Copyright, Information Technology, and the Edifice of Knowledge[1]

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Lending Wings to Human Ability

"The machines that help us to think" was the heading of the introductory chapter to a book by Daniel S. Halacy, an early work of popular science about computers and a typical instance of the spate of literature at that time concerning "electronic brains" and the dramatic impact they were expected to have on society.[2] There was no mistaking the optimism: "with the colossal amount of information in existence – books, articles, speeches, minutes and archives of every kind – an efficient system for locating information will soon be absolutely necessary. The computer is a device with natural aptitudes for this work… Our communications are developing parallel to computers, so that the dream of a world-wide 'intellect' can eventually become reality."[3]

When Halacy's book was published, at the beginning of the 1960s, the technology had already been evolving for quite a long time. Turning to the more or less primitive calculating devices and "analytical engines", the precursors of modern computers, we are looking at time spans of hundreds or even thousands of years. Taking the Englishman Charles Babbage's Difference Engine and Analytical Engine as our starting points, we are talking about just over a hundred years. If instead we begin with ENIAC, the universal ancestor of present-day computers, the time span shrinks to barely a couple of decades to the publication of Halacy's book.[4]

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[1] This article is a revised, English version of a lecture given at The Swedish Royal Academy of Letters, History and Antiquities in 1997, published in Swedish in the 1998 Yearbook of the Academy.

[2] Daniel S. Halacy, *Computers – the Machines We Think With*. Swedish edition: Datamaskiner, Stockholm: Wahlström & Widstrand 1964.

[3] *Op. cit.*, pp. 19-20.

[4] Babbage's Difference Engine (1831) and, still more so, his unrealised Analytical Engine are often referred to as the intellectual precursors of present-day computers. ENIAC, the Elec-

Then as now, it was hard to foresee the potential rapidity of developments and, above all, their exact implications – for social development generally, for different applications, for individual people. Then as now, these difficulties appear if anything to have inspired dreams about *everything that ought to be possible*, about everything that could come true. Then as now, technology was to lend *wings to human ability*. That was the very heading chosen by the Swedish Government IT Commission as the title of its first report, presented in 1994.[5] The tone of that report is set by its opening words: "Man's strength lies in his capacity for growth and development. IT, properly used, lends wings to that capacity. Wings to rise and bridge distances with. Wings for the realisation of otherwise unattainable ambitions, wings which can revolutionise both everyday life and working life… IT creates new possibilities both for the individual and for society. It increases the possibilities of communicating and co-operating, of collecting and using information and knowledge, of solving problems and of developing new knowledge. It opens up new ways of living, working, meeting and relating."

Given this prolonged optimism, given the fact of information technology (IT) as such having developed even faster than has at every stage been anticipated, one can ask the following simple question: why is there still such a widespread feeling of uncertainty regarding the importance of IT for the creation of a "knowledge society"? Ought not, by this stage of things, the history of success to have been written and the recipes for the future formulated? Such vast sums of money invested. So many governmental declarations, research programmes, development projects. And yet there is justification for the scepticism that argues, briefly, that the computer is if anything an overrated tool and that chatting on the web and accessing immense quantities of data leave nobody a penny the wiser.[6]

The discussion which now follows will focus on a limited but by no means unimportant sector of these problems, namely the interaction between law and information technology and the way in which that interaction helps to create opportunities for and obstacles to the IT-supported development of knowledge

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tronic Numerical Integrator and Computer, which was built at the University of Pennsylvania in the United States in 1946, has gone down as the inauguration of the modern era, even though it could not really be programmed in the same way as modern computers.

5   *Informationsteknologin. Vingar åt människans förmåga.* SOU 1994:118. English version: *Wings to Human Ability: Information Technology.* Stockholm: Prime Minister's Office 1994. Similar bodies were set up in several countries, and the late nineties afford plentiful instances of national and international "IT policy programmes". One further Nordic example is *From Vision to Action. Info-Society 2000*, Statement to Parliament, issued by the Danish Ministry of Research and Information Technology in 1995. The American National Information Infrastructure, NII, launched by President Clinton and Vice President Gore, served as a source of inspiration to many of these reports and statements.

6   Criticism of IT goes back a long way. *See e.g.* Ida Hoos, *Systems Analysis in Public Policy. A Critique* Berkeley…: University of California Press 1972. A more recent example with an emphasis on the web euphoria is Michael Wolff, *Burn Rate. How I Survived the Goldrush Years on the Internet.* London: Orion 1999.

and skills. More exactly, attention will be made to focus on copyright and on intellectual working conditions in cyberspace.[7]

Law as a Steering Instrument

One of our first questions concerns law as a steering instrument. Are there any grounds for supposing that law constitutes an effective steering instrument, in the context now under consideration, that law can be used to make IT promote what we may term an edifice of knowledge in society? The answer ought on the whole to be Yes, but this has to be combined with a number of initial considerations and modifications.

In the first place, law, the legal system, is, to say the least of it, a complex phenomenon. As a steering instrument in society it is far from being the simple tool that the mere letter of the law can make it seem. Among other things, there is cause to reflect on the following.

- The written precepts of the law *are not everything*. The legal system includes much else besides – principles of interpretation, decision-making procedures, organisation, competence, economic and physical resources, to mention only a few examples.

- The legal system has both *'operational' and 'emotional' components*. Legislative bodies and the judicial system can be seen as operational components, legal awareness on the part of the general public as an emotional component.

- The legal system has both *open and hidden components*. The written rules of the law, for example, can be contrasted with the power game behind them.

- The legal system can be viewed both as a *steering system* (active, conditioning) and as a *steered system* (passive, conditioned). Thus it is a means of implementing political decisions but also an impediment to the emer-

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7 The expression "cyberspace" was coined by William Gibson in his novel *Neuromancer* (1984). Cyberspace can be described as the "logical space" which global data networks create for contacts, the exchange of messages, information retrieval, business transactions, the exercise of power and so on. In Gibson's own words: "Cyberspace. A consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts… A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding…" (Harper Collins paperback edition 1993, p. 67). A more everyday description of cyberspace is to be found, for example, in Howard Rheingold, *The Virtual Community. Homesteading on the Electronic Frontier*. New York…: Addison-Wesley 1993. *See also* Steven Johnson, *Interface Culture. How New Technology Transforms the Way We Create and Communicate*. New York: Basic Books 1997.

gence of new patterns in society – bulwark of the status quo, a factor of inertia.

- The legal system as a steering system partly *resembles a blueprint* – a wishful image of the future. This is worth noting, not least, in the IT connection: legal norms, in other words, can be regarded as a description of the way in which information processing and communication shall or ought to be constructed.

In every discussion of the way in which the law relates to IT development and the endeavours and expectations connected with it, we are compelled, sooner or later, to take this complexity into account. This applies, for example, when we are talking about "the law lagging behind", i.e. criticising, as not infrequently happens, the tardiness of the legislature and the inability of lawyers to understand the workings and possibilities of IT. In short, *it is not easy to put in place all the structural components of the law that are needed in order for IT, wings and all, to become airborne.* On the other hand, there are good reasons for pursuing a deeper insight into ways in which the law can help to make the dreams of IT come true. The critics of tardiness have a point here: the relation of the law to IT is often trivialised and there is little interest in a new legal order capable of liberating the potentialities of IT. "Business as usual" is not the most appropriate of attitudes in the rapidly changing world of the Internet.

A Word About Copyright

For the purposes of the argument that follows, some of the basics of copyright should also be passed in review. Space will not permit any lengthy excursions into the jungle of regulations, so let us content ourselves with the basics as they are reflected in Swedish valid law.

By copyright we mean the exclusive proprietary right which, in the Swedish legal system, is governed by the 1960 Copyright (Works of Art and Literature) Act and in other countries by corresponding legislation. That legislation gives "authors" certain basic, exclusive rights to the works they have created. Putting it simply, this means:

- a right of reproduction, meaning a right to produce copies of the work,

- a right of public performance of works,

- a right of distribution, i.e. the right to disseminate copies of the work to the general public by sale, rental etc., and

- a right to show copies of the work in public.

This is the *economic* side of copyright, the side meant to give the author a rec-

ompense for the use of his work. There is also a *moral* side, a right based on others being told who the author is and on others respecting the work concerned.

The law hedges copyright about with a large number of *restrictions*, the purpose of which is to strike a balance between copyright and various contrary interests.

First of all, copyright, in principle, is unlimited until a work has left the author's private sphere. Not until the borderline between private and public has been crossed do restrictions become possible. The key concepts in this connection have to do with making a work available to the public. This can occur in different ways, e.g. through physical copies of the work being sold or through communication to the public via an electronic data network.

Of the many restrictions on copyright, it will suffice to mention, as illuminating examples, the right of *producing individual copies for private use* of publicised works and the right of *freely reproducing documents compiled by public authorities*, such as a report by a government commission. These two restrictions, like many others, are in turn combined with exceptions and further restrictions. The whole thing adds up to a tangled skein of rules, frequently bedevilled by problems of interpretation.

Copyright protection is not concerned with the physical object – the collection of papers, the canvas, the piece of marble. What is protected is *the work*, an abstract concept, an intellectual notion of something transcending the physical object, amounting to something different from and more than the concrete product or performance.

Take the example of a drawing. Copyright, of course, does not focus on the individual physical object, the paper (cf. ownership). What is protected is the identity of the work – both in one-to-one copying (absolute resemblance) and in uses where the original is recognisable from the imitation. One of the basic tenets of copyright law, on the other hand, is that protection does not include what is a pure reproduction of facts (consider, for example, a drawing as part of technical instructions for use), nor does it apply to ideas, methods or principles. The question frequently arising – in this and in many similar connections – is: where do you draw the line *between the protected concrete depiction* of, say, a principle and *the unprotected principle as such*? This question plunges us right into a discussion typical of the law of intellectual property – elusive boundary lines between abstract phenomena with no exact definitions, questions concerning the extent of protection, questions concerning the definition of rights to intellectual products.

If copyright is intangible as regards the object of protection, then by tradition it is concrete in another respect, namely that connected with the physical materialisations of protected works. *Copies of works*, then, play an important role in copyright protection, because in many connections the works depend for their *dissemination* and *use* on being manifested in physical objects.

To avoid misunderstandings, it should be said right away that the copyright system does not presuppose fixation in copies. A spoken lecture enjoys copyright protection, just as much as a written one. A composer can raise objections to his works being played live by an orchestra without his consent. But the physical copies have played and continue to play an important role and in certain

connections are the very foundation of the rules and of their practical implementation.

As we enter the electronic world of data networks, the *intangible aspects* of protection come to the fore and *dependence on physical copies* for distribution and use of works diminishes or disappears completely. This is a point, which we shall have cause to return to.

A common starting point in discussions concerning the foundations and purposes of copyright is that *intellectual work is worthy of its hire,* that good protection of works is essential to the encouragement of literary and artistic creativity, and so on. An argument on these lines must be regarded as a simplification and, accordingly, as somewhat misleading. It has to be combined with a discussion of other matters, e.g.:

- Who exactly are the rightholders?

- What interested parties are there in addition to the rightholders?

- Are interests differently balanced in different fields?

It will suffice to note that rightholders (proprietors) belong to *many categories*. Individual persons like authors are only one of these categories. Both big corporations and national authorities are present on the scene, and rights may have originated and been acquired in a variety of ways. *Interested parties* in addition to the rightholders include, for example, libraries and rights-administering organisations. It is a well-known fact that *interests can differ* from one area to another – an academic who is anxious to publish, even at his or her own expense, is in a completely different position from the poet hawking his first collection of poems from one publishing house to another.

Questions of interest, such as those we have now touched on, have to be discussed both in a complicated market perspective and in a global trade perspective, in which copyright is a vital concern of an extensive copyright industry. The small author – the writer, the painter, and the composer – tends to fade into the background.[8] In come the big publishing companies, the radio and television companies, the film companies, the computer software companies, the telecommunications companies and all the rest of them. And national scope for manovre in the matter of special solutions is in many ways heavily circumscribed.

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8 This is remarked on by Eric Hobsbawm in *The Age of Extremes. A History of the World* 1914-1991, New York: Vintage Books 1996. "The young French film critics who, in the 1950s, developed a theory of film as the work of a single creative *auteur*, the director, on the basis, of all things, of a passion for the Hollywood B-movies of the 1930s and 1940s, were absurd because coordinated cooperation and division of labour was and is the essence of those whose business is to fill the evenings on public and private screens, or to produce some other regular succession of works for mental consumption, such as newspapers or magazines. The talents that went into the characteristic forms of twentieth-century creation, which were mainly products for, or by-products of the mass market, were not inferior to those of the classic nineteenth-century bourgeois model, but they could no longer afford the classical artist's role of the loner." (p. 519).

A Look at the Technology

In any description of the technology, the actual *phenomenon of digitalisation* is fundamental. Digitalisation means all kinds of information (texts, images, sound, film) being reproduced numerically, in the form of the two digits, 1 and 0, which make up the basic alphabet of computers. This has far-reaching consequences, summarised by the Canadian scholar Jean Claude Guédon in his "La planète cyber"[9]:

> "In one sweep, texts, images and sound belong hereafter to one and the same big family. Digitised, television, radio, the cinema and computers proceed to form a uniform ensemble."

Secondly, *automation* introduces new elements. First of all, there are *computer programs* as such. These already began to cause a certain amount of copyright concern in the early 1960s. Did they have anything at all to do with copyright? Or should they be protected as industrial products, under the patent system?

Automation also makes a difference in the sense that actions and procedures which, formally, could only result from human deliberations and interference, can now, as it were, be delegated to and performed by computer programs, as for example with the task of compiling a text or selecting image elements and making a new picture out of them.

One important development is connected with *data networks and data communications*. In only a few years, Internet, the global data network of data networks, has developed into a well-known phenomenon, virtually a staple ingredient of everyday life and already a theme of poster campaigns, with telecommunication companies proclaiming special offers to "the man in the street". Those who began developing the precursors of today's Internet in the 1960s were swift to perceive the possibilities of progressing from the computer as *a calculating tool* to the computer as *a medium of human communication and interactivity*. The full extent of that early insight is now becoming clear. And, as has already been intimated, data networks are also of importance as a *distributive medium* requiring no physical copies.

Views of IT vary. One can divide them into views implying *continuity* and those implying *discontinuity*. Continuity means IT being looked on merely as a reinforcement and extension of pre-existing forms of information processing. More, partly different things can be done faster. Discontinuity means that IT is considered radically different, a revolution in the handling of information, comparable to the transition from speech to writing and with the transformation of written culture by the advent of printing. Viewed in these terms, a new form of "*digital writing*" is taking shape, the profounder implications and consequences of which can, as yet, only be guessed at.[10] Digital writing is the gateway to cy-

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[9]   Jean-Claude Guédon, *La planète cyber. Internet et cyberespace*. Gallimard 1996, p. 21 (my translation).

[10]   Such a perspective may be found in, for example, Jay David Bolter, *Writing Space. The Computer, Hypertext, and the History of Writing*. Hillsdale: Lawrence Erlbaum Associates

berspace. In *Hem till jorden (Home to the Earth)*[11], Peter Nilsson offers the following speculation:

> "If I had sufficient imagination and knowledge, I could create a picture of the wet, rainy autumn landscape on my computer screen. I could create whatever world I liked, even a brilliant spring day with greenery and birdsong. But I would not be able to enter the computer landscape. It would only be an image, an illusion of colours or greyness on the other side of the glass of the computer screen.
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> The time is soon coming (it is almost here) when the glass will disappear and we will be able to enter the landscape of images. The boundary between fact and fiction will be broken down. When that happens, no one will any longer comprehend the miraculous side of the legend of the painter Wang-Fô, who stepped into his picture and walked off out of the sensory world."

Continuity and discontinuity are also encountered in views concerning the relation of copyright to IT. The basic question is whether we have cause to distinguish between "then" and "now", copyright, respectively, before and after the digital revolution. Has there in fact been any digital revolution where copyright is concerned? The debate on copyright and computers is of course an old one, going back several decades. Has not copyright by now been developed and adapted so that it can also cope with the situations occurring when texts, voices, music, graphics and video are handled on the Internet? The two standard answers to this question run as follows.

One answer:

There is nothing new under the sun. Besides, copyright is flexible and, time and again, has shown itself capable of accommodating both new kinds of art and new forms of distribution. Thus it is wrong or misleading to speak of then and now, and above all it is wrong to speak of a digital revolution.

And the other answer:

The Internet, and above all the World Wide Web – the web, as it is commonly called – have created a lawless space, a space in which all known legal concepts are turned upside down and where the legal meltdown has already happened. Everything, copyright law included, will have to be re-thought, reconstructed for cyberspace.[12]

Each of these answers contains *a half-truth*. The span between them is where the discussion ought to be conducted. That discussion will be a matter of shades of meaning, of closer definitions, of efforts to achieve deeper understanding. This

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1991.

[11] Peter Nilsson, *Hem till jorden*. Stockholm: Norstedts 1994, pp. 202-203 (my translation).

[12] This point of view is vividly present in Michael Wolff, *op.cit.* in note 6. According to Wolff, we are dealing with a technology where "all bets are off". The Internet is "a speeded up version of culture itself, a series of fads and trends mixing with social and historical and economic forces and technological advances and roiled by constant upheaval and sudden reversals." p. 360.

applies both to the discussion of IT in general and to the discussion of the relation of copyright to IT.

The Edifice of Knowledge, Past and Present

Memory is *personal* and memory is *collective.* Personal memory is a part of each individual's intellectual capacity. Personal memory interacts with the collective memory by collecting material from it, contributing to its growth, its arrangement etc. The boundaries between personal and collective memory are neither hard and fast nor unambiguous. In the typical instance, personal memory is associated with the human brain and collective memory with libraries, archives and suchlike physical stores of recorded information.[13]

The role of memory, and above all of personal memory, can be variously interpreted. It can be viewed as a *parking space* or as a *garden* – that is, as something inert and passively receptive or as something alive and actively productive. There is a clear difference between the present view of the importance of memory for intellectual activity and the view which prevailed in earlier times when culture was still dominated by strong oral elements. In the introduction to The Book of Memory, Mary Carruthers sums this up as follows:[14]

> "When we think of our highest creative power, we think invariably of the imagination. 'Great imagination, profound intuition,' we say: this is our highest accolade for intellectual achievement, even in the sciences… Ancient and medieval people reserved *their* awe for memory. Their greatest geniuses they describe as people of superior memories, they boast unashamedly of their prowess in that faculty, and they regard it as a mark of superior moral character as well as intellect."

The value of the well-developed memory and the highly cultivated art of memory was associated not only with simple remembering but – still more so – with analysis, logic, rhetoric, meditation and even ethics. External media – wax tablets, papyrus, parchment – were regarded as being closely allied with human memory and in a manner of speaking equated with or even subordinate to it. And a great deal of the oral approach – the habit of reading aloud, for example – lingered on as writings gradually became more common.[15]

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[13] For a deep-going discussion of these issues *see* Eviatar Zerubavel, *Social Mindscapes. An Invitation to Cognitive Sociology*. Cambridge: Harvard University Press 1997 (in particular Chapter 6 on Social Memories). *See also* Susan Engel, *Context is Everything: The Nature of Memory*. New York: D.H. Freeman 1999.

[14] Mary Carruthers, *The Book of Memory. A Study of Memory in Medieval Culture*. Cambridge: Cambridge University Press 1990, p. 1. The meagre description of *ars memoriæ* in my article does not do justice to the subject. It is abundantly expounded by Carruthers, who among other things gives a close description of the mnemotechnical stratagems that have survived into our own time – *see* for example Carol Turkington, *12 Steps to a Better Memory*. New York: Macmillan 1996.

[15] Alberto Manguel, *A History of Reading*. London: Flamingo 1996, p. 41 *et seq*.

To memorise was to write on the wax tablet of memory. Things put down in writing tended to be regarded as secondary in relation to conversation and the direct interchange of thoughts. They were often designed to support memorisation as much as to give outward expression to certain information. Memorisation meant assimilating the matter, internalising it, making it one's own, freely usable as part of one's own treasury of knowledge. Expressions like "devouring books" and learning something "by heart" can be viewed as linguistic reflections of this attitude.

This view of writings as a prop for a predominantly oral environment also meant that no harm was seen in texts being commented on and even amended by their readers. On the contrary, this was a sign of a text being taken seriously, being made a topic of conversation and being counted among the authorities.[16]

This attitude has been gradually transformed by the development of the written medium and, not least, of course, by the advent of printing. Very briefly, printing, from the 15th century onwards, has industrialised the processing of text and image at an accelerating rate, has made possible mass markets and has gradually established increasingly powerful economic interests in the production and dissemination of text and image products. In modern times this tendency is underpinned by media for mass communication, radio and television, and by the film industry.

Modern copyright is closely connected with this process and has its foundations in a world where a market for knowledge and entertainment products begins to take shape, in which it is eventually taken for granted that the original work must bring its author – and all the middlemen – an economic reward. At the same time the potentiality already existing in primitive written civilisation is brought to fruition: the boundary between the knowledge objectivised through recording in different external media (the collective memory, one might call it) and one's own, personal knowledge becomes more distinct. We may compare this with an exclusively oral culture, in which, for example, the collective notion of the creation of the world and of one's own tribal history is kept alive through annual ceremonies of dancing and recital in which all individuals take part.

Summarising *the modern view of knowledge* and of rights to "knowledge products" is a rather dizzying enterprise, but as a comparison with earlier times and for the sake of sharpening the arguments it is worth trying:

- The treasury of memory is located outside rather than within each individual. It is fixed in different media, both purely written ones and others (film archives, for example), it is of encyclopaedic abundance and cannot possibly be accommodated in the human brain. The human intellect is distinguished, not by its capacity for memorisation but by its capacity for analysis, inference, insight and holistic perspective.

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[16] Carruthers quotes the example of Anselm, an 11th century Archbishop of Canterbury, finding it quite natural for an unknown reader to have appended criticism to his "Proslogion". He added remarks of his own and had subsequent versions of the text written out in this expanded form (*op. cit.*, pp. 211-213). An author regarded himself as one of many *co-users* of the text published. The latter was regarded more as a stage in an ongoing conversation than as something cut and dried belonging to the author.

- The visible contributions to the edifice of knowledge are those taking the form of independent, freestanding additions to the "external memory", to accumulated, encyclopaedic knowledge. This attitude is epitomised by the maxim "publish or perish", which is taken to be the golden rule of academic living.

- When using knowledge taken from the external memory in the form of writings etc., copyright in the works used has to be respected. Copyright means and indicates that the contributions are referable to a certain person or organisation, not to an anonymous, communal mass of knowledge, and also that use is not free.

- Copyright applies, not to ideas, facts, methods and suchlike but to the outward form in which these ideas, facts etc. have been expressed (cf. above). But the boundary between protected and unprotected is anything but self-evident or free from problems. Among other things, this is reflected by the special, copyright-related protection applying to databases, a protection that can refer to the collection of data as such, so long as the collection and arrangement of the data have required a substantial investment.[17] It can also happen that the way to freely disposable knowledge presupposes actions and utilisation of copies of legally protected works which in themselves amount to infringement of copyright (cf. the screening of a film, the running of a computer program, and the copying of tables).

- As *a basic principle*, copyright makes no distinction between different fields, and so the basic rules are the same for entertainment and amusement products and for purely knowledge-related products. Thus a scientific thesis is protected by essentially the same rules as a novel. The differences are expressed above all in the extent of the protection and in the effects of different rules concerning restrictions on copyright. Efforts to develop definitions whereby copyright would focus primarily or exclusively on "aesthetic" elements or suchlike have not been successful. Nor did fears of computer programs constituting technical matter foreign to copyright prevent them from coming under its protection.

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[17] The European Union Database directive (96/9/EC) states in Article 7, paragraph 1 that Member States shall provide for a right for the maker of a database which shows that there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents to prevent extraction and/or re-utilization of the whole or of a substantial part, evaluated qualitatively and/or quantitatively, of the contents of that database.

Knowledge in Cyberspace

So far we have taken only a few, tentative steps into the world where, in Peter Nilsson's words, the glass vanishes and we can walk into the landscape of the images and where the boundary between fact and fiction will be demolished. That accelerating force comes from the Internet, and above all from the web (World Wide Web), i.e. the technology which is based on hyperlinks between texts etc. and which is in the process of transforming people's everyday lives as well. To convince oneself of this, one need only take a look, for example, at electronic commerce, which is steadily expanding and before long will lead to restructuring of both patterns of consumption and forms of enterprise.[18] In cultural contexts, research contexts and educational contexts, this development can in certain respects be traced a long way back in time, while in others it is closely bound up with the Internet and the web. Thus libraries were among the early users of ADP (automatic data processing), initially by brokering searches of databases and building up electronic cataloguing systems etc. But it is only in recent years that IT has begun to have profound effects on the view taken of library activities, the competence of library personnel, the allocation of financial resources, interaction with "borrowers" and so on. The concept of the "virtual library" is about to migrate from speculation to reality, i.e. an activity defined, not by its physical location and its own physical store of information objects but by its services and its capacity for communicating information over the data network. This activity is acquiring a different relation to publishers and magazine editors from that of the traditional library. Of course, movements and transformations are also in progress in the publishing sector. And the notion of "e-learning" is beginning to be looked upon as a promising branch of electronic commerce.[19]

A good illustration of the dynamics of the present situation is provided by discussions at a symposium on "Art and Technology" convened by the Royal Swedish Academy of Engineering Sciences in 1997, the concluding session of which was concerned with the future of the book. The basic question came to be: Why should we discuss the future of *the book*? Would it not be more interesting to discuss *the future of verbal art* in the world of digital writing? A discussion focusing on the book tends to be about the institutions, which have grown up round the book as a physical object – publishing houses, libraries, bookshops. All of these are today looking for new roles: the publishers are discussing their task as handlers of "complex messages", the libraries are considering the change in their responsibilities entailed by transformation from keepers of printed materials to managers of virtual knowledge, the bookshops are having to pick up the gauntlet thrown down by the electronic vendors on the Internet, where at the

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[18] A broad perspective on these changes can be found in Jeremy Rifkin, *The Age of Access. How the Shift from Ownership to Access is Transforming Capitalism*. London: Penguin Books 2000.

[19] University libraries, among others, rapidly establish themselves as web service providers. *See for example* the Stockholm University Library at "http://katalog.sub.su.se/". For a general overview of the new electronic text and image landscape, *see* Johan Svedjedal, *The Literary Web*. Stockholm: Kungliga Biblioteket 2000.

click of a mouse customers can move from one service to another, with millions of titles to choose from. Cyberspace is a world of superabundance. At the symposium, a publishing representative responded to this theme by remarking that one increasingly important task for "book publishers" was coming to be that of "reading books that no one else wants to read" so as to weed them out and give the readable books a chance. Quality monitoring, then, was by implication the basic task remaining. Anyone who has surfed on the Internet knows what this is all about. But why should this be the task of book publishers? Pleading tradition will not get us very far: tradition carries little weight compared with the new pattern of opportunities opened up by digital writing and global data networks, e.g. quality filters automatically generated by readers' comments and reactions.[20]

Cyberspace moves the limits to the amount of information that can be handled by organisations and individuals, and it moves them both *upwards* and *downwards*. The upper limit is no longer determined by the amount of shelving and the physical shifting and carriage of objects. Rather it is determined by the possibilities of organising and selecting information so efficiently that the content of the practically unlimited electronic storage spaces will no longer be tantamount to complete information chaos. The lower limit concerns the atoms of information worth organising and making accessible. The traditional library had its lower level – the individual book, the individual magazine article. In the digital environment it is perfectly feasible to work at lower levels as well – the footnote, the tabular column, the individual word or combination of words or, should it be of interest, even the individual character (cf. linguistic research).[21]

What all this points to is that the creation and use of knowledge in cyberspace implies vital changes, concerning the implications and range of which we have, as yet, only the foggiest of notions.

One possible, even probable change is that the view taken of knowledge production in the ancient world and in medieval times may be on its way back. Not in its original form, of course, but with regard to attitudes and working methods.

Three things can be noted:

- The development of a symbiotic relationship between man and machine.

- The development of active uses of material on the web.

- The development of a reinforced conversational culture.

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[20] For a current and living illustration, *see* activities on the Internet concerning a modern e-journal of the Linköping University, viz. Electronic Transactions on Artificial Intelligence – "http://www.ida.liu.se/ext/etai". *See also* Svedjedal *op. cit.* in note 15. Among other things, Svedjedal engages himself in a detailed analysis of "clusters of functions" performed in the traditional "book trade" as compared with the digital "book trade", pp. 131-132, 173.

[21] This view is expounded in Peter Seipel, *Law Libraries and Information Technology*. In: Juridisk Tidskrift vid Stockholms universitet, 5 (1993-94) 2, pp. 312 ff.

The first of these items is connected with the possibilities of *constructing well-ordered memory stores with the aid of technology*. In these electronic stores, the boundaries between the internal and external, between the local and the global, are fluid. With present day technology, for example, the individual researcher can build on and reinforce the memory store of the brain with a store consisting of IT-assisted components like (1) material stored in his own computer (texts, video clips, sound recordings etc.), (2) collections of links and filters providing access to material on data networks as the need arises, (3) "intelligent" agents tasked with watching out for and tracking down certain information from networks, (4) interest markings and profiles whereby others transfer certain information or provide links to certain information. In earlier times, the situation was essentially the same, but the internal memory store (that located in the brain) – which in the case of individual persons could be extremely impressive in both volume and structure – had (originally of necessity) greater relative importance. Nevertheless, there are impressive early efforts to design cataloguing systems for libraries such as the famous one in Alexandria (intended to encapsulate the totality of human knowledge).[22]

The man-machine interface serves the same purposes as the internal memory alone, namely a well-ordered overview, possibilities of retrieval in the desired order, possibilities of structuring and compiling. Modern IT environment is distinguished by the symbiosis between man and machine for information processing being possible to develop much further than was the case with more primitive aids. In those days, for example, vivid (e.g. violent) pictorial scenes could be inserted in a text on parchment, both as decoration and, above all, as an aid to visual memory in the task of memorising and locating. In the electronic environment, use can be made of corresponding aids – icons are a familiar feature of the IT scene – but there are also plenty of other possibilities in which modern cognition science takes an interest (colours, combinations of sound and text, spatial metaphors etc.).[23]

Thus with the aid of the Internet, each individual can create his or her own treasury of memory. The boundary between the internal memory of the brain and the external memory of the world's data networks is being obliterated and people will find themselves more and more in symbiosis with the surrounding flow of information. In a manner of speaking, therefore, we are reverting to the classical and medieval attitude to the management of knowledge and the edifice of culture. The oral tradition is being revived and on new premises. This was foreseen by the people who drew the master plans for today's Internet in the 1960s. One of them was Dr J.C.R. Licklider, at that time working with Bolt, Beranek and Newman in the USA. In 1965 Licklider criticised what he found to be an artificial distinction between man and machine. He argued that the traditional view of things, associating certain functions with man and certain functions with the machine, was particularly unsatisfactory. In order for the basic functions

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[22] Alberto Manguel, *op. cit.*, pp. 187-199.

[23] Cf. Marti A. Hearst. *Interfaces for Searching the Web*. In: Scientific American, vol. 276 (1997), no. 3, pp. 60 ff. *See also* Alberto Manguel, *op. cit.* pp. 55-65 about memorising and books in ancient times.

connected with knowledge processing to be performed efficiently, he maintained, there had to be a synergy, with man and machine participating together, without any hard and fast boundaries between them.[24] In that perspective, it makes no difference whether I have memorised, say, a poem or a description of the results of a chemical experiment in my human brain or in one of my machine brains, e.g. on the hard disk of my computer.

Peter Gärdenfors, addressing this phenomenon in a discussion of "the ant hill of language", observes: "There are many cases where the boundary between sensory organs and the outside world becomes blurred. The submarine commander sees with the periscope, not with his eye. The blind sense with a stick, not with their hand. In the same way, we think with our road signs, calendars and pocket calculators. It is impossible to draw any absolute line of distinction between the thinking which goes on in the head and that which goes on out there. Consciousness leaks out into the world."[25]

In the same vein, Andy Clark explicates: "Every thought is had by a brain. But the *flow* of thoughts and the adaptive success of reason are now seen to depend on repeated and crucial interactions with external resources. The role of such interactions, in the cases I have highlighted, is clearly computational and informational: it is to transform inputs, to simplify search, to aid recognition, to prompt associative recall, to offload memory, and so on. In a sense, then, human reasons are truly *distributed* cognitive engines: we call on external resources to perform specific computational tasks, much as a networked computer may call on other networked computers to perform specific jobs."[26]

The second fact to be noted concerns *the use of material taken from the web.* It is natural – and digital technology facilitates this – that use should not be confined to passively receiving. On the contrary, the simplicity of copying, remarking, converting, compiling, linking, associating etc. makes it natural to activate use in a variety of ways. The edifice of knowledge can become supremely interactive and collective. Examples are beginning to appear in certain electronic magazines with regular routines for receiving and using readers' comments and for keeping material alive through revised versions.[27] New ways of using other

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24 J.C.R. Licklider, *Libraries of the Future*. Cambridge: The MIT Press 1965, p. 91. Other proposals in a similar vein were put forward by Vannevar Bush in his often cited article in the Atlantic Monthly in 1945 (the "Memex" machine) and by Ted Nelson who coined the term "hypertext" in connection with "literary machines" in 1965 and has proposed a scheme for a universal electronic library. *See* Jay David Bolter, *op.cit*. pp. 21-25, 101-104. As for the ideas and realities behind the World Wide Web, *see* Tim Berners-Lee, *Weaving the Web*. New York: Harper San Francisco 1999.

25 Peter Gärdenfors, *Nya rön från språkets myrstack* (New Findings from the Ant Hill of Language). In: Moderna Tider, November 1997, p. 52.

26 Andy Clark, *Being There. Putting Brain, Body and World Together Again*. Cambridge: The MIT Press 1997, pp. 68-69.

27 For a current discussion *see* The Economist, vol. 346 (January 1998), no. 8052, pp. 87-88 (Publishing, perishing, and peer review). Notice, for example, the following: "But even the peer review role is being taken over, at least informally, by the archives. According to Paul Ginsparg, who runs one of the biggest – the physics and mathematics archive at the Los Alamos National Laboratory in New Mexico – scientific authors are meticulous about updating their articles with changes suggested by colleagues, since it is in their interests for the latest

people's work are being developed, as for example when a magazine article is used as a search argument by a computer program for finding similar texts on the web.

The third fact has to do with *the rebirth of conversation*. Many discussion sites on the web are hybrids of classical conferences, with the delegates meeting just once, and ongoing interchanges of opinion. It is in the nature of the new forms of communication and interaction that contributions come to be regarded as fleeting, casual – just like contributions to a conversation which is carried forward by everyone's contributions and which depends on what has been said and what is going to be said. The boundaries between what is public and non-public in the copyright sense become indistinct, as do the boundaries between *meum et tuum*. In this way what is written acquires an element of the oral, a phenomenon which was quickly observed in connection with electronic mail. In addition, the written communication has been joined by verbal communication in the form of more or less sophisticated types of chat and video conferencing. As yet we have neither deep nor firm knowledge of the impact of the data network environment on knowledge production generally and scientific activity in particular. Development is moving at different speeds and with different characteristics in different fields. But there are empirically based indications worth mentioning, for example that personal contacts are stimulated, becoming more numerous and becoming intensified, that interaction in the form of co-authoring of papers is growing more common, that the work cycle is changing and that the dialogue is broadening round "pre-prints" etc.[28]

Summing up, IT has in many ways moved the goal posts of knowledge production and sharing. One can sense, or at all events speculate about, the fruitful combination of earlier traditions and modern ones, of speech and writing, of individual people's contributions and common efforts. If the classical and medieval scientific tradition venerated *ars memoriæ* and the hitherto modern tradition *ars publicationis*, then perhaps we are now entering a combined *ars com-*

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version to be available."

[28] The Internet journal Electronic Transactions on Artificial Intelligence mentioned in note 20 practices a novel, two-stage review procedure where the first review phase is *open* and allows the peer community to ask questions to the author, and to create a discussion about the contribution. The second phase – called *refereeing* – is like conventional journal refereeing except that the major part of the required feedback is supposed to have occurred already in the first, review phase. For general viewpoints *see* John P. Walsh, Todd Bayma, *The Virtual College: Computer-Mediated Communication and Scientific Work*. In: The Information Society, vol. 12 (1996), no. 4, pp. 343 ff. *See also* Philippe Hert, *Social Dynamics of an On-Line Scholarly Debate*. In: The Information Society, vol. 13 (1997), no. 4, pp. 329 ff. Hert maintains that the changed environment makes the interchange of opinion less "scientific", because the scientific "documents" are no longer "immutable": "The mutability of e-mail is linked to the "cutting" and "pasting" of messages from one to another that e-mail readers enable. This practice of "poaching" makes the exchanges more vivid – and less scientific – by allowing new messages to be composed out of someone else's. It is a tactical action that uses the possibilities of the context. This medium is then a resource for negotiating different interpretations of some messages. The interpretation is constructed in the community around the messages under consideration. Although these messages are not properly scientific tests, they are still important to bind the scientific community in the virtual space of the discussion group." (p. 345).

municationis which accommodates everything referred to above and much else besides. The final question concerns the relation of copyright to these possibilities. Does copyright help to make use of them or is it, in its present form, an impediment?

Copyright Spells Money?

Since the 1960s, copyright has been adapted to IT and data networks successively and by means of specific changes. Problems and questions have cropped up, e.g. as to whether computer software could ever enjoy copyright protection and concerning the way in which reproduction on display screens should be viewed in relation to the protection of rights.[29] There have been changes and modifications, then, and "digital copyright" has taken shape step by step and not through any single, sweeping law reform. The changes are still going on. Discussions concerning their implications and consequences have had an unfortunate tendency to dwell on details rather than on fundamentals. This means, for example, that the problems and possibilities are formulated in the categories provided by current copyright provisions, rather than in open-ended terms and with a view to fundamental changes.

Recently, however, it has become more common (and, one can say, more fashionable) to question the reach of copyright in general and in particular in the electronic environment. One explanation for this change is that activities and events on the Internet have made visible the difficulties over enforcing copyright. They have also illuminated the striving of the right owners for far-reaching control (technical as well as legal) of every use of copyright protected materials, even when this means attempts to prevent activities that have previously been regarded as innocent and permitted under "fair use" or "home use" exceptions. The most well known example is the Napster web site, which made it possible for users to share music files fetched from each other's computers and which was successfully legally challenged by the music right owners.[30] Another aspect is that the emerging mega-companies in the information industry become increasingly powerful and control property rights to an extent that puts the very foundations of the copyright system into question. An example of the kind of harsh criticism that is now occurring can usefully be cited:

"The once approved-of concept of copyright has developed into a system under which a few industries control intellectual and creative properties that belong in the realm of public interest. Abuses happen and are easily identified, but the problems are wider and more subtle… The consequences of such monopoly are frightening. Groups dominating the cultural industry disseminate only the artistic works and entertainments to which they hold copyright. They invest in and promote heavily only a few star items, and earn income from the spin-offs. Because of high risk levels and return-on-investment requirements, worldwide

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[29] Development of this legislation began relatively late in Sweden. *See* SOU 1985:51, *Upphovsrätt och datorteknik.*

[30] Ken C. Pohlman, *Music Wars.* In: Scientific American, Vol. 283 (2000) No. 5, 41.

marketing campaigns are so aggressive that all other artistic creations bypass many people's cultural awareness. This jeopardises the diversity of artistic expression, which is essential to democracy".[31]

Democratic and human rights aspects are also emphasised by Naomi Klein in her critical study of the overly aggressive ownership practices of present-day "consumer capitalism":[32]

> "Artists will always make art by reconfiguring our shared cultural languages and references, but as those shared experiences shift from firsthand to mediated, and the most powerful political forces in our society are as likely to be multinational corporations as politicians, a new set of issues emerges that once again raises serious questions about out-of-date definitions of freedom of expression in a branded culture. In this context, telling video artists that they can't use old car commercials, or musicians that they can't sample or distort lyrics, is like banning the guitar or telling a painter he can't use red. The underlying message is that culture is something that happens to you. You buy it at the Virgin Megastore or Toys 'R' Us and rent it at Blockbuster Video. It is not something in which you participate, or to which you have the right to respond."

Of particular interest for the discussion in this article is the notion of so called Open Source Software (OSS).[33] As the name indicates, the source code (briefly, the version of a program understandable to humans) of such software is open in the sense that it is freely available to any person wishing to develop it – in order to correct it, to improve it, to adapt it, to alter it, and so forth.[34] Thousands of programmers are engaged in ongoing software development projects of this kind, where, of course, the Internet plays an important role. The flagship of the OSS movement is the Linux operating system, but there are also other well-known examples. The advantages of such collective software development are found in speedy improvements and adaptations. Generally speaking, it is very well possible that the communal open source model is more efficient for producing high quality software than the traditional model based on proprietary rights and secret source code. The economics of the model are also of interest in the light of what has been said above about incentives for creative work. Those who participate in the efforts are to a large extent driven by non-economic motives, not least to gain the respect of their co-workers and peers. Moreover, the busi-

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[31] Joost Smiers, *The Business of Intellectual Property. Copyright is Wrong*. In: Le Monde diplomatique, 13 September 2001. Lawrence Lessig, who is also a critic of the copyright system in its present shape, emphasises that the technical design (the architecture) of information systems displaces the balance in copyright law, e.g. with regard to the fair use exception. He also sees dangers in the loss of opportunities to access and use works anonymously. *See op.cit*. pp. 122-141.

[32] Naomi Klein, *No Logo*. London: Flamingo 2001, at p. 178.

[33] For a recent overview, *see* Patrick K. Bobko, *Open-Source Software and the Demise of Copyright*. In: Rutgers Computer & Technology Law Journal, Vol. 27 (2001) No. X, 51.

[34] The code is made available under a "general public licence" which prevents the co-developer from establishing proprietary rights in the software and secures that the source code continues to be freely available. *See op. cit*. at 81 with further references regarding licensing practices.

ness models that have developed around OSS are based not on license fees but on services of various kinds (technical support, for example). To summarise, the OSS experience can be used, and is indeed being used, as a basis for a critical appraisal of the copyright system and the way it is exploited by the information industry.

For the common man (which for present purposes includes, for example, the individual researcher and librarian), the debates over the status and future of the copyright system are not easy to understand and take part in. Such participation (if it is to be serious) requires expert knowledge, copyright having gradually evolved into a complicated and intractable system of rights and exceptions. There are partly different rules for different categories of work, the system of restrictions on copyright protection is a complicated one and the exceptions are themselves subject to exceptions. EC directives have been added to the existing legislation like new patches on a quilt. This, coupled with the fact of legal protection developing in an international environment and being by nature intangible and based on abstract, elusive basic concepts like "work" and "derivative works" (cf. above), makes the protection of rights hard to comprehend, as regards both the application of the law to concrete situations and its overall effects.

Regardless of difficulties of various kinds, it can hardly be doubted that it is essential to pay attention to the basic relations between copyright and the creation and shaping of knowledge in the digital environment and to engage in a critical discussion of the copyright system as such. There are, however, many impediments and resistances. These can be divided into at least three groups.

Firstly, it is by no means clear how the digital environment can best support knowledge production and the advancement of knowledge or what liberty it requires, in concrete terms, to engage in different activities.

Secondly, as has already been mentioned, there is a strong and natural tendency for the existing regulatory system to dominate the conduct of the discussion and the definition of the problems. If, for example, it is an established principle that the right of "reproduction" shall be reserved for the author, then attention will be made to focus on the question of what acts shall be deemed "reproduction" in the digital environment.[35]

Thirdly – and most important of all – the *ideology, organisations* and *market* of copyright have to be included in the picture. These represent a combination of powerful forces. Copyright is usually described in general terms as necessary for the encouragement of creative activity and, above all, as a means of securing the profitability of investments in protected products. The levelling of criticism against the copyright system and arguments in favour of restrictions on that protection can then be interpreted as a negative attitude towards culture and the dissemination of culture. Sloppy notional conventions of this kind are not exactly beneficial to a constructive discussion. On the basis of copyright, moreover, there has evolved an organisational structure and constellations of interests which are affected by changes in the base and which often spring to the defence

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[35] For a typical example, *see* Ian J Lloyd, *Information Technology Law*, 3rd ed., London: Butterworths 2000, pp. 430-441.

of their own existence when they feel it to be threatened by suggested changes to the base. These are organisations which administer and exploit rights, and they also include the authors' own interest organisations. These are today sufficiently powerful to act with a great deal of independence, without their self-interest being called into question. Lastly, the market for trading in copyright products is worldwide and in economic terms of immense proportions. Reference is made to a copyright industry, and it is this industry that to a great extent determines the emphasis of international work with regard, among other things, to the adjustment of copyright to IT. The dominant players in the market are in favour of change when it benefits their own positions but hardly when it is prompted by other considerations of a more or less philanthropic nature. Nor are they of an experimental turn of mind.

When digital technology and data networks are discussed in the context of copyright, the emphasis is often, not on cultural development and the edifice of knowledge but on methods and technical solutions aimed at securing the continuance of traditional copyright provisions in a new technical environment. This environment seems menacing, not least through its possibilities of rapidly and easily producing copies of texts, images and sound with no change of quality. Considerable efforts, for example, are being devoted to creating technical systems of rights protection through "digital watermarking", "digital tattooing" and suchlike of works, with a view to establishing proprietary claims, facilitating the discovery of unauthorised use and providing a basis for the computation and enforcement of charges.[36] This can also be a matter of recreating, in the digital environment, the properties of the traditional environment, insofar as these are of importance for the copyright system. The best example concerns the physical copies of works which play such an important role in traditional connections – the book, the video cassette, the recorded tape, and so on. In the essentially "copyless" digital environment, special technical stratagems are becoming necessary in order for fictions about original copies, limited editions etc. to be sustainable. The practical implication, for example, is that when person A looks at a certain image or reads a certain text on his or her display screen, it must not be possible for that image or text to be present simultaneously on person B's screen.[37] In this context it may be noted that the enforcement of copyright to a considerable extent necessitates logging and tracking of the activities of users, i.e. a loss of anonymity. From this point of view, copyright collides not only with general freedom of information interests but also with interests related to the individual's privacy.[38]

Demands for strong protection of rights combined with technical possibilities of guaranteeing such demands can lead us towards a situation where the digital

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[36] For a general account, *see* The Economist, vol. 346 (January 1998), no. 8050, pp. 67-68 (*Thanks to computer technology, bootleggers have never had it so good. Are "digital watermarks" the answer*?).

[37] For a general account, *see* Mark Stefik, *Trusted Systems*. In: Scientific American, vol. 276 (1997), no. 3, pp. 68 ff.

[38] A survey of this and other aspects of anonymous communication on the net, *see* A. Michael Froomkin, *Legal Issues in Anonymity and Pseudonymity*. In: The Information Society, Vol. 15 (1999) No. 2, 113.

environment is dominated by pay systems and limitations rather than by free access and free use. In a *maximum* scheme of this kind, the question may arise of

- emphasising the importance of copyright for "the information market" and its players, including such secondary players as rights administrators,

- protecting, regardless of quality requirements, everything of commercial value and having as a basic presumption that everything is protected,

- working to secure a long protection period,

- generously protecting not only literal elements but also non-literal elements involving the structure and organisation of the work,

- protecting even small fragments and minor parts of works and limiting the possibilities of quotation,

- regarding all kinds of further use as processing operations requiring consent,

- developing and using the technical possibilities of locks and barriers, of rights monitoring, automatic collection and electronic "micro payments" in order to establish a close-meshed system of "gate money",

- limiting the possibilities of free "private" use,

- minimising restrictions in favour of libraries and teaching, for example,

- stressing the economic rather than the moral side of copyright,

- having the same strong protection for all sectors (entertainment, culture, education, research and so on).

A contrary strategy, that of a *minimum* scheme in terms of protection, could mean

- toning down the interests of the "rights industry" and balancing these against other interests for the purpose of promoting freedom of information and access to information,

- protecting above all that which has a demonstrably high quality and having as a basic presumption that work and creativity in a digital environment require re-use and further development,

- above all protecting complete works and allowing generous opportunities of quotation,

- restricting protection mainly to literal elements, i.e. narrowing the scope of protection rather than broadening it,

- making the presumption of impediments to further use conditional on clearly indicated restrictions,

- contemplating short protection periods as a counterbalance to strong protection of rights,

- having an advanced system of collective solutions, rights exchanges, mutual consent and alternative forms of remuneration for authors,

- generously permitting private use unimpeded by rights,

- generously developing the system of restrictions in favour of libraries, teaching etc.,

- toning down the economic side of copyright but consolidating the moral side,

- having different basic rules of conduct for different sectors, and above all reserving the strong protection of rights for sectors where purely commercial conditions can be deemed natural and amply justified.

These two schemes provide points of departure for analysing the present and the desirable relations of copyright to the digital environment. I will not pursue that kind of analysis any further, but the viewpoint which I now wish to return to and further emphasise is that *holistic assessments* are urgently necessary. This applies to every level of copyright protection. On the level which concerns *aims and purposes*, it is concerned with the possibilities of digital writing and *ars communicationis* lending wings to human ability and with ways in which the copyright system as a whole promotes or obstructs desirable development. In this discussion it is essential to bear in mind the thoughts, which earlier sections of this article have tried to illuminate, concerning the changed conditions for knowledge production. Among other things, this means that the purpose of copyright, that of providing economic recompense for proprietors and rights administrators, should be toned down. Given the powerful interests committed to the established order of things, this is more easily said than done. One possible way might be by establishing special arenas in cyberspace, arenas for testing new orders, e.g. an order in which non-economic rewards are based on quotation frequency and where protection of the moral rights of authors is articulated and enlarged at the same time as their economic interests are thrust into the background and are assumed to be provided for by other means (employment contracts, commissions, project funding, services performed, etc.).

At lower levels we need to review the relation of copyright to other legislation which modifies the protection of rights. Examples can be taken from legis-

lation on privacy protection, legislation on public domain documents, and legislation prohibiting and impeding the use of exclusive rights in a manner that inhibits competition and leads to a monopoly of information.

Lastly, the holistic picture is also urgently important where individual legal rules and their interpretation are concerned. This can be instanced with the regulation, added in recent years to the Swedish Copyright Act, prohibiting, even for private use, the "(making of) copies in digital form of compilations in digital form" (Section 12).[39] This, in a word, means that the main rule concerning the right of copying for private use does not apply, for example, when collections of data (texts, images etc.) on the Internet are downloaded and stored on a private hard disk. It should be obvious that a prohibition of this kind – even though subject to exceptions – can strike hard against the construction of the symbiotic man-machine memory we were discussing earlier. The Government Bill introducing the new provision looks for a way out by stating that "non-independent fixations", i.e. fixations which "disappear after a moment or when the computer is turned off", do not constitute a copy (reproduction) and, consequently, do not require consent.[40] Here, to begin with, the question arises as to whether such an interpretation agrees with the EC directive on legal protection of databases that the Swedish legislation is designed to give effect to.[41] To put it mildly, this is not altogether clear. More interesting in terms of principle is the question of whether the interpretation cited is suitable and whether the regulation needs to be developed further.

At present, certain starting points for such discussions may be found in Swedish valid law, e.g. in the regulation of the scope of legitimate usage rights.[42] More importantly, work is now on its way to implement the recent EC directive on copyright in the information society.[43] It is to be hoped that this work is being based on careful and knowledgeable deliberations concerning ways of working in the digital environment. The question is: what ways of working ought to be encouraged and how important are they with a view to IT lending wings to human ability?

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[39] The provision implements a corresponding rule in the EU Database directive (1996/9/EC) requiring Member States to provide for a right to prevent extraction and/or re-utilisation of the whole or of a substantial part of the contents of a database evaluated qualitatively and/or quantitatively (Article 7).

[40] Government bill 1996/97:111, p. 50.

[41] Directive (1996/9/EC) on legal protection of databases.

[42] Section 26 g of the Swedish Copyright Act contains a proviso concerning the right to dispose of a compilation in the manner necessary in order to be able to use the compilation for its intended purpose.

[43] Directive on the harmonisation of certain aspects of copyright and related rights in the Information Society (2001/29/EC). It may be noted that Art. 5 of the Directive permits temporary acts of reproduction, which are transient or incidental [and] an integral and essential part of a technological process and whose sole purpose is to enable (a) a transmission in a network between third parties by an intermediary or (b) a lawful use of a work or other subject-matter to be made, and which have no independent economic significance. But this is, among other things, made subject to the measure not being in conflict with "normal exploitation of the work".

On this point opinions are divided. One cannot even hope for unanimity concerning something which ought to be fundamental, namely that things which were possible and accepted in the traditional, pre-digital environment ought not to be prohibited or restricted in the digital environment. In this respect, the EC directive on copyright in the information society referred to above gives cause for worry. For example, the directive observes in one of its recitals that, in view of their increased economic impact in the context of the new electronic environment, certain exceptions should be reassessed so as to duly reflect the changed circumstances (Recital 44). The traditional library system of distance lending cannot count on exceptions to reproduction rights in the electronic environment since the directive explicitly states that such exceptions should not cover uses made in the context of on-line delivery of protected works or other subject matter (Recital 40). Succinctly put, the recitals indicate a general anxiety with regard to exceptions that may erode the value of proprietary rights. There is less concern for the opposite problem, viz. the erosion of freedom of information caused by overly strong proprietary rights. The spirit of the directive is caught in Recital 22, which states that the objective of proper support for the dissemination of culture must not be achieved by sacrificing strict protection of rights.

Copyright – a Part of *ars communicationis*

The development of IT as an aid to intellectual work, the edifice of knowledge and human communication is above all part of our own immediate present. We cannot distance ourselves from the phenomenon and at the same time we find it hard to comprehend. These difficulties are compounded by the manifold nature of the phenomenon. We are talking, not about IT in any narrow sense but about IT in a complicated process of interaction with institutions and functions in a society. In this paper I have touched on the connections between IT and memory – personal memory and social memory. James G. Miller, who describes memory at societal level, offers a deeper discussion of this in terms of "living systems". According to Miller societal memory is composed of a large number of components which include teaching institutions, cultural organisations, national archives, suppliers of scientific information, libraries, archives, research groups and individual persons (teachers, storytellers, etc.).[44] Information technology makes it possible to transform *the whole of this structure*, to build new structures, which benefit the growth of knowledge, and to *elevate the total intellectual capacity of the human race*. This is urgent enough in a world where the capacity of Homo Sapiens to do harm to the world appears to have outdistanced his ability to think about the future of the world. Thus, the philosopher Hans Jonas argues that knowledge has acquired a new role through man's unfortunate capacity for creating threats to the whole of nature and to the continuing existence of his own species. As he himself puts it:[45]

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[44] James G. Miller, *Living Systems*, New York…: MacGraw-Hill 1978, pp. 639-642, 796-799.

[45] Hans Jonas. *Ansvarets princip. Utkast till en etik för den teknologiska civilisationen*. Stockholm: Daidalos 1991, p. 33 (my translation).

"In such circumstances, *knowing* becomes a very urgent duty beyond everything ever previously harnessed for its role, and the extent of knowing must correspond to the causal dimensions of our actions. But the fact of the former not really being able to measure up to the latter, i.e. predictive knowledge not corresponding to the technical knowledge that lends power to our actions, is itself ethically significant. The gap between the strength of foresight and the power of action creates a new ethical problem."

To succeed in the difficult task of elevating total capacity for "strength of foresight", an advanced *ars communicationis* is needed. This also includes framing the rules of copyright in proper harmony with the overall endeavour, a task on which I have attempted to shed some light and which I humbly hope the reader will find cause to commit to memory.