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## Digital Humanities: Foundations

V0.2

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We must keep in mind some numerical data when we evoke the transition from the paper to the digital age. In particular, the following contrast speaks for itself::

1. All the books ever written represent 50 billion bytes
2. The information produced in 2006 represents 150 quintillion ( $150 \cdot 10^{18}$ ) bytes. That is to say, during 2006 alone, the world produced three million times the informational content of all the books ever written.
3. Things continue in this way at high speed: the only internet track of May 2009 has generated 500 billion bytes..

Thus, our paper-based heritage is already a tiny fraction of what the human race has produced and this fraction decreases, relatively, every day. Viewing these data, the conception of a digitization enterprise should be thought of and considered by humanists as enlarged. The narrow acceptance of the project – the view that it is merely

a technical process of converting our paper-borne heritage into electronic form – is dramatically insufficient. To paraphrase Clemenceau’s famous words about war and militaries, digitization may be too serious a thing to be left to the digitizers alone. Scholars must face the issue and understand it as one of the most important problems they have to deal with and, as I will argue, as a real opportunity to renew their practices and disciplines.

To start with some affective considerations, which, after all, matter too, digitization is a major source of anxiety for the Humanities. Not least because the world of computers was radically strange to scholars, many of whom spent a long time using computing machines and word processors often in quiet ignorance of the underlying processes. Moreover, there is some resistance from scholars, long familiar with browsing, annotating and cherishing their books, to iPads and other devices, which allow similar practices and may even evoke similar feelings in the process. Deeper than that, though, they are disturbed by the idea that, along with the possible evanescence of the final printed output, the material signs of distinction and *auctoritas* may also disappear. For digitization is also a transition from a universe of tangible books or academic journals, whose recognizable appearance evidences interest in content and the dignity of authors, to an undifferentiated situation of *Big Commensurability*, deserted by the immediate material marks of reliability and reading-worthiness. The dramatic issue is: what is the future of philological probity and other humanistic ideals in a world where the ultimate measure is that of the byte, according to which, millions of contentless electronic messages have greater weight than the *Quixote*? To cope with this central question, we should perceive digitization not as a technical issue, but as a whole process of appropriately integrating the tiny hand of our cultural heritage in the ocean of digitally-borne information.

## 1 The Empire of Digital

It is a commonplace that the ways of doing and communicating science are rapidly changing under the ubiquitous influence of computers. The widespread use of these machines results in an epistemic enhancement. This enhancement has several aspects. First, and most manifestly, it consists of an *extension* of our native capacities as paper readers: we can now be acquainted with many more items than those we previously had access to. Overcoming the necessity of travelling to libraries and of waiting for book delivery, our new databases and repositories lead us to a position of consulting and browsing more material than before. In this way, we are doing approximately the same job but at higher speed, at a wider range and in greater comfort. Second, and more importantly, this enhancement may be a qualitative *augmentation* of the scope of scholarship, giving us access to features of cultural heritage that we were not equipped to detect in previous times. The frequency of occurrences of given words in

wide corpora, the dynamics of their evolution or the regularities of their coexistence with other words are typical features of this kind. Third, the treatment and analysis of such massive data often involves *conversion* of the modalities of our work; for example, when we are led to visualize these data by means of curves or other iconic ways of representation. In such cases, the very task of reading cannot be done by the human eye and it is left to machines: we simply deal with the result of their work, using a radical approach to our cultural heritage that was previously unavailable.

To grasp the meaning of the transformation just described, scholars should firstly realize that their field is not at all as specific as they use to believe, and that the Digital Turn is today affecting the whole of scientific enterprise in a similar way. The Galilean ideal of reading Nature in mathematical language, namely of understanding and foreseeing it in the analytic way, by means of appropriate differential equations, is today in question. To restrict to some examples, dynamics of fluids has become a largely computerized discipline, not only because we use computers to solve numerically equations that are analytically unsolvable in most cases (that use of computers would correspond to the *extensive* meaning of “epistemic enhancement” above), but because the detail of a turbulent flow cannot even be suitably *represented* and analyzed except via a super-computer.<sup>1</sup> The same consideration of the complexity of data issue applies, even more eloquently in the present context, to the “reading” of the human genome, which can obviously not be done by man alone: the database currently used encompasses more than five times the amount of information contained in the *Library of Congress*. To sum up, the most intriguing features of Digital Humanities are nowadays shared by classical domains of hard sciences. One has just to ask, in the general landscape of this New Kind of Science, what is the specific object of the humanistic brand of this general evolution.

## 2 *Philology aufgehoben*

The best way of characterizing the Digital Humanities is probably to contrast them with the tradition of the past half-century in ‘continental’ philosophy. People in this trend used to describe their activity as ‘interpretive’ or ‘hermeneutic’. Considering that the Masters of Suspicion (Marx, Nietzsche and Freud, to quote some of them) had definitely deconstructed the traditional idea of philosophy as a variety of the pursuit of truth, they have emphasized the interpretive nature of any enterprise of understanding. The salient issue, in this perspective, is the adjudication of the standards of correctness for the interpretations. Either one faces the problem seriously, and one must, therefore, be prepared to admit an exception to the move beyond True and False. Or, one assumes integrally the relativist motto of hermeneutics, and one has to make interpretation itself subject to interpretation, not to a justifiable verdict of correctness or incorrectness.

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<sup>1</sup>On the general scope of this extension of human capacities by computing machines, see [7]

The second horn of the dilemma has been clearly preferred, positing the idea that any interpretation is legitimate, insofar as it is expressive enough of the idiosyncratic situation of the interpreter: briefly expressed, interpretation becomes a genuine act of creation by the reader. No surprise, then, that in these conditions philology or ‘objectivist’ scholarship were dismissed in recent times: their relegation is on a par with the fashionable idea that the meaning of a text is just what the reader attributes to it:

The relegation of writing to the indeterminate and endlessly transforming processes of textual dissemination is a by-product of Saussurian linguistics and some of the structuralist theories built upon it. In privileging the structures of speech over those of script, it displaced the older, text-based, philological, diachronic study of language, in favour of purely synchronic analysis – how people talk now. This shift in attention away from the study of historical process makes it easy to conclude that we cannot really presume to recover an authorial voice at all, or an intended meaning, from the written or printed records of it. We are left only with synchronic structures, and the conventions which regulate their meaning as we read. It follows, of course, that if the meaning we read is entirely a function of the structural relations within the verbal sign system which constitutes a text, then it is not something inherent which can be expressed at all. Meaning is not what is meant, but what we now agree to infer [11, pp. 33-34]

### 3 Rematerialization

Digitization is often regarded as immaterialization. The presiding spirit of the assimilation is simply this: books are solid and available, whereas their digitized counterparts only enjoy an intermittent and mediated existence, at the moments when, and on the condition that, the relevant electronic devices are powered up. Although it corresponds significantly with daily superficial experience and feeling, the immaterialization view is wrong in many senses. First, digital information is not floating above the material world; rather, it is always physically implemented, albeit in another manner than paper information (if this was not the case, the nagging question of the so-called obsolescence of the electronic storage devices would disappear). Second, and deeper, digitization, when strictly and adequately conceived and deployed, locates the texts in the landscape of a fine-grained ontology, closer to the usual material ontology than the paper publication does. This point, which is of fundamental significance for the Digital Humanities, needs some explanation.

Currently, a copy of Twardowski’s famous essay ‘Actions and Products’ ([12]) is on my desk, open at the initial page, and I am reflecting on the ideas defended in this text and on their relevance to the topic of the Digital Humanities. It appears as if the book - I mean, my copy of the book, the book as a physical object – connects me with

the thoughts Twardowski had a century earlier. Now, the question is that of the nature of the relata. No miracle, of course, is involved, because the relationship between myself, as a material creature, and the products of the mental activity of a philosopher I have never met is mediated by the book. I am physically related to my copy of that book, the inked inscriptions on the book impress my retina, I recognize in those inscriptions familiar words and sentences and, as a competent English-reader, I access the linguistic meaning of those sentences, which delineate the thoughts Twardowski had in his head at the time he wrote them. This is a well-known story: our capacity to access the thoughts of past thinkers is to be decomposed in (i) our perceptual capacity to access the token of the words they drew on paper; and (ii) our linguistic capacity to access the meaning of those words (now considered, not as concrete inscriptions or ‘tokens,’ but as linguistic ‘types’). Nevertheless, crucial details of this familiar story differ, according to whether we are dealing with printed books or digital devices.



Figure 1: Twardowski’s archive, Library of Warsaw Philosophy Institute

To say that I have the text of Twardowski’s essay at hand is somewhat misleading. Of course, this assertion is *always* misleading, except when uttered by the happy few who have the privilege to leaf through Twardowski’s manuscript, contained in the Library of the Institute of Philosophy in Warsaw (Fig. 1). As for the other readers, the author has not marked the signs they read himself. The physical product of Twardowski’s writing activity in Łvov lies in a blue-grey dossier *T.16* in Warsaw library and nowhere else and, strictly speaking, we cannot talk of it being displayed on the pages of a printed book or on the screen of a computer. Nevertheless, the assertion about my possession of his text is *particularly* unacceptable when I am reading a copy of the

book. The point is not that Twardowski never had any physical contact with this object – this is trivial – but rather that the material chain that connects the both of us and which allows me to access his thoughts has been seriously broken.

Twardowski had a wide command of many languages beyond Polish, but he had never written anything in English and, therefore, he has not marked anywhere any sequence of signs equiform to those in front of me. The text I have on my desk is just a translation of the Polish original and the relevant causal chain has, therefore, been broken or dashed by the translation process. And what if we suppose that the book on my desk is the Polish version [14], republished in 1965 in Warsaw along with other writings by the author. The problem remains the same: Twardowski never collected his works in this way and the logical structure of this book as well as its physical shape cannot be considered as genuinely derivative from his intentions and activity. This, then, is the point where paper and digital publication crucially differ. This difference may be explained by Fig. 2.

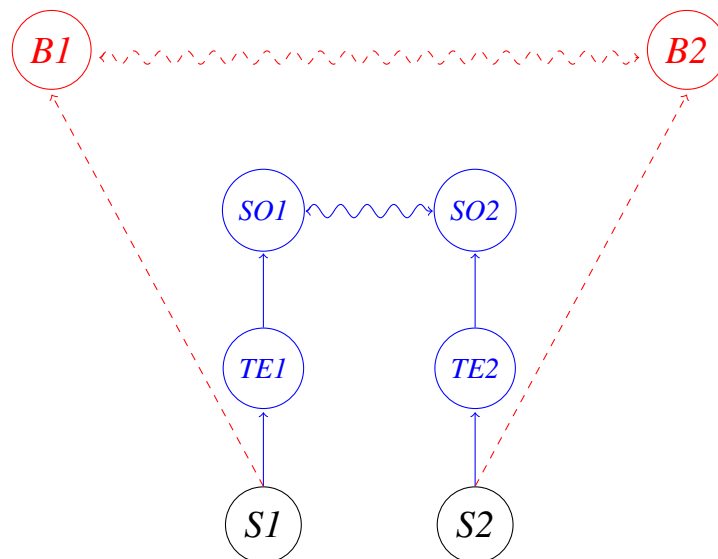


Figure 2: Two different schemes

The traditional circuit (in red on the figure) of paper publication is rather simple, albeit sometimes complicated to execute. One or another of the sources ( $S1$ ,  $S2$ ) are selected and a subsequent book  $B1$  (or  $B2$ ) is published, providing its reader with words and sentences that are *type-equivalent* to their counterparts in the sources. The organization and the structure of this material are left to the appreciation of the publisher and they are not supposed to be similar to the organization and structure of the sources. A fortiori the same applies to the physical shape of the original, which is neither conserved, nor recoverable from the printed book. In the case of a scholar



displayed in the main text and the others are simply referred to in footnotes. In other words, the object one has in hand, the printed volume, is just one book, in the sense of it being the output of the publication process from a given source. The relationship between *B1* and *B2*, which are considered as material objects, is not the physical cohabitation in one mundane item, but rather their proximity on the shelves of our libraries.

The situation is thoroughly different with Digital Humanities editions, from the perspectives of their relationship to their sources and also of their mutual relations. The circuit (in blue on the Fig. 2) differs from the previous one in terms of the interposition of a new level between the source and the final output; namely, that of the canonical encoding TEI of the properties of the source, which extend beyond its literal content properly said. Far from being a continuous recording indifferent to the fine structure (page-breaks, etc.) of the source or even to its physical appearance, this operation keeps track of everything potentially relevant in the source, making, in principle, any consultation of the original by the reader pointless. The process can be extended to the manuscript sources, as shown in the example of Twardowski's essay.

The first lines of the manuscript in Fig. 3 are encoded as follows in XML/TEI standard:

```
<teiHeader>
  <text>
    <body>
      <pb n="1"/>
      <fw place="top-center" type="pageNum">71</fw>
      <head>
        <title>Fonctions et produits</title>
      </head>
      <p>
        <lb n="1"/>Quelques remarques
        <subst>
          <add place="above">des</add>
          <del>touchant les</del>
        </subst>
        confins
        <lb n="2"/>de la psychologie, <del>la</del> grammaire
        et <del>la</del> logique
      </p>
      <p>
        <lb n="3"/><hi>¶167;1.</hi> En comparant deux expressions
      </p>
```

This code integrates not only the author's words, but the concrete way he wrote them on his page (e.g. the centring of the title is reflected on line 5, the deletion of the articles before the words 'grammaire' and 'logique' is recorded on line 16, etc.). In



short, the TE level keeps track in coded format of every feature of the source, including the material aspects that are neglected in the traditional edition. This long-established method is more or less guided by the famous slogan WYSIWYG: What You See – you typist, on your screen – Is exactly What You Get in printed form. From the Digital Humanities standpoint, this result is unacceptably poor, because the editorial output is only what one sees in the main course of the text, obliging us to add separately a lot of paraphernalia to deal with the remaining text. One could say that, in this case, the leading slogan is the opposite of WYSIWYG; namely, WYKIWAW: What You Keep – you, editor – Is exactly What the Author Wrote. Moreover, the connectedness of the screen outputs SO (Fig. 4) for different sources or variants is physically enforced by the versatility of electronic devices: suitable hyperlinks are enough to ensure the possibility, for the reader, to navigate between the corresponding windows without changing his environment in the slightest way.

### **A TEI Project**

## **Encodage de “Fonctions et produits”**

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### ***Fonctions et produits***

Quelques remarques des touchant les confins  
de la psychologie, la grammaire et la logique

**§1.** En comparant deux expressions comme  
appareillées jointes de en paires appariées juxtaposées en paires comme  
celles-ci: marcher - marche, courir - course,  
sauter - saut, crier - cri, chanter - chant,  
parler - parle parole penser - pensée, errer - erreur,  
juger - jugement, tourner - tournure, nous  
on voit, que la première signifie une  
fonctions action; quelle est la significations de  
la seconde en rapport à la signification  
de la première - c'est la question, dont  
s'occuperont les considérations suivantes

Figure 4: Screenshot of the French version of *Actions and Products* after TEI Encoding

One can summarize the difference between the two publishing schemes as follows: the new scheme firmly re-establishes the chain between the author and the product of his

activity, which was threatened by the traditional way of proceeding. This restoration has wide consequences, often unperceived or misapprehended.

## 4 The end of the *reader-shift*

*Prima facie*, the enterprise of digital edition involves a new avatar of the technical means of reproduction of the cultural works Walter Benjamin analyzed in his most influential essay [2] on the philosophy of culture. Benjamin's train of thoughts is well-known: the quality of the original presence – of the 'aura', in his terms – of a cultural item is always deprecated, even destroyed, by its reproduction. The impetuous development of reproduction technics in modern times induces a "sense of the universal equality of all things" ([2, p. 223]), which is a mark of the contemporary mass culture.

Benjamin even seems to have put his finger, in a premonitory manner, on the *Big Commensurability* characteristic of the Digital Age, with his description of a certain erosion of the very distinction between readers and writers:

For centuries a small number of writers were confronted by many thousands of readers. This changed toward the end of the last century. With the increasing extension of the press, which kept placing new political, religious, scientific, professional, and local organs before the readers. an increasing number of readers became writers - at first, occasional ones. It began with the daily press opening to its readers space for "letters to the editor." And today there is hardly a gainfully employed European who could not, in principle, find an opportunity to publish somewhere or other comments on his work, grievances, documentary reports, or that sort of thing. Thus, the distinction between author and public is about to lose its basic character. The difference becomes merely functional; it may vary from case to case. At any moment the reader is ready to turn into a writer [2, pp. 231-232].

From this perspective, the cultural impact of the contemporary Web might be viewed as a magnification, at a huge scale, of the effects that the daily press had a century ago; namely, the loss of distinction, authority and sacrality of the written work.

As far as written works are concerned, Benjamin's analysis of the effects of reproducibility can be challenged. The first objection is that if reproduction itself is to be incriminated, then the fatal turn should have been taken, not in contemporary times, but centuries ago by Gutenberg. This conclusion, which Benjamin seems ready to accept – "printing, the mechanical reproduction of writing [...] is merely a special, though particularly important, case [of the phenomenon examined here]" ([2, pp. 218-219]) – does not fit well with the background of the whole essay; namely, that of a mutual harmony between capitalism and mechanical reproducibility: the anachronism was unacceptable, even for one ready to accept that "the perspective of world history"

(Loc. cit.) affords a certain liberty with historical accuracy. Besides, Benjamin claims insistently that the possibility of traceable ownership should be considered as one of the characteristic marks of an original, not a reproduced, piece of culture:

Even the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be. This unique existence of the work of art determined the history to which it was subject throughout the time of its existence. This includes the changes which it may have suffered in physical condition over the years as well as the various changes in its ownership. The traces of the first can be revealed only by chemical or physical analyses which it is impossible to perform on a reproduction; changes of ownership are subject to a tradition which must be traced from the situation of the original. [2, p. 220].

Books can, of course, be such items, as lyrically described by Benjamin himself in a short essay dedicated to book collecting [3]. To conclude, printed books, or at least some of them, should not be considered as inauthentic replicas of 'auratic' sources, but as original pieces of culture by themselves. That changes everything, because:

1. the significance of such books can no longer be viewed as only derivative of a first, inaugural (handwritten) act of creation.
2. there is no compulsory reason to consider different editions, or even different copies of the same edition,<sup>2</sup> as just redundant tokens or realizations of the same abstract type.

Once we have rejected, in the domain of written culture, Benjamin's motto of the absolute privilege of the punctual, inaugural *hic and nunc*, the binary opposition between the 'auratic' start-point and the replications of this sacrosanct origin vanishes in the same way. The site of textual authority can no longer be equated with the only Ur-Text. The sources of reading-normativity are distributed in the subsequent proliferation of versions or variants and their readers are, therefore, not left to appreciate and to judge the erratic circumstances of their activity. In sum, one can escape the dramatic consequence of Benjamin's conception in the domain of textual culture; namely, that people remote from the origin are obliged, and then free, to adopt whatever interpretation of their cultural legacy. To avoid this interpretive anarchism, according

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<sup>2</sup>As an example, compare the two following editions of the latin translation of Diophante's *Arithmétiques* by Claude-Gaspard Bachet, Sieur de Méziriac: the 'original' published in Paris in 1621, and the re-edition of 1671 in Toulouse, augmented by Fermat's notes. Or, to come to the nub of the issue, the specific significance of Fermat's copy of the original, with the marvellous annotation stating Fermat's 'last theorem' as well as the impracticability of writing its demonstration within the margin of the copy.

to which ‘everything goes’ for the contemporary reader, is precisely the aim of the Digital Humanities.

## 5 Interpreting texts and cultural artefacts: the DH stance

As has been remarked ([5]), current practitioners of the Digital Humanities deal with such a number of technological and institutional issues that one might consider this to be *making* (archives, tools, methods or consortia), rather than *interpreting*. Some (including [1]) evoke the temptation of simply describing the distinctive nature of the Digital Humanities by pushing forward the practical idiosyncrasies of the people working in the field – who have a minimal acquaintance with the traditional Humanities, they use computers, they collaborate in an interdisciplinary way, and so on. This was a plainly desperate move, analogous to that of defining chemistry as merely the scientific field of those who manipulate retorts and test tubes.

The foundations of the difficulty lies, beyond the fact that Digital Humanists are supposed, to reuse Sokal’s phrase, to “transgress the boundaries,” in the inconsistency of the following data:

1. The hope, or wish, or certainty, that nothing should prevent Digital Humanities from dealing with digital production as well as with paper-borne heritage<sup>3</sup>
2. The fact - the *Big Commensurability* analyzed above - that, in the digital realm, no watertight distinction between authors and readers can survive: in digital environments readers become prolix and give free and public play to their verbosity, becoming authors as well and, moreover, indiscernibly so.
3. The normative thesis that humanistic scholarship rests on a fundamental asymmetry between authors and commentators, the latter trying to grasp the meaning of texts and being apt to be right or wrong in doing so.

In sum, and paradoxically, the Digital Humanities seems to make sense only as far as paper-legacy is concerned, that means in the domain of computer-aided Humanities or, as one used to say, the ‘computing Humanities.’

The solution to this difficulty might be found in analyzing the canonical author/reader asymmetry more deeply than usual. Given the lack of clarity in the very notion of the ‘meaning of a text’ – while we have at hand a reasonable analysis of the meaning of a word, or of a sentence, it is highly questionable whether a rigorous counterpart

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<sup>3</sup>On “Electronic Literature”, namely digital born writing, not print literature digitized afterwards, [cf. 6].

to this is available for a *text* today – the simplest way is to start at the sentential level. According to the traditional picture, the author uses a certain sentence  $\sigma$  to express, or to refer to, some abstract entity  $A$ , which is  $\sigma$ 's meaning. The duty of the reader is to recognize that  $\sigma$  has that meaning. He is reading  $\sigma$  as meaning  $B$ , and he is right if  $B = A$ .

As simple as it may appear, this picture raises a series of difficulties. The first lies in the assumption of the pre-existence of the entity targeted by the author; as it were, an inert, sleeping entity waiting to be woken up by someone's statement. This view is not entirely indefensible: it has been notoriously advocated by Bolzano, who conceives his *Sätze an sich* in this way, i.e. propositions that are what they are independently of any speaker who is able to give them a linguistic form in his or her idiom. Nevertheless, one would prefer, *ceteris paribus*, to dispense with this metaphysical view of language, where authors are rarely considered either active or creative. As soon as we dismiss this kind of conception, we should also abandon the *deciphering model* of interpretation: readers are not trying to decode an author's message, for there is nothing for an author to encode.

Turning to more mundane entities and prosaic analysis, one could simply distinguish, (following [12]), between two kinds of products of a mental activity such as thinking. The first is a psychic product, the thought. These thoughts, and psychic products in general, never last. Far from being eternal *Gedanke an sich*, they ontologically depend on the thinker and they do not survive him or even his particular relevant thinking action. On the other hand, mental activity may be the (partial) cause of physical products, such as spoken or written sentences, which survive its non-lasting psychic products. In other terms, the only enduring products of mental activity are its material *traces*. Twardowski calls these traces psycho-physical products, because the people who accede to them may have a similar mental activity and produce similar psychic products for themselves. That is, roughly presented, the Twardowskian explanation of the way that 'thoughts' are subtracted from the transitoriness of one's mental life and potentially transmitted to others: by the mere survival of the material traces that often accompany and express psychic activities.

Returning to the question of author/reader asymmetry, it appears in this frame in another light. This asymmetry is essentially that of anteriority, in both a temporal and a causal sense: authors leave traces for their readers that can be interpreted by them to occasion similar mental episodes as those that governed the production of these marks. This 'naturalistic' account of the transmission of culture is, however, compatible with the normative component that is currently, and rightly so, felt to be an essential part of humanistic scholarship. All readers are not on the same line: one in a position of being acquainted with the trace and its material details is the best equipped to understand the author. That does not forcefully mean that the author's contemporaries are the only ones able to do this. Contrary to the spoken discourse, which, in order to be understood, often requires hearing *in praesentia*, the written discourse, when suitably

established and appropriately transcribed (metadata are crucial) can survive for a long time from the moment of its material production.

Far from being a renouncement of the traditional Humanities, DH may be viewed as scholarship put in the right perspective: neither platonic thoughts jointly targeted, nor abstract texts independent of their material realizations, but rather normed mental activity directed towards inscriptions and governed by them.

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