

Philosophy in an Evolving Web: Necessary Conditions, Web Technologies, and the Discovery Project

Thomas Bartscherer, Chicago
Paolo D'Iorio, Paris

Introduction

The Internet has been a mixed blessing for humanities' scholars, and especially for philosophers. On the positive side, instant access to an inexhaustible fount of information caters to our inveterate and equally inexhaustible curiosity. And recent developments in both habits of use and technological capacity—captured, albeit loosely, in the notion of Web 2.0—have made the Web, in particular, ever more hospitable to philosophy. And yet for the purposes of academic research, the Internet has heretofore suffered from decisive shortcomings. The very freedoms that make cyberspace a lively forum for intellectual exchange make it treacherous for scholarship. The litany of questions is familiar enough: how reliable, for example, are the articles in *Wikipedia*? Or those in any given electronic journal? Or the translations that can be found on, say, the *Pirate Nietzsche Page*? Is that website even in existence any longer? And if not, what happens if I cited it as a source in an essay I wrote? Perhaps one may think I had it coming, citing a website with a name like that. But how about the more staid-sounding *Conference: A Journal of Philosophy and Theory*, hosted by Columbia University? Or *Earth Ethics*? Or *Acta Philosophica: An International Journal of Philosophy* hosted by the Pontifical University of the Holy Cross? All were once available on the Web but are presently defunct, and while that last one may yet be resurrected, there is no shortage of examples of online resources that have disappeared forever. And there is the more general and more pervasive problem of broken links.¹ In a nutshell, the questions pertain to standards of quality and stability of sources.

In this paper, we shall be considering how digital technology—and in particular recent innovations in networking and Semantic Web—can be exploited to assist scholars in conducting academic research while at the same time avoiding the pitfalls that render the Internet a false friend of scholarship.

We begin with an attempt to articulate certain principles that are independent of any given technology but are of fundamental significance for the humanities in general as it becomes ever more intertwined with emerging information technology. In light of these principles, we then turn to a detailed look at one particular example—the Discovery Project, recently launched under the aegis of the European Union’s eContentplus programme—that is presently developing a web-based network for academic research in philosophy.² And we conclude by noting three major challenges that confront this project and all similar initiatives aimed at integrating humanities research and digital technology.

Conditions of Possibility

The digitization of humanities research thus far has in many cases been driven more by capacity than need, with each advance in technology inspiring a new set of aspirations and plans, many of which never come to fruition or quickly lose relevance. In what follows, we shall be discussing a project that, through its engagement with emerging technologies, runs precisely these risks. While such risks are unavoidable in this field, we believe that they can be minimized, and it is to this end that we would like to emphasize the importance of beginning with a reflection on how humanities scholarship has traditionally been structured and practiced. The more accurate one’s understanding of the underlying presuppositions of academic research, the better equipped one will be to conceive, design, and evaluate technological support for it. Concretely, we would like to try to formulate certain principles that undergird scholarship in the human sciences as it has come to be practiced in the West. To borrow a Kantian formulation, one could say that these are conditions necessary for the possibility of scholarship. While not purporting to have assembled an exhaustive list, we offer the following preliminary set of interrelated conditions:

- i. *Stability*—Once published, a scholarly source must remain in a fixed form at a fixed, citable address. This is a familiar expectation in the context of paper publishing. The citation—complete with the name of the source, its author, the publisher, and the publication date—points to a source that is fixed in its published form. Insofar as academic research functions as a science, it requires that authors make and defend claims which are then open to refutation. The stability of sources is a necessary precondition for this activity. Once published, a text cannot be “unpublished,” nor can

someone other than the author change the text without the author's consent. Subsequent changes made or authorized by the author, meanwhile, result in the creation of a new source document—e.g., a second edition that will be identified as such in its title and in any citations pointing to it.

- ii. *Accessibility*—Both primary sources and secondary scholarship in a given field should be made generally available for consultation and review by others working in that field. Without access to primary sources, scholars are, to varying degrees, at the mercy of intermediaries and constantly at risk of over-reliance on the argument from authority. Access to secondary sources, meanwhile, is necessary not only so that the knowledge may be shared, but so that arguments may be tested, verified, or refuted. This has traditionally been ensured by the preparation and publication of texts on the part of scholars, and by the establishment and support of libraries that acquire this material and furnish it to scholars.
- iii. *Durability*—In principle, published texts should be preserved and permanently available. In the paper world, this has traditionally been the responsibility of libraries and archives.
- iv. *Dissemination*—While properly thought of as a means by which accessibility and durability are achieved, dissemination merits emphasis because of the key role it has played in the development of scholarship. The reproduction and distribution of texts—originally in manuscript, then in print and now also in photographic and digital formats—has been, in practice, the most effective means to ensure that scholars have access to primary and secondary material. At the same time, the more broadly a text is disseminated, the more likely it will be that it survives the vicissitudes of time.
- v. *Standards of Quality*—This is, to be sure, complex and controversial territory, but it is in the nature of academic scholarship that standards be established and enforced. In academic publishing, editorial prerogative, institutional oversight, and peer review have all traditionally played roles in maintaining standards of quality.

Discovery

To see how these principles might be realized in the digital environment, we turn now to the Discovery Project, a multi-national initiative co-financed by the European Commission under the aegis of the eContentplus programm and launched in November 2006 with a total budget of € 2,912,289.00.³ Discovery is developing a two-tiered infrastructure consisting of, 1) *philosource*, an extensive digital library of primary sources and peer-reviewed secondary material that is augmented with metadata for Semantic Web compatibility; and 2) *philospace*, a networked peer-to-peer desktop application that works in conjunction with *philosource* to process and manipulate Semantic Web data, permitting users to add metadata and build ontologies.⁴ While *philospace* is designed to exploit the great power of the Internet to support open, fluid, loosely structured, fast-moving intellectual exchange, *philosource* is directly concerned with assuring the necessary conditions for the possibility of scholarship.⁵

Philosource

Philosource will be a digital library of primary sources and a publishing venue for scholarship, both new and previously published. While it is conceived as a continually expanding collection, it will originally be launched with a substantial kernel of material consisting of representative philosophical works, drawn from the entire history of western philosophy, that are not yet freely available on line in reliable scholarly editions. It will be helpful first to sketch an overview of that initial critical mass of content before taking up the question of how *philosource* proposes to meet the conditions outlined above.⁶

a. Ancient Philosophy

Three authoritative reference works will form the core of the ancient material in *philosource*:

- a complete electronic edition of the fragments and testimonia of the pre-Socratic philosophers, based on *Die Fragmente der Vorsokratiker* edited by Diels and Kranz, in ancient Greek with German and Italian translations.
- a complete electronic edition of all testimonia related to Socrates and the so-called Minor Socratics, based on Giannantonis' *Socratis et Socra-*

ticorum Reliquiae and including, in addition, the text of Aristophanes' *Clouds* and Xenophon's Socratic writings, all in ancient Greek.

- the complete text of Diogenes Laertius' *Lives of the Philosophers*, in ancient Greek with accompanying Italian translation.

This material is being prepared in Rome by the *Istituto per il Lessico intellettuale europeo e Storia delle idee* (ILIESI) of the Italian Consiglio Nazionale delle Ricerche (CNR).

b. Early Modern Philosophy and Science

This group of materials, also being prepared by ILIESI, contains a selection of philosophical and scientific texts in Latin, Italian and French, from the 16th to the 18th centuries. Authors represented, and some sample texts, include G. Bruno, *De infinito, universo et mundi* and *Spaccio de la bestia trionfante*; R. Descartes, *Meditationes de prima philosophia* and *Passions de lame*; B. Spinoza, *Tractatus politicus* and *Ethica ordine geometrico demonstrata*; G. W. Leibniz, *De primae philosophiae principia (Monadologia)* and *Principes de la nature et de la grâce fondés en raison*; G. B. Vico, *Principi di una scienza nuova* and *De uno universi iuris principio*; and A. G. Baumgarten, *Meditationes philosophicae de nonnullis ad poema pertinentibus*.

c. Post-Enlightenment Philosophy

NietzscheSource (or the HyperNietzsche Project⁷) at the *Institut des Textes et Manuscrits Modernes*, CNRS-ENS, Paris) has already digitized roughly 30,000 pages of primary material for the study of Friedrich Nietzsche, including manuscripts, correspondence, first editions of Nietzsche's published works, photos, and other biographical documents.⁸ Roughly 8000 pages of this material have already been published on the website, with the balance to come over the next two years. This facsimile edition is one of the three main components of the site's collection of primary sources. The second is an xml-encoded digital version of the Colli-Montinari critical edition of Nietzsche's published works, posthumous fragments, and correspondence. Finally, NietzscheSource will provide access to a complete genetic edition (including all the manuscripts, fair copies, proofs, and the first edition) in facsimile and scholarly transcription of *The Wanderer and his Shadow* and *Daybreak*. The former has already been published and the latter is currently being proofread for publication on the site.

The *Wittgenstein Archives* at the University of Bergen (WAB) will contribute 5000 pages of the Wittgenstein *Nachlass* to *philosource*, including

material from the Big Typescript complex (1929-1934), the Brown Book complex (1934-1936), the “Lecture on Ethics,” and “Notes on Logic,” in both facsimile and critical transcription, including texts in German and English with Wittgenstein’s own translations of English texts into German and vice versa. These primary sources will be accompanied by a continually expanding multilingual resource of Wittgenstein research material, including text, audio, and video files from WAB’s collection “«Fragments»: Views into Wittgenstein Research.”⁹

d. Contemporary Philosophers

Some three hundred video and/or sound segments featuring contemporary philosophers addressing a range of philosophical topics will be made available by RAI Radiotelevisione Italiana (RAINET). These segments are drawn from several philosophy-related series in RAI’s vast archives. Included are thematically organized lectures and interviews on the history of philosophy and contemporary philosophical problems, drawn from RAI’s *Enciclopedia Multimediale delle Scienze Filosofiche* (Multimedia Encyclopaedia of the Philosophical Sciences); specially designed hour-long “video monographs” from the series *The Roots of European Philosophy*; half-hour segments presenting philosophical perspectives on social and political issues from the series *Philosophy and Current Affairs*; and material from other relevant series. Prominent philosophers featured in these programs include H.G. Gadamer, Gilles Deleuze, Paul Ricoeur, and Gianni Vattimo.

In addition to being a multi-media digital library, *philosource* will be a publishing venue that maintains standards of quality at least as demanding as those in the best paper journals. Material submitted for publication will be subjected to double-blind peer review by an Editorial Board of established experts. Secondary work accepted for publication will be fully integrated with both the primary material available on the given website and with all the other secondary material on the site. So, for example, if an article cites either a primary or secondary source that is present on the site, links will automatically be established from article to source. Likewise, when viewing any source on the site, the user will have immediate access to all the other material that cites that particular source. This system can function at various levels of granularity. For example, while viewing Nietzsche’s *Daybreak* one could choose to see a list of all the articles that refer to the text as a whole, to a given section of the text, or to a particular aphorism. The system could, theoretically, be refined to an even more narrow focus—homing in on a par-

ticular line, phrase, or word. Moreover, the affiliated websites that constitute *philosource* will be similarly integrated, meaning that an article published on the Nietzsche site that references the Diels-Kranz edition of the pre-socratics would be automatically linked to the Diels-Kranz source, and so forth.

Returning now to the question of the conditions for the possibility of scholarship, Discovery will be instituting two measures to ensure the *stability* of scholarly sources. The first is a principle to which Discovery is committed and one that is made clear to authors through the publication agreement: an item published in *philosource* cannot subsequently be modified or deleted by anyone, including the author.¹⁰ Second, every item published in *philosource* is given a permanent URI (Universal Resource Indicator), which will make the item available via a simple, intuitive, and citable web address. For example, a complete facsimile edition of the notebook labeled N IV 1 in Nietzsche's archive is available at the address <<http://www.hypernietzsche.org/N-IV-1>> . One can also specify page number and even individual notes on the page, so <[http://www.hypernietzsche.org/N-IV-1,5\[1\]](http://www.hypernietzsche.org/N-IV-1,5[1])> goes directly to the first note on page 5 of the notebook N IV 1. Nietzsche's published works are accessed through a similar system: <<http://www.hypernietzsche.org/WS-3>> accesses the third aphorism of *The Wanderer and his Shadow*. Secondary sources, meanwhile, are identified by author, so for example the first contribution by Mazzino Montinari to HyperNietzsche bears the stable address <www.hypernietzsche.org/mmontinari-1>.

As has often been observed, much of the activity on the Web resembles a vast, ongoing conversation, more like spontaneous, ephemeral face-to-face communication—hence the ubiquity of the term “chat”—than like the authoring of books and articles. This aspect of the web is most manifest in what has come to be called the blogosphere. But *scholarly* conversation, whether in the hard or the human sciences, is a special kind of conversation. At its core lie the making, critique, and defense of claims, or in other words, demonstration followed by refutation or confirmation. And this in turn requires stable sources. While the value of such stability has long been recognized in the world of paper publishing, it has heretofore been largely neglected in the hectic, future-obsessed digital realm.¹¹ If the notion of ensuring such stability on the Web were to take hold, it may mean that the next “revolution” in digital culture will take the form of a partial “restoration,” a renewal of time-honoured customs in a world altogether new.

Our second principle, *accessibility*, is optimized by *philosource*. Let us take Nietzsche studies as an example. In this field, Nietzsche's published texts and *Nachlass* are customarily regarded as primary sources. Various critical editions of his work have been published over the years, but all of

them, even the celebrated Colli-Montinari edition, remain *editions*. They are not without weaknesses and they always act, to some extent, as a screen or filter between the scholar and the original source. This is prominently so in the case of the *Nachlass*, for which the real primary sources are the manuscripts that are stored in the Nietzsche archives. The Colli-Montinari edition makes much of this material available in a convenient form, but at the cost of serious distortion.¹² By making digital reproductions of those manuscripts available online for free, *philosource* brings scholars much closer to the original sources and permits competing claims to be adjudicated on that more solid basis. Moreover, the increased accessibility of secondary sources leads to an overall gain for the field, as arguments are subjected to increased scrutiny and therefore are more likely to be refuted or confirmed by other scholars.

What we have called the *durability* of scholarly resources is a concept that overlaps somewhat with both *stability* and *accessibility*, but it places emphasis more on the bare existential issue: whether scholarly material will be preserved for the future. *Discovery* responds to this need in two ways. First, the project is committed to developing the institutional structures necessary to ensure free access in perpetuity to the material it publishes. While not a guarantee of success, prioritizing long-range planning from the start at least maximizes the chances that solutions will be found. Second, *Discovery* subscribes to a principle clearly articulated and defended by the project whose acronym communicates the key idea: LOCKSS, or, *Lots of Copies Keep Stuff Safe*.¹³ Whatever commercial advantage the various regimes of “digital rights management” may or may not have, from a preservationist’s perspective, they are troubling. As students of antiquity know, the more copies that are made of a text, the more likely it is to survive. This insight lies behind the decision to use Copyleft licenses in *philosource* and thereby to encourage the wide distribution and reduplication of scholarly material.

Philosource, like many other recent initiatives, thus exploits the power of the Internet as a tool for the *dissemination* of information in order to ensure both the accessibility and the durability of research resources. Often, however, electronic dissemination is pursued energetically without sufficient attention being paid to questions of stability and quality. *Discovery* aims to see whether a research paradigm can be developed for the Internet in which all of these conditions are met and are in fact mutually reinforcing.

To ensure standards of *quality*, *Discovery* relies on double-blind peer review, which is, in terms of objectivity, the most rigorous form of quality control in academic publishing. Each affiliated site is responsible for establishing an Editorial Board to oversee the review and publishing procedures

on that site. In contrast to some traditional publishers, the Editorial Board of NietzscheSource, for example, will not be appointed by the publisher, nor, at the other extreme, will it consist simply of all users of the site, as in the case of organizations run by direct democracy. Rather, the community of users of the site vote to elect a representative Editorial Board drawn from the members of the community, and the Board is then responsible for all editorial decisions.

While the program adopted by *Discovery* is expressly designed to provide for the conditions indicated, it must be acknowledged that even for a project so designed there are significant challenges to maintaining those conditions in the digital environment over the long term. We will consider some of those challenges at the close of this essay.

Philospace

We now turn to the other aspect of *Discovery*, which aims to harness the power of emerging Semantic Web technology for the purposes of research in philosophy. The idea here is to develop a desk-top application, called *philospace*, that functions in conjunction with *philosource* but that also exploits the potential of collaborative, open source scholarship through the use of peer-to-peer networking and semantically structured metadata. If *philosource* is a kind of library, *philospace* is like a personal workspace that, through networking, becomes a public forum for scholarly exchange.

One way to think about *philospace* is to compare it to how scholars have traditionally worked. Imagine a scholar in 1960 working on the concept of eternal recurrence in Nietzsche. She may own a copy of the *The Gay Science* and have filled the margins of §341 with handwritten notes, which might well include citations of related passages in the same book or in other works from Nietzsche or in works from other authors. This scholar would also likely have written down thoughts in notebooks, including citations to other sources. The idea behind *philospace* is to permit scholars to collaborate at this stage of research, before their work is ready for publication. It is as if our scholar working on eternal recurrence were to make her copy of *The Gay Science*, together with all her annotations, citations, and notes available to others interested in the same topic and were, in turn, to have access to similar material that her colleagues make available, all in a highly structured, easily navigable environment. With *philospace* scholars will be able to augment and enrich the content of the *philosource* material with new, un-reviewed contributions without comprising the integrity of that which has been of-

ficially published. Sophisticated filtering mechanisms will be designed to permit scholars to select what they wish to make public and to sift through the mass of material from other scholars quickly and easily.

Philospace will be a customized version of an existing application called *Dbin*.¹⁴ In technical terms, *Dbin* is a peer-to-peer desktop application, similar to existing file-sharing applications, but one that traffics in Semantic Web metadata to permit browsing, searching, and the editing of annotations. *Philospace* will rely on a “Brainlet”, a domain-specific application, to tailor the program to the specific needs of each research community. *Dbin* permits the gradual, sustainable development of a local database that supports semantically driven browsing and intelligent interaction with the local media and files. *Dbin* also accommodates a number of experimental modules to deal with specific kinds of metadata (audio metadata extraction, textual analysis, desktop integration) and provides a domain-specific user interface. Importantly, *Dbin* also includes an RDF subgraph digital signature facility that uses personalized trust policies to provide filtering out of unwanted information.

Future Challenges

In closing, we would like to call attention to three interrelated and significant problems that will be confronted by the Discovery project, and by any similar initiatives, in the foreseeable future. The first is the difficulty of coordination and execution. To harmonize such a large and diverse set of actors and material is exceedingly difficult in the decentralized world of academic scholarship, and that difficulty is amplified by the instability of rapidly evolving technology. In this regard, there is reason to be optimistic about *Discovery*'s prospects. The partners comprising the consortium have a proven record of accomplishment, the objectives are clear, and thus far at least, collaboration has proceeded smoothly. But still, the road from potential to actual is full of pitfalls.

Even if the project achieves its major objectives, it is not certain that there will be financial support available to preserve those achievements beyond the initial founding stage, which is financed through a limited-duration government grant. Moreover, as noted in the discussion of stability and durability, it is essential to the success of *Discovery* that the material in *philospace*, at least, be sustained in perpetuity. Here again, there is reason for optimism. Most of the partners that comprise *Discovery* are firmly established, well-financed public institutions with substantial physical, not just “virtual”, pres-

ence and assets. These institutions are rooted in their respective societies and have stable sources of funding. And it should also be noted that the cost of simply maintaining, as opposed to augmenting, a project like *philospace* is relatively miniscule: at a bare minimum, one large server and one staff person could keep it all going.

Perhaps the most profound concern, however, is the threat of obsolescence. From a technological perspective, it is not enough simply to maintain such a resource; it must be consistently upgraded to sustain a functioning and profitable relationship with other information systems. From a theoretical perspective, meanwhile, the danger of obsolescence is no less serious: the way we think about the organization of information is constantly affected by the tools at our disposal, and those tools are changing at a rapid rate. In this, however, we are simply confronting the radical uncertainty of the future, which to one degree or another haunts all human endeavour and about which one can only wonder. If we remain optimistic at this point, it is with the belief that Aristotle was right when he said that philosophy begins in wonder.

References

- Bartscherer, T. (2003). Ecce HyperNietzsche: It's Not Just the Philology of the Future Anymore. *NMEDIAC: The Journal of New Media and Culture* 2 (2). <http://www.ibiblio.org/nmediac/fall2003/ecce.htm> (accessed 10 September 2007).
- Bartscherer, T. (2007). La naissance d'Hyper enfanté par l'esprit de la critique génétique. IN Gifford, P. & Schmid, M. (Eds.) *La création en acte: devenir de la critique génétique*. Amsterdam, Rodopi.
- D'Iorio, P. (Ed.) (2000a). *HyperNietzsche. Modèle d'un hypertexte savant sur Internet pour la recherche en sciences humaines. Questions philosophiques, problèmes juridiques, outils informatiques*, Paris, Presses Universitaires de France.
- D'Iorio, P. (Ed.) (2000b). *HyperNietzsche. Modèle d'un hypertexte savant sur Internet pour la recherche en sciences humaines. Questions philosophiques, problèmes juridiques, outils informatiques*. Presses Universitaires de France, Paris. <http://www.hypernietzsche.org/doc/puf/> (accessed 10 September 2007).
- D'Iorio, P. (2002). Principles of HyperNietzsche. *Diogenes*, 49, 58-72.
- D'Iorio, P. (2007). Nietzsche on New Paths: The HyperNietzsche Project

- and Open Scholarship on the Web. IN Fornari, M. C. (Ed.) *Friedrich Nietzsche. Edizioni e interpretazioni*. Pisa, Edizioni ETS.
- Gerike, I. (2000). Les manuscrits et les chemins génétiques du Voyageur et son ombre. IN D'Iorio, P. (Ed.) *HyperNietzsche. Modèle d'un hypertexte savant sur Internet pour la recherche en sciences humaines. Questions philosophiques, problèmes juridiques, outils informatiques*. Paris, PUF.
- Groddeck, W. (1991). 'Vorstufe' und 'Fragment'. Zur Problematik einer traditionellen Unterscheidung in der Nietzsche Philologie. IN Stern, M. (Ed.) *Textkonstitution bei mündlicher und bei schriftlicher Überlieferung*. Tübingen, Niemeyer.
- Ho, J. (2005). Hyperlink obsolescence in scholarly online journals. *Journal of Computer-Mediated Communication*. <http://jcmc.indiana.edu/vol10/issue3/ho.html> (accessed 2 September 2007).

Endnotes

- ¹ It is worth noting that the common practice of citing the date of access when using electronic sources is of little help if the source subsequently disappears. For a study of broken link syndrome, see (Ho, 2005).
- ² See note 3.
- ³ For more information about the Discovery, see the project's website: <<http://www.discovery-project.eu>>. For more information about the eContentplus programme, see <http://europa.eu.int/information_society/activities/econtentplus/>. The present authors are both currently affiliated with project, of which D'Iorio is the director.
- ⁴ For a basic introduction to Semantic Web, metadata, and digital ontologies, see the site of the World Wide Web consortium (W3C): <<http://www.w3.org/2001/sw/>>, <<http://www.w3.org/Metadata/>>, and <<http://www.w3.org/TR/webont-req/#onto-def>>.
- ⁵ It is worth emphasizing that *Discovery* is an integrated project, bringing together both humanities scholars and IT specialists, stakeholders from both the academy and industry. Partners include: the *Institut des Textes et Manuscrits Modernes* of the *Centre National de la Recherche Scientifique*, Paris; *Lessico Intellettuale Europeo e Storia delle Idee* (ILIESI), Rome; the *Wittgenstein Archives* at the University of Bergen (WAB), Bergen; the Department of Electronics, Artificial Intelligence and Telecommunications at the Polytechnic University of Marche (DEIT), Ancona; the Italian public broadcaster Rai Radiotelevisione Italiana (RAINET), Rome; and the Pisa-based IT company Internet Open Solutions (Net7). The project will also hold workshops and training sessions designed to encourage support from academia, pri-

vate industry, and governmental bodies to sustain the project after the initial period of EU funding.

- ⁶ The following overview is adapted from the Discovery website: <<http://www.discovery-project.eu>>.
- ⁷ NietzscheSource is the successor to the HyperNietzsche Project. Material originally published at www.hypernietzsche.org will still be available through the original address or at www.nietzschesource.org.
- ⁸ For more information about the project, see (Bartscherer, 2003, Bartscherer, 2007, D'Iorio, 2000a, D'Iorio, 2000b, D'Iorio, 2002, D'Iorio, 2007).
- ⁹ See <http://wab.aksis.uib.no/wab_contributions.page>.
- ¹⁰ Corrections and additions of any kind can of course be made after the original publication, but such addenda will be clearly marked as subsequent additions and the date of entry will be noted. The original text will always remain accessible in its original form.
- ¹¹ There are exceptions, prominent among them the Netpreserve consortium: <<http://net-preserve.org/about/index.php>>.
- ¹² For a discussion of some weaknesses in the Colli-Montinari edition, see and (Grodeck, 1991, Gerike, 2000).
- ¹³ See <<http://www.lockss.org/lockss/Home>>.
- ¹⁴ *DBin* is being developed at *Semantic Web and Multimedia Group (SEMEDIA)* at the *Università Politecnica delle Marche*, Ancona, Italy. See <<http://www.dbin.org>>.