

Digital Codicology and Contextual Editing of Medieval Manuscripts

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At the turn of the third millennium, important changes affecting all of the substantial areas of human life, i.e. the cultural, social, economic as well as political, took place. These changes are so distinctive and extensive that they entirely transform current human reality and in connection with that strongly influence contemporary human experience. If I am to use a somewhat frivolous *bon mot*, rather than rave with Venezuelan icon Hugo Chávez for Socialism of the 21st century¹, it is better to consider the state in the third millennium with Duke of Liechtenstein Hans-Adam II². One of the first to become aware of it was Alvin Toffler, who wrote about the rise of the so-called information wave³; Don Tapscott saw it in brighter contours when he promoted so-called digital economics, or so-called macro/wikinomics⁴; and I myself have attempted to describe new stimuli which arise from the altered circumstances for manuscript work and manuscript librarianship⁵. Some of these ideas seem to be too distant from the scientific environment; some are hardly acceptable for more traditionally oriented scientists in their organisational and methodological conservatism, so that particularly in the humanities they found more or less no response for a long time. It has only been in the course of the last few years, when the prophetic enthusiasm of the protagonists of the innovations has somewhat worn off and when the continuity of ideas in the discontinuity of discourses has established itself on the one hand and the traditional and static stone institutions have come to terms with the dynamic network environment on the other hand, that the humanities have taken the new ideas and possibilities as well as opportunities into account, especially when the – say – borderless world on the internet has been given

¹ See Heinz Dieterich Stefan, *Bolivarian Republic of Venezuela: The World Revolution advances through Hugo Chávez*. in *Axis of Logic: Finding Clarity in the 21st Century Mediaplex* [http://www.axisoflogic.com/artman/publish/Article_21736.shtml] [24 April 2011]; cf. *Socialismus 21. století*, in *Wikipedie: Otevřená encyklopedie* [http://cs.wikipedia.org/wiki/Socialismus_21._století%C3%AD#Hugo_Ch.C3.A1vez_a_socialismus_21._stolet.C3.AD] [24 April 2011].

² Hans Adam Liechtenstein, Fürst, II.: *Der Staat im drittem Jahrtausend*, Triesen, 2009.

³ Alvin Toffler, *The Third Wave*, London, 1981.

⁴ Don Tapscott, *Digital Economy: Promise and Peril in the Age of Networked Intelligence*, New York, 1995; Idem, *Wikinomics: How Mass Collaboration Changes Everything*, London, 2010; Idem and Antony D. Williams, *Macrowikinomics: Rebooting Business and the World*, London, 2010.

⁵ Zdeněk Uhlíř, *Teorie a metodologie elektronicko-digitálního zpracování rukopisů a hybridní knihovna*, Prague, 2002.

limits⁶. It has been roughly two years since a number of conferences emerged on the topics of digital codicology, digital palaeography, digital diplomatics, etc.⁷, accompanied by some conference proceedings⁸.

For the disciplines of the humanities, these changes undoubtedly have entirely essential consequences. These are particularly two new facts. The first of them is the discovery, application and establishment of information-communication technologies, so-called computers, with the main issues not being technical but mental, intellectual and cultural, because if we consider the lower level, the activity of a computer is incomparably faster and more precise than natural human mental acts. In practice, it means that some routine operations are better entrusted to computers, simply because they attain better performance and results; and on the other hand, this leaves more time for the person to evaluate the component results and to prepare the further progress more elaborately in terms of methodology. Also the memory of a computer has a greater capacity than the long-term memory of a person – and it has yet another advantage: in comparison with the human mind, it is external like any other written (epigraphic, palaeographic, typographic) record or audio or video, but it is also internal with respect to the entity of a computer, so it is much more coherent both with the acts of the computer and the acts of the human mind than external memory in the traditional, i.e. non-computer world and conception. The earlier dichotomy of external memory and the acts of the human mind is being superseded by the trichotomy of external memory, the acts of computers and the acts of the human mind; this situation is significantly more complicated, but it allows a person to do away with the resolution of routine tasks on the one hand and on the other to structure more deeply the individual activities, thus providing a greater perspective for the distribution of team work. On a higher level, thus if computers are connected in a network with individual nodes, the utilisation of information-communication technologies entails both a reduction of the dependence on time all the way to nearly zero, because the network functions and the network services are provided twenty-four hours a day, seven days a week regardless of where the user is and where the source data are, and much greater segmentation of the activities and fragmentation of the tasks spatially and temporally and between individual persons, so it is better to delegate the tasks assigned so far *lege artis* to one person (e.g. manuscript cataloguing, text editing) to more people on the basis of qualification and ability keys or simply according to the different levels of

⁶ Jack Goldsmith, and Tim Wu, *Who Controls the Internet: Illusions of a Borderless World*, [Oxford], 2006.

⁷ See for instance the conference *The Digital Middle Ages: Teaching and Research* in New York, 16-17 June 2010 [<http://margot.uwaterloo.ca/DMAConference/index.html>] [24 April 2011]; *7th International Conference of the European Society for Textual Scholarship* in Pisa on 25-27 November 2010 [<http://www.textualscholarship.eu/conference-2010.html>] [24 April 2011]; *Digital Edition und Forschungsbibliothek* in Mainz on 13-14 January 2011 [http://www.medienkonvergenz.uni-mainz.de/veranstaltungen/tagungen/digitale_editionen/] [24 April 2011] and many others.

⁸ See e.g. *Kodikologie und Paläographie im digitalen Zeitalter / Codicology and Palaeography in the Digital Age* (ed. by Malte Rehbein, Patrick Sahle, Torsten Schaßan), Norderstedt, 2009.

experience gained. Whereas the second half of the nineteenth century for the humanities meant the rise of professionalisation and the specialisation associated with it, the turn of the twenty-first century has meant for them pressure on the accession of paths – say – to industrialisation. Some could see it as fulfilment, others as dehumanisation⁹, but to express myself to it would go beyond my considerations here.

The second fact arising from the fundamental changes of recent times is the trend heading towards the formation of information and knowledge society, or in an ideally more optimistic form towards the state as an enterprise of services. In connection with that, various, often contradictory streams have appeared, but all are related to contemporary society represented as the social state or the welfare state. On the one hand, there is an effort for truly thorough privatisation and the limitation of the state only to the performance of the functions of power and order and for the deprivation of sovereignty, which it acquired in the course of modernity, hence an attempt to place the state in its pre-modern role, but on the other hand there is the opposite effort to make everything public, by publishing almost everything, which of course encounters more or less brutal financial limits, so quite vigorous changes and reforms must be assumed also in this extreme, although many here profess the slogan ‘after us, the deluge’, because – in Keynes’ terms – we are all in the long-term perspective dead¹⁰. When one extreme speaks of productivity, the other must speak at least of efficiency, and both must speak of the deepening division of labour, which reacts to the heterogeneous needs and inhomogeneous consumption to which society has come. It arises from this that pressure is increasing for the humanities to undergo a division of labour in the sense that it will suit the much more diverse needs of reception than some are capable of imagining and others to admit. Although the gathering of component results is, like it has been so far, based on thorough specialisation and it will continue to be so in future, the pressure increases for further elaboration in the interdisciplinary and transdisciplinary directions (which already is a problem for many) and for utilisation with an eye to extra-scientific purposes (for the majority of humanities scholars it is most likely dangerous blasphemy). In sum, it means that – no matter how we evaluate it, moreover it far surpasses the topic of this article – specialisation stops being socially and culturally appreciated as it was in the classical period of Ortega y Gasset’s ‘rebellion of the masses’¹¹, and that the majority of people simply and undoubtedly want humanities researchers to present the results of their work for discussion and strongly dislike being told particularly by historians which content their historical awareness should have. If freedom is so much discussed, albeit many times quite dubiously and often very inaptly, then the expression of freedom is to be foolish and uneducated, it allows a person to understand their efforts for independence and autonomy.

⁹ Cf. Jiří Cejpek, *Informace, komunikace a myřlení: Úvod do informační vědy* [Information, Communication and Thought: An Introduction to Information Science], 2nd edition, Prague, 2005 (first edition, 1998).

¹⁰ See John Maynard Keynes, *The General Theory of Employment, Interest and Money*, New York, 1964 (first edition, 1936).

¹¹ See José Ortega y Gasset, *La rebelión de las masas: El tema de nuestro tiempo*, Madrid, 2010.

The first response to these dynamic, turbulent and extensive changes is the building of a scientific infrastructure in the humanities and the discovery of the so-called *digital humanities*¹², digital history¹³ or digital philology¹⁴ and on a lower level digital codicology¹⁵, digital palaeography¹⁶, digital diplomatics¹⁷ etc. etc. This diverse-activity area demanding in terms of time, personnel, finances and materials is often neglected, because it is not science in the narrow sense, as which only the so-called basic research is usually considered. Generally, this is however a fundamental error, because this area undoubtedly involves science in the wider definition, hence with a view of the intellectual prerequisites of so-called basic research. If we consider it in terms of organisational bureaucracy, which is not only typical but also completely impossible to leave aside for the form of richly structured society in our time, then the building of a scientific infrastructure must be considered as so-called applied research. Yet this distinction, although possible and entirely rational in a certain sense, seems to me as also somewhat rigid, narrow-minded and pedantic. It is necessary to repeat again and be constantly aware that scientific infrastructure and its building are not only a material-technical and organisational prerequisite of normal

¹² Cf. *A Companion to Digital Humanities* (ed. by Susan Schreibman, Ray Siemens, John Unsworth) [<http://www.digitalhumanities.org/companion/>] [24 April 2011]; *Digital Humanities Quarterly* [<http://digitalhumanities.org/dhq/>]; *Digital Medievalist* [<http://www.digitalmedievalist.org/index.html>]; *Culturomics* [<http://www.culturomics.org/>]. In a somewhat neo-Orthodox context, see Filip Horáček, *Google, digital humanities a technologie budoucnosti* [<http://www.inflow.cz/google-digital-humanities-technologie-budoucnosti>] [24 April 2011].

¹³ See Z. Uhlř, *Digital History: Problem of Creation of Resources*, in *Library and Information Services in Astronomy. IV. 2-5 July, Prague, Czech Republic* (ed. by B. Forbín, E. Brusin, M. Wolf), Washington, DC, 2003, p. 127-135 [<http://www.eso.org/gen-fac/libraries/lisa4/uhlir.pdf>] [24 April 2011].

¹⁴ Cf. *Digital Philology* [http://www.arts-humanities.net/digital_philology].

¹⁵ See Z. Uhlř, Adolf Knoll, *Manuscriptorium Digital Library and ENRICH Project: Means for Dealing with Digital Codicology and Palaeography*, in: *Kodikologie und Paläographie im digitalen Zeitalter* cit., p. 65-76; Elena Pierazzo, P. A. Stokes, *Putting the text back into context: a codicological approach to manuscript transcription*, in *Kodikologie und Paläographie im digitalen Zeitalter. 2 / Codicology and Palaeography in the Digital Age. 2* (ed. by Malte Rehbein, Patrick Sahle, Torsten Schaßan), Norderstedt, 2011 [in print].

¹⁶ Cf. *Digital Palaeography: ESF Exploratory Workshop*. Convened by Malte Rehbein. 20-22 July 2011, Würzburg, Germany [<http://www.esf.org/activities/exploratory-workshops/humanities-sch/workshops-detail.html?ew=10865>] [19 April 2011].

¹⁷ See *Digitale Diplomatie: Neu Technologien in der historischen Arbeit mit Urkunden* (ed. by Georg Vogeler), Köln-Vienna, 2009; Georg Vogeler, *Charters Encoding Initiative (TEI): Zur Möglichkeiten der Integration mit Hilfe eines Standards für Urkundendigitalisierung*, in *Alte Archive – neue Technologien* (ed. by Thomas Aigner, Karin Winter), St. Pölten, 2006, p. 181-198; Idem, *Charters Encoding Initiative Overview*, in *Digital Proceedings of the Lawrence J. Schoenberg Symposium on Manuscript Studies in the Digital Age*, Vol. 2: Iss. 1, Article 8 (2010) [<http://repository.upenn.edu/ljsproceedings/vol2/iss1/8>] [19 April 2011]; *Digitale Diplomatie: Die Diplomatie auf dem Weg zur eScience?*, in *Digitale Diplomatie: Die historische Arbeit mit Urkunden in der digitalen Welt – Digital Diplomatics: Historical research with medieval charters in a digital world*, Köln, 2009; Georg Vogeler, *Digital Edition: Beispiel Urkunden*, in *Geschichte „in die Hand genommen“*, Munich, 2005, p. 209-226.

scientific operation but primarily a paradigmatic issue in the strictly epistemological sense. It means that it determines the basic imagination on the individual and socio-cultural level and on its basis actually all of the defined topics of research along with its disciplinary structure and that in the final result it determines what is worthy of scientific interest and what is not. By disregarding the scientific infrastructure and its building, both the scope of considerations with respect to their subject and the human mind with respect to the diversity of its acts become distinctly limited, and consequently thinking lapses into simple matters of fact and becomes uncritical, which is however *contradictio in adiecto*. For digital codicology and its building, a scientific infrastructure represents several qualitatively different levels, among which it is necessary to emphasise at least the following five.

First of all, it is the digitisation of the sources. Digitisation is still frequently understood in the technicist sense as a mere conversion of media, as the transposition of a document or paper into another form, not as a transformation of its internal structure¹⁸. In other words, this level thus considers as the main and essentially only goal of digitisation the creation of digital copies of historical papers or documents and making them accessible (at the beginning of the digitisation efforts exclusively only on solid external carriers like CDs, later dominantly in a network digital environment). While it allows a much easier access to historical sources to a significant degree independently of time and space, it does not allow researchers to utilise digital tools and new methodological approaches or other means of work with information-communication technologies but still refers them again to the traditional work methods and techniques typical for the existing, or today already vanishing printed information and communication environment. Consequently, if digitisation is to have any professional and scientific significance at all, it is necessary to admit that it is not only making images¹⁹. Particularly, it is necessary to accomplish not only the transposition of a manuscript into digital images but also its transformation into the form of a virtual book²⁰. It means that the images-digital copies of a manuscript, hence the data, must be complemented by meta data, i.e. the data on the data, namely at the very least the descriptive metadata, providing an analytical description, hence a specification of the manuscript's content, rather than a detailed description of its physical form and physical state, and structural metadata, describing the ordering of

¹⁸ See Z. Uhlř, *Uživatel artefaktu a uživatel komunikátu ve virtuálním prostředí: kulturní význam technologie*, "Ikaros" [online], 7 (2001) [19 April 2011] [<http://www.ikaros.cz/uzivatel-artefaktu-a-uzivatel-komunikatu-ve-virtualnim-prostredi-kulturni-vyznam-technologie>]; Idem, *Súborný katalóg historických fondov a stredoeurópska spolupráca [A Union Catalogue of the Historical Collections and Central-European Cooperation]*, Bratislava, 2002, [p. 6].

¹⁹ See Idem, *Digitization is Not Only Making Images: Manuscript Studies and Digital Processing of Manuscripts*, "Knygotyra" 51 (2008), p. 148-162 [<http://www.leidykla.vu.lt/fileadmin/Knygotyra/51/148-162.pdf>] [19 April 2011].

²⁰ See Idem, *Příprava dat pro digitalizaci rukopisů, její význam a souvislosti [The Preparation of Data for Manuscript Digitisation, Its Importance and Context]*, "Národní knihovna: Knihovnická revue" 10 (1999), 3, p. 117-129 [<http://digit.nkp.cz/CzechArticles/Pripavadat.html>] [19 April 2011]. Cf. also Idem, *Digitalizace rukopisů mezi ochranou fondů a historickou prací [Manuscript Digitisation between Collection Protection and Historical Work]*, "Národní knihovna: Knihovnická revue" 7 (1997), 6, p. 207-212 [<http://digit.nkp.cz/CzechArticles/Uhlir.html>] [19 April 2011].

the individual images, i.e. coordinating or correlating the physical pages of a manuscript with their images-digital copies, as well as the foliation in the technical sense, lying in the simple ascending order of the natural numbers and the so-called valid foliation, taking into account both the historical structure of the manuscript and the citation rules arising from it. Consequently, a virtual book created in this way allows for both simple orientation, i.e. browsing, and targeted navigation, i.e. searching. And at the same time, although it is represented by advanced modern technologies, it makes it possible for the continuity of ideas to be manifested in the discontinuity of discourses, i.e. for a substantial part of both the common experience and sophisticated research traditions to remain preserved in the different formal expression, because the references to the so-called valid foliation lead to the earlier specialised literature and from there all the way to the beginnings of professional manuscript work in the Late Middle Ages and Early Modern Period. Moreover, it is possible to assign also fulltext data to the digital copies of manuscripts-image data, namely in two different functions: as editions of original historical texts contained in the digitised manuscript records and as specialised texts created newly on the basis of historical texts or their manuscript carriers as various types of interpretation. And since in the case of the editions of original historical texts it is possible within the usual linear text to mark the interface of the pages of the model and thus correlate these texts with the digital images-copies of the source manuscript and since it is also possible in the form of hypertext of the basic linear text to make notes and create a context with other related historical texts and run these hyperlinks at one's pleasure almost to infinity, the digital world offers an inexhaustible number of possibilities and even opportunities, which in the traditional printed environment not only did not exist but were entirely unimaginable. Although the preparation of data for manuscript digitisation is thus not scientific action in the usual sense, it still has almost revolutionary significance for this well-established science.

Second, it is necessary to take into consideration the aggregation of resources²¹. Building the resources in a digital network environment with a view to codicology entails the association of the individual digital copies of manuscripts including the additional information to be able to work with them from the only place of the digital network environment. It would, however, be entirely insufficient if this place were a common domestic website, because it would allow only orientation in the manuscripts made accessible, i.e. browsing, but would not allow targeted navigation among them even within its framework, i.e. searching. On the other hand, it is desirable, even indispensable, for every resource in the network environment making mediaeval and early modern manuscripts accessible to be furnished with a database and information system relating to the end user and allowing, or facilitating, work for him/her as well as with an administrative system allowing and conditioning

²¹ See Idem and A. Knoll, *Manuscriptorium Digital Library and ENRICH Project: Means for Dealing with Digital Codicology and Palaeography*, in *Kodikologie und Paläographie im digitalen Zeitalter* cit., p. 65-76; Z. Uhlř, *Unitatea polimorfă a culturii Europei Centrale: proiectele ENRICH și REDISCOVER*, "Revista Română de biblioteconomie și știința informării" 6 (2010), 2, p. 53-64.

its sophisticated internal organisation. Such a resource then is not a mere digital replica of a physical library with its depository, catalogue, loan and basic information services but much rather a kind of elementary heuristic tool assuming not only the functions of unqualified as well as qualified service personnel but also replacing some basic, routine research activities. It is thus evident that the building of the individual resources making mediaeval and early modern manuscripts accessible already in itself in the indicated sense significantly surpasses the opportunities that were offered by the traditional scientific infrastructure until just recently, that hence already now the progress is substantial, in spite of the fact that the established scientific circles are usually not able – or willing – to see it. The aggregation of the resources, i.e. their association, further multiplies or even exponentiates their infrastructural significance. While it is possible in the simple form of a plain portal, which makes a uniform user interface accessible to the end user, under this interface the aggregated resources are accessed separately. The disadvantage of this method is not so much its relative slowness, although also that may play a role in the user's evaluation, but predominantly the inconsistency of the searching, because the heterogeneity of the original meta/data is preserved in that their different information depth remains unconverted, and consequently unchanged, but also in that they maintain their original format, which is usually in various such resources different and is not converted into a uniform structure. In this way, it often occurs that they 'mix apples and pears' and the results of searching do not always have to be homogenous and sometimes they are not even comparably reliable. For this reason, it is better, although it is materially, technically and financially more demanding, to aggregate the resources in such a way that their descriptive metadata, i.e. catalogue entries, are aggregated and are converted to a uniform format, whereas the data, the digital images and alternately fulltexts remain distributed in the original resources on the servers of individual partners of the aggregate resource. The advantage of this centralised-distributed conception of an aggregate resource is on the one hand the significantly faster as well as completely consistent searching, providing considerably greater comparability and reliability, which is only minimally disturbed by the different information depth of the descriptive metadata, i.e. of the catalogue entries from the original resources. In this way, the joint search finds manuscripts which had never until now been found in it. To attain the same result with traditional heuristic methods is infinitely more exhausting and slower and in a number of cases is not possible at all. The aggregation of resources is thus a substantial contribution of digital codicology to the development of the field, because it allows not only work with the individual phenomenon, which so far has been done by generations of manuscript employees of all types, but also work with a mass phenomenon and true development of quantitative codicology, which has until now not been possible or at the very least has been extremely difficult.

Third, it is a level entailing an integration of services²². Service in this sense is a new concept in relation to the codicological research not appearing in its full

²² Idem, *Evropský projekt ENRICH a jeho význam pro vybudování virtuálního badatelského prostředí*, "Knihovna: Knihovnická revue" 21 (2010), p. 5-14.

extent until in the digital network environment. In essence, it is what is called strategic services in the other cultural, social and economic sectors²³. They are hence neither the personal services which have traditionally been offered to end users by libraries and other memory institutions since time immemorial nor the type of services which has been replacing routine research work in the digital environment and is a component of the previous digitisation and aggregation levels. This type of services is in contrast much more sophisticated, because it already affects some elements of actual research work in that it makes it possible to perform various comparisons of the sources or their conversion to a more usable form, but it is necessary to point out that this level presupposes the transformation of the original physical analogue sources into the form of digital data, whether turnover or full/text or sound or multimodal/multimedia. In short, manuscripts are at this level usable solely in the form of digital image copies and their further processing exclusively in the form of electronic fulltexts, and so on, etc. It means that whatever exists only in traditional printed or written and other, simply analogue form does not exist for this way of utilisation and elaboration, because it is not machine-readable and consequently it is essentially ungraspable. It is in retrospect completely clear from this how colossal an importance the digitisation of the written and cultural as well as the scientific heritage has, because without it irreplaceable losses occur. If then some more conservatively oriented researchers claim that digitisation has no significance for scientific codicological research²⁴, they are deeply mistaken and the implementation of this negative stance of theirs would have far-reaching consequences for the future position of codicology and all of the more closely as well as more distantly related disciplines already in the very near future. Nevertheless, the point is not only that the position of codicology among the other disciplines would become more inferior, but that without integration of the services it would also lose the stimulus for its development to a significant extent, because it is clear that the digitisation and aggregation of resources move the focus of codicology (like with bibliography) from the current dominant emphasis on outward features and formal attributes to inner features and content attributes. This removes codicology's tendency to become an independent, more or less isolated, discipline and integrates it much more tightly in the entire cluster of historical and philological fields as a kind

²³ Jo Bryson, *Managing Information Services: A Transformational Approach*. Aldershot, 2006; Larry Nash White, *Library Performance and Service Competition: Developing Strategic Responses*. Oxford 2008; Terry Kendrick, *Developing Strategic Marketing Plans that Really Work: A Toolkit for Public Libraries*, London, 2006; *Breaking through the Walls: The Strategy of the National Library of Scotland*, Edinburgh, 2003; Karen Donoghue, *Built for Use: Driving Profitability through the User Experience* [electronic resource], New York, c. 2002; Sue Roberts and Jennifer Rowley, *Managing Information Services*, London, 2004; Joseph R. Matthews, *The Evaluation and Measurement of Library Services*, Westport, 2007.

²⁴ Cf. Michele C. Ferrari, *Impuls und Bestätigung. Alte und neue Erfahrungen mit Handschriftenkatalogen, in Katalogisierung mittelalterlicher Handschriften in internationaler Perspektive*. Vorträge der Handschriftenbearbeitertagung vom 24. bis zum 27. Oktober 2005 in München. Herausgegeben von der Bayerischen Staatsbibliothek. (Beiträge zum Buch- und Bibliothekswesen 53) (ed. by Claudia Fabian and Bettina Wagner), Wiesbaden, 2007, p. 15-36.

of method of general cultural-historical work. It is best to provide these services through relatively independent tools but at the same time through suitable application interfaces integrated into large digital libraries making mediaeval and early modern manuscripts accessible. This ensures both the possibility to upload the results into the resource with which the tool is integrated and on the other hand the possibility to download them and provide them to another resource or make them a component of some outcome of electronic publication. Such tools have already begun to be developed successfully and effectively, and it is the question of a few years before they are used in practice. They include particularly a text comparer, allowing the determination of the relative nearness of individual texts within a groups of texts, an image/page comparer, allowing a distinction between individual types of the formal appearance of the pages (image – text – notation – bordure – table – diagram) or the determination of relative similarity of individual images/pages within a group of images/pages, or a tool for automatic handwritten text recognition (HTR) and its correction²⁵. It is likely that these and possibly other tools will be a large stimulus for the development of digital codicology.

Fourth, there is the level of the personalisation of the environment²⁶. This does not mean having the possibility to create one's own account in the formal sense only within the individual resources, i.e. the existence of an access password, on the basis of which the end user is recognised. It much rather means that each end user of this or that resource has his/her own digital space, which s/he can use independently. Having a personal account, i.e. a personal space, available entails first of all the possibility to accumulate the results of previous work and hence also to have one's own tools for acquiring results as well as for their further processing and subsequent utilisation in the digital network environment there. It arises from this that such a personal environment cannot exist offline on the personal computer of the respective end user but that it must be placed online on the server at one of the nodes of the digital network environment. This can be imagined in two ways: either as an account at some institution dealing with codicological research but not having historical collections, hence most likely some university or other academic institution, or as an account with one of the aggregate resources which at the same time provides access to the integrated strategic services facilitating work with the written and documentary heritage. This is the easiest way to provide the opportunity of connection to the individual digital copies of manuscripts in their structured form of virtual books (from a placement outside the module of the relevant resource, it would work only with difficulty in this structured form through persistent addressing). And there is still another advantage here tied to this type of personal space. The user of the personal space may reserve all of his/her space for himself/herself and nobody else or make all of this space or some of its component parts or even individual documents and files accessible to other selected persons and also quite generally to all users of

²⁵ See *A database for handwritten text recognition research* [http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=291440] [24 April 2011].

²⁶ Z. Uhlíř, *Svaranje ambijenta za virtuelno instraživanje istorijskih izvora*, "Savremena biblioteka" 22 (2010), 27, p. 24-29.

the digital network environment. If we look at it in terms of the method and approach of codicological work, the personal space allows both strictly individual work and team work as well as various combinations of them. Through general access for all of the digital network environment, however, also the base for electronic network publication is created, which does not have to be necessarily dependent on employer or publisher institutions, or such relations will be resolved in a different way than up to now. At the Manuscriptorium source, operated by the National Library of the Czech Republic²⁷, a personal account of this type is already available, albeit for the moment only in a very rudimentary form²⁸ (and also the results of all of the previous stages, i.e. digitisation of the sources, aggregation of the resources, integration of the services, are naturally available there). The base of this personal space are the tools for creating virtual collections (collections comprised of manuscripts found in various physical collections) as well as virtual documents (documents comprised of pages/folios found in various original manuscripts). It is not much so far, but it is still a good base both for common heuristic work and for the possible creation of hyperlinks, and hence for the addition of annotations and notes for material and research works. It is likely to be also a suitable base for the future contextual editions, which will be mentioned below, but this requires that great technical efforts be exerted and the methodology of digital codicological work be expanded and verified.

Fifth, this opens an entirely new level of the virtualisation of knowledge²⁹. Knowledge is the ability to treat and elaborate information, to complement it with metainformation³⁰, i.e. additional information, and on that basis to create transinformation³¹, hence new information. At the same time, it is necessary to be aware that information is identical with data, that it is not a form of content but communicated particular which has an influence on a change in thought and subsequently also behaviour. Knowledge thus is not and cannot be only the representation of information, because in this regard there is nothing to represent generally, but it is the ability to work with information, to create metainformation and transformation and eventually also new knowledge *ad libitum ad infinitum*. Virtualisation³² is a path of how to uncover implicit, not only explicit, features of the

²⁷ See *Manuscriptorium: Building Virtual Research Environment for the Sphere of Historical Resources* [<http://www.manuscriptorium.com>]; [<http://www.manuscriptorium.eu>]; [<http://www.manuscriptorium.cz>].

²⁸ See *Manuscriptorium: My Library* [<http://www.manuscriptorium.com/apps/main/index.php>].

²⁹ Z. Uhlíř, *Manuscriptorium a nové trendy v digitálním zpřístupnění písemného a dokumentárního dědictví*, "ITLib: Informačné technológie a knižnice" 14 (2010), 2, p. 11-16.

³⁰ See *Metainformace – Metainformation* [http://vydavatelstvi.vscht.cz/knihy/uid_es-005/hesla/metainformace.html] [24 April 2011].

³¹ See Ladislav Tondl, *Mezi epistemologií a sémiotikou: Deset studií o vztazích poznání a porozumění významu*, Prague, 1996.

³² Cf. Z. Uhlíř, *Historické dokumenty v hybridním elektronicko-digitálním prostředí*, in *Inforum 2001 – příspěvek na konferenci* [<http://www.inforum.cz/archiv/inforum2001/prispevky/uhlir.htm>] [24 April 2011]; Idem, *Digitalizace, elektronizace a virtualizace*, "Ikaros" 5 (2001), 2 [<http://www.ikaros.cz/digitalizace-elektronizace-a-virtualizace>] [24 April 2011].

objects of the natural and artificial worlds³³. It means that virtual reality is such a reality that is not evident at first sight and is difficult to capture with traditional analytical methods found between induction and deduction, being possible to capture only with the additional use of abduction, i.e. an approach that is beyond the set of the existing methodologies, methods and techniques used in the field concerned and that is adopted from another field or even is based on mere common sense. Under these circumstances, it is absolutely clear that the results achieved on the basis of induction, deduction and abduction must be judged by the path of falsification and not verification³⁴. It seems to be obvious, but in the humanities disciplines it is true rather only for theoretical proclamations than for practical research operation and the *lex artis* arising from it. We thus come to a field which seems to be entirely new and specific for digital codicology as against traditional codicology; nevertheless, we must again draw attention to the fact that the first steps towards this were made by culturomics, which had emerged based on the massive digitisation of the later as well as earlier written and documentary heritage undertaken by Google³⁵. On this so-far last stage, we come to the point of contention: the virtual world of digital codicology is enthusiastically accepted by some, because for them it means inspiration for the discovery of unknown worlds and for the revelation of unimagined possibilities, by others it is emphatically and at the same time anxiously refused, because it seems to them to be full of dangerous uncertainties, doubtful hopes and aberrant ideas. One can only say *hic Rhodus, hic salta*.

The second answer to the changes occurring are methodological innovations and gradual, complete transformation of the methodology of all of the humanities disciplines, at which we have progressively arrived with the description of the building of a scientific infrastructure for digital codicology, its brief analysis and some related considerations. Theoretical and methodological considerations are not well-thought of in the humanities disciplines in Central Europe, because they are usually detached from practical research work and particularly surpass the established scientific operation, namely both in institutional and personnel terms. Only rarely does it occur that innovation is instituted in silence in connection with specific research topics³⁶. And at the same time it is not possible or even right any other way, because theoretical considerations are abstract and consequently disregard specific particulars, which are from this perspective entirely uninteresting and misleading, because their plurality and the complicity of their relations make conceptualisation difficult. On the other hand, however, the devil hides precisely in

³³ These terms are adopted from the theory and methodology of the natural sciences, cf. David Bohm, *Wholeness and the Implicit Order*, London-New York, 1995 [first edition, 1980].

³⁴ See Karl R. Popper, *Das Elend des Historizismus*, 3rd edition, Tübingen, 1971; Idem, *The Logic of Scientific Discovery*, 4th edition, London, 1968.

³⁵ Cf. *Culturomics* [<http://www.culturomics.org/>] [24 April 2011]. See also F. Horáček, *Google, digital humanities a technologie budoucnosti* [<http://www.inflow.cz/google-digital-humanities-technologie-budoucnosti>] [24 April 2011].

³⁶ Cf. e.g. Heinrich Fichtenau, *Arenga*, Graz, 1957 or Bernd Moeller, Karl Stackmann, *Städtische Predigt in der Frühzeit der Reformation: Eine Untersuchung deutscher Flugschriften der Jahre 1522 bis 1529*, Göttingen, 1996.

the details, because whichever historical (and for that matter also philological) discipline is a specific, not universal, science, which cannot be built at all without component details. I hope, however, to be forgiven that just as my considerations on the building of the scientific infrastructure of digital codicology are based on the building of the aggregate resource of the Manuscriptorium, which has already been discussed several times, also the following considerations come from my practical, although not yet published, experience with the sermonic manuscripts by Milicius de Cremsir and from my effort to prepare a contextual edition of his *Quadragesimale*, and some other related manuscript texts. And last but not least, they build on my discussions both with my colleagues at my own workplace and in its close vicinity and in the wider global situation, particularly of course in Europe and North America. I consequently hope that in the following I will not proceed only from empty epistemological concepts but that I will react to what everyone can in one way or another have in his/her specific and practical research experience.

The first extensive area where the methodological transformation in the humanities disciplines is taking place is the advocacy of quantification. In a naïve view of scientific research, people sometimes believe that only the use of the mathematical methods makes a real science of any kind of human investigation³⁷. Some are more moderate and are willing to claim that mathematicisation is significant only for disciplines dealing with the universal but not for those that deal with the specific³⁸. Convincing argumentation has however appeared that the relation of mathematicisation with science is not applicable in those disciplines that are universal but deal with human conduct, such as praxeology³⁹ and economics⁴⁰. The use of mathematics in the humanities disciplines (which essentially means the use of various statistical methods, because abstract modelling⁴¹ did not prove itself at all) thus does not make them scientific: for disciplines dealing with human conduct, it is a substantial category of time, with *contingentia futurorum evenientium* naturally applying⁴². Despite that, however, quantification can be a significant methodological means of digital codicology, which strengthens its historical foundation and allows it to extricate itself from purely technical and essentially ahistorical descriptions. After all, in this case it is possible to proceed from the earlier idea of quantitative codicology⁴³, which began to appear in the 1970s and 1980s but was never more

³⁷ The people active in the context of these ideas are e.g. Jerzy Topolski, *Metodologia historii*, Warsaw, 1973.

³⁸ Cf. e.g. Paul Veyne, *Comment on écrit l'histoire*. Paris, 1996.

³⁹ See Tadeusz Kotarbiński, *Praxeologie*, Prague, 1972; Adam Knott, *A Praxeology of Coercion*, 2nd edition, 2006 [<http://www.praxeology.com/downloads/PDF%202nd%20Ed.%20Final%20Draft.pdf>] [25 April 2011].

⁴⁰ See Ludwig von Mises, *Human Action: A Treatise on Economics*, 3rd edition, Chicago, 1966; Peter Boettke, *Robustní politická ekonomie pro 21. století*, Prague, 2011.

⁴¹ E.g. the creation of ideal types is completely different from abstract or mathematical modelling.

⁴² It was already known by the mediaeval scholastic authors, cf. e.g. Z. Uhlř, *Charles University: Its Scholars and Students in the Middle Ages and Their Work in the Context of Their Age*, Prague, 1998.

⁴³ Cf. Jiří Pražák, *K pojetí kodikologie*, "Studie o rukopisech", 19 (1980), p. 123-141; František Hoffmann, *Zásady popisu rukopisů z roku 1983 a zkušenosti z jejich užívání: Soupis rukopisů*

significantly introduced. The use of statistics as applied mathematics has however only a purely auxiliary significance in this concept, because it is not based on the projection of trends into the future as is usual in other cases but on rendering the frequency of individual phenomena or rather facts in comparison with other individual phenomena or facts. What is important in this case is to understand that whereas a phenomenon is only something objectively existing and recordable, or simply recorded, a fact has a more complicated structure, because it is an interpretation of the relations of a phenomenon or phenomena. A fact is thus the meaning of the phenomenon in context. It is important to have in mind that the phenomena to which the humanities disciplines are devoted, i.e. fields that deal with various aspects of human conduct, already in and of themselves have meaning, so that the meaning of the phenomenon is actually the meaning of the meaning and as a consequence may not be exactly easy to capture. In the attempt for codicological quantification, the point is the endeavour to determine not the meanings but the frequency of their more or less hidden, so-called implicit contexts, namely not in a dynamic form (it would be suitable in prognostication into the future, which certainly is not an objective of digital codicology) but in the form of one or more static profiles (it is suitable for capturing changes in the past, or present, which is the primary objective of all historical fields, including also digital codicology). It is consequently nonsensical to count the letters on manuscript pages and conduct statistical comparisons of such determinations, because it cannot be ascribed any clear meaning or context. On the other hand, it indisputably makes sense to conduct a quantification and subsequent statistical evaluation of the occurrence of entries of texts of diverse kinds in manuscripts of various types, geographical circles and socio-cultural milieux, because it can be ascribed a clear meaning and context can be appended. Aggregated digital resources, making mediaeval and early modern manuscripts accessible and providing integrated services are a suitable base for the quantification of codicological study.

The second substantial change in comparison with the existing codicological methodology is the concept of mass phenomenon⁴⁴. It entirely naturally arises from the effort for quantification of codicological material, which is related to the digitisation as well as to the related activities of the aggregation of resources and integration of services. Nevertheless, quantification, i.e. the quantifiability or quantifiedness, cannot be identified with mass phenomenon. What is essential for mass phenomenon is the reproducible appearance or reproducible observability of the whole class and not one of its exemplars, because mass phenomenon is a mass reality synchronous in a certain time interval, not a single reality multiply diachronically

knihovny Kláštera premonstrátů v Teplé, in *Problematika historických a vzácných knižních fondů Čech, Moravy a Slezska 1998*, Brno, 1999, p. 118-126.

⁴⁴ As of yet, this concept has belonged rather only to the area of general history and not to specialised fields, including also codicology, cf. e.g. Mark Harrison, *Crowds and History: Mass Phenomena in English Towns, 1790–1835*, Cambridge, 1988. Nevertheless, sociology dealt with it much earlier, cf. the classic work by Tomáš G. Masaryk, *Sebevražda hromadným jevem společenským moderní osvěty*, 5th edition, Prague, 2002 or František Weyr, *Nadprůměrná inteligence jako hromadný zjev: statistika vynikajících lidí*, Prague, 1927.

observed and recorded. Mass phenomenon is consequently an abstract entity, not specific, based on an interpretation of a certain social feature or parameter of an entire range of individual specific entities, but it does not mean that mass phenomenon as an abstract entity is simultaneously a universal entity. Without further determination, it cannot even be said that it would be a specific entity, although it is closest to this level. In addition, it is necessary to take into consideration two more factors. First, individual phenomenon – *eventus*, a specific event, if I am to speak like a historian – as a component of a mass phenomenon together does not show connection with it in the sense that in knowledge of a mass phenomenon it would be possible to predict the state of an individual phenomenon or even its existence, although people make this mistake frequently. It is thus not possible on that basis to express oneself on a specific future. It would seem that for history this warning has no sense, but it is not so: the subject of historical – thus also codicological – interpretations is both the time flow and the fundamental unknown (not only the eliminable unknown) of some data which are indispensable and necessary for understanding historical events. This triggers an urgent need (based on the desire for the certainty of knowing) to complement these unknown data credibly. While the projection of the individual phenomena on the basis of a mass phenomenon is tempting here, it is only a deception, because considering the nature of the things it is methodologically impermissible. Despite that, however, it often happens, because the desire of people to determine things more precisely than is at all possible is ineradicable. And second, considering its contextual reference, the individual phenomenon itself has a relative character, i.e. in two different perspectives (when resolving various topics) it is always something else. It is shown clearly in works of literature, which stand more or less reflected at the bases of codicological study⁴⁵. In the manuscripts, the work does not appear as such but exclusively in the records of its version, or its versions, whose levels can be categorised in various ways⁴⁶. Under certain circumstances, the individual phenomenon is a record of the text, whereas under others it is the text itself, but it is evident that the record is an exemplar of a class which is determined by the text concerned. The exemplar and class on the one hand and the individual and mass phenomena on the other hand are thus not homogenous and correlative; they are not interchangeable. The use of the concept of mass phenomenon in digital codicology requires research fantasy and institution, which must first be developed.

⁴⁵ Cf. Richard Sharp, *Titulus: Identifying Medieval Latin Texts: An Evidence-Based Approach*. Turnhout, 2003.

⁴⁶ See e.g. *Functional Requirements for Bibliographic Records: Final Report*, Munich, 1998; Robert R. Maxwell, *FRBR: A Guide for the Perplexed*, Chicago, 2007; Arlene G. Taylor, *Understanding FRBR*, Westport, Conn., 2007; Carlo Chillì, Mauro Guerrini, *Introduzione a FRBR*. Milan, 2001; Patrick Le Boeuf, *Functional Requirements for Bibliographic Records (FRBR): hype or cure-all?*, Binghamton, NY, 2005; Barbara B. Tillett, *What is FRBR?: A Conceptual Model for the Bibliographic Universe*, Washington, 2004.

And finally the third – and in the case of digital codicology most likely the most important – is the idea of fluid text⁴⁷. Fluid text is a very controversial concept, which completely contravenes the existing conceptualisations of the humanities disciplines. The text in semiotic delimitation is a set of features with a meaning and associated on the basis of syntactic rules. In this way, the text can be anything, perhaps even a culture in the sociological sense or a manuscript in the context of its external and internal features. This could be close to social and cultural anthropologists, less however to historians or philologists. I will then speak here of fluid text as of a text in the common sense, i.e. as a record of a language expression with letters. Nevertheless, not even here can we avoid certain collisions and misunderstandings, namely because historians and philologists see something else in such a text: whereas for historians the text is merely a direct or indirect trace of an external reality, which is given by human activity and its material and ideal results, for philologists the text is a part of an external reality itself (and for some it even replaces this external reality). The text and as a consequence of this also the work, the artefact, therefore have a different position in the structure of the world as understood on the one hand by historians and on the other by philologists. This can sometimes lead to misunderstandings; nevertheless – if we are sufficiently aware of it – it will not lead to substantial problems. Positivist and structuralist codicologists of earlier generations might have felt the need sometimes to define themselves against ‘philologists’ (as still earlier some historians needed to define themselves against ‘sociologists’), but this arose more than from anything else from their unsteady awareness of the definition of their own field, so it does not have to be taken into account here. A serious problem, however, remains that the concept of fluid text usually surpasses the imagination of philologists, that they cannot classify it in their world and consequently more or less emphatically reject it. Whereas the imagination of the philologists proceeds along the paths of a fixedly given text and its history, on the one hand speaking of the archetype, Urtext, the best text and on the other hand of stemmas and filiations, fluid text on the contrary denies the fixed givenness of the text as already arises from the term itself. What however does a text in a flowing or fluid state mean when it is surely clear that someone had to create it and created it precisely in this way and not in another way? This means two things: the first is the methodological approach, which arises from the fact that a number of the records of the texts have not been preserved, which concerns particularly sermonic, university and didactic paraliterature, and hence in a number of cases it is impossible to find any fixedly given text, which would be a clear starting point for the further history of the text; the second is a conceptualisation of mediaeval paraliterature, which lacked a sufficiently clear and strong awareness of authorship and originality⁴⁸ and where the individual works were much less different from one another than in the case of so-called high literature and than we are accustomed today. And since particularly

⁴⁷ See John Bryant, *The Fluid Text: Theory of a Revision and Editing for Book and Screen*, Ann Arbor, 2002. For the wider context, cf. Walter J. Ong: *Orality and Literacy: The Technologizing of the Word*, London, 1982.

⁴⁸ Cf. Antonín Škarka, *Literatura bez autorů a bez generací*, in Idem, *Půl tisíciletí českého písemnictví*, Prague, 1986, p. 7-12 (originally, 1948).

historians work rather with this paraliterature, the concept of fluid text has begun to be close to them, because it places the more fluidly given text among the other paraliterary expressions while seeing in this context not only the text itself but already its individual records, so it is possible to consider that the individual manuscript record is a component state of the fluid text, which spreads not only to all preserved but also to all of the formerly created but no longer preserved records and texts. In the traditional printed environment, such an idea was conceivable only purely abstractly and potentially, without any possibility to be realised. In a digital network environment, which can be characterised as infinity closed in borders, it is on the other hand possible to realise, albeit not in the absolute sense. Digital codicology, focusing on the internal features, thus surpasses the possibilities of traditional codicology.

A thorough attempt for the provision of so-called contextual editions thus arises from all that above⁴⁹. A contextual edition is focused on the representation of the text and its record in connections with other texts and records. Already this basic starting point predetermines that the text does not necessarily have to be understood as fixedly given, but that it is characterised by a quite significant level of variability. This must be reflected also in the contextual edition⁵⁰. It is not a critical edition, since it does not attempt to restore the text in its archetype, Urtext, best text or simply canonical text. Neither does it attempt to conduct textological research within the work on the edition. The aim is to provide a reliable text, i.e. the text with regard to the record. It can consequently be said that the base of the contextual edition is a so-called pragmatic edition, whose ambitions are predominantly those aimed at the reader. It does not, however, mean that this type of edition would be entirely without ambitions, but its ambitions are of another sort. They arise from the so-called testimonies of the traditional printed editions, i.e. references to the overt or covert citations or to the mere allusions, and try to develop them further. A contextual edition consequently concentrates predominantly on the intertextual relations and on their clear expressions. This creates the assumption that it will subsequently be a prerequisite for continuing also to transtextual relations. This is somewhat analogous to what was already mentioned above: intertextual relations are manifested on the level of individual phenomenon, whereas transtextual relations are shown on the level of mass phenomenon. When projecting such prospective concepts, it is however necessary to make sure that they not end in complete abstraction and thus also in unrealisability. It can be hoped that it truly is not the case here. Already now, there is a realistic possibility to show intertextual relations not only through mere references

⁴⁹ For the wider context, cf. Elena Pierazzo, Malte Rehbein, *Putting Texts back into Context: Documentary Transcriptions, Genetic Encoding, Codicology and Paleography. DARIAH and CLARINS*, joint conference, Vienna, 19-20 October 2010, see [<http://ztwweb.trans.univie.ac.at/sdh2010/>] [25 April 2011].

⁵⁰ On the new concepts of editorial work, cf. Peter L. Shillingsburg, *Scholarly Editing in the Computer Age: Theory and Practice*, 3rd edition, Ann Arbor, 1996; Raimonda Modiano, Leroy F. Searle, Peter L. Shillingsburg, *Voice, Text, Hypertext: Emerging Practices in Textual Studies*. Seattle, Wash., 2004; P. L. Shillingsburg, *From Gutenberg to Google: Electronic Representations of Literary Texts*, Cambridge, 2006.

but directly through the representation of the text concerned or its relevant part. It is possible in practice through the methodological usage of the common technology of hypertext⁵¹. And since also the requirement of persistent addresses and persistent identifiers is already being practically fulfilled, it is possible to ascribe contextual editions with long-term utility, which was still not possible recently. Two basic presumptions have thus been fulfilled for contextual editions, without which they could not be implemented no matter how complexly they would be considered in theory: personalised environment is being intensively developed within the uniform digital environment and persistent addresses and persistent identifiers are being implemented. The fundamental step from a linear text to the dominant implementation of hypertext also in the case of scientific editions of historical fulltexts is consequently quite well possible already now.

What is particularly important here is an understanding of hypertextuality, manifesting itself in text stratification, which is principally infinitely manifold, as such however uncapturable, and so must be schematised into several essentially standardised layers⁵². It seems that a division into four layers is sensible; these are firstly the collection, i.e. the set of individual texts, be it fixed or only written down once, secondly the text, i.e. the component, relatively closed and relatively independent intellectual unit which can be transcribed even regardless of the collection in which it usually or by chance is found, thirdly the microtext, i.e. the component unit which besides complete exceptions does not appear independently, it is thus always a part of some text, but considering the text of which it is a part it is at the same time promiscuous, i.e. it appears in various such texts, and finally fourthly the motif, which more or less freely travels between texts, or microtexts. Up to here, everything has seemed to be completely clear and nothing has aroused significant doubts or marked misunderstanding, but as soon as we progress to the question of how to implement all of this practically, we discover that some ambiguities appear after all. The question is how to implement and represent those four layers, i.e. collection, text, microtext and motif. It is clear that it will be through the stratification of the individual levels of hypertext. What is less clear is whether the layers of hypertext should reflect in some way also the hierarchy of the levels of the contextual edition or not; it is a question. I do not think so, because a hierarchical system of organisation is very much inconsistent with hypertext. Hypertext is a kind of reified replica of human thought. And thought is a manifestation of the spirit, where *spiritus, ubi vult, flat*⁵³ applies. That is as far as the general view of the thing

⁵¹ See Z. Uhlř, *Hypertext a otazniky nad jeho metodologii*, "Ikaros" 4 (2000), 1 [<http://www.ikaros.cz/hypertext-otazniky-nad-jeho-metodologii>] [25 April 2011].

⁵² See Tomás O'Sullivan, *Defining and Editing the Shifting Shapes of Sermons*. Texts Worth Editing. The Seventh International Conference of the European Society for Textual Scholarship. Pisa, 26 November 2010 [http://67.23.4.192/Pisa_Presentation.wmv] [25 April 2011], which speaks of 'layer-edition'.

⁵³ Cf. John 3:8: *Spiritus ubi vult spirat, et vocem eius audis, sed nescis unde veniat, aut quo vadat: sic est omnis qui natus est ex spiritu* [The wind bloweth where it listeth, and thou hearest the sound thereof, but canst not tell whence it cometh, and whither it goeth: so is every one that is born of the Spirit (KJV).].

is concerned, but there are also at least two specific and practical objections against any attempt at a hierarchical representation of hypertext here. The first of them lies in that it is hardly feasible for purely technical reasons. It would mean preparing for the contextual edition some kind of static matrix, which would undoubtedly become its Procrustean bed: on the one hand it would have too much, on the other hand too little flexibility to resolve unanticipated relations. Moreover, it can be assumed that the end user of the contextual edition will be intelligent enough to handle easily the interpretation of the level of the context. Furthermore, there is still the second thing, which is much more serious, because what is a text in this conception of the contextual edition is not decided by the editor but by the reader. And it means that a contextual edition can in no case be considered as a closed work, because the boundaries between the authors of the edited texts, the editor and the reader become less clear and in the case of the editor and the reader can even disappear. And so it can be supposed that the contextual edition will head towards becoming a collective work: individual readers based on their knowledge of manuscript material will be able to contribute by revealing a new aspect, and thus also a new interpretation. Like we have seen in the case of descriptive records on manuscripts that the network digital environment allows and even prefers teamwork, also in the case of the contextual edition we are discovering that the cooperative method of editing historical texts has the tendency to predominate in the future. In that, it will be important for various reasons to label properly the component contributions of individual persons.

That is connected with a very substantial transformation of the view of authorship, which concerns both the authorship of the original historical texts and all of the outputs in the network digital environment. The question of today's authors can be left out at this point, because it is a question not so much of a simple historical observation of things without the possibility to change them, but on the contrary it is a question of where there are quite real opportunities for that. Those, however, do not concern digital codicology; neither are they therefore connected to my topic. In terms of the historical authors⁵⁴, when creating contextual editions it is possible to cherish the hope that the names of authors and the titles of their works will really be evidence-based, i.e. based on the source material, and that they will not proceed from various handbooks and *repertoria*, whose data are often only very mediated. However, in this context this is not the most important, because the changed view of authorship does not affect specific personal names but the very idea of authorship, or its construct. Today, we understand the construct of authorship as nothing other than individual authorship as this construct has developed in the period of modernity. We even understand anonyms and pseudonyms this way; we only allow other formal expressions (of unknown name – fictitious name), but this approach cannot be applied to the Middle Ages. Even then, there certainly existed *auctores*, but they were also *auctoritates*; they had to be authorities or they did not have the right to be

⁵⁴ Cf. Z. Uhlíř, *Příprava dat pro digitalizaci rukopisů, její význam a souvislosti*, "Národní knihovna: Knihovnická revue" 10 (1999), 3, p. 117-129 [<http://digit.nkp.cz/CzechArticles/Pripravadat.html>] [19 April 2011]; R. Sharp, *Titulus* cit., Turnhout, 2003.

called authors. To put it another way, a number of people who actually wrote were in fact not authors and thus cannot be considered as anonyms, at least in today's sense of the word. A number of other people hid under the names of famous authorities. And a number of other people revised the works of famous authors to such an extent that they actually created new works while however leaving the name of the original author. If we attempt to transform this polymorphous situation into some kind of ideal type, it will have four components. First, individual authorship as we know it today. It is precisely here that it should be truly evidence-based. Second, intentional authorship, which marks the authors of such works that were so revised and redacted that they could be considered either as individual author's works by someone else but which circulate under the name of the original author, i.e. the author of the original and basic intention, or as the work of someone different from the original author but included without distinction in the original collection circulating under the name of the original author. This type is very diverse; in our view it includes real authors as well as mere editors or even mere transcribers. Third, there is pseudo-authorship, which is characteristic in that the name of an authoritative person covers a work written by someone else. The point even here is that the possible determination of those hidden authors be in reality evidence-based. And finally, fourth, there is non-authorship, which cannot be identified with anonymous authorship. Today, we simply automatically consider someone as the author if he/she writes something, which we apply also to the past periods. This for example entails that to ask about the author of the Chronicle of the So-Called Dalimil, which is a popular sport among Czech historians, has absolutely no sense, because it is a chronicle without an author, whose Czech, Latin and German mutations freely blend together although they were created at different times, albeit all in the Middle Ages⁵⁵. Digital codicology and contextual editology certainly contribute to the resolution of even these cans of worms.

The basic concepts of general codicological imagination, which are, albeit not usually entirely reflected, manuscript, text and work, must consequently be evaluated otherwise than before. We can already no longer perceive them as completed and closed, hence we cannot perceive them as artefacts in the normal sense. Naturally, we will continue to see them as artefacts in the technological sense, i.e. the results of human conduct, artificial objects, but we would not help ourselves much with that, because an artefact in this technological definition is almost everything in the human world. I will leave aside at this point what we should consider them as, because I do not yet have – and I think that neither does anyone else have for the moment – a clear enough idea on it. Digital codicology and contextual editology thus lead us much farther than we expected at the beginning. We must see their prospects precisely in that.

⁵⁵ Cf. Z. Uhlíř, *Nově objevený zlomek latinského překladu Kroniky tak řečeného Dalimila*, "Knihovna: Knihovnická revue" 16 (2005), 2, p. 137-169; *Die tutsch kronik von Behem lant: Die gereimte deusche Übersetzung der alttschechischen Dalimil-Chronik / Rýmovaný německý překlad staročeské Dalimilovy kroniky* (ed. by Vlastimil Brom), Brno, 2009.