, it is puzzling; at first it is incomprehensible and impossible to handle. It is a challenge. Man has to gather himself together and with this, the first step is taken: man's viewpoint, thinking and activities become more organized and complex. He becomes able to experience and understand organization. The inverse form of organization is disorganization: the escape from the hopelessly complicated, the escape of view, analysis and activity towards grasping the part or perhaps a detail. We take apart something which is complicated and then we put it back together. It seems really simple, but we wish it was not so difficult. The whole is complicated as compared to its part, just as rationality is as compared to life: perhaps this is easily understandable and can be admitted. In one word, an organism is an entity (de)constructed as complicated, through a viewpoint, analyzing thought or human activity. An organism is an independent whole, but it is always an independent entity in relation to something. It is a whole put together from its own parts, and it is a whole which separates itself from its environment. Whatever they may be like, the independence of independent entities is after all, finite – organisms are created and decay. They are organized and later disorganized; they are built up and later they dissolve. They are restless. They are similar to children: they

require constant care and attention. Perhaps they can become something one day. To put it simply, though they can be closed in theory, they are open.

In European thought, the theoretically demanding discussion of organisms began in Ancient philosophy.[1] Taking into account the relationships between our experiences, the first philosophers thought to have discovered a world order; they were striving for the discovery, description and interpretation of an organized whole. Since then, *worlds* constructed of the totality of experiences have been created in quite a large number of versions, and they keep being created again and again, and they can still lay claim to the rank of the most comprehensive organisms that can be understood by man. The development of a concept of *system* proves that they consciously studied the organization of the world. The system as a theoretical tool for grasping the entities which are "kept together" and "considered together" has a decisive significance for the developing sciences. Individual scientific disciplines themselves can be developed by applying it, but it is also utilized in the disciplines in countless versions. Nevertheless, noticing the *complexity of entities* is another great recognition of Ancient thought in "organism theory". As dialecticians said, entities can be complex; they can be composed of opposites. The rejection of the "homogenous" nature of entities and the study of the structure of "not homogenous" entities led to countless scientific, technological and ideological results of the age.

While Greek thinkers tried to understand the development and decay of various organisms as the development of organisms into other organisms and the reorganization of their elements and connections, medieval thought gave the task of creating organisms to God's *creation* from nothingness, homogenous non-existence or form the "almost nothingness". The modern scientific revolution redeveloped the worldview regarding organisms and it tried to give a divine position to man in significant regions of the system of the world: the creating craftsman is the creator of various machines and mechanisms. God's creative work was only needed in case of certain special organisms (the world, the soul, living creatures, etc.). Unfortunately, the new division of labor could only work if the entities were present as homogenous components without a structure.

The "separation of matter and movement" made the modern system incapable of understanding self-organization: the autonomy of created and made organisms is essentially defective; these are systems "moved from the outside" and "controlled from the outside". As a result, it seemed to be justified to give up the cherished ideas about the stable structure (or lack of structure) of systems and system components, given once and for all, and in this way, inner structure and external moving forces were connected in a radically novel conception for example in the viewpoint of Darwin's theory of evolution. The need to explain thermic phenomena introduced *complex systems* into physics.

Nevertheless, the study of the creation and functioning of organisms did not end with these innovations of view; what is more, it gained a huge momentum. One of the determinative results of the recent decades is the emphasis on the research of the organizational and functional principles of organizations relying on varied principles and conceptual apparatuses. As an illustration, perhaps it is interesting to note a few widespread theoretical approaches: systems theory, cybernetics, non-equilibrium thermodynamics, synergetics, catastrophe theory, chaotic dynamism, autopoiesis, fractal geometry, the theory of self-organizing critical states and network theory. Of course, we do not have an opportunity to analyze all these. In what follows, we will only discuss some theoretical aspects which are shared by most approaches and which can be useful in the study of the Internet as an organism.

5.1.1 Identity, integrity and reproduction

All entities can be regarded as entities in a certain context. We cannot say anything about something which exists "just simply", devoid of all circumstances, effects or interactions, at least not except for what we have already mentioned, namely that we do not now anything about it. If something does not have a context, it does not exist. Here we use the expression "context" in a wide sense which implies both ontological and epistemological components. Following Heidegger's encouragement, we could probably use the concept of "world" for ontological purposes instead of "context", and we could talk about *being-in-the-world* or, following different traditions, we could also use the concept of "*environment*" as well, but perhaps for now the expression "context", with both ontological and epistemological meanings, will be more suitable.

[1] Probably it would be very interesting, but here we do not regard it our task to present the concepts of organism expressed in a magical, mythological and early religious forms.

The context of entities necessarily separates and can be separated well from the entities and in this separation they mutually secure each other's *identity*. Their relationship is symmetrical in a certain sense, though it is possible to break the symmetry through a decision: from now on I will regard something as an "entity" and something else as "context" and asymmetry prevails. In this procedure, the main question is the creation of identities. By preserving the symmetry between an entity and its context, I can also say that the entity receives its identity from its relation to the context and *vice versa*, or through a decision for their asymmetrical relationship, I derive the identity of an entity from the identity of the context. Even this quite abstract scheme reveals the possible basic structures of organisms: the "entity-context system" is a single complex system the identity of which is "determined from the inside"; in contrast, the entity put into a context presents itself as simple and homogenous and receives its identity from outside of itself. We would like to draw attention to the fact that the choice between the mentioned organism concepts is *free*; there is no logical constraint, both views are intelligible – of course, if we use them consistently and repeatedly, we get to different worldviews and different problem areas. We can make the value system of our culture effective and we can satisfy our ideological needs through a free choice between the mentioned alternatives.

Besides their identity, another basic characteristic of organisms is their *integrity*. The concept of integrity is for describing the "wholeness" and "unity" of the organism and the degree and stability of its identity. The organisms suffer the effects of the external factors which influence their integrity, and they either give in to it or resist it. The effect of internal factors – if we can interpret them at all – will become the trigger of mutual and constant transformations. It is obvious that we can describe the integrity of organisms without a structure with the dichotomy of formation and destruction, but the "life history" of a structured organism can be more complex; it can go through a historical development, that is, a series of transformations between its formation and destruction during which it relatively preserves its integrity.

The key form of the existence of organisms is *reproduction*. Reproduction can be either active or passive: the organism can reproduce itself and it can suffer reproduction. The organism preserves its integrity when there is equilibrium between the two. The necessary errors of reproduction and construction/production play an important role both in case of self-reproducing organisms and organisms construed and (re)produced by external constraints. (The "error tolerance" of organisms is often described with the concept of robustness.) Nevertheless, reflective reproduction operated with error correction methods is also imperfect and it is a condition of the evolution of the organism (Koch 1989). Natural and artificial organisms go through a similar (re)production: genes, memes, computer programs, information, interpretations and cultural organizations all show this. Interpretation and misinterpretation, understanding and misunderstanding are equally important in communication and culture. Human culture is at least as much a misunderstanding-culture as it is not.

Thus, organisms are entities which permanently preserve their identity even in changing environments. They are typically systems with a complex structure and a complicated history, but we can identify their homogenous and simple versions as extreme cases. It is obvious that the conceptions about living organisms satisfy the mentioned abstract and general criteria (Gutmann – Neumann-Held 2000; Ruiz-Mirazo – Etxeberria – Moreno – Ibáñez 2000; Perlman 2000), but perhaps it is worth to note that of course, we can understand the objects and systems of classical physics as organisms with a special nature, not to mention numerous conceptual, mental, linguistic or social systems. Perhaps it is interesting to recall the difference of opinion between Neumann and Wigner in connection with the possibility or impossibility of a self-reproducing automaton (Wigner 2005). Cyborgs are characteristically postmodern organisms (Haraway 1991; 2005) and the agents of the researchers of artificial intelligence.

The entities of technology, communication and culture mentioned during the description of the Internet, or rather, these entities themselves can be understood as various organisms, and not only in one way. In the typical approaches we discussed during the presentation of the basic questions of the philosophy of technology, communication and culture, technology, communication and culture proved to be organisms (with different structures, complexity, identity and integrity). Technological and communication situations are for example characteristics organisms. Their identity is determined by internal and external factors together; without their integrity, the control over situations and the realization of the goals would be impossible. Communication media such as images, speech, writing, texts and especially hypertexts or cybertexts are also characteristic organisms. These are communication media with an especially strong integrity.

The integrity of the more and more complex organisms that can be constructed of various organisms may be much more prone to injuries than its components are. An obvious example of such "super-organisms" might be the computer the historically produced vacuum tube versions of which illustrate well the possibility of losing integrity. The probability of the malfunction of an individual vacuum tube can be expected to be much smaller (a few thousand

times smaller) than that of one of the few thousand vacuum tubes built into the computer. This was an important experience for Neumann and he could get rid of this problem through making use of appropriate organizational principles (parallelisms used in a sophisticated) and thus he could build a computer with an adequate integrity. We can find similar difficulties in the construction of the Internet as a "super-organism".

It is an especially interesting question for us here how the own organism of the Internet assembles from other organisms, technological systems, communicative agents and cultural media. In fact, the organism of the Internet is created out of the technological, communicative and cultural systems which the users regard as "belonging together" and "used together". In this way, the Internet is the construction of the users (including the groups of those who construct it and the observers and those who are averse to it, so perhaps it would be more precise to say users and interpreters), and it only exists as an independent organization because we identify and use it as such. It is a soft organism. Its identity is not based on some "hard", objective reality independent of man; its existence, characteristics and way of functioning depends on how its users actually "bring it together". It is notable that it is also an organization quite prone to injuries; it is much more prone to injuries than for example its own more robust technological and cultural components are separately.

5.1.2 Systems, networks and the world

Organisms are entities with a structure. The immediate experience of the complexity of organisms is expressed by a statement about the *existence* of the structure of organisms. Of course, disclosing the characteristics, individual or typical versions, features, regularities, functioning and modifications of the complexity requires more and they are an object of various ideological standpoints and the topic of scientific analyses and even a multitude of disciplines. Using a currently fashionable expression, while working on such problems we undertake to study *complexity*.[2] Here we will emphasize three characteristic approaches which are important for the description of the Internet: systems theory, network science and the viewpoints of philosophy working with the concept of the world.

We can encounter countless versions of the scientific examination of complexity in *systems theories*.[3] In fact, this is the main goal and meaning of systems theory. As Bertalanffy puts it, "general systems theory wants to be the exact doctrine of totality." (Bertalanffy 1968; 1969, 29). The concept of totality here refers to the fact that the system to be understood is "complete" in a certain sense, for example, in the sense that a "whole" can be more than the sum of its parts and this surplus cannot be ignored. Sadly, the results of general systems theory seem to be quite modest in light of its ambitious aims, and especially from a theoretical point of view. The truth is that on the one hand, the methods of systems analysis which can be used well in practice provide few theoretical generalizations, on the other, the purely theoretical ambitions of systems theory also show minimal results. The latter can probably be explained by the fact that actually, they did not succeed in creating a sufficiently independent conceptual framework of systems theory. They basically took the applied concepts (state space state, interaction, dynamics) from the conceptual framework of analytic mechanics, thermodynamics and a few other classic disciplines of physics and at most, they reinterpreted them. The utilized mathematical tools are also from this area and they show a quite diffuse picture anyway. Interestingly, systems theory is unambiguously successful in the spread of its "philosophy" in wide circles: nowadays we see systems everywhere from star worlds to al-Qaeda. We already encountered the most important message of this philosophy: systems are things which are "kept together" or "understood together". Therefore: we talk about the *unity* of *several* things. It is not very easy to develop an easily manageable, homogenous conceptual system of objects of various kinds between which several types of interactions are possible and there can be many of these. At the same time, a frequent mistake of systems theories is an exaggerated abstraction from the concrete nature of the entities included in the system, the direct result of which is the emptiness of the conclusions that can be reached.

If we want to say a little more than this, it is probably a good idea to avoid exaggerated generalizations and start to analyze specific systems. In the recent decades, analyzers of society developed an analytic technique which has a quite simple set of concepts and methods, and which is still adequate for representing complex relationships. Studying the relationship systems (e.g. acquaintances, friendship or cooperation) of various human communities

[2]The famous Hawking himself called the age ahead of us the century of complexity [Hawking 2000; Barabási 2001].

[3] When we talk about systems theory, we focus on the viewpoint of general systems theory. We will not discuss theories of any kinds of special systems, though network science could be understood as a special systems theory since networks can be regarded as special systems. Identifying networks as special systems is widely accepted, but in spite of this fact, the theoretical description of networks usually does not follow the traditions of systems theory but uses its own conceptual and mathematical apparatus, thus it is not suitable to characterize it as a special version of regular systems theory. To put it simply, *networks are special systems, but the current theories of networks are not traditional systems theories*. We could also say that we can talk about a new paradigm of systems theory.

(e.g. schools, workplaces, professional groups), they started to talk about *community networks* (Buchanan 2003; Barabási 2003; Kapcsolatháló). In fact, a network such as this is a quite special system in which the elements included and the relationships that can be created between them are both represented in a very simple manner, with the nodes and edges of a graph. In a few decades, the description and study of social networks developed into a well-tried tool system of sociology and it was even applied as a paradigm of social organization (Castells 2005; NETLAB). By far not with so much success, but of course, scientific research of networks have been going on for a while in many other areas, for example in connection with transportation, public utilities (and other types of infrastructures), biology an biophysics, commerce, production and consumption networks, what is more, we could encounter a completely built network thermodynamics in the 1970s.

We could witness a decisive change in the last decade. Suddenly, the network paradigm became quite widespread and it practically replaced the general paradigm of systems in the study of the problems of complexity. Nowadays, we see networks everywhere, from metabolism through the Internet to company ownership. Today, networks are the most important scientific tool to describe complexity. Several factors facilitated the mentioned change. First of all, the recognition of a few expressive and still surprisingly profound network descriptions of complexity, as for example the stabilizing and integrity enhancing effect of weak connections, the interpretability of the "small world" effect present in many networks, or the protection or lack of protection of networks against various malfunctions (Barabási 2003; Buchanan 2003; Csermely 2005). It turned out these network characteristics are the consequences of a few very simple organizational principles. It was an unexpected discovery that certain characteristics and even the development and decay of very complicated networks which contain several million nodes and connections are the consequences of very simple principles (which can be put in 2-3 easily understandable sentences) as we can see it for example in the work of Barabási and Albert on the so-called scale-independent networks (Barabási 2003; Barabási 2005a; 2005b; 2005c; Albert – Barabási 2002; Barabási – Bonabeu 2003; Barabási 2006). It probably also contributed to the success of the network paradigm that it follows a simple and easily understandable description of graph theory, and that in the analysis, we can use the available methods of statistical physics developed for other purposes relatively easily. Last but not least, it also influenced the fast spread of the network paradigm to a great degree that we spend many hours every day dealing with the networks of the Internet. In this way, it is natural that the analysis of the Internet has an important place among the illustrative discussions about networks.

It seems to be unquestionable that network science is successful as compared to general systems theory. This is true regardless of the fact that what it can provide is not very much; it is mostly only phenomenology, that is, description of prevailing (complex) circumstances in a unified framework. Of course, the general systems examined by systems theories and the special systems examined by network sciences are equally complex organisms, but they embody different aspects of complexity. While the traditional systems theoretical point of view is mostly sensitive to the complexity of the *behavior* of systems and cannot take much into account from the structure of the examined system, the reverse seems to be true in case of network science, or at least it is quite different. Though the examination of the complex *structure* of networks is emphasized in the viewpoint of network science, we also get a good description of the formation of the structure and a few essential components of its functioning, thus we can have a more complete and balanced understanding.

All this is illustrated well by the basic concept of the individual disciplines. Traditional systems theories try to give an account of the structure of the system with the help of the concepts of elements, (system) parts, subordination and super-ordination, inclusion, separability, composition and a few other similar concepts. They approach the same task with the following concepts in network science: nodes, edges (connections), degree (and even degree distribution), path, diameter, intermediacy, closeness, clusters, correlation, network motive, significance profile, tree, etc. Hopefully, the diverging orientation of the two conceptual systems is apparent without the discussion of these concepts.[4] The components are homogenous and simple in the traditional theory; the nature of the components can be quite varied in the conceptual system of network science. Above all, we differentiate between the nodes and the edges connecting them from the start. Furthermore, in scale-free networks (as for example the Internet) we have nodes with very different degrees inside a network and their differences (and their degree distribution) are decisively important for the structure. We can also express this by saying that in network theories, there is an obvious connection between the complexity of the network and the diversity of the nodes of the network. The dichotomy of "simple components and the complex system" which can be observed in systems theory is not present here in a clear-cut form. Nodes are simple but not unstructured and featureless objects; we can attribute various characteristics to them depending on their degree, intermediacy and closeness.

[4]Basically all mentioned concepts are presented and illustrated in the readily accessible writings of graph theory and network science [for example Surányi 2004; Buchanan 2003; Csermely 2005; Kapcsolatháló].

We find another difference which points into this direction if we compare the connections that can be established between system components. In traditional systems theories, the components (elements, partial systems, etc.) are ordinarily in clear spatial relationships and definite state space interactions with each other; the connections between the components may be plural in systems theories, what is more, the interpretation of the connections is extremely far-reaching; they can involve anything from phone lines through the existence of shared friends to an imaginary journey in the same spaceship. The "node-edge" assignment and the relation system between them are not fixed, that is, we can use any optional procedures while constructing a network.

Instead of places, it is location which matters in networks; instead of the globally effective interactions which are valid for the whole system, it is intermediacy, closeness, correlations and clustering which are effective in the local connections between nodes and which shape the structure. The structure of traditional systems is revealed for the observer who is standing outside of the system; in case of networks, the graph of the network can be disclosed during its guided or unguided tour.

On the basis of their mentioned characteristics, we can conclude that systems are *modern* and networks are *post-modern* organisms. The most important argument for this claim is the necessarily plural nature of the components of networks (as compared to system components). It is also prominent that the "rules" which build up and keep together networks are effective locally or individually, while the "laws" creating and sustaining systems are effective globally and universally. Surprising network features (e.g. the small world phenomenon)[5] are made intelligible by the "fragmented" nature of networks or its inclination to create groups in which the stronger relationships among the coexisting relations of various strengths lead to the formation of groups, while the connections between groups are sustained by weak relationships. We create systems through generalization and abstraction, and we create networks through a certain rule following simulation. On the basis of all this, we will regard systems as organisms with a modern organization and ontology, and we will regard networks as organisms with a postmodern organization and ontology.

On the basis of what we said above, we can regard the "*world*" concept of philosophy as in which the concepts of system and network are interwoven. The world is the widest context or it is this context itself and the entities included in it. It is an organism the identity, integrity and existence of which is unquestionable, and which we create in infinite numbers and variety. The world as a totality is the subject of the exact doctrine of systems theory; it is the reference of systems theory. The quantity and quality of parts of the world, components and elements are all infinite, and the only way to map them is going through the whole of it step by step. Our world is cut into parts by countless fault lines, the most striking are perhaps the boundaries separating and connecting reality and possibilities. The separation of reality and possibility makes it possible to interpret the changes in our world, while their interconnectedness makes it possible to interpret its openness and virtuality. The world is a changing, open and virtual organism, though the whole might seem to be eternal, closed and real for inhabitants or prisoners of different parts of the world. The world is a structured organism in which everything can be connected to everything – though the variety, immediacy, mediated nature, strength or weakness of the connections is often confusing. The world as a web of connections is the object and reference of network science. System and network are worlds tamed by scientific methods.

We ordinarily recognize the organisms of technology, communication and culture as systems. Nevertheless, such declarations are only mere declarations, they are the common names the elements and connections of which are regarded as belonging together, and they very rarely suggest a more profound content. Of course, there are exceptions, as for example Luhmann's autopoietic social systems theory built on communication, or the idea of the evolution of technological systems. Understanding organisms as systems always implies that the organisms in question are (or can be) the subject of scientific analysis.

While describing technology and communication, we gave an important role to the concept of *situation*. Situations are also made up of components and relations which are kept together, so they can rightly be regarded as special systems. Their specialty is that they are power systems. We divide life situations which make up human world into controllable systems, that is, situations. The boundaries of a situation are marked out by the possibilities of control and the abilities of the person involved in the situation. The components of situations are the multitude of naturally given and artificially created conditions, the person involved in the situation, the human goal to be reached and tools used for reaching the goal. We can see that situations are organisms operated in a teleological way. The tools

[5]This expresses the surprising idea according to which the way between two optional nodes of a network which contains a very large number of nodes goes through relatively very few nodes. For example, two optional persons can be connected by a chain of acquaintances consisting of six people in the whole world.

used in the situations (for example the shaped medium of the communication) are in a necessary connection with all components of the situation, and thus in fact they contain the whole structure of the situation in themselves.

The computer as an organism is also a system, more precisely, it is a technological system. Technological situations are the complexes of the conditions, aims, the agents setting the aims and realizing them and their tools. We will see soon in the example of the computer that the structures or functions of political or economical systems can also be expressed in a technological system. In fact, this is understandable, since there is a necessary similarity between the various power situations which can be derived from a given life situation, and this similarity can be revealed through an appropriate analysis. A social constructivist method, motivated by hermeneutics can take into account the division of life situations into situations adequately. The systems of the life world transformed into situations make up a controllable reality; they are typically modern organisms.

We regard the technological system of the Internet as a network. In this case, the network paradigm seems to be completely self-evident, since the aim of its construction is connecting individual computers into a network. The methodology of building networks is plural: besides the usage of the tools and programs which make the connections possible, there are hardly any rules for the realization of the connections. There is no universal structure and there is no universal way of functioning. (Perhaps using the network for wrong purposes is a good example of this, as we can observe it in case of the so-called "bot-nets" where, through a harmonized operation of the programs secretly set up on the computers connected into the network, we can force the cooperation of millions of computers.) The network is continuously made by adding new nodes and connections and by rebuilding and transforming the earlier ones; and it is never finished. Its components, connections and structure are not originally given but are freely developing. An analysis of the technological network of the Internet can reveal the structure and important characteristics of the network and the laws of its evolution as well (Faloustos – Faloustos – Faloustos 1999; Vázquez – Pastor-Satorras – Vespignani 2002; Pastor-Satorras – Vespignani 2004; Yook – Jeong – Barabási 2002). For example, we can show that the technological system of the Internet is a scale-free network, we can determine the degree distribution characteristic of the network, clustering, the correlations between the degrees of neighboring nodes, the regularities of the expansion of the network and similar other network features. The technological network of the Internet is a single mega-component; logically, it does not have any separate partial systems which are not connected into the Internet.

The Web is also obviously a network, that is, the system of the links creating connections between the websites. For example, it is striking that in this structure, we can describe the organism with following locations instead of places (using a network language, intermediacy, closeness, clustering or correlations), or that the number of links connected to the websites (the degree of the nodes of the Web) can be quite varied. What is more, we can also see that the link structure of the Web, that is, of the Internet is a scale-free network. We can essentially describe its formation by using two principles: 1) the number of nodes and connections is continuously rising, 2) a preference is effective in the development of the connections, that is, nodes which have more connections gain new connections with a greater probability (Barabási 2001; Albert – Barabási 2002; Barabási 2003). It is notable that though the technological networks built of websites and that of the Internet are similar in many respects (for example, both of them are scale-independent), of course, they are not the same. Thus for example the network of the Web contains guided edges (that is, a link on a website creates a one-directional connection with another website), the network breaks up into areas separated from each other, and so on. The so-called "grids" built from a multitude of personal computers connected into a network and forming a supercomputer are an especially special type of networks just as the "bot-nets" operated through coordinated malicious programs set up in computers connected to the network.

Therefore, another network, the Web as a network of interconnected websites, is built on the technological network of the Internet. What is more, we can notice further complications if we consider that communication also takes place in the same technological and website network, as a result of which we can also diagnose the creation of networks of communities. Such community networks can be similar in some respects to traditional social networks (e.g. they are based on conversation), however, they are quite different from them in other respects (for example, it is based on the conversation of people who do not necessarily see each other). There are also many networks through the creation of which the goal is expressly that the interwoven social and Internet networks create new types of community network types permeating each other (iwiw, Osztálytárs, Orkut, Myspace, Friendster, Facebook, XuQa, Tagworld, Catch-27 etc.).

5.1.3 The autonomy and value content of organisms

When we think about the creation and existence of organisms, it is easy to notice that it is suitable to choose a viewpoint somewhat different from how we approached technology, communication or culture. In our earlier analyses, we could start out from the natural assumption that the objects we are examining are artificially created, man made systems subject to social control. At the same time, suggesting the possibility of the autonomy of technology, communication and culture has a relative meaning: all of these systems can appear as autonomously existing and functioning systems for a citizen of a given age and society and for people living in a certain social situation, but of course, we cannot talk abut technology, communication or culture which were absolutely independent from man. In case of organisms, the situation is a little different: it seems to be more suitable to relate the creation and functioning of organisms to the environment of the organisms understood in a general sense; that is, to the environment which is "external" to them and not to the immediately human, social context. Of course, the human and social environment is always appropriate "external" environments for organisms, but it is worth emphasizing the analysis of the effects of the naturally given environmental factors as well.

In fact, the case is that we would obviously like to accept the self-development and self-organization of organisms, but in case of technology or culture, we would like to insist that these are necessarily connected to human activity. Thus, in case of organisms, it is possible to talk about their absolute autonomy and think about their creation and form of existence which is independent of all human intervention.[6]

In this way, the basic question of the philosophy of organization (the philosophy of systems, the philosophy of networks, etc.) is the relationship of the organism to its "external" environment and the examination of the question how determination works in this relationship. The two typical answers to the basic question are the following: organisms are self-organizing, autonomous entities or actually, the case is different and organisms can only be created and can only exist as a consequence of environmental effects and at mercy of them. Autonomous organisms are closed; those under the control of the environment are open. Open organisms controlled by their environment – depending on the nature of the environment (e.g. naturally given conditions, conscious human choices) – can realize various forms of existence. We can also talk about their evolution, construction or creation as well.

The other aspect of the basic question is also somewhat different from the earlier basic question versions. The "value laden" nature of organisms can be revealed by the fact that we cannot completely separate the consequences of the existence of the organism from the consequences demanded by its environment. This is the case during the so-called *emergent* behavior of organisms, when beyond the environmental constraints, a certain "surplus" is also manifested, when something "new" is created, something which was not "built into" the environmental conditions and is still realized. (Of course, the same can happen in case of autonomous organisms as well.) This is not the case during "value neutral" behavior: the existence of the organism does not add any "surplus" to for example the existence required by the environmental conditions.

We can differentiate between four approaches of the philosophy of organization on the basis of their standpoint in the basic question (similarly to the interpretation of technology, communication and culture): determinism, instrumentalism, substantivism and constructivism (see *Table 8*).

THE ORGANISM	AUTONOMOUS	UNDER "EXTERNAL" CONTROL
"VALUE NEUTRAL"	*Deterministic* Mechanistic worldview	*Instrumentalism* Creation
"VALUE LADEN"	*Substantivism* Development	*Constructivism* Evolution, construction

Table 8: A possible classification of the philosophy of organization on the basis of their standpoint in the basic question

In the *deterministic* versions of the philosophy of organization (the philosophy of systems, networks and philosophical ontology), the organism is closed and does not display any emergent features. We can meet such views in

[6] Of course, this standpoint does not invalidate the earlier mentioned principle of the human construction of all existence independent of man – the two statements refers to different levels of constructive human activity.

mechanistic worldviews. Their typical realizations are the classical mechanical systems of mass points. In *instrumentalist* understandings of organization, the organism is open, that is, it exists at mercy of "external" control and it does not reveal any emergent features but it follows the commands of the control forming it faithfully and perfectly. Various creation theories and philosophical discussions of creation are obvious illustrations. In the *substantivist* understanding of organisms, the organism is a closed system, which is capable of existing independently of its environment, but it is still able to behave in an emergent way. This is an organism in which the features which are to be evolved are somehow coded into; it is an organism capable of self-evolution, self-movement and self-organization. The history of thinking about living organisms contains similar views in varied forms. Finally, the *constructivist* understanding of organization presupposes an open organism capable of emergent behavior and which is dependent on environmental control but is able to be actively in harmony with its environment. Obvious examples are organisms capable of evolution and artificial organisms of various versions of constructivism. The systems described by Bruno Latour's actor-network theory are good examples of the latter (Latour 1987; 1999; Stadler 1997).

5.2 Modern and postmodern organization

The late modern world is populated by entities with a modern, postmodern or a double nature (in some respects modern, but in others postmodern). We can reveal their nature by studying their organization, organizational principles and value content. Out of the organisms which embody modern and postmodern values, here we will only discuss the problems of the entities which play an important role in the construction and functioning of the Internet, we will chiefly try to analyze computers and the Internet as a whole. We call an entity modern or postmodern if it embodies a sufficient amount of the respective set of values. We do not think it justified to list modern and postmodern values here again since they were featured in several places earlier in our book. Here we would like to show the forms of their manifestations in objects, organizational and functional principles in the historically changing worldview of physics.

5.2.1 Organization and modern physics

The objects of the late modern age are mostly modern by nature. The modern object is the construction of the modern individual, which he creates through an egoist methodology; he populates his world with units which have a transparent structure, which are without any "inner" degrees of freedom that can be identified as the source of all indeterminacy and mysteriousness, which are obeying to the effects of the external environment without any delay (that is, which are without a memory) and which can be controlled completely. The nature of the modern entity is simple, unchanging and eternal. Its typical example is the object of classical mechanics: the mass point. They mostly made use of the help of the divine clockmaker for constructing, moving and starting the clockwork made of mechanistic objects in harmony with the modernist value system. This is a timeless world (or imagined as timeless). Its harmony seems to be secured by the eternal recurrence of capital.

(Somewhat) surprisingly, modern constructions are efficient in the interpretation of many modern problems, but they cannot be used in numerous cases. For example, it is striking that the observable natural processes always lead towards a favored direction, machines which seem to be faultless break down, mechanisms devised for an eternal recurrence slow down or stop; the whole magnificent structure is threatened by deterioration and decay. Because of problems which cannot be interpreted in the mechanistic worldview, the mechanistic explanations which work with causal determination are complemented by ideas operating with teleology aimed at achieving a stable state.

In the 50s and 60s of the 19th century, they could not find the model of the changed circumstances of the societies afflicted with the general economical and political crisis in mechanics, thus the rule of the mechanistic worldview faltered and this created favorable circumstances for the development of a new worldview. In this *thermodynamic* worldview the (world) system is the dominant entity, the components of which are *unstructured* objects which are defined only in an abstract manner and which are inseparable from their environment, albeit they have a certain abstract relation to it. The whole system is teleological and moves in one direction, that is, it evolves. Similar elements are defined even already in Hegel's philosophy and later in the philosophy of life, but its scientific content was manifested in phenomenological thermodynamics. In this viewpoint, instead of the concepts of mass and force, the abstract concepts of energy and entropy characterize the changes and the striving for equilibrium creates a distorted concept of order: heat death. While the mechanistic worldview assumes that man is active and nature is passive in the relationship between man and nature, the relationship is reversed in the thermodynamic worldview:

(objects) and man simply suffer the effects of the environment. The viewpoint of classical thermodynamics seemed to be appropriate for interpreting many natural processes, but it offered a quite unfavorable perspective by presenting the natural process of reaching equilibrium, that is, for example the decay of various human constructions as the inevitably effective consequence of existence. The thermodynamic worldview only gives an explanation of the crisis, but it does not obviously help overcome it.

We can hope for a program of overcoming the crisis and a more harmonic relationship between man and nature (an active man in an active environment) from the synthesis of the mechanistic and the thermodynamic worldviews. The objects of this *statistical mechanistic* worldview are *complex* by nature; even if they were reduced to a few characteristics in their concrete reality, at least they possess more characteristics as abstract possibilities; they are dependent on their environment and have an internal structure. The global processes of the global system developing from the multitude of such objects through various interactions obey specific laws of evolution: we can talk about evolution but not teleology in connection with the developing order (Prigogine – Stengers 1995). The central element of this statistical, population or dialectic worldview is dialectics, which interprets the concrete coexistence of the following opposites: one-many, necessary-accidental, concrete-abstract, harmony-struggle, local-global, causal-teleological. We can encounter its various versions in evolutionary theories, discussions of structure development in classical physics, theories of complex systems with various motivation, social theories, psychology, economy and many other theories.

Both the thermodynamic and the statistical mechanical worldview are alienated from the modernist viewpoint of the mechanistic worldview and can be regarded as expressing postmodern values. The concept of diversity plays a key role in both worldviews. It can be shown that these worldviews – both from a historical and a logical point of view – are closely connected to the worldviews of societies in a crisis, what is more, because of the identity of their value worlds, thermodynamics and statistical physics can rightly be regarded as the "sciences of crisis" (Ropolyi 1992; 2000a). At the same time, since we characterized the postmodern value system as the value system of the crisis, it is obvious that postmodern values are embodied in the understanding of objects and organizational principles of thermodynamics and statistical physics.

The methods used in the analysis of *networks* are also derived from statistical physics to a large degree (Albert – Barabási 2002; Barabási 2005b; 2005c; Pastor-Satorras – Vespignani 2005). The organizational principles of networks built up of spread out but interconnected objects take into account similar regularities, but instead of point-like or localized objects, they use the principles in the systems of situations, flows or relations. The networks discussed with the help of statistical physics are equally useful tools in the description of communication networks and the Internet (Barabási 2005a).

5.2.2 Constructions and constructors

In the statistical viewpoint, the "supporting medium" of the examined organism is regarded as an active participant in the mechanism of organization, which is expressed by the fact that the process of the creation and functioning of the organism is usually called organization, self-organization or self-design. With this approach, they are opposed (to different degrees) to the various ideas explaining genesis relying on *construction*. Perhaps we can divide the approaches which use the various variants of construction into *four* big groups.

THE CONSTRUCTION	STRONG	WEAK
IMPERSONAL	*Social constructivism*	*Evolutionary tinkering*
PERSONAL	*Modernism*	*Radical constructivism*

Table 9: The classification of constructivist approaches

First of all, it is suitable to differentiate between groups operating with strong and weak construction. According to approaches working with *strong construction*, the construction of organisms follows a preconceived plan. However, we can call the method in which our only claim is that the genesis of organisms is not a naturally given process *weak construction*. Strong construction is necessarily a teleological process; on the other hand, weak construction is not necessarily one.

The natural consequence of constructions is the appearance of *constructors* in the process: conscious agents controlling or supervising the construction. The modern worldview works with strong construction and we can

identify the modern individual or God imagined in a similar role as the constructors. In fact, the idea of strong construction is decoded into the concept of *machines*. In this way, all machines are obviously tools of power. Of course, the computer is one, too; what is more, as we will see soon, the computer is a typical power machine.

Weak construction usually works with impersonal constructors. We can regard Jacob's *evolutionary tinkering* (Jacob 1986) as representing the evolutionary process as a typical form of weak construction. According to this idea, the computer network which creates the Internet is constructed in this way: contingency plays an important role in its development, the web does not change in order to realize an originally given plan and it does not have a constructor who we could name (Turkle 1995). It seems that Searle also talks about weak construction (Searle 1995) and autopoiesis (Whitaker 2001) also belongs to this group.

Social constructivism represents the third group of constructions. On the one hand, in this approach an impersonal constructor is at work (usually social interests and values), on the other, despite of this fact, we can regard it as a strong construction since they expect the unconditional predominance of an originally given social value system in the construction process.

Finally, it seems that the fourth possible relationship between the constructor and the construction is expressed by the various constructivist approaches of Kelly, Piaget, Glaserfeld, Gergen and others which work with *psychological* motivations in which the constructor is the *person* himself, nevertheless, the construction is weak (Botella 2000). The so-called radical constructivism has a similar basis and occupies a somewhat similar position.

In the following discussions we would like to demonstrate on the one hand the functioning of social constructivism and weak construction conceived as evolutionary tinkering, on the other, we would like to shed light on the value content of computer networks. First of all, let us mention that while examining the relationship between computers and society, it the social effects of computers which are chiefly studied. However, here we will try to analyze just the opposite and our question is whether particular social relations, value systems or interests appear in the principles of construction and functioning of computers (and computer networks). If yes, how can social relations are represented in the hardware and software of computers? Can the basic principles of computer building and social organization be connected to each other? We can only give a substantive answer to these questions, and in fact we can even only raise them if we apply a social constructivist viewpoint of the philosophy of science and technology while analyzing the problem area. In what follows, this is precisely what we will do and we will try to show that computers are tools which express the values of modernity while computer networks embody postmodern values.

A few years ago, the audience of a discussion list focusing on Hegel's philosophy was debating whether elements of Hegel's dialectics were used in the creation of computers. Some firmly claimed that "the Hegelian concepts of existence and nothingness are the basis of the whole information technological revolution; Hegel foresaw the binary system which could become the basis of modern technology (…) The computers are tools which are capable of using the most abstract categories very fast and this ability of theirs has fantastic consequences". In our view, it is at least questionable that we can connect these "Hegelian" ideas to the principles of computer building, but it would be probably worth it to refer to other Hegelian ideas. For we can recall one of Hegel's basic system building principles, and as a special paraphrase of it, say that *society wants to recognize itself in the tools which develop in social processes*. In other words, society only accepts those technological tools and makes the mass production and long term preservation of those technological tools possible which can be in harmony with the value and interest system of the given society and which express and recognizably represent them. In their everyday usage, these tools adjust to the social environment more and more, and they can develop further while changing together with it and can acquire a long term existence.

The followers of the social constructivist viewpoint are trying to present concrete social processes in which such harmony can be created. According to their basic principle, technological tools and even the whole of knowledge "are the product of human activity, just as the state is" (Shapin – Shaffer 1985; 344). Thus, it is quite understandable that the *social circumstances* which determine the society of a given age and the *technological circumstances* which determine the technological tools of the age are *similar* in a certain sense, since both relation systems are sustained by human activities influenced by the same values and interests of the given age. Following Hegel, we can recognize and describe the common ideas expressed in computers and in society; and accepting the basic principles of social constructivism, we can also ask about the reasons which determine this common content. On the basis of all this, perhaps we can also point out that it is not the building and the functioning of computers which has Hegelian roots but much rather, social constructivism.

Several studies successfully describe the development of the “socialized” scientific and technological tools of the 17th century, which harmoniously fit the contemporary social environment (Shapin – Shafer 1985; Freudenthal 1986). The *clockwork* metaphor summarizes perhaps the most important relations of the age. The clockwork is not a simple time measurement device but a universal automaton; in fact, all existing entities can be regarded as clockworks: living organisms, the human body, the soul, and even the whole world. The idea of the calculator was created in this intellectual atmosphere: both Pascal and Leibniz designed such mechanism. It is notable that the calculating automaton is completely in harmony with the whole system of the clockwork world, that is, it is obvious that the first concepts of the computer as special clockwork were created under the influence of the *mechanistic* paradigm and they faithfully reflect its value system. In what follows, we would like to show that essentially, the computers of our days are essentially built based on the same mechanistic principles: most essential characteristics still represent the value system of 17th and 18th century mechanistic philosophy, that is, the ideology of modernity.

5.3 Modern computers

At a first glance it is obvious that these machines - the historical clockworks and the more recent computers - have very simple, clearly separated, unambiguously identified and related elements, which with the whole mechanism have a well-defined state at every moment of their working, with all the processes predictable and countable, having the possibility of representation in a very simple language. Their actual state, processes, aims and applicability are determined from 'outside' - they have no 'inner' freedom.

Below, we will discuss in detail that the ideas of modernity are represented at all levels in these machines; they can be demonstrated in the constituents of machines, in the functioning of these constituents, in their relations, in the basic principles of their building, and in human-machine relations too. In the language of computer engineering the values of modernity can appear in both hardware and software. (However it is obvious enough that even the hardware-software distinction reproduces the Cartesian mind-body problem of the seventeenth century.)

In computer hardware, social relations can be found at least in two forms: on the one hand in the relations which are determined by the actual social environment of the manufacturing process of a concrete computer, and on the other hand in those relationships in which the basic principles of computer building, working and using are formulated.

Of course, the elements of the hardware - the transistors, chips, discs, various cards, monitors - are realized in socially concrete workplaces. Here 'socially concrete' means the know-how, discipline, level of cooperation between the agents of the working process, and so on. These relations determine many aspects of the possible products. (This is expressed in a very clear form in a joke which circulated in the 1980s in Eastern countries: 'TASS has reported that with a lot of hard effort the biggest chip in the world has been successfully produced in a Soviet factory!') From this point of view, in the history of computers many important changes can be seen [Goldstine, 1972; McCorduck, 1979; Virtual Museum of Computing, n.d.]. Replacement of mechanical elements with different generations of electronic ones led to many new possibilities in computer building. Some of these have been realized (e.g., the speed and effectiveness of manipulations). Moreover, the basic characteristics of these machines and the very nature of their elements essentially did not change. In other words, the social values (interest, intentions, goals) built in and represented by the elements and the whole computer are essentially the same throughout all the computer generations.

5.3.1 The principles of mechanistic philosophy in computers

The nature of elements built into computers is very simplified in relation to natural beings, the entities of our life-word and the complexity of real systems. The state of an element can be characterized by one or very few markers, usually by numbers. All elements can be replaced with another one, which is a functionally equivalent copy: the individual character of the elements would be a possible source for mistakes, so they have to be eliminated.

In the normal *working* of the elements of a computer predictability, countability and reproducibility are the essential characteristics. To support these features a high level of redundancy is acceptable. In the course of redundant events the different processes lose their identity; the unique right result is the goal and the path leading to this goal is unimportant. All the processes are deterministic; the stochasticity - the accidental events - would result in errors, so

they have to be avoided. All (past or future) states of a computer can be calculated exactly - even without any Laplace demon. The processes are localized, they are reversible and sequentially executed; the space-time relations in a computer have an obviously classical mechanical character.

The interrelations of the elements of a computer are fixed. Every element has its own role, which is predetermined and unchangeable. The interaction of the elements produces a new unit, a special whole, but this whole is a simple collection of its elements, nothing more. There is no spirit in the machine, i.e. the computer does not think.

Among others, these mechanistic features of computers guarantee that it is a mechanical tool; such a machine expresses the ideas of the mechanical world view - the world view of modernity. Of course, these features characterize not only modern computers, but any kinds of mechanistic machine too. Here we wish to emphasize exactly this relationship: computers are mechanistic constructions, independent of the micro-electronic production and electronic working of their components. Moreover, it can be stated that the computer is the best realization of the idea of a perfect machine imaged in the eighteenth century. Perhaps it would be worth mentioning that these features of computers should not necessarily be accepted. For example, applying the principles of cellular automata we would be able to construct other types of computer, with no strict mechanistic characters. However, we build only mechanistic machines, so at this point a value-choice - preference of the mechanistic type - is playing an important role. Why do we choose these machines? What kind of relations influenced us?

The mechanistic world view is an essential element of modernist ideology. The main purpose of modernity is to build a world, to build or at least to define a system which is absolutely controllable. The total control of events (natural, social and even mental ones) is our goal if we are to follow the ideology of modernity. For these purposes we can use computers; we would emphasize, however, that the computer itself shows these characteristics, too. The computer has become part of the huge clockwork of power of modern society and at the same time it is a construction of power, a power-machine; i.e. the most important characteristics of the modernist power structure are built in and expressed in it.

5.3.2 Modern political and economic relations in computers

It is well known that in modem computers a sharing of tasks takes place. Disregarding the input-output problem computers have three separate tasks: controlling, operating and storing. On the basis of the earlier description it is evident that computers have three main, separate units for these different purposes. The central control unit determines, organizes and controls the operation of the commands; the operational unit operates and actually executes the commands; and the memory unit stores and keeps the relevant data. These characteristics of computers have already appeared in the ideas of Charles Babbage in the nineteenth century and of course in the so-called 'Preliminary Report' created by von Neumann and his co-workers in 1946. In this 'Preliminary Discussion of the Logical Design of an Electronic Computing Instrument' they declared that a general-purpose computer must have a control unit, an arithmetic and logic unit, a unit where instructions and data for the actual problem can be stored, and an input-output unit. As Rheingold (1985) says: 'They very strongly suggested that their specification should be of the general plan for the logical structure and fundamental method of operation for all future computers. They were right: it took almost forty years, until the 1980s, for anyone to make a serious attempt to build "non-von Neumann machines'."

It is easy to recognize a functional analogy of this computer structure to the political structure of the modern state regarding the treatment of tasks. In a modern civil state one can identify similar forms of the division of power, an important result of the political struggles of the seventeenth and eighteenth centuries. The parliament determines and controls the social system by laws - which in a certain sense are the universal versions of commands. The government operates under these laws in the field of real matters, and the law court preserves and keeps alive the laws and certain significant details of cases.

Moreover, if we go into the details of this analogy we find that the digital representation of both the data and the commands of a computer program, i.e. Neumann's so-called 'stored program' principle, has a very important role. From the point of view of our recent analysis this technical aspect has an ideological message as well: everything can be interchanged, and everything can be expressed with a series of digits. The universality of digital representation of the different things reminds us of the universal role of money in modern society. The universal way that money is used in modern society expresses the universal interconvertibility of all kinds of social values. Serving

the 'calculations' of customers the actual prices of different products are represented by quantities of money. Furthermore, money also represents a special kind of universal power which determines essentially the actions of citizens in modern society.

Here we would mention that our analysis concentrates on digital computers, because of their more significant social role; however, this view would also be applicable to analogue computers. As an illustration we would mention that there are many similarities, dissimilarities and interrelations between real and monetary economic processes and also between analogue and digital computers. Analogue/digital conversions take place in the commercial sphere, where values of products are converted into money and vice versa.

Based on these views it is very easy to recognize that another, more fundamental triad works behind the triadic structure of computers (and political institutions): this is the economic triad. In the real sphere of economy three different units can be recognized in close analogy to computer units, namely the institutions of the market, which exercise control of processes; the real economic units (firms, employers, etc.), which realize real economic (production, commercial, etc.) processes; and the banks, which are used to store properties. They are interconnected by direct material relations, but their monetary interconnectedness is the essential organizing force.

In this way, following the very nature of social constructions, computers, as much as the state, are the product of those human actions, which are trained and which can be observed in the economic praxis as well. Therefore it can be concluded that some political, economic and technical systems of modernity have a similar organization. In the Table 10 we try to summarize these relations.

functions of special units	units in state power	units in computers	units in economy
controlling	*parliament*	*central control unit*	*institutions of the market*
executing	*government*	*operational unit*	*real economic units*
storing	*courts*	*memory units*	*banks*
univalents	*laws*	*digits*	*money*

Table10 . Organization of different systems in society and computers.

Perhaps these ideas may seem to be very peculiar ones; however, they are not based simply on mere speculation: there are some historical indications of their validity. It is well known that von Neumann, who influenced so fundamentally the organizing principles of modern computers, in his last work (Neumann, 1959) compared these principles to the organizing principles of the human nervous system and studied the details of their possible similarity. However, from the point of view of our recent analysis another, not so well-known, field of Neumann's activity has more basic significance. From the 1930s until his last years he had been working on the theoretical-mathematical description of economic systems (Neumann, 1963). In these studies he applied, for example, general physical principles and mathematics (e.g. game theory) to describe economic processes. The hypothesis seems to be reasonable that the ideas of the organizing principles of an economic system and a general-purpose computer influenced each other in his extraordinarily universal mind. In such a way perhaps he was the person who consciously called into play social forces. (According to the memoirs, one of the most surprising aspects of Neumann' s character was his ability to make connections between very different fields of knowledge.)

A very typical function of a modern computer is its data-processing activity. There are at least two fields of modem society where the significance of this processing is high: administration and economic life. Taking a glance at the common histories of these fields and computer building some important parallels can be considered (Beardon, 1994). In this interesting paper the relations between the features of computers and the ideas of the Enlightenment and those of logical positivism are discussed.

5.3.3 Hierarchical subsystems, information and society

Another aspect of our analysis is a consideration of the relations between information processes in computers and society. Because of the special nature of information this demands, at least, a 'two-level' process analysis carried out on both fields. We have to consider the processes on the one hand in the substratum or medium level of the given information process, and on the other hand in another, evaluating level, where the information itself appears as information. Moreover, we have to consider the question how the processes of these different 'levels' are inter-related in these systems. These levels can be identified, for example, as the physical and computational processes in a computer or as the production of goods and their values in a social system. It is clear that the disjunction of these 'levels' is usually virtual; i.e., we can conceive of the same thing in different contexts, for example, on the one hand as a physical process, and on the other hand as a special interpretation of the same process - as a change in the value of a parameter. Because of the nature of information one is faced with important questions at this point.

How many levels can be distinguished in computers and in society? How can we recognize or produce different interpretations of a process in the computer and in society? How do these different levels of the information process interrelate in this concrete case? It would be interesting to know whether these problems have been considered in a similar way in the case of computers and society.

In this respect the main part of the usual descriptions of the information society (Masuda, 1980) simply accept and apply - more or less deliberately - the Hegelian position: the information society wants to recognize itself in the tools applied in society, so the computer can be considered as an information machine, which produces, exchanges, analyses and distributes information. (However, in these studies only one side of the society-computer relationship - how computers act on society - is emphasized.)

If we are interested in the more fundamental relationships of this problem we have to study the above-mentioned questions. Until now we have spoken about computers disregarding their input-output units. However, these are obviously essential parts of them. (Actually both Babbage and Neumann emphasized the fundamental role of input-output units in computers.) In our view the input-output units of a computer appear and work on the borderline of different 'levels' of the system of the computer and its environment. These units interconnect, mediate and represent to each other the signs of the different 'levels' (i.e. inside and outside of the computer, the electronic and visible or sensible representation, the machine code and the higher level programming languages, etc.) Here the input-output concepts are conceived of in a very general sense: they have hardware elements (screen, keyboard, etc.) and software elements (e.g. compiler and interpreter), and even the operating systems belong to this category. In other words every element of computers, which are situated at the borders of different levels of the machine, and which we call input/output units, are related to the signs of both levels of the system and in this way they can interpret the signs of a substratum level as information on the other: the evaluating level. These general input-output units are actually interpretation devices. Thus these units are the level-bound sources of information.

The modern computer is a hierarchical, multi-level system. The whole computer can be identified as the highest-level unit. In this case its input-output devices interpret the electronic signs of the inner processes as visible, audible or perceptible (forms of) information for the user and vice versa. These input-output units have hardware (e.g. monitor) and software (the so-called interface) elements. Within the computer the operating system (Unix, MS-DOS, OS/2, etc.) treats the hierarchy of levels. In a computer of our days more than 10 levels can be distinguished. Each level can consist of hardware and software elements. Every level is built on the lower levels, but the details of its processes are hidden from the higher level. Thus the operating systems are the most significant interpretation devices in computers; they organize the transformation of data between the levels and interpret the signs of a level as information for another level.

Modern society is a hierarchical, multi-level system as well. Let us think of Parsons', Habermas' or Luhmann's ideas on modern society. This structure appears in the superposition of the economic, political, cultural, etc. fields (or levels, if you like) and even within these levels we can find more and more sublevels. It is obvious that in social systems the input-output equipment appears too, and like the input/output elements of computers they organize communication between social levels. For example, in political life, different kinds of global and local communities express their will. Many social problems have their roots in the communication disorder between the levels of these communities; i.e. the interpretation of the will of a given community as information for the actors of the other levels might be false or bad. The whole political system is organized and operated by the political institutional system, which tries to interpret the processes going at the political level as information for the communities of another level, in another context. Following the democratic tradition the 'input-output units' in politics are the

democratic institutions (being the 'hardware') and the elected delegates, councils and politicians (being the 'software'). Thus the political system of a society and the operating system of the computer have an analogous role and the same structure. This is the case in the fields of culture and economy, too.

Accepting these statements it is very natural that the information technologies in computers and in society are similar, although concerning the idea of an information society this similarity and some of its consequences are realized without any reflection on their origins. Moreover, applying the above-mentioned analogy between economic and computer processes we can take into account the similarities of information processes in computers and the money transfer in society; on this basis we can correlate these processes to each other and in this way we can speak about the monetary aspects of information and the information aspect of money in society, respectively.

5.3.4 Division of labour, alienation and selfishness in computers

From a philosophical point of view, of course, there are some other, equally important ideological characteristics of modernity: among others, selfishness and alienation. How do these characteristics appear in computers? We can identify them first of all in the social context of computers, in human-computer relations and in software.

In the typical realization of the *human-computer relation* the human has the role of a ruler: she/he declares her/his commands and the computer executes them. (Unfortunately, exactly those commands, which were given.) Applying different software the user defines the actual work of the computer and in a certain sense the human being can determine the actual nature of the computer. However, within this special nature the very fundamental nature of all kinds of computers is expressed: being the perfect slave. (In this respect the computer differs from other machines, because it can be ordered to solve not only special and standard, but also universal and flexible tasks.) In a way programming is a kind of creative exercise: the programmer is in the position of the creator, which is a special version of the divine position. It is enough to declare (more exactly: to write down) our commands and they will be conceived of as absolute, unquestionable laws by the computer and it will execute them without hesitation. It is clear enough that any kind of creator has a selfish character, so selfishness belongs fundamentally to the position of the programmer or the user of the computer. Of course, it would not be necessary to enter fully into the spirit of this attitude and to follow it in other aspects of human relations. But this is the case, sometimes. For example, this attitude operates in the phenomena of creation and distribution of computer viruses.

The *history of programming* shows a very similar development to the history of hardware. It started obviously with the mechanical paradigm and later went through many stages up until now, but its role has not changed during this history: to force the concrete human will into the dead machine. However, the fundamental principles and tools of programming were already present in ancient societies; their practical application and improvement was already occurring in the mills of the Middle Ages. In this process the cam-shaft (interludium) and later the barrel had a fundamental role [Endrei, 1992]. Applying these tools the continuous movement of the mechanical machine (e.g. certain wheels of a watermill) can be interrupted and restarted in such a way that its movement could be programmed. These programming tools were applied in the automata of the seventeenth and eighteenth centuries. Later versions of these kinds of tool (punch ribbon and punch card, magnetic tape and disc) more or less preserve the mechanical features of the programming tools and even their material structure and processing. (The fundamentally mechanical parts of a computer interacting with these mechanical programming tools used to go out of order most frequently.)

However, it is more important that the *principles of programming* also contain mechanical ideas. First, the prescription of the states of the automata (computers) is absolutely strict; a rigid determinism is prevalent in these machines. It is well known that most programming languages are procedural ones, which means that they prescribe all the steps of the processes leading to the final result. In the case of a modern computer, of course, we cannot comprehend all details of the processes and relations, but the operating system can. For us, as for an everyday user, it is enough to know the possible states and processes at the highest or nearly the highest level of the computer, which is closest to the human sphere. The development of programming languages is partly driven by this aspiration [Sammet, 1969].

The structural aspects of a programming language express clearly the methodological ideas of modernity. It has fixed basic elements (tokens), definitions and descriptions (e.g. identifier definitions, rules), several executable

statements (e.g. editing, data handling, control statements) and a few declarations and non-executable statements (e.g. procedure and subroutine declarations). It has a simple and unambiguous syntax.

It has a special universal character: in principle every problem and task can be described by and treated with this type of language, like a mechanical one, which, in principle, could treat all the problems of the mechanistic universe of the eighteenth century. The concept of the *Turing machine* formulated this possibility more precisely in 1937, at the time of construction of the first modern computers. McCorduck [1979, 51] summarizes its main content: 'If we can express precisely the steps needed to accomplish a task, the task itself can be programmed and carried out by the machine in this astoundingly abstract way. Turing's universal machine can in theory carry out any computing task that any special-purpose automaton can do.' The idea of universal machine (e.g. the computer) seems to be a perfect expression of the aspirations of the Enlightenment to find a universal method; thus the computer is a very characteristic tool of modernity.

In the case of programming languages an opposite tendency occurred as well: they often have an explicit task-oriented character. Moreover, the concept of universality has another meaning: programming languages have to be machine-independent. These features of the languages highlight another aspect of modernity: the highly developed state of the division of labour in modern society. The concrete task or sub-task, expressed and mediated by the program, only realizes certain possibilities of the 'individual' machines.

Philosophers sometimes ask whether a computer is a tool or a medium. For example, Webb (1995) discussed the problem on the Net. He found that understanding the notion of the computer as a tool or a medium runs into some substantive definitional and conceptual problems. In our opinion hardware is the tool for the everyday person of modernity, but it is a medium for the programmer; furthermore, software is the tool for the programmer also, and finally the whole computer is the tool for modernity to control a part of the world and, at the same time, it is a medium which expresses the will to power of modern man.

However, the will to power resulted in contradictory success: modern man was not liberated from the rule of necessities, but at the same time, in some respects, became a victim of his own aspirations. It is easy to recognize the most obvious case of alienation in our problem: modern man becomes not the lord, but the slave of his technical environment, including computers. (Perhaps it would be worth recalling again Hegel and his analysis of the relation of the lord and the slave.) Of course, there are some important conditions for interchanging roles in the power situation: first, the mechanization of human nature, the coming into being of the human-machine, as the absolutely alienated form of human nature. This idea emerged, as is well known, also in the seventeenth and eighteenth centuries. (In this case the old idea of modernity was realized by our century again - however, the point was shifted in the most dangerous direction [Adorno and Horkheimer, 1974].) The other important difficulty in the interchanging of human-computer roles is whether computers are endowed with human characteristics. Obviously, thinking is the most important question. Can computers think or not? Many works in the field of cognitive science and artificial intelligence research try somehow to answer this question. An alienated conception of thinking is another important condition for the development of an alienated man-machine relation. Although such a notion of thinking has appeared in different forms during the last centuries, it is now perhaps enough to draw attention to the fact that most recent approaches to artificial intelligence have in fact a mechanistic character [Tamburrini, 1997]. In these views the intellect is mechanized (i.e. it is forced to work as a Turing machine: going ahead step by step, following and combining some predetermined rules, etc.); when some authors go further and, by interpreting certain results of autonomy, speak about the brain as a computer [Churchland and Sejnowski, 1992], it can be stated that this route leads us exactly to an alienated concept of thinking. Thus the two parts of the alienated human nature (the human as a machine and the machine as a thinker) can reinforce each other and can produce a very natural element of the enormous clockwork of modern society.

However, principles of other kinds have also been applied in computer building; nevertheless, on the basis of our analysis of the above-mentioned fundamental principles we can conclude that a computer can be regarded as the very objectivisation of the ideas of modern society. Of course, there are different realizations of the ideas of modernity in different computers. As an illustration of this fact we would like to quote some of Umberto Eco's (1994) famous sentences:

“Insufficient consideration has been given to the new underground religious war which is modifying the modern world. It's an old idea of mine, but I find that whenever I tell people about it they immediately agree with me.

The fact is that the world is divided between users of the Macintosh computers and users of MSDOS compatible computers. I am firmly of the opinion that the Macintosh is Catholic and that DOS is Protestant. Indeed, the

Macintosh is counter-reformist and has been influenced by the 'ratio studiorum' of the Jesuits. It is cheerful, friendly, conciliatory, it tells the faithful how they must proceed step by step to reach - if not the Kingdom of Heaven - the moment in which their document is printed. It is catechistic: the essence of revelation is dealt with via simple formulae and sumptuous icons. Everyone has a right to salvation.

DOS is Protestant, or even Calvinistic. It allows free interpretation of scripture, demands difficult personal decisions, imposes a subtle hermeneutics upon the user, and takes for granted the idea that not all can reach salvation. To make the system work you need to interpret the program yourself: a long way from the baroque community of revellers, the user is closed within the loneliness of his own inner torment.

You may object that, with the passage to Windows, the DOS universe has come to resemble more closely the counter-reformist tolerance of the Macintosh. It's true: Windows represents an Anglican-style schism, big ceremonies in the cathedral, but there is always the possibility of a return to DOS to change things in accordance with bizarre decisions...

And machine code, which lies beneath both systems (or environments, if you prefer)? Ah, that is to do with the Old Testament, and is talmudic and cabalistic ...”

5.4 Postmodern Internet

The social values and goals represented in and served by the modern computer are essentially the same ones as those which can be connected with the machines of the eighteenth century. Of course, a recent computer works in a better, quicker and more effective way.

In our age some new social values and interests emerged as well. Among others, postmodernism collects them and tries to form a new type of world view. Of course, the followers of postmodernism want also to recognize and represent their values in art, science and in the medium of technology as well. In the technical sphere, for example, the coming into being of networks realizes these aspirations. After some early versions of the interconnected systems of special machines (telephone, telex, radio, television) the worldwide networks of universal machines, i.e. computers, have been born and used. The special machines and the networks of special machines are rather consciously constructed and they served modern purposes first of all. Computer networks are rather 'tinkered'; they consist of modernist computers, but their goals, usage and functioning differ absolutely from those of the earlier machines, including the machine elements of networks.

Our main thesis is that the fundamental ideas of postmodernity are built into computer networks, so in that way they are finally built up into the network of networks, the Internet. This is probably not a very surprising statement: there are many studies concerning the various details of this relation. There exists an enormous amount of literature in the Internet also (Age, 1998), which is available for further study. Here we would underline only some of the most important aspects of this relation.

It is not so easy to characterize postmodern ideology because of its very basic, pluralism-loving, nature. The traditional descriptions consist of some parallelisms between the preferences of modernity and those of postmodernity [Lyotard, 1991; Habermas, 1985; Hassan, 1984]. Regarding this comparison the most important statement is that postmodernism is not separated from modernism as the successor of it, but postmodernism includes modernism as an aspect of itself. On the other hand, while modernism follows the tradition of the Enlightenment, postmodernism rejects this tradition of thinking. Postmodernism includes different, often opposing aspirations, values and goals, and rejects all kinds of absoluteness of them.

The network of computers interconnects such computers which have modernist features in themselves. Moreover, it is very clear that in the networks a lot of typical modernist activities can occur, which are functioning in a more convenient, quicker and effective way. It is well known that the first interconnected computers and their network served the quicker exchange of data for military purposes. But electronic correspondence, electronic publications of peer-reviewed journals and the popular commercial activity on the networks can also be considered as the modernist use of this artefact. However, certain ways of using networks have broken these frames down and at this moment they seem to be very authentic ways of using the Net - some years ago creating and searching gopher sites; nowadays creating and visiting personal, institutional and/or thematic web pages, representing and investigating all products of human culture on the network, including oral, textual and visual aspects, official and very personal versions, the very significant and the absolutely negligible parts of it. During very extended internetworking

activities, including hypertext and multimedia usage, every user can contact directly and actively sources of the entire human culture. However, this culture seems to be a fragmented, chaotic, virtual and plural one. It includes, of course, e-mail messages, electronic mutations of newspapers, reclaims and different business actions as well. In the process of networking the whole context structure of the culture is continuously destroying and rebuilding. All these show clearly that computer networks are such tools, which have a very different nature in relation to mechanistic ideas. How could we characterize this different - not modern, but postmodern - nature of the Internet?

It is very important that the emergence of postmodern thinking and that of the Internet have been running at the same time, in a parallel process, starting in the mid-1960s. In both cases, the formation of a radically new cultural construction can be considered, which is based on some earlier traditional productions. Their homeland in this case is not Europe but the American continent, where they have parallel, sometimes common histories [Zakon, 1996]. Many, well-distributed computers are needed for building computer networks. The construction and spread of personal computers had a fundamental role at the beginning of the 1980s. By that time the relevant networking tools (e.g. TCP/IP) had been elaborated and networking activity had significance. However, the explosive development of networks started about 10 years later, when PCs had started being used in large numbers, and networking activity became a standard part of everyday life - at least in the Western part of the world.

The most important features of postmodern ideology appear in the working and the proper praxis of networking. This is so obvious that a short enumeration will probably be enough.

5.4.1 Plurality

Plurality both in the hard and soft structure of the Internet: The network is a collection of different domains - subnetworks which follow different goals (educational, scientific, business, military, etc.) with different kinds of computers. All kinds of information ('valuable' and 'invaluable', right and wrong, traditional and original, etc.) have taken up equal positions and have become mixed into a more or less inseparable system of knowledge.

5.4.2 Fragmentation

Fragmentation both in the hard and soft structure of the Internet: The network has no unified, predetermined or even known structure or creators. It is not being built by one or a few persons as its designers, but it is built, used and destroyed by anybody and/or nobody. It is a self-organizing formation similar to any other products of evolutionary 'tinkering' [Jacob, 1982]. The statement about fragmentation can be strengthened by the uncontrollable, changing, and unstable working of the network as well. (As a consequence of these characteristics it can be seen that, from time to time, some of the references in our paper may become unavailable. However, sometimes traditional libraries are closed also ...) The Internet influences even network-free domains through the use and programming of PCs. Nowadays, users usually do not write programs, but they do compile the programs needed from program fragments downloaded from Internet sources.

5.4.3 Virtuality

One of the most important aspects of the postmodern ideology is the blurring of the difference between reality and virtuality. Most networking activity is a stalking, through the reality-virtuality border. The various fields of virtual reality (different virtual communities, institutes and exercises) strongly influence our everyday life. Various transitional forms of network-dependent life emerge and the birth of 'netizens' can be realized [Rheingold, 1994; Hauben, 1996].

5.4.4 Included modernity

The Internet includes modern computers and modern knowledge as its parts. Thus the unlimited open character of postmodernity is confirmed again. Recalling our earlier description of the modernist features of computers it can be stated that none of them is valid in the case of computer networks. The whole network has no stable structure and its working is essentially unpredictable and non-reproducible; exchanging its elements the whole network is changing also, and so on. Modern knowledge is represented on the Internet, but its context is an absolutely different one. We can study the body of knowledge in a proper way as a picture or a sculpture which is constructed in hypertext style and not as linear text. Applying a browser program we are able to 'read' 10 million pages at the same

time. The space-time of the Internet definitely has no classical physical nature, although its parts have. The social values of modernity appear and operate also on the Internet: for example, the public sphere of communities and the democratic tradition are included and transformed here [Thornton, 1996].

5.4.5 Against power

The very citizen of the Internet galaxy, the netizen, tries to reject the power structures of modernity; the netizen is a supporter of a special kind of anarchy; she/he tries to defend networking against the expansion of commercial and financial activities. The very application of plurality demands equality of any kind of ideas, approaches, values and goals, so in this spirit most network users protest radically against any control or regulation on the Internet. A special type of representative of these values are the hackers of the network.

5.4.6 Individuality

A being on the network is a being in an individual world. The netizen wants to form her/his own world, developing a personal context between pieces of culture and her/his life. For the modern person the structure of culture and life, and their relations are (pre)interpreted by the knowledge experts (scientists, philosophers, artists, politicians, etc.). The netizen becomes - more or less - free from these constraints and her/his world-building activity based on her/his own, personal life-world. The netizen's science, art and philosophy - if these fields preserve their independent meanings at all - have some new, 'expert-free', naive, original, plural characteristics [Agre and Horswill, 1997]. The modern individual is born into his own world, and the netizen has to tinker with it.

5.5 The worldwide organism and the world of the Internet

The Internet is the super-organism of several different and independent organisms. We talked about these organisms mostly as systems and networks but it also seems to be justified to consider for example culture as an independent world. On the basis of this, it may be justified to raise the following question: is the Internet only an organism, which exists as a system and a network, or can we regard it as an independent world? If we recall what we said about the world as an organism, we will see that of course, the answer is yes.

Systems and networks are intertwined in the super-organism of the Internet. The Internet can be understood as the widest context or the sum of this context and the entities included in it; it is a context for countless technological, communicative and cultural entities and forms of activities. It is a man-made organism the identity, integrity and existence of which is unquestionable. The Internet is a certain totality, and consequently it is a subject of the exact doctrine of systems theory; it is a reference of systems theory. Both the quantity and quality of world parts, components and elements included in the Internet are infinite; the only method of mapping them is going through the whole thing step by step. The Internet is cut into pieces by countless fault lines; the most prominent are perhaps the boundaries separating reality and the possibilities. The separation of reality and the possibilities makes it possible to interpret the changes of the Internet; and their intertwined nature makes it possible to interpret its openness and virtuality. The Internet is a changing, open and virtual organism; though the whole might seem to be eternal, closed and real for an inhabitant of an individual part of it. The Internet is a structured organism, in which everything may be connected with everything else – though the variety, immediacy, mediated nature, strength or weakness of the connections is often confusing. As a web of connections, the Internet is a subject and reference of network science. Systems and the networks are descriptions of the Internet tamed by scientific thought.

The two dimensions of the world-like quality of the Internet are the Internet in the modern, real world and the Internet's own, postmodern, virtual world.

Interesting and well executed research is carried out on the place of the Internet in the world, how the network of the Internet is built up, the denseness of the network, the frequency of Internet use, the local and global geographic distribution of the computers connected into the network, and websites, servers and other characteristic parameters of the network (Internet Geography Project 2001; Cyber Geography Research; Yook – Jeoung – Barabási 2002; Pew Internet and American Life; The Filter; The Internet Scout Project; UNESCO Observatory on the Information Society; Committee on the Internet 2001). Among others, we learnt from these comparative research projects that the concentration of practically all parameters of the Internet is high precisely in the neighborhood of traditional

cultural centers, that is, in the surroundings of university cities. In the end, this is understandable since the density of individuals who use the Internet in a given population and the intensity of intellectual life is the highest precisely here. Another interesting connection was revealed by comparative studies of this kind, namely that the off-line relationships of Internet users – both in cities and sparsely populated areas – are more intensive than the relationships of those of who do not use the Internet.

In many places and in many respects, the Internet became an important subject (and at the same time, tool) of research in empirical sociology, political science and anthropology in the issue of exploring the Internet's own world (a.o.i.r; Oxford Internet Institute; NETLAB; Howard Rheingold Associates; The Filter; The Berkman Center for Internet & Society at Harvard Law School; Resource Center for Cyberculture Studies; Institute of Network Cultures; Virtual Society?). We can also encounter various actions and scientific research which are based on the extension of the network of the Internet with varied motivational background. One of the most interesting problems is whether we can write a program which we could run on the whole of the Internet as a worldwide computer with distributed parameters. It is easy to notice the prominent similarities between the intertwined networks of technology and content built on each other and the functioning of the human brain, but it is very difficult to develop a standpoint in the question whether we can imagine that the super-organism of the Internet can "gain consciousness" of some kind and what kind of symptoms a development as this might have.

5.5.1 Worldwide computer and communication networks

It is partly the tools and methods of Internet use which led to the construction of the so-called mega-computers or grids. These are systems consisting of a large number of computers connected into a (local) network and which, programmed for a parallel functioning, become capable of very fast computations. Through this method, they have managed to handle research tasks which were earlier regarded as hopelessly needing calculations. The usage of interconnected computers as more or less one single computer regularly generates new ideas. Though it is not necessarily based on the network paradigm, another initiative, interesting in a different respect, makes the performance of individual "research tasks" (e.g. the search for extraterrestrial intelligence or for example evaluating larger amounts of measurement data regarding certain anticancer drugs) possible through utilizing the unexploited capacities of our computers (Global Grid Forum 2006; Grid. org 2006; World Community Grid).

Such ideas about "*utilizing the web*" make it possible for us to imagine the Internet as a worldwide computer and urge us to imagine the operation of a mega-machinery which consists of hundreds of millions of computers (Anderson – Kubiatowicz 2002). Even though such functioning would require a certain central control and consequently it would be opposed to the mentality of the current structure of the Internet, many developments are currently on the agenda. In fact, "bot nets", created virtually through the coordination of malware set up on defenseless individual computers, are based on using the Internet as a worldwide computer. These networks consisting of millions of coordinated computers can be used for data fishing and concentrated attacks against servers.

On the basis of an analogy between the network of the Internet and the network of the nervous system, we can imagine the Internet as some kind of super-organism or the brain of such an organism (Heylighen 2000; Heylighen – Bollen 1998). Furthermore, there are approaches which regard the Internet as the basis of (Lévy 1997) some kind of collective intelligence (Pór 1995). It seems to be obvious that we can argue for such claims, but the reality of the mentioned ideas is quite debated. In our view, it is a crucial question whether we can create artificial entities the interpretative praxis of which is unregulated since artificial entities would be capable of intelligent behavior connected to interpretation only with this characteristic.

We can regard the worldwide functioning of the Internet realized in our days as more significant and perhaps more interesting: the functioning of the familiar network which makes worldwide communication possible and the operation of search engines which carry out thematic search in the immeasurable data ocean of the Internet. The development of the characteristics of the world of web citizens developed from the communities of the millions who utilize the communication networks of the Internet is continuously taking place. This world of web life, reinterprets the concepts of life and death, good and bad, human and non-human, beautiful and ugly and of course, all our traditionally followed values and creates countless new, unusual values. Tracking, interpreting and analyzing these changes will occupy the bigger part of the second volume of our treatise on the philosophy of the Internet.

A really effective global artificial intelligence can indeed develop through improving search engines, which are able to navigate an extreme amount of data. Many Internet specific intellectual activities can be built on an appropriately constructed, content sensitive search algorithm. Web citizens who use search engines are able to "read"

millions of websites simultaneously even today, but this activity is still very inefficient: they cannot differentiate well between contents valuable or valueless to them. Perhaps the development of the semantic web, which has been on the agenda for a long time, and the creation of new versions of search engines (there are already thousands of them) might help in this issue (Berners-Lee – Hendler – Lasilla 2001; W3C Semantic Web 2001; SemanticWeb.org 2002).

5.5.2 Globalization, network society, web life

The effect of the Internet, covering the whole Earth, influencing *social relations and processes* is also extremely important. The banking and stock exchange transactions which can be completed very fast worldwide are the indispensable part of the global economy (and even of tourist journeys). With its initially prospering and later significantly dropping but by all means significant presence, e-commerce is a part of information society impossible to ignore. The so-called "year 2000" panic could develop in the United States in 1999 only because of the key role of computer networks in operating developed societies (Ropolyi 2000b). The widely spread fear of the total collapse of the modern social system was caused by the catastrophic consequences of the supposed errors in computer date handling. The extremely high level of the network dependence of American society became obvious. (We will discuss the phenomena in more detail in the next chapter.) Besides the worldwide financial, economical and commercial networks, the appearance of *political movements* organized with the help of the Internet became one of the prominent phenomena of world politics. The movement based on global civic initiatives, groups an individual activities – which actually often follows anti-globalization aims – has recently successfully and quickly organized rallies several times each year in a way which was impossible to follow for its political opponents and in which hundreds of thousands participated. It seems that the Internet has become the most important tool of global civic society (Naughton 2001)

However, in fact something much more is happening. Organizing anti-globalization movements on the Internet, e-commerce or bank transactions are all traditional modernist practices; they could equally be performed without the Internet, at most more slowly and with more work and effort. The use of the Internet only increases the efficiency of traditional practices but it does not change their essence. In our view, we can talk about a significant effect of the Internet if the latter process also takes place, that is, the utilization of the Internet results in the development of new qualities of social relations.

Castells reports such changes (Castells 2005; 2001) which he identifies as the developmental process of *web society*. According to Castells, the essence of the changes is that while modern society can be understood as a system of places, web society can only be understood as a system of flows. We have to accept Castells' diagnosis – the year 2000 problem for example clearly proved the validity of his observations; – however, we do not find his description of the end of the process suitable. We cannot do so especially because it seems to be inadequate for demonstrating the importance of the changes. For our analysis of information technologies, network communication and cyber culture shows that currently the social form of existence is being replaced by another form of existence. We call this new human form of existence *web life*. Among other things, web life is different from network society inasmuch as the production of the circumstances of existence takes place through a different technology. In the production of social circumstances, it is traditional technology, production processes made up of regulated material processes which carry the burden of reproducing the social system. However, in our analyses above we argued that it is the method of reproducing circumstances of existence which developed in the late modern age and which is based on information production and a hermeneutical praxis what becomes determinative. That is, the reproduced system is *no longer* a social system but something different: web life.

5.6 Anzix from a network society

The Year 2000 computer problem (the Millennium Bug, Y2K Crisis, Time Bomb 2000, etc.) emerged from the common programmer's practice of the 1950s and 1960s that for representation of the year in computers they used two rather four digits. In that time this practice was reasonable and economic. [Fallows, 1999, Information] On the one hand according to the common opinion of the age the development and complete renew of computer software will be a very fast process, in this way within a few decades the two-digits representation of the year will be considered as the interplay of the forgotten past, on the other hand the computer memory and processing time was very expensive. However, if we compare these expectations to the real processes we will find the technological development run in a different way. The development of computer hardware was really very fast, but the relevant

software changed and developed relatively slowly, and in many cases a version of the basically same, old software were used in the new computers even close to the Millennium, too.

This surprising situation (combining with some other extraordinary expectations on the Millennium) caused a special kind of social crisis, especially in the Western part of the world, first of all in the USA. According to the scenario of the crisis when the date goes from 1999 to 2000 many old computer software that has not been fixed will register the date - because of their two-digits year-representation - not 2000 but 1900 which will induce an escalation of technical problems in the infrastructure of the highly computerized society. This process will very probably produce a complete chaos leading to finally at a global corruption of the modern civilization.

The crisis situation produced an extended and widely popularized public debate about the reality and the perspective of the crisis including enormous amount of newspaper and journal articles, books, many special sites on the internet and programs in the electronic media. According to some popular analyses the Year 2000 computer problem has been the most significant and enormously dangerous technological difficulty in the history of mankind. In spite of this, many experts have emphasized a radically different opinion: the difficulty was not real, no significant danger was expected due to the date problem. The debate between the different groups of "experts" about the nature and treatment of the problem has been widely popularized, in this way the public was informed, however, the lay public was not able to estimate the reality of the risk and the possible consequences of the problem and certain hysteric and apocalyptic reactions were observed especially in the USA. Finally, the events took place in a rather quiet way and there were no any serious problems. Any significant signs of the final apocalypse were not diagnosed.

In spite of the fundamental social influence of this deep crisis only very few social, socio-psychological, psychological, ethical and philosophical investigations were elaborated until now. [Douglass Carmichael] Studying hundreds of web pages devoted to the problem [Yahoo!] here we would like to present some elements of a philosophical analysis of the "Year 2000" computer problem in order to demonstrate its most important social and ethical aspects and to contribute to the understanding of the problem with some ideas.

5.6.1 The escalation of the problem

At the beginning of the events (a few years earlier) the Year 2000 problem seemed like an enormous software business. It was widely advertised that the old versions of computer software are unable to treat the change of the date in the case of Y2K, so it is necessary to install new versions or at least fix the old versions of many software all over the world. Later (a few months before the crucial date) the problem liberated from this (software business) framework and became similar to a complete social catastrophe which can destroy the whole human (especially the Western) civilization: the dangers appeared in the personal life of the citizens as well; the collapse of the networks of water, and of electricity supply, and of banking, moreover, the end of the modern city and/or society was visionized. How and why did the problem change so radically? It had clear social and ethical causes.

Our understanding would be probably easier if we could separate some relatively independent parts of the very complex social situation supposing that the Year 2000 problem was a complex problem of three - relatively separated - sub-problems: a technical-technological, a business related, and a social sub-problem. [Wheatley and Kellner-Rogers, 1999, Y2K: A People] Of course, their independence has only very restricted meaning - we suppose it just for the start of our analysis and we will realize their interrelatedness proceeding in the analysis.

5.6.2 The technical problem

The direct technical problem of the date representation in computers did not have any difficulty, for the most experts it was clear that this problem can be solved in a very simple way. (For example, for the right preparation of the home computers many simple advice's and programs appeared in the internet suggesting to control of this part of the problem for any person of the lay public.) So, from technical point of view, the only problematic aspect of the situation was the large number of fixing actions during a finite time period. But it was also clear that the most important computer systems have been fixed and checked in time, in this way the most parts of computer experts were calm and declared their optimistic views. However, essential groups of the lay intelligentsia did not trust these computer experts. Realizing the dimension of the technological task it was demonstrated that most technological projects did not get finished in due time, especially in the software industry, so it would be important to take into account the presumable technical, economical, social difficulties and to draw the public's attention to the risk and possible dangers. In this respect the crucial question is: the presence or absence of the trust of the public in the solution of the technical problem. How and why was this trust constructed or destroyed? In the case of experts

their trust in the solution of a technical problem rest on their concrete or at least abstract knowledge about the topic. However, the lay public without relevant knowledge is surrendered to the public media which forms the public opinion in the problematic questions. It is very clear that the actors of media have also own goals which can be independent from the actual topic and many times influenced by their interests in sensation-creation to produce higher profit. So the construction and destruction of the public trust became a battlefield and a sharp struggle of the social actors for forming of the public opinion in question has been observed. During this struggle the technical problem was transformed into a problem of business and politics.

5.6.3 The business-related problem

The business related problem had many different aspects: the economic influence of the big software-business attracted money, the high level trade activity created by the apocalyptic forecasts, the continuous presence of trade and banking supplies, etc. The opinions about these problems were very controversial. [Meyer, Dr. Ed Yardeni, Y2K Book] For example, there were some forecasts about the economic crisis and some others about the economic boom caused by the Y2K problem, as well. [Matt Rosoff]

One of the most important phenomena was probably the appearance of the ideas and activity of the so called survivalists, who - due to the possible collapse of the trade systems - suggested to buy, to store, to supply practically everything which is important for the civilized life. [Y2KChaos] They have emphasized the possible risks of the date problem and with the ideological support of certain apocalyptic religious prophets and movements they have suggested to prepare to a social chaos saying that they are "dedicated to helping you prepare the worst, while hoping for the best". [Y2KChaos, The Year 2000] In this way the question of trust in the technical solution of the Y2K problem was directly related to the trading activity motivated by a fear of the end of civilization. The representatives of the survivalism were not basically interested in the solution of the technical problem of date but they were interested in a special managing of the fear of people. The basic purpose of their managing activity was, of course, making money. In this respect they had a strategy similar to that of the big software firms, but while the software firms earned a lot of easy money selling optimism and the hope of avoiding of the computer created problems to other firms, the survivalists earned money selling pessimism and some hope of survival to the disinformed lay public.

Here we would like to recall again to the central significance of the problem of public trust in its own technical environment and the continuous presence of this environment. Especially for the American people the possibility of continuous use of supplies, including shopping, banking, traveling, etc. has a very high value. They seem to be much more than simple economic activities, they have an important ideological, cultural meaning, as well, like to the high prestige idea of privacy. If something endangers this continuity they take it seriously, so the survivalists knew very well the fundamental American values.

However, all of these relationships formed an advantageous environment to the emergence of the social problem of Y2K.

5.6.4 The social problem

In about the last one-two year before the crucial date of 31 December 1999 the escalating technical and business problems transformed into a complete social problem. Of course, many people forced this development: they were the Y2K experts. Gary North, who is a propagandist of an apocalyptic religious system of ideas [Gary North] and Edward Yourdon, who is a computer specialist [Yourdon and Yourdon, 1998] had an important role in this process. We speak about social problem because the whole body of (American) society was influenced by or involved into the Y2K problem somehow, from the government to the individual people, from the entertainment to the basic necessities of life.

The social problem has been three different managing strategies: the survivalism, the critical opponents of survivalism, and the governmental strategies. The position of survivalism was characterized above. The critical opponents of the survivalist strategy (which emerged in a few months before the crucial date) pointed out its hidden business related aspect and criticized its pretended attitude. [Doug Ritter] They applied many times excellent humor and parodies and suggested more rational solutions of the Y2K problem. [Gary South, 100 STEPS] Among these solutions different versions of a new American dream appeared time to time: to rebuild real communities in the highly individualized society. [Petersen] The Y2K problem clearly demonstrated the interrelatedness of the indi-

viduals by the computer mediated networks. From this point of view the Y2K problem is an invitation to the co-operation of individuals.

The government wanted to demonstrate its efforts to prepare its computer systems and that of the other critical sectors of the economy and society, in this way to save the public trust in itself, especially in its high level problem solving abilities. There were a lot of well-demonstrated (and successful) problem solving-activity in every level of the political hierarchy. [U. S. Federal] In their strategy the problem had an international aspect, as well, especially in the form of criticism of the practice of other, not enough well-prepared countries.

5.6.5 Some conclusions

The Y2K problem and its treatment have a very high significance for the social scientists. It became clear that the modernity have already transcended - at least in the USA. The modern computers build up into the social networks have a crucial role in the working of the postmodern network society. [Castells, 2000] A modern society would not endangered by the Y2K problem. The modern society can collapse only its details, and not in an universal sense. The global collapse can be produced only by the postmodern network society. [Baudrillard, 1998] Earlier we had a practice to coexist with the restricted and reparable bugs of the modern society and the modern people did not think of the apocalypse because of the troubles of some modern machines. [Ropolyi, 1999] But now we experienced something different. [Fosket and Fishman, 1999] The serious anxiety of many people about the collapse of civilization is an important sign that in their thinking the postmodern network society represents already the civilized society. The actual running of the Year 2000 problem can be considered as a measurement process of the postmodernity of the present American society. The result of this measurement shows a high level of postmodernity around the Millennium.

Chapter 6. The nature of the Internet

In this book, we attempted to characterize the nature of Internet. While mapping the problem, we learned that the complex nature of the Internet can only be revealed by a many-sided analysis. The confusing richness of Internet activities tempted us to follow Aristotle's method. According to the Aristotelian approach, so successful in understanding the nature of things, we have to uncover four causes in case of each thing and we have to explain our chosen subject as matter, form, movement and purpose. In case of the Internet, these four causes were given in a more or less natural way, and it became clear that it is practical to study the Internet as technology, communication, culture and organism.

During our analyses, the extraordinary divergence of the conceptual system customarily used in the understanding and description of the area caused problems in each case. In case of the technological aspect, the concept of information, in case of the communicative aspect, the concept of communication, in the dimension of culture the concept of culture and as regards organization the concepts of systems, networks and the world have proven to be loaded with extremely complicated interpretations. Consequently, we had to tackle problems connected to the interpretation of the basic concepts in each chapter and we could only continue after we had clarified them to some extent and provide a many-sided presentation of the Internet. Of course, it is clear that many apparent diversions could probably have led to a better understanding of the individual topics.

Based on a certain level of understanding of technology, communication, culture and organization, in each case it seemed necessary to study their late modern versions which we can see in our days since it is precisely the study of these which could contribute to the understanding of certain aspects of the Internet.

In the end, the original Aristotelian model of the *Aristotelian philosophy of the Internet* developed and followed during the analysis of the nature of the Internet tries to find an answer about what the Internet is, of what and how and with what results it is developed. This was the task of our attempt to develop a philosophy of the Internet. Through using ideas of the philosophy of technology, communication, culture and organization (though in a way which might have seemed arbitrary for researchers who are familiar with the topic) we tried to reveal what the Internet consist of, what it is, how it is created and to what end it exists. We found that the Internet is created from technology, communication, culture and other organisms. We pointed out that it is a complicated, complex superorganism, which expresses postmodern values. It turned out that it is created through the construction practices of the man of the late modern age. It became clear that the goal of its creation and existence is the liberation of late modern man from the modern world built on universal and abstract values and the development and maintenance of a new, virtual and open human sphere of existence, regarded as free and built on postmodern values.

With this, we performed our task and presented the nature of the Internet. Philosophical trains of thought supported by a multitude of analyses are behind each mentioned characteristic and they make them valid, at least in principle. But perhaps all this is not enough. On the one hand, we know it well that being forced to step out of analytic thinking, we have already made a mistake since the permanently changing human world would require continuous reflection. We cannot solve this problem; we can only promise that we will not give up. We will carry on the contemplation about the nature of the Internet and as a result, we will hopefully be able to make further additions available for our readers who are still interested. On the other hand, readers might miss that while presenting the plural nature of the Internet, we could not emphasize enough and characterize clearly the unified, interconnected and organized unity of the relations which mean the existence of the Internet. In what follows, we would like to work on this task briefly.

The existence of the Internet is a mode of existence which can be described as the coexistence of *control, unity, freedom and integrity*. In reality, this is of course not the exclusive structure of the mode of existence of the Internet since in some respect, these circumstances exist in connection with all entities; perhaps we can also say that this is some kind of basic ontological structure. Control, that is, "the control over the environment" involves the possibility of existence. There are no entities which cannot be separated and differentiated form their environment. Unity, that is, "the unity with the environment" includes the coexistence of separated entities; this is existence in progress, existence being realized. Freedom is the content of existence: it is separation and unity in a particular way; it is the purpose of existence, an end in itself. Integrity is the persistence and preservation of existence, the "coexistence with the environment"; it is existence as a result. In this way, the basic structure of existence is an end in itself which can be reached as the realization of possibilities in a real environment.

In case of the Internet, we can express all this in the following way: the existence of the Internet is chiefly the existence of control, a control through which man creates an artificial entity. This artificial entity exists virtually and openly, it is free and postmodern by nature.

But what is this artificial entity? It is the artificially sustained human community. It is the peculiar, new unity of people separated in many ways; it is the coexistence of people communicating in many ways. It is a unity supported by communication machines and controlled individually and practically by the participants; it is a virtual, open, free human community. There is no need for individual expertise, an expertise of building communities for building communities since the knowledge built into the computer can replace it. Thus, the existence of the Internet is the existence of an artificially created community of separated people.

But what is this artificial entity like, what is this artificially sustained community like? It is free as regards its goals; it is free for something. It is a community which is an end in itself, the inhabitant of the realm of freedom with a culture created by its free and independent web citizens. The identity and value world of individuals is open, they can become anyone virtually; anything can become a value for them. Thus, the existence of the Internet is the existence of autotelic, plural communities of separated people which choose their values freely.

Choosing their plural culture individually, these communities as ends in themselves can come into existence and subsist. Thus, the existence of the Internet is the existence of the artificially realized, autotelic, plural subsisting communities which choose their values freely.

Though these are perhaps true and valid claims, they certainly do not mean the same for everyone. In case of claims of the philosophy of the Internet, this is of course not surprising; on the contrary, it is desirable since any kind of *philosophical claims* have to be unambiguous and possess an infinity of meanings at the same time. It is obvious that the various individual interpretations will see and present the Internet in somewhat different ways.

To illustrate this, perhaps it is worth recalling some known philosophical approaches in connection with the Internet available nowadays. Graham's book for example, which attempts to give a philosophical analysis of the Internet (Graham 1999), raises and discusses several relevant points, but it seems that in connection with his claims about the nature of the Internet, he is satisfied with less and he almost exclusively concentrates on the technological tool nature of the Internet. Such reduction does have a meaning: through using it, the classical results of the philosophy of technology can be well utilized in the interpretation of the Internet. In fact, considering the Internet as a tool used in various technological situations of man would be suitable for presenting the real nature of the Internet, especially if we are cautious enough in the identification of the various organisms of the Internet and in the analysis of technological situations. Instead, Graham's analysis recalls trains of thought about the good or bad nature of technology in connection with the Internet, thus, his efforts have relatively humble results.

Hubert Dreyfus (Dreyfus 2001) puts the emphasis differently, but his approach is also quite one-sided and unsophisticated. It seems that what is important for him is maintaining the criticism he developed in connection with the computational realization of artificial intelligence (Dreyfus 1972) and extending it to the typical situations of the usage of the Internet. Dreyfus stresses that during activities on the Internet, bodily/sensory presence is not realized, and this necessarily occurring deficiency significantly limits the use of the Internet.

Recently, the claims regarding the Internet of one of Jürgen Habermas's lectures appeared on the discussion list of the community of the researchers of the Internet (a.o.i.r.). It would be probably unnecessary to discuss a few sentences of the great philosopher in detail, but it is by all means notable that similarly to the philosophers mentioned above, he also warns us of the dangers of Internet use. Perhaps, without recalling further similar claims, we can rightly point out that the uniformity of the claims regarding the harmful nature of the Internet is quite strange. First of all, it is strange because it seems that many thinkers fail to recognize the complexity of the Internet and its radically new nature, different from all earlier organisms, and they have fundamental claims only about one or another component of the Internet. It is probably better than this solution if we go back to Aristotelian methodology and we try to defend ourselves from the modernist one-sidedness invading our viewpoint through building an Aristotelian philosophy of the Internet.

Chapter 7. Summary and a preliminary abstract of volume two

We have presented the nature of the Internet in the *first* volume of our treatise. Taking into consideration the most widespread Internet activities, we concluded that we need four approaches for uncovering the nature of the Internet, that is, we equally need to analyze the Internet from a technological, communicative, cultural and organizational point of view. For an adequate solution of our task, we had to develop the viewpoints with the help of which the understanding of technology, communication, culture and organizations became possible in a more or less unified framework.

Since the Internet is a product of the recent few decades, we also had to find the features characteristic of the late modern age. In the end, we managed to build the nature of the Internet on the conclusions of the analyses of late modern technology, communication, culture and forms of organization. Our result was that the Internet is the tool of the web citizen, who revaluates social circumstances and who transforms the essence of his own existence from the social sphere into the circumstances of web life, it is a tool because of the existence of which this change becomes possible at all, and with the use of which this state of affairs can actually be realized.

The description of the process of the transition into web life and the characteristics of web life will be the subject of the *second* volume of our treatise titled *The Reformation of Knowledge*. We will use a historical analogy in the identification and interpretation of the changes taking place today, partly visible and ahead of us. Our starting point is the assumption that nowadays we go through changes similar to the process of reforming religion in the 15th century. We will try to interpret and put in an intelligible framework the processes taking place today through introducing and using the concept of the reformation of knowledge. We can reach the following important claims through this interpretative ambition supported by the analogy:

1. The knowledge represented on the Internet and mediated through it gives a higher value to forms of knowledge which are situation dependent, technological by nature and show postmodern characteristics. The whole system of modern knowledge is revaluated and becomes virtual to a significant degree; our relationship to knowledge becomes personal, concrete, open and plural. The significance of the scientific institutional system is radically pushed into the background. Instead of scientific knowledge, technological knowledge and the technologies of interpreting knowledge are stressed.

2. Besides culture, created by the communities of society, individual cyber culture acquires a more and more important role. In this process, the traditional separation of the producers and consumers of culture is pushed into the background to a large degree. The worlds of billions of web citizens, effectively supported by information technologies, join the products of the official constructors of culture. Cyberspace is populated by the simultaneously existing, infinitely varied variations of our virtual worlds. Aesthetical culture gains ground at the expense of scientific culture; imagination becomes the human ability which determines cultural activities.

3. Personality becomes postmodern, that is, it becomes individually fulfilled and virtually extremely extended and playful, and it acquires and ethereal characteristics. A more vulnerable, post-selfish inhabitant of the web develops who has to rely on a chaotic dynamics. The citizens of the web mostly occupy themselves with network activities, that is, with building and maintaining their personality and their communities.

4. The sphere of web life develops besides the natural and the social spheres of existence. Man is now the citizen of three worlds. The human essence moves towards web life. The freedom to access individual spheres and the relationship between the spheres of existence develops in a way unpredictable to us today.

5. The form of existence of web life is the realm of concrete existence. Stepping into web life, the “true history” of mankind begins “again”, the transformation from social life into web life leads us from the realm of life based on abstract human abilities to the realm of life built on concrete abilities.

We would not like to talk much about the favorable or unfavorable, positive or negative, good or bad consequences of the foreseeable changes and the utopian or anti-utopian nature of the perspectives, rather, we only consider the registration of the changes as our goal. True, registration also measures, but it is not all the same with what. Our ambitious undertaking is not an exception, but at least we are aware of this since:

“My spread wintry web,

The sky is glowing –

Glittering, its icy branches

Are the stars.”[1]

[1]My translation from Attila József’s poem, “Háló” (Web) (the translator’s note).

Chapter 8. Postscript: Prolegomena to a Web-Life-Theory

Human existence is being transformed. Its structure, many thousand years old, seems to be changing: built on the natural and the social, there is a third form of existence: web-life. Man is now the citizen of three worlds, and its nature is being formed by the relations of natural, social and web-life. We regard as our main goal the study of web-life which developed as the result of internet use.

A. Methodological Remarks

1. While constructing a theory of web-life which interprets web-life, we will try to present and interpret the most important contexts primarily through philosophical trains of thought, above all the appearance of the Internet, its features, its widespread usage and the consequences of these. Firstly, we will try to reveal the complex nature of the Internet, and then we will examine the social and cultural *effects* of internet use.

2. The two topics are of course closely related. The interpretability of social and cultural effects, to be discussed in the second step, requires a presentation of the nature of the Internet in which effects of this kind are conceivable at all. In certain cases this involves trying to make use of connections which are uncommon in the task of interpreting the Internet. Thus for example we will engage in discussions of philosophy, philosophy of technology, communication theory, epistemology, cognitive science and social and cultural history instead of discussing directly the Internet "itself". We will do all this hoping that besides a more complete understanding of the Internet, we can prepare for the presentation of its social and cultural consequences as well.

3. On the other hand, it is of course also essential that the nature of the Internet has been developing and is developing not in a "naturally given" way but as a result of conscious decisions, serving certain social and cultural aspirations, following intentions, interests and values. Taking into consideration the social and cultural factors which *define* as well as participate in the *shaping* of the nature of the Internet obviously helps identifying those social and cultural effects that *occur* in the course of Internet use. Thus it seems to be useful to include certain social and cultural contexts in the examination of the nature of the Internet.

4. We have developed a complex method for the interpretation of the nature of the Internet which we have dubbed "*the Aristotelianphilosophy of the Internet*". This has two important features:

i) We will try to present – as a philosophical introduction – a philosophical (and not "scientific") description

ii) In the course of this we will try to apply the approach of the Aristotelian theory of causation as regards the nature of entities.

5. The *complexity* of the Internet and the extreme diversity of our experiences and ideas in connection with the Internet support these methodological assumptions. Among researchers of the Internet there is a lack of consensus in this matter: according to many, it is not clear whether it is the (scientific) theory of the Internet or its philosophy which is missing for the time being. In our view philosophical description can be more fruitful at the beginning: it is not constrained by the approach of any discipline.

6. The "*omnipresence"* of the Internet, that is, the experience that the Internet can basically be found in the whole of human practice and has effects on it makes the interpretation of the social and cultural effects of the Internet more difficult. A further difficulty is the essential *simultaneity* of the changes and the analyses. Analogies seem to be a useful methodological tool in this situation. We are going to introduce two illuminating analogies:

i) The analogy of the *reformation of knowledge* is based on the comparison of faith in the middle ages and the late modern situation of scientific knowledge

ii) The analogy of the shaping of *web-life* is based on the comparison of the changes of human nature caused by Internet use with the process of becoming human.

7. In this introduction the interpretation of the nature of the Internet, the problems of the philosophy of the Internet and the analogies clarifying the effects of Internet use are all presented as theses. My discourse on the philosophy of the Internet puts the theses in wider context and is available in an earlier version above.

B. The Nature of the Internet

1. The tool of interpreting and describing the Internet is the Aristotelian philosophy of the Internet. This means that we look at the Internet in *four* – easily distinguishable, but obviously connected – *approaches*: as a system of technology, as a participant in communication, as a cultural medium and as an independent organism.

2. Just as other technologies, the Internet serves human control over given situations. With the use of a technology, man can create and maintain artificial entities, and as a mater of fact, an artificial world: its own "not naturally given" world and he shapes his own nature through his own activity.

3. The Internet is a specific system of information technology. Essentially, it functions in the medium of information and not in a certain macroscopic physical sphere; it works with information. Since information is created through interpretation, a certain kind of hermeneutical practice is a decisive component of information technologies. Consequently information – and all kinds of information "products" – is virtual by nature; that is, though it seems *as if* it was real, its reality has a certain limited degree.

4. The information technological system of the Internet – in fact we can talk about a peculiar version of a system, that is, a network – consists of computers which are interconnected and operated in a way which maximally secures the freedom of information of the individuals connected to the network: the control over information about themselves and their own world in space, time and context.

5. Thus from a technological point of view the Internet is an artificially created and maintained virtual sphere, for the operation of which the functioning of the computers connected into the network and the concrete practices of people's interpretations are equally indispensable.

6. For the characterization of the Internet as a participant of *communication* we understand communication as a certain type of technology, the goal of which is to create and maintain communities. Consequently the technologies of communication used on the Internet are those technologies with the help of which particular – virtual, open, extended, online, etc. – communities can be built. The individual relationships to the communities that can be built and the nature of the communities can be completely controlled through technologies of the Internet (e-mail, chat, lists, blogs, podcast, "facebook", etc.).

7. Communication through the Internet has a network nature (it is realized in a distributive system); it uses different types of media but it is a technology which follows a basically visual logic.

8. Thus as regards communication, the Internet is the network of consciously created and maintained extended plural communities, for the functioning of which the harmonized functioning of computers connected to the network as well as the individual's control over his own communicative situations are needed.

9. From a cultural point of view, the Internet is a medium which can accommodate, present and preserve the wholeness of human culture – both as regards quality and quantity. It can both represent a whole cultural universe and different, infinitely varied cultural universes (worlds).

10. Culture is the system of values present in coexisting communities; it is "the world of" communities. Culture shapes and also expresses the characteristic contents of a given social system. Each social system can be described as the coexistence of human communities and the cultures they develop and follow. Schematically, society = communities + cultures. The individual is determined by his participation in communities and culture, as well as his contribution to them.

11. The internet accommodates the values of the late modern age, or the "end" of modernity. That is, it houses late modern worlds. Late modern culture contains modern values as well, but it refuses their exclusivity and it favors a plural, postmodern system of values. The way of producing culture is essentially transformed: the dichotomy of experts creating traditional culture and the laymen consuming it is replaced by the "democratic nature" of cyber culture: each individual produces and consumes at the same time.

12. Thus from a cultural point of view the internet is a network of virtual human communities, artificially created by man unsatisfied by the world of modernity; it is a network in which a postmodern system of values, based on the individual freedom and independence of cyber culture prevails.

13. From an organizational point of view the Internet is a relatively independent organism which develops according to the conditions of its existence and the requirements of the age. It is a (super)organism created by the continuous activity of people the existence, identity and integrity of which is unquestionable; systems, networks and worlds penetrating each other are interwoven in it. It has its own, unpredictable evolution: it develops according to the evolutionary logic of creation and man, wishing to control its functioning, is both a part and a creator of the organism.

14. The indispensable vehicles are the *net*, built of physically connected computers, the *web*, stretching upon the links which connect the content of the websites into a virtual network, the human *communities* virtually present on the websites as well as the infinite variations of individual and social *cultural universes* penetrating each other.

15. The worldwide organism of the internet is loaded with values: its existence and functioning constantly creates and sustains a particular system of values: the network of *postmodern* values. The non-hierarchically organized value sphere of virtuality, plurality, fragmentation, implied modernity, individuality and opposition to power inter-connected through weak bonds penetrates all activity on the Internet – moreover, it does so independently of our intentions, through mechanisms built into the functioning of the organism.

16. Thus from the organizational point of view, the Internet is a superorganism organized from systems, networks and cultural universes. Its development is shaped by the desire of late modern man to "create a home", entering into the network of virtual connections impregnated with the postmodern values of cyber culture. For man, the Internet is a new – more homely – sphere of existence; it is the exclusive vehicle of *web-life*. *Web-life* is created through the transformation of "traditional" communities of society and the cultures prevailing in the communities. Schematically: web-life = "online" communities + cyber cultures.

17. To sum up: the Internet is the medium of a new form of existence created by the late modern man and it is built on the earlier, (natural and social) spheres of existence, but it is markedly differentiated from them. We call this newly formed existence web-life and we are trying to understand its characteristics.

C. The Reformation of Knowledge

1. For the study of the mostly unknown relations of web-life it seems to be useful to examine the nature of knowledge which was transformed as a consequence of Internet use, its social status, and the consequences of the changes.

2. The unhappy inhabitants of the 15th and 16th centuries and our age have to face similar challenges: the citizen of the middle ages and the modern "web citizen" participate in analogous processes. The *crisis of religious fate* unfolded in the late middle ages, and in our age the *crisis of rational knowledge* can be observed.

3. In those times, after the crisis – with the effective support of reformation movements – we could experience the rise of rational thinking and the new, scientific worldview; in our times, 500 years later this scientific worldview itself is eventually in a crisis.

4. The following question emerges today: how can we get liberated from the power of the decontextualized, abstract rationality that rules life? In the emancipation process that leads out of the crisis of our days the *reformation of knowledge* is happening, using the possibilities offered by the Internet.

5. The reformers diagnose the transformation of the whole human culture: the possibility of an *immediate relationship between the individual and knowledge* is gradually forcing back the power of the institutional system of abstract knowledge (universities, academies, research centers, hospitals, libraries, publishers) and its official experts (qualified scientists, teachers, doctors, editors).

6. We can observe the birth of the yet again liberated man on the Internet, who, liberated from the medieval rule of *abstract emotion* now also wants to rid himself of the yoke of modernist *abstract reason*. But his personality, system of values and thinking is still unknown and essentially enigmatic for us.

7. *Postmodern* thinking was itself created and strengthened by the – more or less conscious – reflection about the circumstances of the crisis, as the eminent version of the philosophy of the crisis. The postmodern point of view clearly perceives the disintegration of the modernist conception based on abstract rationality; what is more, it

evaluates it as a necessary and desirable development. But essentially, it does not have anything to say about the possibilities of recovering from the crisis.

8. The Internet developed and became widely prevalent *simultaneously* with the spreading of the postmodern point of view. It seems that the crisis of modernity created a "tool" which is in accordance with its system of values. It is kept because of this accordance; what is more, people develop it further. However, at the same time, this "tool", the Internet seems to be useful for pursuing forms of activities which are built on the postmodern world but transcend it and also for the search for the way out of the crisis.

9. The processes unfolding in the social and human system of relationships show a lot of similarities with the change of the status of religious belief in the middle ages.

10. Religious worldview lost its earlier stability 500 years ago; people's trust in the contemporary religious institutional system and the official experts of faith wavered. At the same time it is also obvious that they did not necessarily reject the truths of God, but their embeddedness in society and their tendency to legitimize political power; they condemned the system of conditions of the creation and use of truths of faith.

11. *Reformation* movements of the age appeared as a response to the crisis of faith, as a consequence of which religious faith became pluralized to a significant degree. Reformed faith brakes with the medieval concept to faith which can be characterized as an abstract emotional state and it fights for the acceptance of the personal versions of the relationship to God. But of course, its "suggestions to solve the crisis" do not lead out from the world of faith.

12. It is well known that book printing played an important role in the reformation of faith. Books are "tools" which are in accordance with the system of values of the world undergoing modernization. They made it possible to experience and reform faith in a personal manner as a result of the fact that the modern book was capable of accommodating the system of values of the Middle Ages. But the typical usage of the *book as a modern "tool"* is not this, but rather, the creation and study of modern narratives in a seemingly infinite number of variations.

13. The *scenes* of the reformation of religious faith were religious institutions (churches, monasteries, the Bible, etc.). Nowadays, the reformation of knowledge is being generated in the institutional system of science: research centers, universities, libraries and publishers.

14. The reformation of religious faith was a development which evolved from the crisis of religious faith. The reformation of knowledge is a series of changes originating from the crisis of rational knowledge.

15. In both cases the (religious and academic) institutional system and the expert bodies (the structure of the church and the schools and especially universities, research centers, libraries and publishers, as well as priests and researchers, teachers and editors) lose their decisive role in matters of faith and science.

16. The reformation of faith, ignoring the influence of ecclesiastical institutions, aims for developing an immediate relationship between the *individual and God*. The reformation of knowledge crates an immediate relationship between the *individual and scientific knowledge*. On the Internet, Ideas can be presented and studied in essence independently of the influence of the academic institutional system. There are no critics and referees on web sites; everyone is responsible for his own ideas.

17. The reformation of faith played a vital role in the development process of the modern individual: harmonizing divine predestination with free will it secured the possibility of religious faith, making the development of masses of individuals in a religious framework possible and desirable.

18. However, the *modern individual* that developed this way, "losing his embeddedness" in a traditional, hierarchical world, finds himself in an environment which is alien, what's more, hostile to him. As a consequence of his fear and desire for security, the pursuit of absolute power becomes its second nature; the modern individual is *selfish*.

19. Man, participating in the reformation of knowledge (after the events that happened hundreds of years before) is forced again into yet another process of individuation. Operating his personal relationship to knowledge, a *postmodern individual* is in the process of becoming. The postmodern personality, liberated from the rule of the institutional system of modern knowledge, finds himself in an uncertain situation: he himself can decide in the question of scientific truth, but he cannot rely on anything for his decisions.

20. This leads to a very uncertain situation from an epistemological point of view. How can we tackle this problem? Back then, the modern individual eventually asked the help of reason and found solutions, e.g. the principle of rational egoism or the idea of the social contract. But what can the postmodern personality do? Should he follow perhaps some sort of *post-selfish* attitude? But what could be the content of this? Could it be perhaps some kind of plural or virtual egoism? The postmodern personality got rid of the rule of abstract reason but it still seems that that he has not yet found a more recent human capacity the help of which he could use in order to resolve his epistemological uncertainty.

21. From a wider historical perspective, we can see that people in different ages tried to understand their environment and themselves and continue living by relying on abstract human capacities that succeeded each other. People in primeval societies based their magical explanation of the world on the human *will* – and we managed to survive. After the will, the *senses* were in the mythical center of ancient culture – and the normal childhood of mankind passed, too. Medieval religious worldview was built by taking into consideration the dominance of *emotions* – and this ended too at some point. In the age of the glorious *reason* it was the scientific worldview that served the reign of man – until now.

22. Today the trust in scientific worldview seems to be teetering; the age of the Internet came. However, the problem is that we cannot draw on yet another human capacity, since we have already tried them all once. Or have we? Do we still have hidden resources? Or can we say goodbye, once and for all, to the usual abstractions, and a new phase of the evolution of mankind is waiting for us, which is happening in the *realm of the concrete*?

D. The Formation of Web-Life

1. In order to study the mostly unknown context of web-life it seems to be useful to examine the nature of human existence, transformed through Internet use and the consequences of the changes.

2. While using the Internet, *all* determining factors and identity forming relations change which had a role in the evolution of mankind from the animal kingdom and in the process of the development of society. We can identify tool use, language, consciousness, thought as well as social relationships as the most decisive changes in the process of becoming human and in the formation of web-life which developed as a result of Internet use.

3. The simultaneous transformations of animal tool and language use, animal consciousness and thought as well as social relationships and the series of interwoven changes led to the evolution of humans and to the development of culture and society. Nowadays, the robust changes in the same areas are also simultaneous. They point into one direction intensifying each other and induce an interconnected series of changes. Te quantity of the changes affecting the circumstances of human existence results yet again in the qualitative transformation of the circumstances of existence: this is the process of the development of web-life.

4. The material circumstances of *tool making* and tool use lose their significance and the emphasis is now on the most essential part of the process: interpretation. A crucial part of tool making is the interpretation of an entity in a different context, as different from the given (such as natural entities) and in this "technological situation" its identification as a tool. During Internet usage, individual interpretations play a central role in the process of creating and processing information on different levels and in the information technologies that are becoming dominant. At the same time the material processes that provide the conditions of interpretation are to a large extent taken care of by machines. Hermeneutics takes the central role of energetics in the necessary human activity of reproducing human relations.

5. The human double (and later multiple) representation strategy developed from the simpler strategies of the *representation* characteristic of wildlife led to language, consciousness, thought and culture. Double representation (I can regard an entity both as "itself" and "something else" at the same time) is a basic procedure in all these processes – and in tool making as well – and an indispensable condition of their occurrence. The use of the Internet radically transforms the circumstances of interpretation. On the one hand, it creates a new medium of representation, in which – as in some sort of global "mind" – the whole world of man is represented repeatedly. On the other hand, after the ages of orality and literacy it makes it possible basically for all people to produce and use in an intended way the visual representation of their own world as well. Virtuality and visuality are determining characteristics of representation. We are living in the process of the transformation of language, speech, reading and writing, memory and thought.

6. “Traditional” human culture is created through the reinterpretation of the relations “given by nature”, it materializes through their perpetual transformation and it becomes a decisive factor in the prevailing social relations. Cyber-cultural practices of the citizens of the web is now directed at the revaluation of *social* relations, and as a result of their activities a cyber, web or Internet-cultural system of relations is formed, which is the decisive factor in the circumstances of web-life.

7. The basically naturally given communities of animal partnership were replaced by the human structure of communities which was practically organized as a consequence of the tool use based indirect, and language use based direct communicative acts. However, the control over communicative situations can be monopolized by various agents: as a result it is burdened with countless constraints. The nature of the communities that come into existence under these circumstances can become independent from the aspirations of the participants: various forms of alienation and inequality can be generated and reproduced in the communities. The citizen of the web who engages in communication reinterprets and transforms communicative situations; above all, he changes power relations in favor of the individual: the citizen of the web can have full powers over his own communicative situations.

8. Society is a system of relationships which develops from, and is built on the natural sphere. Web life is a system of relationships which develops from, and is built on the social sphere. Man now is not the citizen of two worlds but three: he is the inhabitant of nature, society and web-life.

E. Web-Life in Practice

1. The knowledge presented and conveyed through the Internet valorizes the forms of knowledge which are characteristically situation-dependent, technological and postmodern. The whole modern system of knowledge becomes revaluated and to a large extent, virtualized; the relationship to knowledge takes a personal, concrete, open and plural shape. The significance of the institutional system of science is diminished. Instead of scientific knowledge technological knowledge and the technologies of interpreting knowledge are in the forefront.

2. Besides culture which is created by the communities of society, individual cyber culture plays a more and more important role. The traditional separation of the producers and consumers of culture becomes more and more limited in this process. Supported effectively by information technologies, billions of the worlds of the citizens of web-life join the products of the professional creators of culture. Cyber space is populated by the infinite number of simultaneous variations of our virtual worlds. Aesthetic culture gains ground at the expense of scientific culture and imagination becomes the human capacity that determines cultural activities.

3. Personality becomes postmodern, that is, it becomes fully realized as an individual, virtually extremely extended and acquires a playful character with ethereal features. A more vulnerable post-selfish web citizen is developed, compelled by a chaotic dynamics. Web citizens are mostly engaged in network tasks; that is, in building and maintaining their personalities and communities.

4. Besides the natural and the social spheres, a sphere of web-life existence is built up. Now man becomes the citizen of three worlds. The human essence moves towards web-life. The freedom of the access to the separate spheres and the relationship of the spheres of existence are gradually transformed, in a yet unforeseeable manner.

5. Web-life as a form of existence is the realm of concrete existence. Stepping into web-life the “real history” of mankind begins yet again; the transition from social existence to web-life existence leads from a realm of life based on abstract capacities to a realm of life built on concrete capacities.

Fellow-netizens of the web! Let’s switch on our computers – the age of shaping web-life has come.

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Yahoo! Computers and Internet: Year 2000 Problem (1999): *http://dir.yahoo.com/ Computers_and_Internet/Year_2000_Problem/* (1999 November 3, 1999 December 15, 2000 January 7).

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Year 2000 Computer Bug Hoax (1999): *http://www.angelfire.com/oh/justanumber/* (1999 November 4).

Year 2000 Computing Crisis. GAO Reports and other GAO Publications (1999): *http://www.gao.gov/y2kr.htm* (1999 November 6).

Year 2000 Conversion. (1999): *http://www.y2k.gov/* (1999 September 3).

Year 2000 Research Center. (1999): *http://www. cio.com/* (1999 September 3).

Y2K: A People Problem. Center for Y2K and Society. (1999): *http://www. y2kcenter.org/ misc/people_problem.html* (1999 November 3):

Y2K Book Center. (1999): *http://www.wbn.com/y2ktimebomb/books/index.htm* (1999 September 3).

Y2K Bug. (1999): *http://www.alequus.com/Y2K_Bug_Page.htm* (1999 November 4).

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y2kculture.com. (1999): *http://www.y2kculture.com/* (1999 November 3).

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Chapter 10. Websites about the Internet on the Internet

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History of the Internet

Zakon, Robert H'obbes': Hobbes' Internet Timeline v8.1. *http://www.zakon.org/ robert/internet/timeline/*

Internet Society (ISOC) All About The Internet: History of the Internet. *http://www.isoc.org/internet/history/index.shtml*

Internet & World Wide Web History. *http://www.elsop.com/wrc/h_web.htm*

Griffiths, Richard T.: History of the Internet, Internet for Historians (and just about everyone else). *http://www.let.leidenuniv.nl/history/ivh/frame_theorie.html*

LivingInternet.com. How The Internet Was Invented. *http://livinginternet.com/*

NetHistory. An informal history of BITNET and the Internet. *http://nethistory.dumbentia.com/*

Gromov, Gregory R.: History of Internet and WWW: The Roads and Crossroads of Internet History. *http://www.netvalley.com/intval.html*

Howe, Walt: A Brief History of the Internet. *http://www.walthowe.com/navnet/history.html*

Press FAQ Tim BL: *http://www.w3.org/People/Berners-Lee/FAQ.html*

Lynch, Keith: Keith Lynch's timeline of net related terms and concepts. *http://keithlynch.net/timeline.html*

Computer Industry History. *http://www.elsop.com/wrc/h_comput.htm*

Charles Babbage Institute. Center for the History of Information Technology. *http://www.cbi.umn.edu/*

The Computer Museum History Center. *http://www.computerhistory.org/*

Chronology of Computer History: 3000 BC to the Present. *http://www.cyberstreet. com/hcs/museum/chron.htm*

IEEE History Center. *http://www.ieee.org/organizations/history_center/*

The Modern History of Computing. (Stanford Encyclopedia of Philosophy) *http://plato.stanford.edu/entries/computing-history/*

The Virtual Museum of Computing. *http://www.comlab.ox.ac.uk/archive/other /museums/computing.html*

The History of Computers. *http://www.thinkquest.org/library/cat_show.html?cat_id=4*

Operating Systems Through Time (8 bits). *http://www.armory.com/~spectre/tech.html*

Development of the Internet

Agre, Phil (ed.): Red Rock Eater News Service. *http://polaris.gseis.ucla.edu/pagre/rre.html*

Living Internet. *http://www.livinginternet.com/*

Internet Scout Project. *http://scout.cs.wisc.edu/*

Internet Society (ISOC) *http://www.isoc.org/isoc/*

e-OTI/*OnTheInternet* Archives. *http://www.isoc.org/oti/archives/index.html*

The Register. *http://www.theregister.co.uk/*

Wired News. *http://www.wired.com/*

ZDNet News. Where Technology Means Business. *http://www.zdnet.com/*

Myers, Brad A.: Computer Almanac. Numbers about Computers. *http://www.cs.cmu.edu/afs/cs.cmu.edu/user/bam/www/numbers.html*

Hargittai, Eszter (ed.): Eszter's List. *http://www.eszter.com/elist*

Nemzeti Információs Infrastruktúra Fejlesztési Program. *http://www.iif.hu/*

National Telecommunications and Information Administration. Reports, Filings and Notices. *http://www.ntia.doc.gov/reports.html*

Center for Digital Discourse and Culture @Virginia Tech. *http://www2.cddc.vt.edu/*

Online Journalism Review. *http://www.ojr.org/*

CMC Info: Computer-Mediated Communication Information Sources. *http://www.December .com/cmc/info/*

Kuro5hin. technology and culture, from the trenches. *http://www.kuro5hin.org/*

CAIDA, the Cooperative Association for Internet Data Analysis. *http://www.caida.org/home/*

Global Internet Statistics (by Language). *http://global-reach.biz/globstats/index.php3*

GVU WWW User Survey. *http://www-static.cc.gatech.edu/gvu/user_surveys/*

Statistical Indicators Benchmarking the Information Society. *http://www.sibis-eu.org/*

InternetWeek. The Business and Technology of the Internet. *http://internetweek.cmp.com/*

Global Internet Revenue Survey 2005. *http://www.fwointl.com/RS-12-05-open.html*

Russ Haynal's ISP Page. *http://navigators.com/isp.html*

Computers and Internet in the Yahoo! Directory. *http://dir.yahoo.com /Computers_and_Internet/*

Beaucoup! 2000+ Search Engines, Indices and Directories. *http://www.beaucoup.com/*

Internet-reseracrh

network research. *http://www.netzwissenschaft.de/e.html*

Howard Rheingold. *http://www.rheingold.com/*

Net-Life Resources. *http://www.informatik.umu.se/nlrg/nlr.html*

NetLingo.com Dictionary of Internet Terms: Online Definitions & Text Messaging. *http://www.netlingo.com/index.cfm*

The Hacktivist. Hactivism and Technopolitics. *http://www.thehacktivist.com/*

epic.org - Electronic Privacy Information Center. *http://epic.org*

Cyber-Geography Research. *http://www.cybergeography.org/*

African Internet Connectivity. Maps and Tables. *http://www3.sn.apc.org/africa/afrmain.htm*

Psychology of Cyberspace. Article Index. *http://www.rider.edu/users/suler/psycyber/*

King, Storm: The Psychology of Virtual Communities. *http://webpages.charter.net/stormking/*

Presence-Research.org. *http://www.presence-research.org/*

Floridi, Luciano: Philosophy and Computing - A Webliography *http://www.wolfson. ox.ac.uk/~floridi/webliography.htm*

Imagining the Internet. *http://www.elon.edu/predictions/*

Online Internet Institute. *http://oii.org/index.html*

Mobil Research Forum. *http://mrf.ecdc.info/*

Associations

a.o.i.r. Association of Internet Researchers. *http://aoir.org/*

German Society for Online Research e. V. (D.G.O.F.). *http://www.dgof.de/index_en.php*

Association for Computing Machinery. *http://www.acm.org/*

The American Communication Association. *http://www.americancomm.org/*

Magyar Kommunikációtudományi Társaság. *http://communicatio.hu/mktt/*

Reserach centers

Oxford Internet Institute. *http://www.oii.ox.ac.uk/*

Center for Internet Studies at the University of Washington. *http://www.cis.washington.edu/*

Rob Kling Center for Social Informatics at Indiana University. *http://rkcsi.indiana.edu/*

Stanford Law School Center for Internet and Society. *http://cyberlaw.stanford.edu/*

Internet Studies Center at the University of Minnesota. *http://www.isc.umn.edu/*

MIT Media Laboratory. *http://www.media.mit.edu/*

N E T L A B_at the University of Toronto. *http://www.chass.utoronto.ca/~wellman/*

iCAIR. International Center for Advanced Internet Research at Northwestern University. *http://www.icair.org/*

WebUse: Scientific Research on the Internet. University of Maryland. *http://www.webuse.umd.edu/*

Internet Studies at Curtin University of Technology. *http://smi.curtin.edu.au/netstudies/index.cfm*

Virtual Knowledge Studio for the Humanities and Social Sciences. *http://www.virtualknowledgestudio.nl/en/*

Információs Társadalom- és Trendkutató Központ. *http://www.ittk.hu/*

RIS. Internet usage in Slovenia. *http://slovenia.ris.org/*

Center for Advanced Studies and Research in Information and Communication Technologies & Society. University of Salzburg. *http://www.icts.sbg.ac.at/*

Center for Internetforskning. Aarhus Universitet. *http://www.cfi.au.dk/index.jsp*

M.I.N.D. Media Interface and Network design Labs. *http://www.mindlab.org/*

Journals

First Monday. Peer-reviewed Journal on the Internet. *http://www.firstmonday.dk/*

ctheory.net. *http://www.ctheory.net/*

Communications of the ACM (CACM). *http://www.acm.org/cacm/*

Journal of Computer Mediated Communication. *http://www.ascusc.org/jcmc/*

The Journal of Virtual Environments. *http://www.brandeis.edu/pubs/jove/*

Journal of Online Behavior. *http://www.behavior.net/JOB/*

JASSS. The Journal of Artificial Societies and Social Simulation. *http://jasss.soc.surrey.ac.uk/JASSS.html*

Computer-Mediated Communication Magazine. *http://www.December.com/cmc/mag/*

EJC/REC Electronic Journal of Communication. *http://www.cios.org/www/ejcmain.htm*

Talbott, Stephen L. (ed.): NETFUTURE. Technology and Human Responsibility. *http://www.netfuture.org/*

cybersalon.org. *http://www.cybersalon.org/*

nettime mailing lists. mailing lists for networked cultures, politics, and tactics. *http://www.nettime.org/*

*spark-online. exploring electronic consciousness. *http://www.spark-online.com/*

Pajamas Media. *http://pajamasmedia.com/*

Convergence: The Journal of Research into New Media Technologies. *http://luton.ac.uk/Convergence/*

tripleC. cognition, communication, co-operation. *http://triplec.uti.at/*

KAIROS: A Journal of Rhetoric, Technology, and Pedagogy. *http://english.ttu.edu/ kairos/index.html*

Techné: Research in Philosophy and Technology. *http://scholar.lib.vt.edu/ejournals/SPT /spt.html*

NMEDIAC: The Journal of New Media & Culture. *http://www.ibiblio.org/nmediac/index.html*

The Filter. A publication of the Berkman Center for Internet & Society at Harvard Law School. *http://cyber.law.harvard.edu/filter/*

Terminal. Technologie de l'information, culture et société. *http://www.terminal.sgdg .org/accueilgb.html*

COMMposite. La revue électronique des jeunes chercheurs et chercheuses en communication. *http://commposite.org/*

Információs Társadalom. *http://www.ittk.hu/infonia/infotars_index.html*

replika. társadalomtudományi folyóirat. archívum. *http://replika.hu/archivum*

Médiakutató. *http://www.mediakutato.hu/*

Internet and culture

Wikipedia, the free encyclopedia. *http://en.wikipedia.org/wiki/Main_Page*

Resource Center for Cyberculture Studies. *http://www.com.washington.edu/rccs/*

Cyberculture. An electronic forum for the discussion of the implications of subjectivity and community in Cyberspace. *http://cyberculture.zacha.org/*

Alan Liu's Voice of the Shuttle. *http://vos.ucsb.edu/*

Institute of Network Cultures. *http://www.networkcultures.org/portal/*

fibreculture. internet theory + criticism + research. *http://www.fibreculture.org/*

.netculture. happy dot. *http://www.netculture.gr/eng/*

CCMS. Communication, Cultural and Media Studies. *http://www.cultsock.ndirect.co.uk/MUHome/cshtml/*

EJournal. An electronic journal concerned with the implications of electronic networks and texts. *http://www.ucalgary.ca/ejournal/*

M/C. Media and Culture. *http://www.media-culture.org.au/*

Net Culture Site Directory. *http://creativehat.com/public_html/netculture.htm*

CRUMB: curatorial resourse for upstart media bliss. *http://www.newmedia. sunderland.ac.uk/crumb/phase3/index.html*

New Media Studies, for web info, reviews, design, and culture. *http://newmediastudies.com/index2.htm*

Database of Virtual Art. *http://www.virtualart.at/common/recentWork.do*

AHDS Visual Arts. *http://vads.ahds.ac.uk/*

Rhizome.org. Connecting Art &Technology. *http://www.rhizome.org/*

-empyre- soft_skinned_space. *http://www.subtle.net/empyre/*

Body, Space & Technology Journal. *http://people.brunel.ac.uk/bst/home.html*

Crossings. Electronic Journal of Art and Technology. *http://crossings.tcd.ie/*

fAf. fineArt forum = art + technology net news. *http://www.fineartforum.org/*

Online Communication Studies Resources. *http://www.uiowa.edu/~commstud/resources/*

Electronic Literature Organization. *http://www.eliterature.org/*

Trace. *http://trace.luton.ac.uk/*

BeeHive hypertext/hypermedia literary journal. *http://beehive.temporalimage.com/*

www.theory.org.uk - the media theory site. *http://www.theory.org.uk/*

popcultures.com. Sarah Zupko's Cultural Studies Center. *http://www.popcultures.com/*

Bloglines. *http://www.bloglines.com/*

LiveJournal.com. *http://www.livejournal.com/*

Podcast.net. The Podcast Directory. *http://www.podcast.net/*

Edge. *http://www.edge.org/*

SYSTRAN Information and Translation Technologies. *http://www.systransoft.com/*

Internet and society

Virtual Society? The Social Science of Electronic Technologies. *http://virtualsociety. sbs.ox.ac.uk/*

Cybersoc: Internet Research, Consultancy, and Design. *http://www.cybersoc.com/*

Cybersociology webzine. *http://www.socio.demon.co.uk/magazine/*

Electronic Frontier Foundation. *http://www.eff.org/*

Pew Internet and American Life. *http://www.pewinternet.org/*

The Berkman Center for Internet & Society at Harvard Law School *http://cyber. law.harvard.edu/*

APC. The Association for Progressive Communications. Internet and ICTs for Social Justice and Development. *http://www.apc.org/english/index.shtml*

IGC. Internet. Institute for Global Communications. The Progressive Community. *http://www.igc.org/igc/gateway/index.html*

globalab.org. *http://www.globalab.org/eng/*

INA: International Networks Archive. Remapping Our World. *http://www.princeton.edu/~ina/*

Kapcsolatháló elemzők honlapja. *http://www.socialnetwork.hu/main.htm*

DoWire.Org - Democracies Online. *http://dowire.org/*

Center for Digital Democracy. *http://www.democraticmedia.org/*

Europe's Information Society. *http://europa.eu.int/information_society/index_en.htm*

UNESCO Observatory on the Information Society. *http://www.unesco.org/cgi-bin/webworld/portal_observatory/cgi/page.cgi?d=1*

Simputer ™. radical simplicity for universal access. *http://www.simputer.org/*

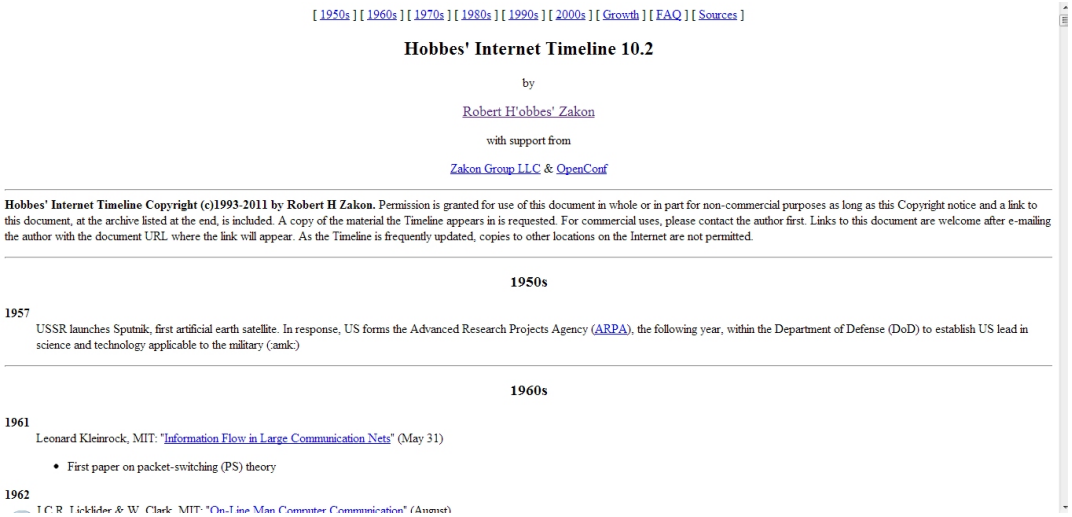
Internet-archive

Internet Archive. *http://www.archive.org/index.php*

textz. *http://textz.com*

Appendix A. Appendix

Some important webpages



[1950s] [1960s] [1970s] [1980s] [1990s] [2000s] [Growth] [FAQ] [Sources]

Hobbes' Internet Timeline 10.2

by

Robert H'obbes' Zakon

with support from

Zakon Group LLC & OpenConf

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1950s

1957

USSR launches Sputnik, first artificial earth satellite. In response, US forms the Advanced Research Projects Agency (ARPA), the following year, within the Department of Defense (DoD) to establish US lead in science and technology applicable to the military (:amk:)

1960s

1961

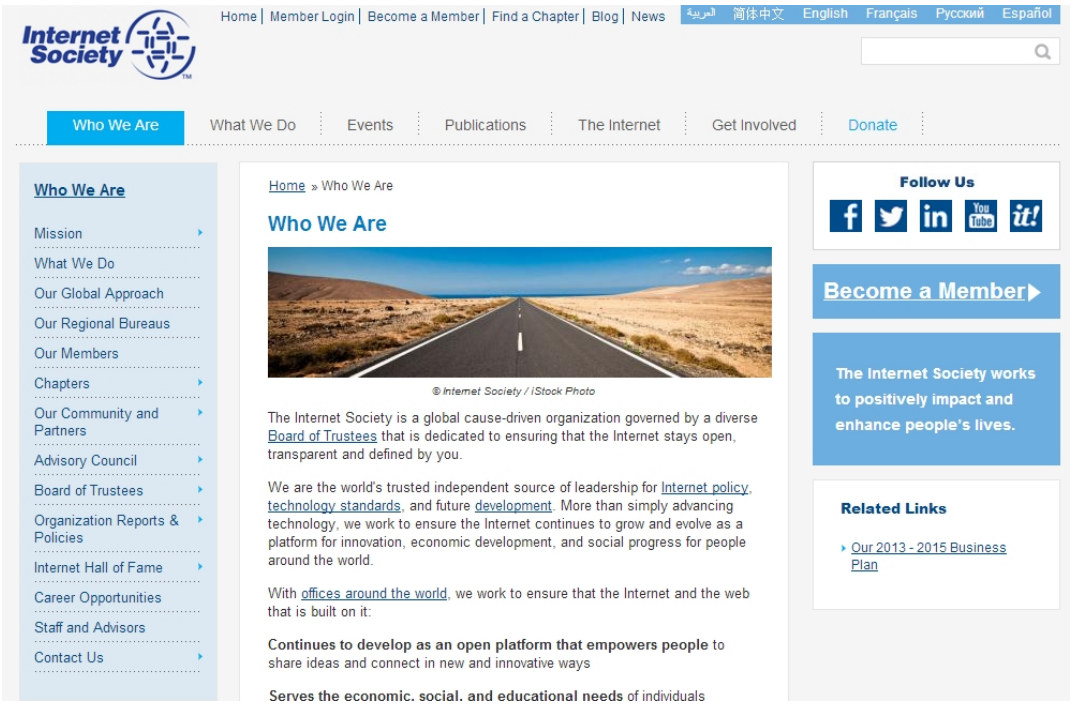
Leonard Kleinrock, MIT: "Information Flow in Large Communication Nets" (May 31)

- First paper on packet-switching (PS) theory

1962

J.C.R. Licklider & W. Clark, MIT: "On-Line Man Computer Communication" (August)

Fig. 1. Hobbes' Internet Timeline



Internet Society

Home | Member Login | Become a Member | Find a Chapter | Blog | News | العربية | 简体中文 | English | Français | Русский | Español

Who We Are | What We Do | Events | Publications | The Internet | Get Involved | Donate

Who We Are

- Mission
- What We Do
- Our Global Approach
- Our Regional Bureaus
- Our Members
- Chapters
- Our Community and Partners
- Advisory Council
- Board of Trustees
- Organization Reports & Policies
- Internet Hall of Fame
- Career Opportunities
- Staff and Advisors
- Contact Us

Home » Who We Are

Who We Are

© Internet Society / iStock Photo

The Internet Society is a global cause-driven organization governed by a diverse Board of Trustees that is dedicated to ensuring that the Internet stays open, transparent and defined by you.

We are the world's trusted independent source of leadership for Internet policy, technology standards, and future development. More than simply advancing technology, we work to ensure the Internet continues to grow and evolve as a platform for innovation, economic development, and social progress for people around the world.

With offices around the world, we work to ensure that the Internet and the web that is built on it:

Continues to develop as an open platform that empowers people to share ideas and connect in new and innovative ways

Serves the economic, social, and educational needs of individuals

Follow Us

Become a Member

The Internet Society works to positively impact and enhance people's lives.

Related Links

- Our 2013 - 2015 Business Plan

Fig. 2. Internet Society

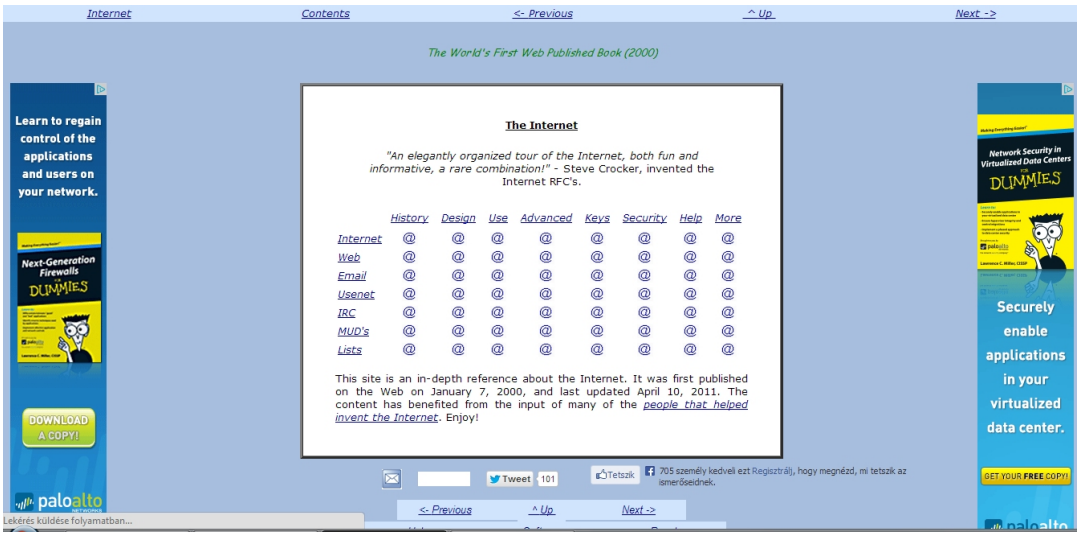


Fig. 3. LivingInternet.com

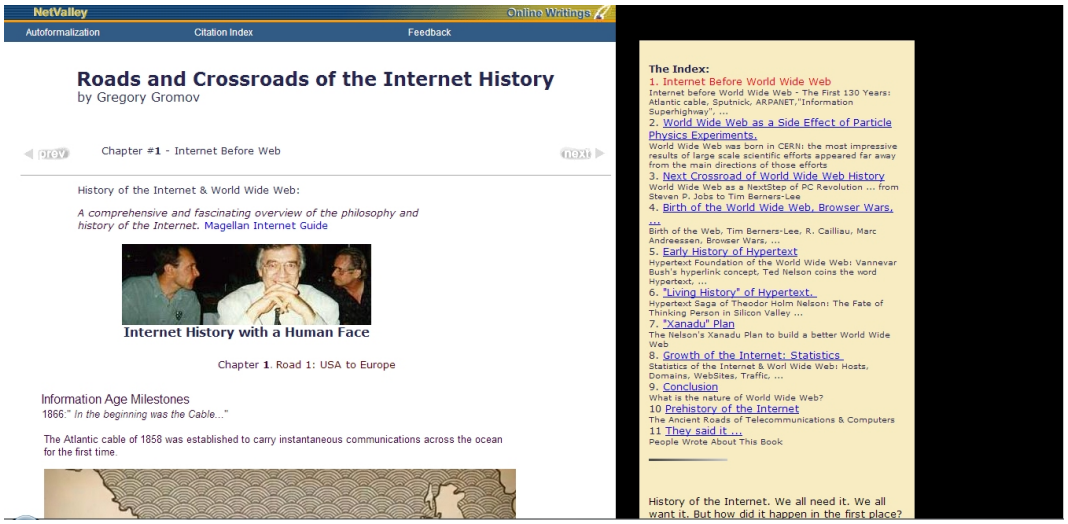


Fig. 4. Gromov: The Roads and Crossroads of Internet History

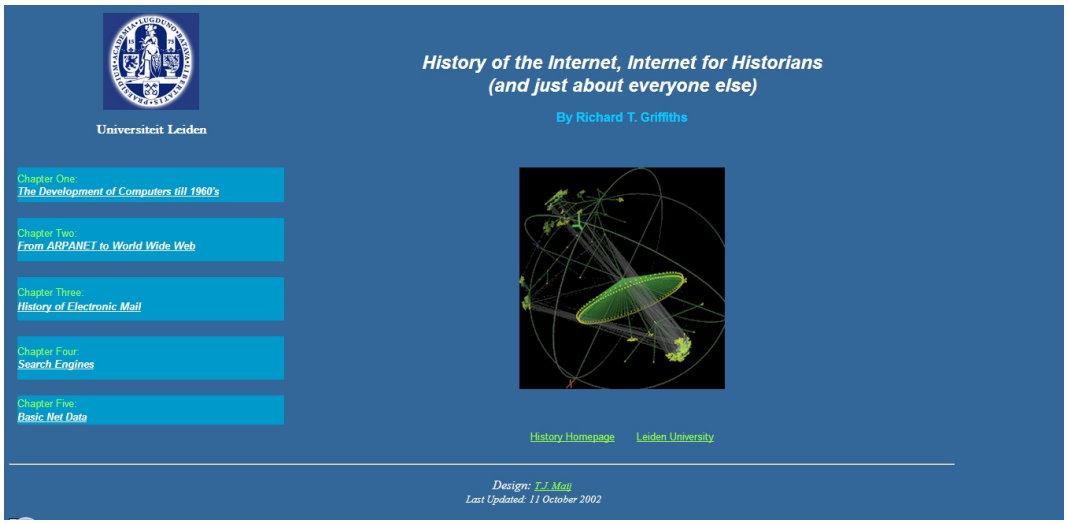


Fig. 5. Griffiths: History of the Internet, Internet for Historians

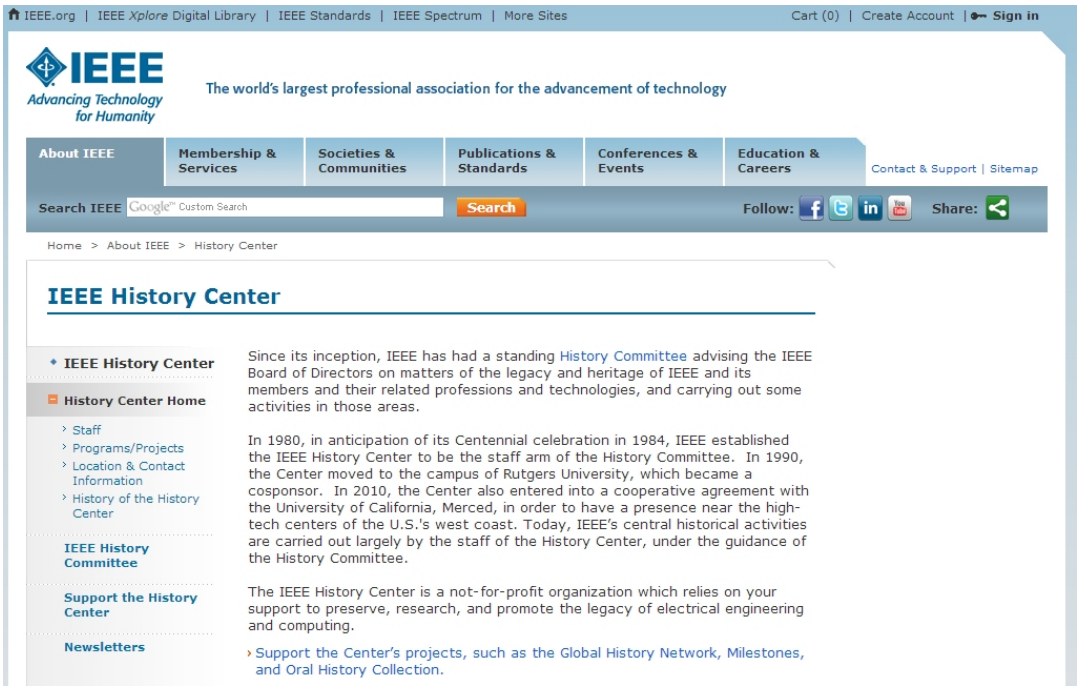
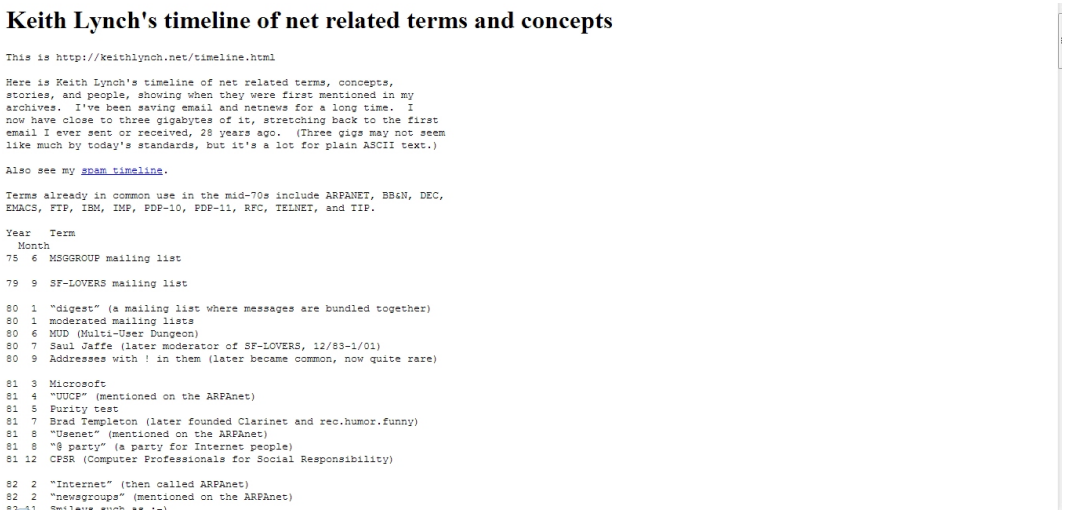


Fig. 6. IEEE History Center

Fig. 7. Internet Society: History of the Internet

Fig. 8. Charles Babbage Institute. Center for the History of Information Technology



Keith Lynch's timeline of net related terms and concepts

```
This is http://keithlynch.net/timeline.html

Here is Keith Lynch's timeline of net related terms, concepts,
stories, and people, showing when they were first mentioned in my
archives.  I've been saving email and netnews for a long time.  I
now have close to three gigabytes of it, stretching back to the first
email I ever sent or received, 28 years ago.  (Three gigs may not seem
like much by today's standards, but it's a lot for plain ASCII text.)

Also see my spam timeline.

Terms already in common use in the mid-70s include ARPANET, BB&N, DEC,
EMACS, FTP, IBM, IMP, PDP-10, PDP-11, RFC, TELNET, and TIP.

Year   Term
  Month
75  6  MSGGROUP mailing list

79  9  SF-LOVERS mailing list

80  1  "digest" (a mailing list where messages are bundled together)
80  1  moderated mailing lists
80  6  MUD (Multi-User Dungeon)
80  7  Saul Jaffe (later moderator of SF-LOVERS, 12/83-1/01)
80  9  Addresses with ! in them (later became common, now quite rare)

81  3  Microsoft
81  4  "UUCP" (mentioned on the ARPAnet)
81  5  Purity test
81  7  Brad Templeton (later founded Clarinet and rec.humor.funny)
81  8  "Usenet" (mentioned on the ARPAnet)
81  8  "@ party" (a party for Internet people)
81 12  CPSR (Computer Professionals for Social Responsibility)

82  2  "Internet" (then called ARPAnet)
82  2  "newsgroups" (mentioned on the ARPAnet)
```

Fig. 9. Keith Lynch's timeline of net related terms and concepts

Red Rock Eater News Service

The Red Rock Eater News Service (RRE) is a mailing list organized by Phil Agre. Subscribers to the list receive about five messages a week. These messages have no single format; they simply contain whatever I find interesting. RRE is not a discussion list.

Topics. These days most of the messages concern the social and political aspects of computing and networking.

Disclaimer. Please note that neither Phil nor UCLA nor anyone else necessarily endorse anything that is sent to RRE, and that Phil's opinions are his own and not UCLA's or anyone else's.

FAQ. Here are some frequently asked questions about RRE. Topics include: subscribing and unsubscribing, changing addresses, submitting items to the list, the format I use when describing URL's, press releases (no thank you), the software we use, and how I find the time to read everything (I don't).

(Un)subscribe. To subscribe to RRE, send a message that looks like this:

```
To: requests@lists.gseis.ucla.edu
Subject: subscribe rre
```

You will receive a message explaining a little more about the list, including the fact that the way to end your subscription is to send a message like this:

```
To: requests@lists.gseis.ucla.edu
Subject: unsubscribe rre
```

Trouble. If you have trouble using the RRE News Service, send me a note at pagre@ucla.edu. Describe your difficulty in as much detail as you can, and include the full text and all of the arcane headers of any message from the RRE server that doesn't seem right. We'll have a look and get back to you.

Archives. You can also read RRE on the web. Kee Hinckley <nazgul@somewhere.com> maintained an archive of RRE messages that ran through June 2004. It's not complete, but it's pretty good.

There's another archive at Yahoo that starts in January 2001, though it may have fallen into disrepair. It continues an earlier archive at eGroups that broke off in October 2000. Its formatting is worse and its ads are more obnoxious, but its search engine is probably better.

Items of interest. Here are some other items from the list.

The Network Observer, which I edited from 1994 to 1996.

Notes and recommendations that I've sent out subsequently.

Fig. 10. Phil Agre: Red Rock Eater News Service

Note: Many of these questions are now answered in much more depth in my book, ***Weaving the Web***

Frequently asked questions

I feel that after a while if I answer the same questions again, I will start answering rather mechanically, and will forget important steps, and after a while it won't make sense. So I have put a few answers from my outgoing mail in this list to save everyone time. But this list is (c) TBL so don't quote directly in the press without permission. Do feel free to quote for school projects. If you are doing a school project, I have a special page of questions that people tend to ask for reports. Thanks.

- Roles at MIT, W3C and Southampton?
- Spam - "Please stop sending it to me"! (2002/4)
- I have this great new idea - changing the world
- What's happening? (2000)
- What about peer-peer file sharing?
- General questions 1999
- General questions 1998
    - Q: I understand you invented the Internet....
    - Q: What is the difference between the Net and the Web?
    - What did you have in mind when you first developed the Web?
- Examples of early WWW hypertext
    - What was the first web page?
- Physics: why and influence
- W3C and standards (1996)
- What computer do you use?
- Robert Cailliau's role
- Where exactly did you work at CERN?>
- Spelling of WWW
- Why the //...#...etc?

Fig. 11. Frequently asked questions – Tim BL

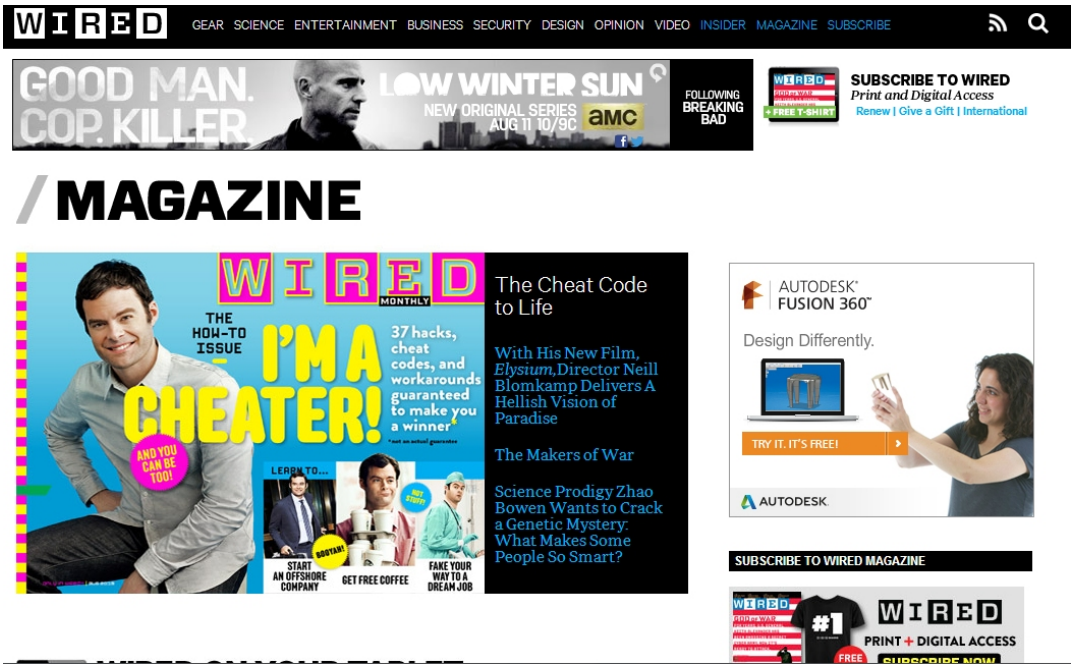


Fig. 12. Wired Magazine

Fig. 13. Statistical Indicators Benchmarking the Information Society

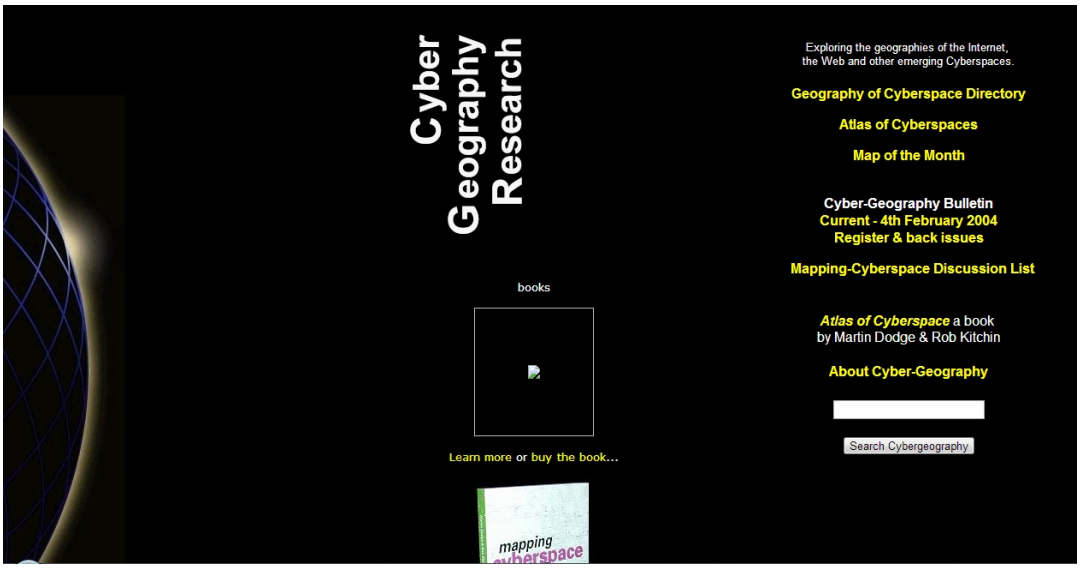


Fig. 14. Cyber-Geography Research

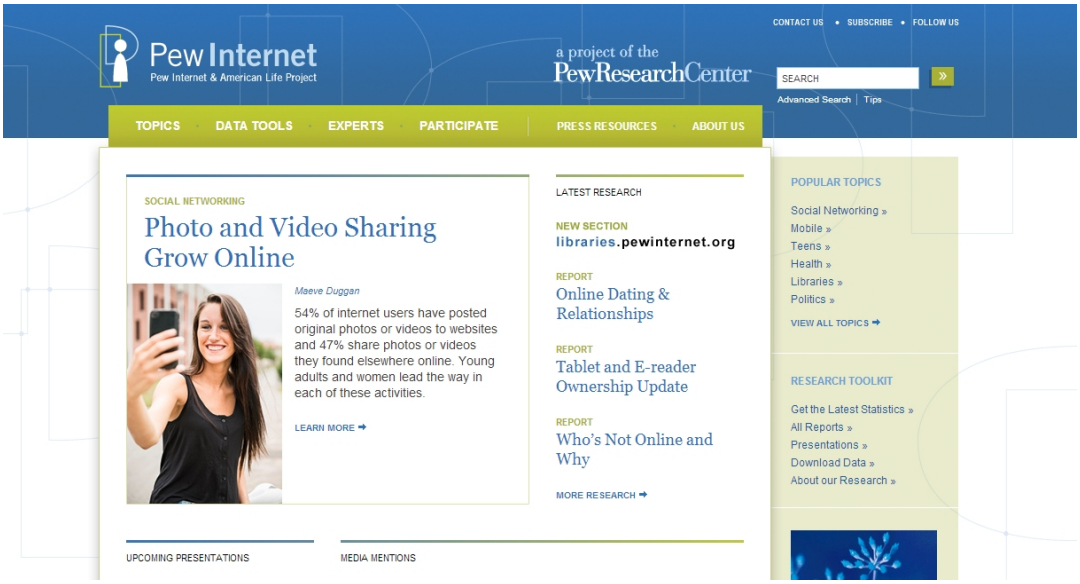


Fig. 15. Pew Internet and American Life Project

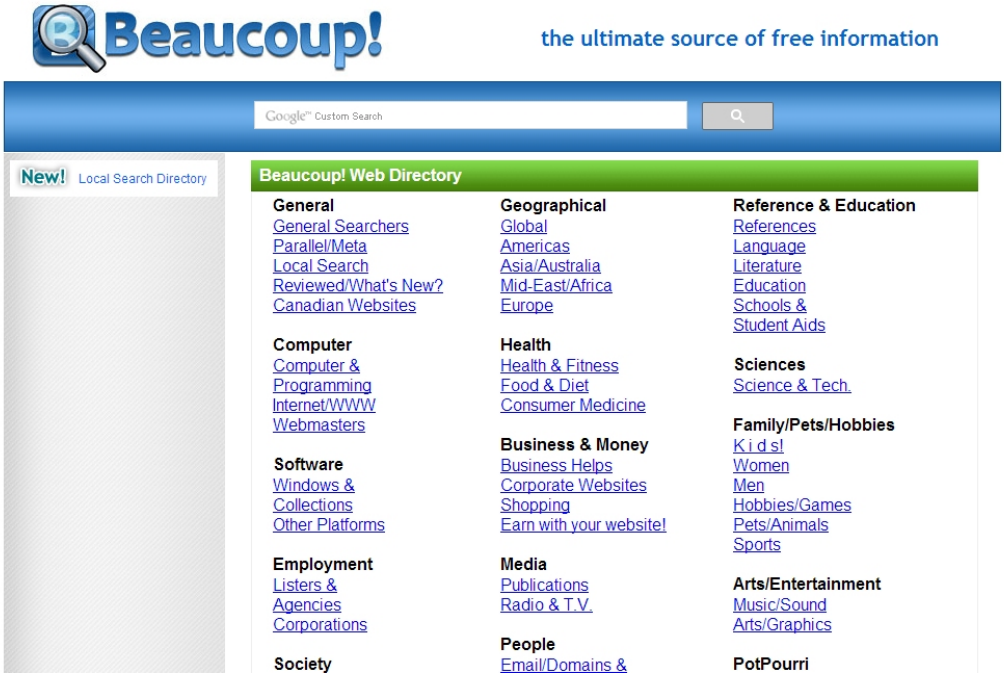


Fig. 16. Beaucoup! 2000+ Search Engines, Indices and Directories

Fig. 17. Association of Internet Researchers

Fig. 18. Oxford Internet Institute

Fig. 19. The Berkman Center for Internet & Society at Harvard Law School

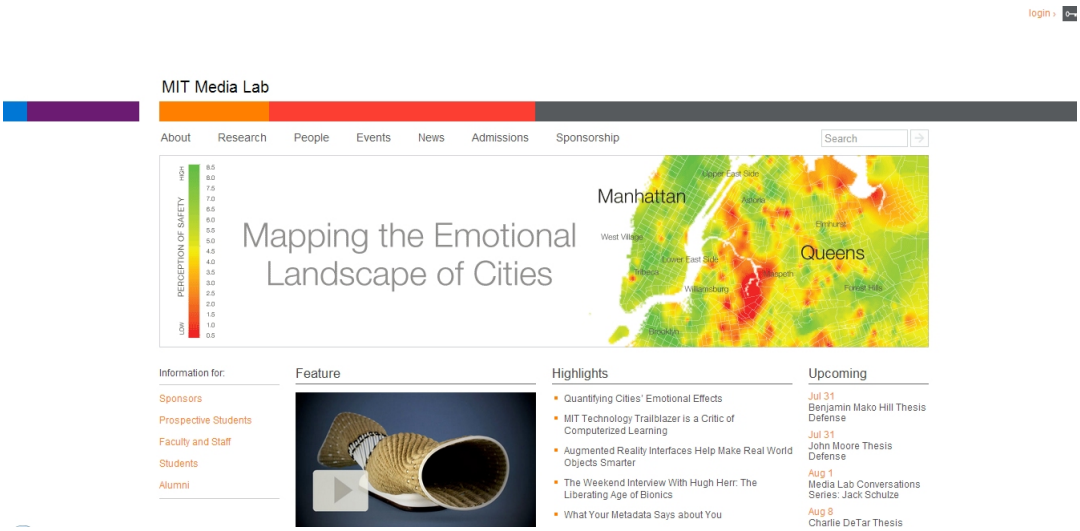


Fig. 20. MIT Media Laboratory

Fig. 21. The ICTs and Society-network

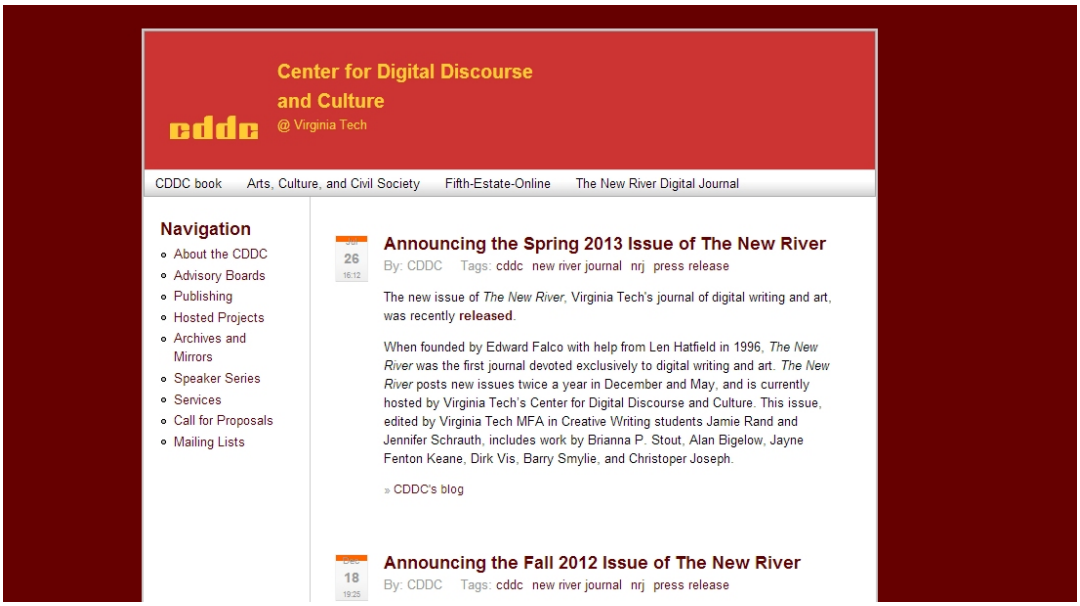


Fig. 22. Center for Digital Discourse and Culture (CDDC)

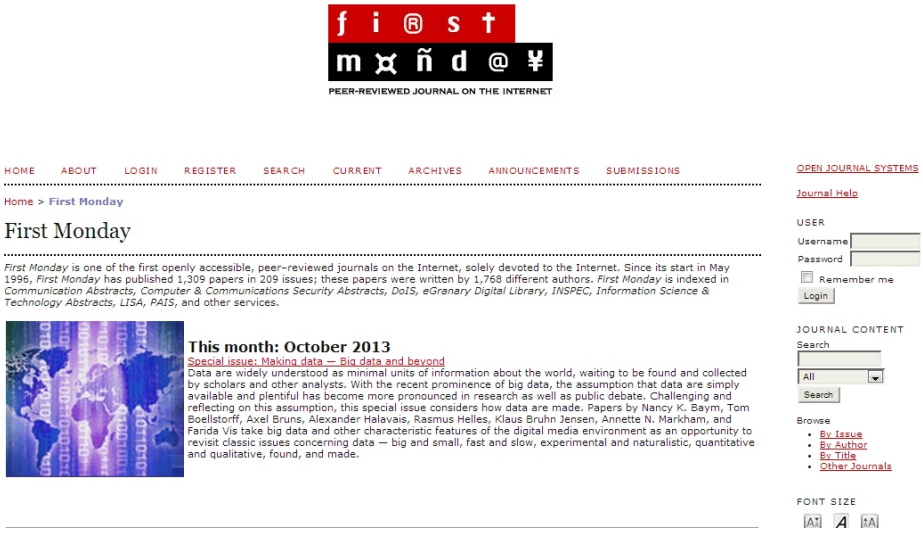


Fig. 23. First Monday. Journal on the Internet

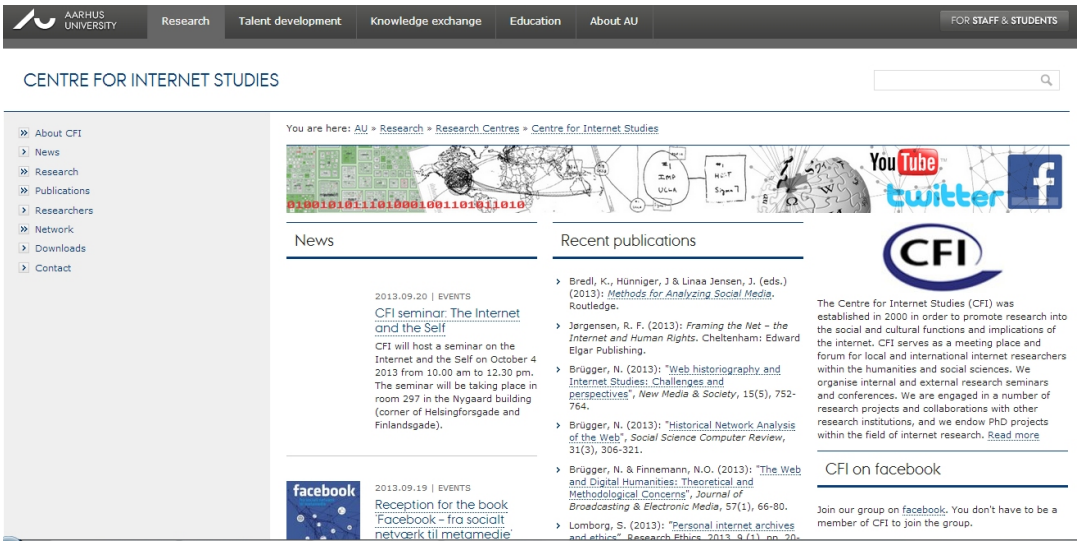


Fig. 24. Centre for Internet Studies at the Aarhus University

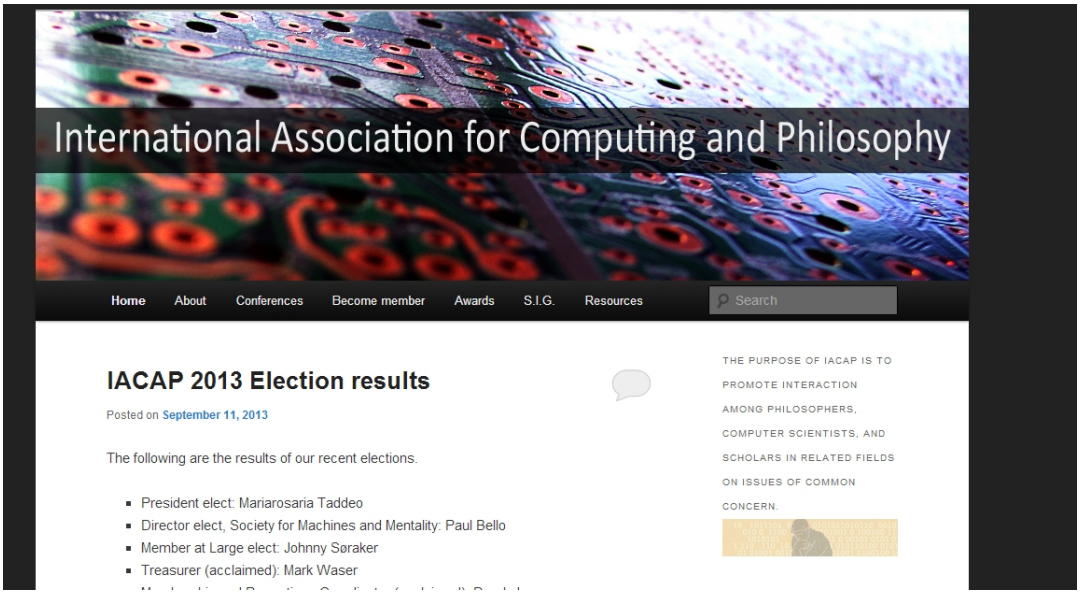


Fig. 25. International Association for Computing and Philosophy

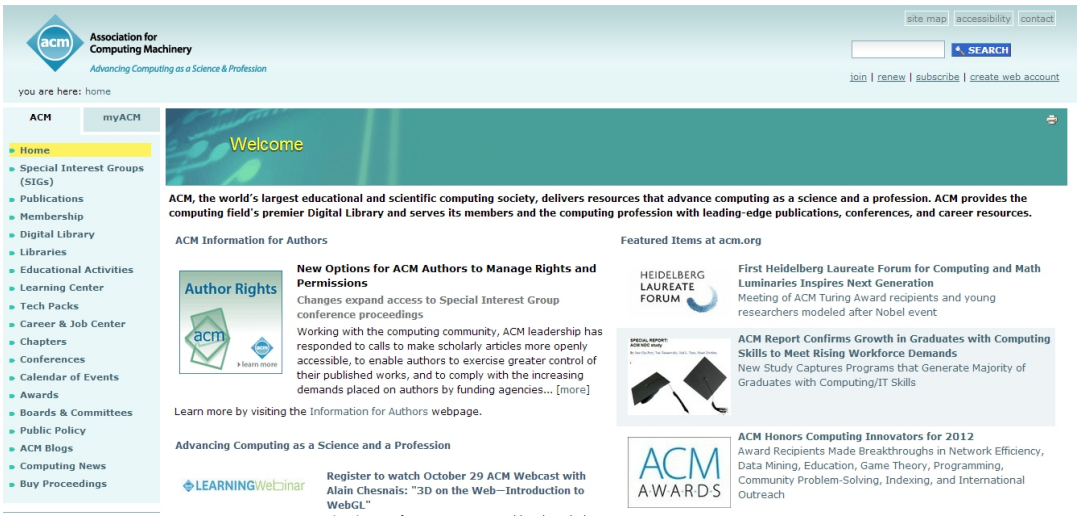


Fig. 26. Association for Computing Machinery

Fig. 27. DoWire.Org - Democracies Online

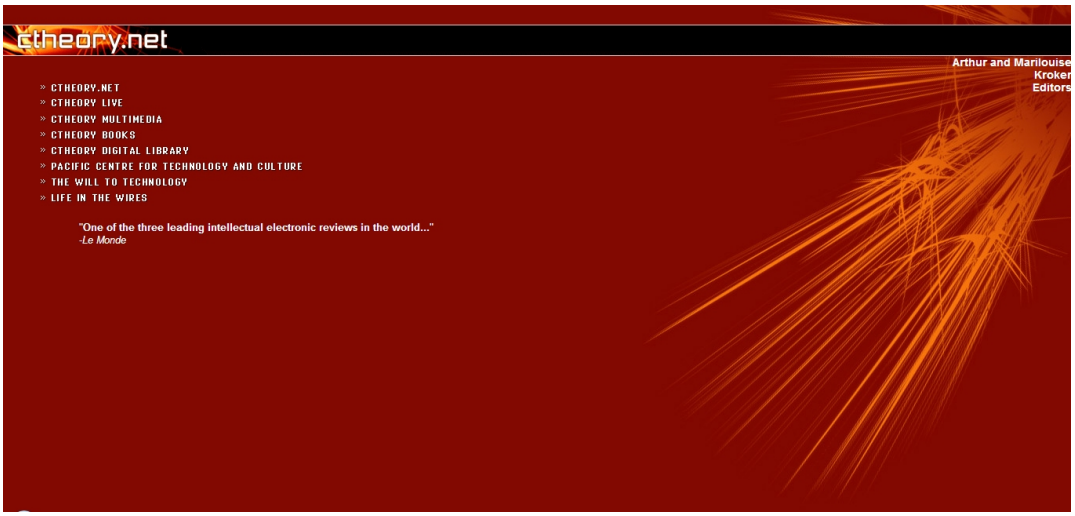
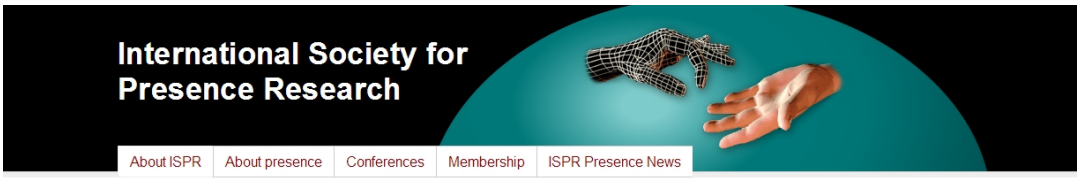


Fig. 28. ctheory.net

Fig. 29. German Society for Online Research



The International Society for Presence Research (ISPR) is a non-profit membership organization founded in 2002 to support academic research related to the concept of (tele)presence.

Telepresence, often shortened to presence, is commonly referred to as a sense of 'being there' in a virtual environment and more broadly defined as an illusion of nonmediation in which users of any technology overlook or misconstrue the technology's role in their experience.

This web site is intended to serve as a resource for those who conduct research, develop theory, design, market, write about, or simply are interested in, the concept and phenomena of presence.

We encourage your questions, contributions, comments and suggestions regarding ISPR and all aspects of this website; please feel free to contact us via e-mail at ispr@ispr.info.

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- Jobs

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- September 2013 (40)
- August 2013 (44)
- July 2013 (46)
- June 2013 (40)
- May 2013 (44)
- April 2013 (44)
- March 2013 (42)

Fig. 30. International Society for Presence Research

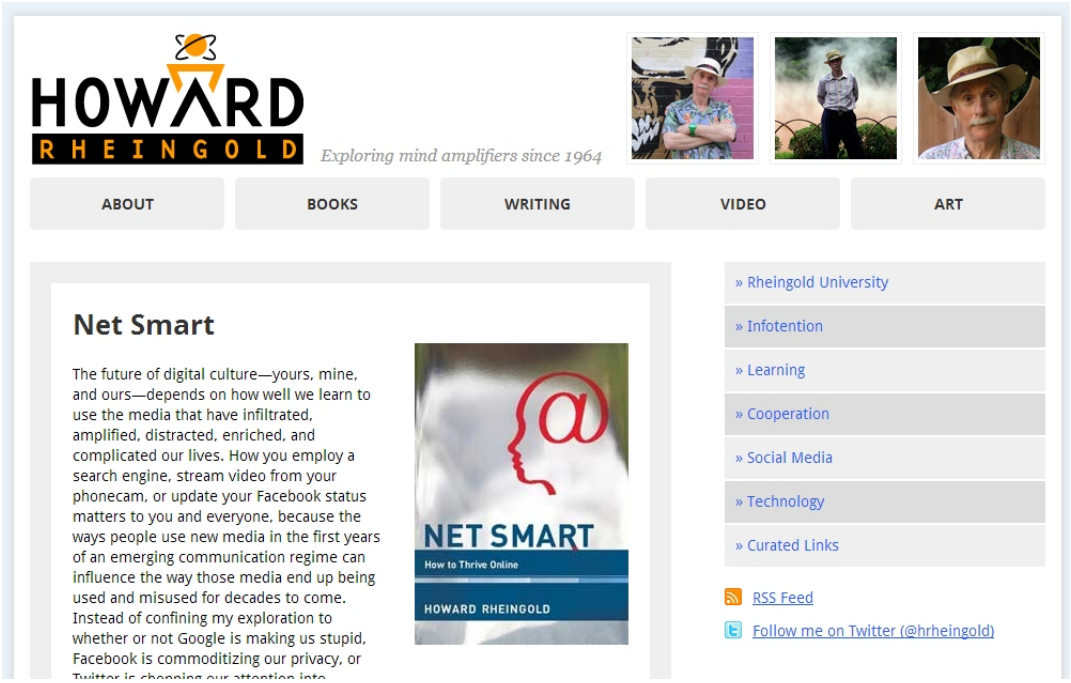

Fig. 31. Howard Rheingold's page

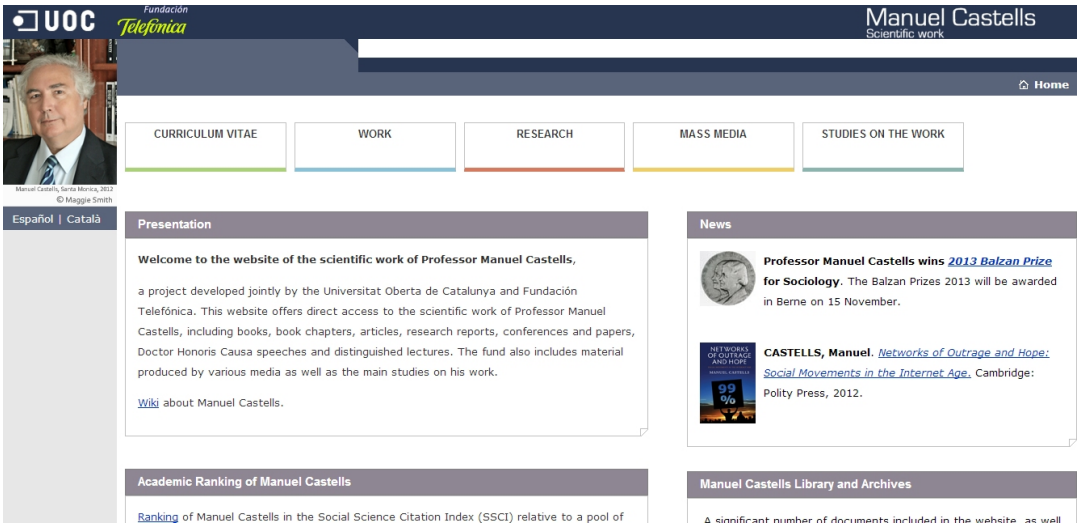

Fig. 32. Manuel Castells' page

Fig. 33. Barry Wellman's page

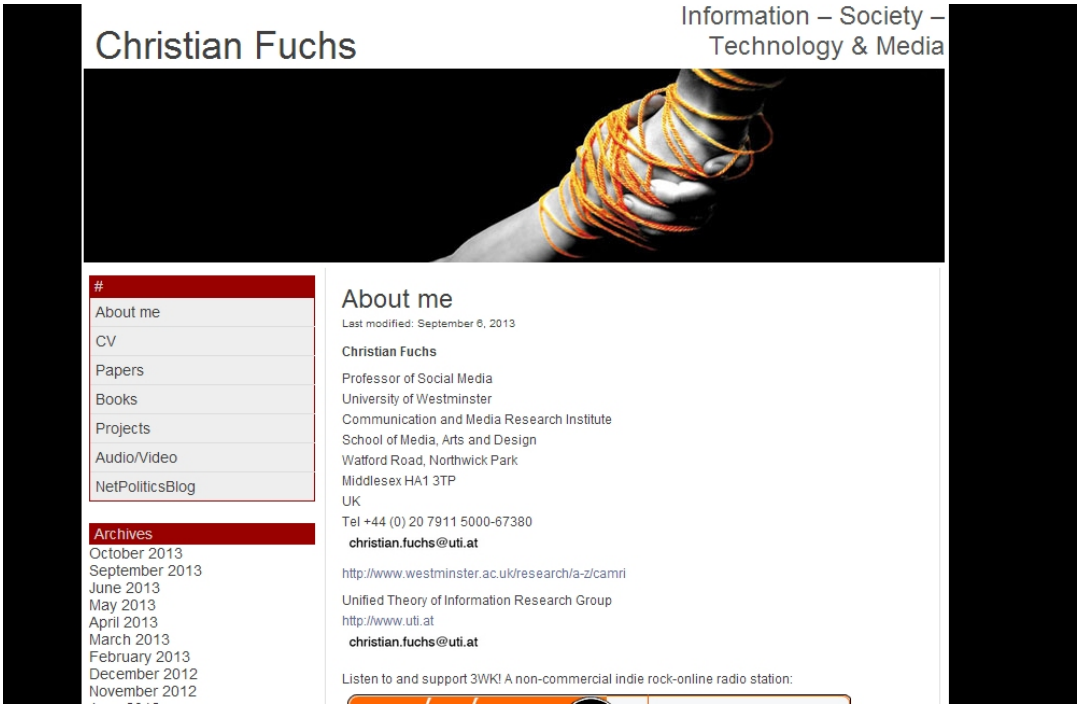

Fig. 34. Christian Fuchs' page

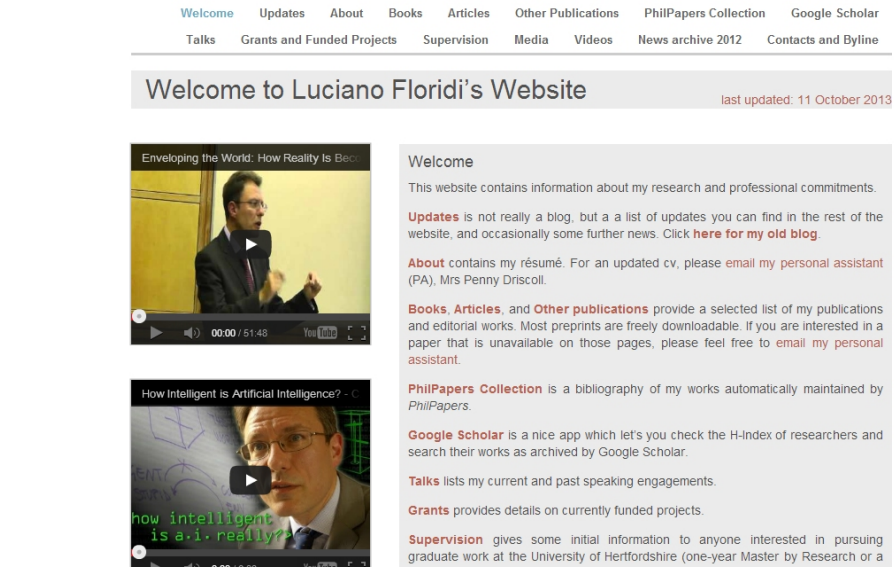

Fig. 35. Luciano Floridi's page

Fig. 36. UNESCO Observatory on the Information Society

Fig. 37. tripleC: Communication, Capitalism & Critique. Open Access Journal for a Global Sustainable Information Society

Fig. 38. Alan Liu's Voice of the Shuttle

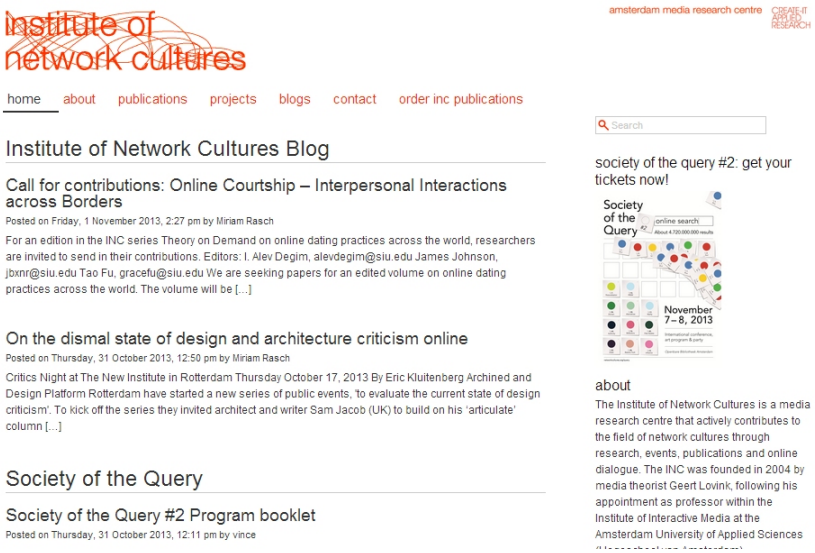

Fig. 39. The Institute of Network Cultures

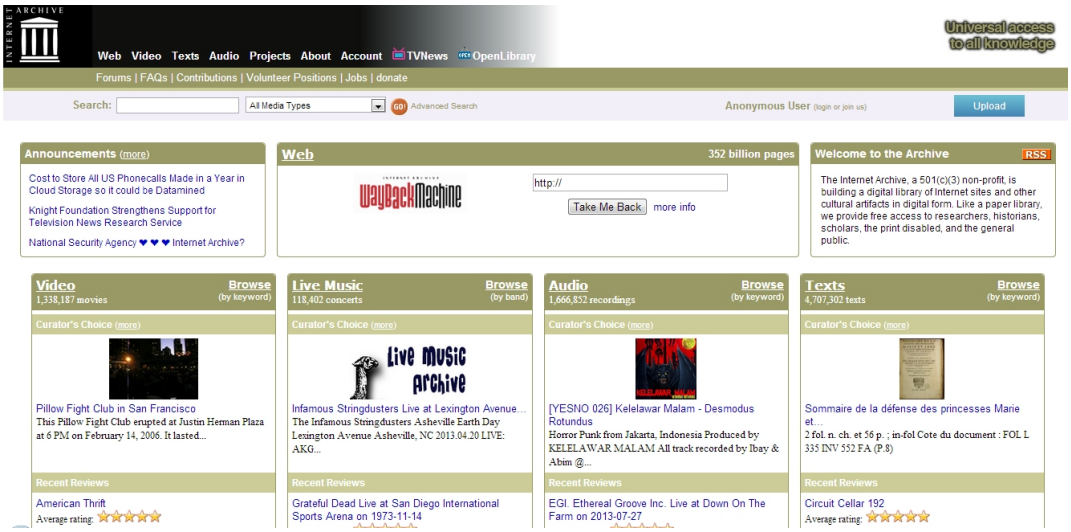

Fig. 40. Internet Archive