

# Two Approaches to the Philosophy of Information

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## 1. The Analytic Approach to the Philosophy of Information

Of our mundane and technical concepts, information is currently one of the most important, most widely used and least understood. So far, philosophers have done comparatively little work on information and its cognate concepts. The paradoxical situation may soon count as one more “scandal of philosophy”.<sup>1</sup> However, the problems are fairly recent, dating back half a century or even less,<sup>2</sup> and work is already in progress—witness this special issue of *Minds and Machines* and some important collections<sup>3</sup>—so we might still be in time to do a good job. Philosophy, understood as conceptual exploration and analysis, needs to turn its attention to the new world of information. This is a quick and dirty way of introducing the field that, in other contexts,<sup>4</sup> I’ve defined as the *philosophy and information* (PI). As an introduction, I believe it to be reasonably convincing. There is definitely a reassuring sense of *déjà vu* about it, and I have seen it becoming increasingly acceptable even among the more sceptical. But if this is the whole story, I must admit that I’m not entirely satisfied. Before explaining why, let me briefly elaborate on it.

The story is familiar, so I shall merely sketch it. It goes roughly like this. Somehow, somewhere, new conceptual problems, confusions, and vacua arise. As these issues are neither easily predictable nor often preventable, I agree with Hegel that philosophers tend to arrive on the scene of crime after things have gone badly wrong, or at least wrong enough to demand their attention. They usually agree to join forces against conceptual vandalism, pollution or mere slackness, but soon start differing on the best strategy for taking care of the hard problems, those that are genuinely open to informed debate and honest, reasonable disagreement, not just in principle. Inevitably, competing methodologies, analyses and solutions emerge, until new difficulties require further work elsewhere and philosophy moves on. The optimistic view is that every drop of conceptual clarification helps. Pouring water on the same fire from different angles is the positive outcome of a pluralistic approach, rather than evidence of irreparable and counter-productive disagreement. Two interesting implications are that the source of philosophical activity is fully externalized—philosophers will be in business for as long as humanity generates conceptual muddles and novelties (i.e., forever)—and that philosophy does de-



*Minds and Machines* 13: 459–469, 2003.

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velop, for it can be more or less timely, depending on how successfully it interacts with the culture within which it flourishes.

According to this story, the computer revolution, the informational turn and the ICT (Information and Communication Technologies) society have recently generated plenty of conceptual problems, confusions and vacua, many new ideas and unprecedented issues, several new ways to revisit old theories and issues, and so forth. This new combination of informational confusion and virgin territory constitute the sort of “reclaimable land” that philosophy is typically called upon to explore, clear and map. So, the argument goes, today we need a PI, understood simply as a (Kuhnianly) normal development in the history of philosophy, an important expansion of the philosophical frontier whose time has quite clearly come, but which certainly won’t be the last.

There is a more cynical version of the story, usually associated with the early Wittgenstein. Nowadays it seems less and less popular, but it can be found, by reading between the lines, in many philosophers, from Descartes to the Vienna Circle. Let me introduce it by an analogy.

Anti-virus companies don’t write the viruses that they help to fight, but they do flourish because of them, so urban legends insist on the opposite view. It is the simplistic logic of the *cui prodest* (the perpetrator of a crime is whoever profits by it) spiced up with some classic conspiracy theory. Now Wittgenstein, but not only Wittgenstein, had a similar complaint about philosophy. Philosophers generate the very mess they appoint themselves to clean up, and make a living thereby. And just in case you thought this to be some sort of post-modern *maladie*, let me quote Berkeley, who phrased the complaint very incisively:

Upon the whole, I am inclined to think that the far greater part, if not all, of those difficulties which have hitherto amused philosophers and blocked up the way to knowledge, are entirely owing to ourselves—that we have first raised a dust and then complain that we cannot see.<sup>5</sup>

Two interesting implications of this view are that now philosophy does not so much interact with the culture within which it develops as with its own intellectual tradition, and that, since the source of philosophical activity is internal, philosophers may put themselves out of business by eradicating their own conceptual problems once and for all (i.e., never). Admittedly, the cynical view loses in terms of external timeliness, but there is still a sense of philosophical development, gained in terms of internal eschatology. It seems that Heidegger shares at least this much with Wittgenstein.

I’m not sure the cynical view can be nonchalantly dismissed as merely another urban legend, but I certainly disagree with its extremism and its lack of hermeneutic charity. Of course, quite a lot of philosophical work can be explained in the light of this view. If we restrict our attention to PI, we may consider, for example, the trust placed by many philosophers of mind in computational and informational approaches, or Quine’s “cognitization” of epistemology. In cases such as these, PI can work as a powerful methodology to debug past philosophical mistakes, in-

cluding those caused by PI itself. The analysis of the misuse of the Church-Turing thesis and of the concept of a Universal Turing Machine provides an instructive example (Copeland, 2003). Nevertheless, “upon the whole”, we should not confuse the mixture of responsibility, enthusiasm and relief—which the philosophical community may feel on finding a new conceptual mess, which will keep it in business for a while—with a desire to see things go badly just for the sake of philosophical exercise, or with a childish inability to play without making a mess. Berkeley, and hence Wittgenstein, were wrong. For the truth is that philosophy has no external space of reason where it can dump its waste, so philosophers are sometimes forced to clean up the mess inadvertently left behind by previous generations in the course of their more constructive work. Berkeley simply mistook sawdust for dust.

So goes the familiar story and its two well-known interpretations. Both agree on describing philosophy’s positive mission as a process of semantic exploration and policing. Both allow, indeed seem to require, the development of PI as the next step to be taken within the analytical tradition. The line of reasoning is simple. The information revolution has been changing the world profoundly, irreversibly and problematically for some time now, at a breathtaking pace and with an unprecedented scope. It has thus created entirely new realities, made possible unprecedented phenomena and experiences, provided a wealth of extremely powerful tools and methodologies, and raised a wide range of unique problems and conceptual issues. All this calls for conceptual analysis and exploration, and hence for the development of PI.

## 2. The Metaphysical Approach to the Philosophy of Information

One could say that our previous narrative opens, like *Hamlet*, with the philosopher-sentinels on the battlements of history, patrolling the foggy unknown and struggling with the appearance of conceptual ghosts. Now, this is a very promising *incipit*, but I find the introduction of PI as an upgraded version of philosophical semantics—one more guard on the wall who, like Barnardo, “comes most carefully upon its hour”<sup>6</sup>—only partly satisfactory. Explaining why is not too hard but it is somewhat embarrassing. This is because it requires me to recall another story that academic good manners and intellectual sensitivity might prefer to leave untold. Here it is.

There is a “metaphysical crime” at the roots of contemporary philosophy. To remind ourselves about it is to touch one of the most sensitive nerves in the philosophical body. And since talking of the death of God may be in bad taste, let us consider instead the gradual disappearance of that metaphysical principle that in Descartes creates *res extensa* and *res cogitans*, keeps them from falling apart, makes sure that knowledge and reality communicate noiselessly and undisturbed by malicious inferences, and keeps all eternal truths immutable and fully accessible. Let us call this powerful but brittle principle “god”. Descartes’ god is not Kierkegaard’s God but only a metaphysical guarantee of an objective, universal

semantics that eventually harmonises and gives sense to nature and history, culture and science, minds and bodies. It may be nothing holy, sacred or transcendent—and this was Kierkegaard's charge against Descartes—but, because it is supposed to be the ontic and rational foundation of any reality, it is also the ultimate source of semanticisation that the Cartesian Ego needs in order to escape its solipsism and to make sense of the world and its life in it, as something intrinsically meaningful and fully intelligible.

From Descartes to Kant, epistemology can be seen as a branch of communication theory. Ultimately, its task is decrypting and deciphering the world, god's message. From Galileo to Newton, the scientific task is made easier by a theological background against which the message is guaranteed to make sense, at least in principle. So, whatever made Descartes' god increasingly frail and ultimately killed it—and it may well be that very Ego that soon considers itself sufficient for the epistemological foundation of a fully rational and human metaphysics—Nietzsche was right in mourning its disappearance. Contemporary philosophy is founded on that loss and the ensuing sense of the irreplaceable absence of the great programmer of the game of being. Already in Hume and very clearly in Kant, making sense of the world is a heavy burden, carried entirely on the shoulders of the I (it is indicative, for example, that Husserl revisited the *Mediations* form an Ego-centric perspective that had no more space or role for god). The solitude of the I in a silent universe becomes evident in German Idealism, which can be read as a series of titanic attempts to reconstruct an absolute semantics by relying on very streamlined resources: the mind and its dialectics. The grand project is a naturalization of the I and an I-dealization of nature. The natural allies are a powerful philosophy of history and of course Greek philosophy, as the stage of pre-theological thought. But, in the end, German Idealism is unable to overcome Kant's dualism by re-acquiring Greece's virginity concerning the integral place of the mental within nature, while the scientific view gradually replaces the historical view. The gap between mind and being cannot be erased by travelling back in time, pace Heidegger.

An information-theoretical understanding of ontology and hence a *constructivist*<sup>7</sup> approach to the conceptualization of reality, an "object-oriented" treatment of information, and an insightful understanding of the centrality of the dynamic (hence historical) processes of information: the vocabulary has changed, yet these seem to be some of German Idealism's most important and still vital contributions to PI. From Kant to Hegel, the mind is recognized to be essentially poietic, and its ontologization of Being is accepted as the praxis-related condition of possibility of its flourishing. Dualism is beautiful, whether dialectically reconciled (Hegel) or not (Kant), whereas a-theistic monism can only be alienating, as a Being-ization of the I. For there is no openness to Being without the annihilation of the opened, witness animal intelligence, which is petrified by the world, and hence absorbed into the world. The mind needs to be decoupled from Being in order to flourish. This is something that Heidegger seems to have overseen in the history of ontology.

After the Idealist effort to synthesise meaning through a theology of the I, subjectivism and naturalism, the shattered components of the modern-Cartesian picture, start floating apart. Dualism is antedated to Descartes himself, rightly in terms of genesis, wrongly in terms of advocacy, since in Descartes mind and Being are still two branches of the same metaphysical tree. The linguistic turn represents the full acknowledgement of the untenability of the modern project of an epistemology that reads in Cartesian terms a world-message whose original meaningfulness can no longer be taken for granted. The informee is left without informer. Whether there is any meaningful message, instead of a chaotic world of data understood as constraining affordances, depends now on whether it is possible to construct a semantics that depends entirely on the informee, or at most on the environment in which the informee operates, be this society and history, as in Marx,<sup>8</sup> or nature. The debate on scientific realism and the need for a theory of meaning—two direct consequences of the disappearance of Descartes' god—are rightly recognized as two pressing issues in contemporary philosophy. But analytic philosophy initially reacts to the failure of the various Idealisms and the successes of the various sciences by retreating behind the trench of diagnosis and reconstruction. It is a reaction caused by disappointment, as Moore, Russell and Wittgenstein (but also, in a different context, Dewey, Peirce and C.I. Lewis) testify.<sup>9</sup>

The construction of a fully-meaningful view of the world, which can stand up unaided by an external, metaphysical source of creation and semanticization, is postponed. Kant's negative lesson—protecting the frontiers of philosophy from bad metaphysics and plain nonsense—continues to be the only good lesson, and dominates the metatheoretical agenda. Philosophers are dispatched to guard frontiers more and more distant from the capital of human interests. In search of a theory of meaning from which to begin the re-semanticization of reality, analytic philosophy goes through a syntactic, a semantic and then, more recently, a pragmatic season.<sup>10</sup> The I is first the speaker and then also the agent. The Cartesian Ego is re-embodied and then re-embedded, first within the community of speakers, then in an environment of interacting agents situated in the world. It is naturalized as a cognizer rather than a knower, turned into a distributed agent or a society of interacting agents, rather than an individual. Naturalism begins outsourcing epistemic and semantic responsibility. But while searching for a way to fill the semantic gap left by the death of god, the philosophical task remains the same: invigilating over whatever semantics is left in a godless universe. The consequence is a paradoxical de-responsibilization of philosophy itself, which fails to replace god after its disappearance, while allowing (when not programmatically delegating) other narratives to compete for the role of ultimate source of meaning, from political and economic doctrines to religious fundamentalisms.

The metanarrative that sees philosophy as conceptual analysis was very popular until recently (Dummett, 2001). In more edulcorated versions, is still with us, I suspect mainly for lack of serious competition. Actually, it should not be taken too rigidly. A lot of analytic philosophy has always been far more constructionist

that it ever wished to admit. For many years, the metanarrative was, politically, the official reply given to sceptical visitors or funding agencies inquiring about the philosophical trade. Yet, conceptually, it was also the outcome of the death of god and the following metaphysical crisis, the trademark that kept philosophy in business during the twentieth century. We should be grateful to past generations for its formulation, for it was a great achievement at a time when philosophy was in danger of extinction, irrational fragmentation or nostalgic metaphysization. We have also seen that, as a metatheoretical frame, it has aged well, for it can still account, convincingly, for the emergence of a new field such as PI. But it also seems to have become increasingly constraining and unsatisfactory.<sup>11</sup> For, while philosophy was fighting a rearguard action against its own disappearance, the post-Cartesian Ego, whose semantic activities analytic philosophy was supposed to guard, was evolving dramatically. Slowly but surely, it morphed from an agent subject to nature and an orphan of its god into a *demiurge*, progressively more accountable for its epistemic and ontic activities, with moral duties and responsibilities to oversee the preservation and evolution of present and future realities, both natural and artificial.

The technical term *demiurge* should be understood here partly in its Platonic sense and partly in its original meaning. Plato's *Demiurge* is not an omnipotent God, who produces the universe out of nothing, but a smaller god, who moulds a pre-existing reality according to reason. On the other hand, *demiourgos*, which literally means "public worker", was originally used in Greek to refer to any artisan practising his craft or trade for the use of the public. So by *demiurge* I mean here an artisan whose extended but not unlimited ontic powers can be variously exercised (in terms of control, creation, modelling, design, shaping, etc.) over itself (e.g., ethically, genetically, physiologically, neurologically, narratively), over society (e.g., legally, culturally, politically, economically, religiously) and over natural or artificial environments (e.g., physically and informationally) for the use of humanity. This demiurge is like a gardener that builds her environment and takes care of it (note that, contra Heidegger, *poiesis* is taken to be more primordial than *caritas*).

The history of contemporary philosophy may be written in terms of the emergence of humanity as the demiurgic Ego, who overcomes the death of god by gradually accepting its metaphysical destiny to replace god as the creator and steward of reality, and hence as the ultimate source of meaning. This demiurgic turn is the real watershed between our time and the past. After it, constructing, conceptualizing and semanticizing reality has become as crucial as analyzing, reconstructing and vindicating its descriptions. Of course, both types of tasks belong to philosophy. What past philosophy failed to recognize was that the new demiurge needs a constructionist as well as an analytic philosophy. And here is where an alternative way of interpreting the emergence of PI has its roots. For one of the forces that lie behind the demiurgic turn is the Baconian-Galilean project of grasping and manipulating the alphabet of the universe. And this ambitious project has begun to find its fulfilment in the computational revolution and the resulting informational

turn that have so profoundly affected our knowledge of reality and the way we see it. Informational narratives possess an ontic power, not as magical confabulations, expressions of theological logos or mystical formulae, but immanently, as building tools that can describe and implement the world.

Seen from a demiurgic perspective, PI can be presented as the study of the informational activities that make possible the construction, conceptualization, semanticization and finally the moral stewardship of reality, both natural and artificial. Indeed, we can look at PI as a complete *demiurgology*, to use a fancy word. According to this alternative standpoint, PI has an engineering vocation. And not by chance, since its elaboration may close that chapter in the history of philosophy that opens with the death of the Engineer. To paraphrase Kant, PI is man's emergence from his wishful state of demiurgic irresponsibility, into which humanity entered with its theological impoverishment, the death of god.

To recapitulate, PI can be seen as the continuation of conceptual analysis by other means, to put it à la von Clauswitz, or as a constructionist project. The analytic approach is metaphorically horizontal and more ("the new frontier") or less ("patrolling the territory") optimistic. The metaphysical approach is metaphorically vertical, for it is clearly foundationalist. It presents PI as the convergence of several modern threads: the death of god, the demiurgic transformation of the I; the scientific revolution; increasing moral responsibility, shared by humanity, towards the way reality is and could be; and the informational turn. Personally, I have privileged the more "analytic" interpretation when presenting PI metatheoretically (Floridi, 2002), hoping to capture in this way the minimal common ground shared by many different philosophers working in this new area (Floridi, 2003a). But I have privileged the "metaphysical" interpretation when doing PI (e.g., Floridi, 2003b) the way I understand it, that is, as a constructionist enterprise.<sup>12</sup> Both approaches are normative and perfectly compatible. Indeed, they seem to me to complement each other. Like the helpers in Plato's *Republic*, the philosopher-sentinels enforce a necessary semantic policing, but they are not sufficient. They need to be joined by the philosopher-rulers, that is, by semantic policy-makers in charge of the present and future realities that are under construction. Horatio and Marcellus need to be joined by Hamlet, to use the previous image.

### 3. Outline of the Special Issue

Turning now to this issue, I shall not attempt to summarise the contents of each article—the abstracts already fulfil this task very well—but I'd like to comment briefly on each of them, and outline a few threads that run across the collection in view of the different ways in which PI may be approached. I'm going to intersperse my discussion of the papers with some interpretations that I hope to be mainly correct but that may not necessarily be shared by the authors themselves.

The first four papers provide as many topic-oriented frames that help us to understand how PI has influenced research in epistemology and the philosophy of mind (Frederick Adams), in computer science and logic (Johan van Benthem), in the philosophy of science (Gordana Dodig-Crnkovic) and in the philosophy of AI (Viola Schiaffonati), respectively.

To my knowledge, Adams has succeeded in providing the first reliable overview of the principal “steps that lead to a use of informational concepts to naturalize meaning and purposive activity”. It is to be hoped that his calls for an “inclusive treatment of the informational turn, looking at all of philosophy and much of computation theory and artificial intelligence research” will be answered soon, as a book on the first stages of PI would be both fascinating and very useful.

One of the key issues clarified by van Benthem is what he call the *Dynamic Turn* in various branches of computer science, mathematical logic and philosophy, and its connection with the emergence of PI. As he writes, “representation of information cannot be separated from the processes which use and transform that information. These days, in the same spirit, modern logic is undergoing a *Dynamic Turn*, putting activities of inference, evaluation, belief revision or argumentation at centre stage, not just their products like proofs or propositions”. This is profoundly true, and can be extended to semantics as well as ontology. The *Dynamic Turn* is also mirrored in mathematics by the growing importance of category theory. Perhaps it may be seen as the coming to maturity of what Cassirer (1910) interpreted as the evolution of modern science, whose centre of gravity shifted from the concept of substance to that of function. It certainly seems very consistent with the importance acquired by information processes in our view of the world.

The article by Dodig-Crnkovic makes a strong case for a view of PI as a fruitful, interdisciplinary field that may bring together “the two cultures”. It also reminds us how information-theoretic and computational studies represent nowadays a new frame of reference for philosophy in general and for the philosophy of science in particular, where they seem to have replaced physics as the most common paradigm. This may be as much a sign of the omnipresence of the technology and its conceptual frames, heralded by HCI (Human-Computer-Interaction) and CMC (Computer-Mediated-Communication), as evidence of how esoteric contemporary physics has become. Or, more optimistically, it may be because physics itself has become another information science.

PI took its first steps as a philosophy of AI, and it seems very appropriate to close this “metatheoretic” part of the special issue with Schiaffonati’s proposal in favour of a general framework that may provide a foundation for AI and its philosophy. The approach taken by Schiaffonati is significant, for she chooses to look at AI from the perspective of multi-agent systems, thus complementing van Benthem’s view of a *Dynamic Turn* in PI very well.

It seems to me that the first four articles can be read either “analytically”, as a way of clearing the ground and mapping new territories, or, as I would prefer, “metaphysically”, as laying part of the foundations for a metaphysical project. The

fifth article, by Ken Herold, attempts to develop a “continuum conjecture” (Floridi, 2004) concerning data, information and knowledge. It seems to belong even more plausibly to the metaphysical approach to PI.

There follow three articles that belong squarely to the analytic approach to PI, in this case to the “semantic-policing” approach. Manuel Bremer offers a detailed analysis of the classic problem of the informational nature of logical truths, already addressed by Frege (1892). He then proceeds to offer a solution à la Hintikka. Anthony Chemero elaborates a much needed clarification of the different ways in which the concept of “information” is used in Gibsonian-inspired psychology, cognitive science, epistemology and philosophical semantics. Finally, Paul Bohan Broderick analyses and compares the technical notions of communication (Shannon) and computation (Turning), and shows how difficult it is to distinguish between the two once they are properly understood.

The next two articles seem to me to be “analytic”, insofar as they can be said to belong to the “new frontier” approach to PI. Mario Alai critically examines the debate concerning the possibility of an AI approach to the logic of scientific discovery, and argues in favour of the cognitivist and connectionist approach by Holland, Holyoak, Nisbett and Thagard. Patrick Grim, Paul St. Denis, and Trina Kikalís develop a computational analysis of semantic information that raises the traditional theory of meaning as use to a new level of accuracy and control.

A fine balance is then provided by three “metaphysical” articles devoted to information ethics, understood as the philosophical foundation of the applied field of computer ethics.<sup>13</sup> Following a cognitivist ethics approach, Bernd Carsten Stahl discusses why current artificial agents cannot yet count as moral agents, despite the fact that they already manifest several characteristics proper of moral agents. His argument is that they are still semantically-impaired and hence cannot use information in such a way as to behave morally. Soraj Honladarom focuses on the problem of the digital divide and on a proposal to bridge it by making information more “transparent” through a system of information *about* information. And Don Fallis outlines a value-theoretic approach to epistemology, which he offers as a way to clarify three of the major issues in information ethics, namely intellectual property, speech regulation and privacy.

In Floridi (2001), I’ve argued that the computer revolution is not a rigid *post quem* but rather the threshold beyond which PI has started to coalesce as a new way of doing philosophy, and hence that it is perfectly reasonable and indeed very fruitful to approach past philosophers and theories from a PI-oriented perspective. So I thought it would be very fitting to place at the end of this special issue Roger Young’s paper, which interprets Wittgenstein’s *Tractatus* as an experiment in PI. It seems the perfect conclusion for a collection of articles that opens with Adam’s history of PI. Again, I tend to read this article too as a contribution to the metaphysical project of PI, but I’m aware that, to a man with a computer-hammer, everything looks like information-nail, and I’m afraid that in my case it does so foundationally.

## Acknowledgements

I would like to thank Jim Fetzer for his kind invitation to guest-edit this special issue. The project owes him a lot, as it developed through a series of conversations we had in Orlando (FL) during the *Fourth World Multiconference in Systemics, Cybernetics and Informatics* in 2000. I am also very grateful to Jim Moor for his editorial support, and to the authors for their contributions and collaboration. Finally, I wish to acknowledge the useful feedback I received from Fred Adams, Mario Alai, Johan van Benthem, Franca D'Agostini, Gian Maria Greco, Paul Oldfield, Matteo Turilli and Gianluca Paronitti about this introduction. I wish I could have followed all their suggestions. None of them is responsible for any mistakes that remain.

## Notes

<sup>1</sup>I'm using the expression here neither in its original Kantian sense, which referred to the tension between the irrefutability and the untenability of scepticism about the external world (later adopted by Board to describe the Humean problem of induction), nor in Heidegger's sense of recurring attempts to resolve that tension. I'm using it to refer to the scholastic canonization of problems, which, by rigidly fixing the scope of issues that are supposed to be philosophically relevant, fails to keep the philosophical discourse open to new problems, thus preparing the ground for its own downfall.

<sup>2</sup>See, for example, Anderson (1964), Pylyshyn and Bannon (1970) and Sloman (1978).

<sup>3</sup>This includes Burkholder (1992), Bynum and Moor (1998), and Moor and Bynum (2002).

<sup>4</sup>In Floridi (1996b), I have tried to provide a simple introduction to PI for undergraduates; Floridi (2003a) is more advanced; in Floridi (2002) I have reconstructed the history of PI and suggested a possible definition; in Floridi (2004), I survey a series of open problems central to the field.

<sup>5</sup>Berkeley (1710–1734), *Introduction*, §3.

<sup>6</sup>Shakespeare, *Hamlet*, I.1.6.

<sup>7</sup>I use the term “constructionism”, instead of “constructivism”, to refer to (i) a Kantian-based position that emphasizes the epistemic/poietic processes of modelling, designing or structuring a knowledge-independent reality, not to (ii) various forms of social constructionism or to (iii) mathematical constructivism.

<sup>8</sup>For an interpretation of Marx from an explicitly “demiurgic” perspective see Kolakowski (1968).

<sup>9</sup>Rockmore (2001) provides an interesting reconstruction of the Neo-Hegelian turn in contemporary American philosophy. Although I'm not sure I would agree with his view of which aspects are the most fundamental in Hegel's philosophy, I find his overview very convincing. As he writes: “This paper has discussed the massive analytic turning away from Hegel almost a century ago and the recent, more modest, incipient turn, or return as an offshoot of the turn to pragmatism in the wake of the analytic critique of classical empiricism. I have argued that analytic philosophy has misunderstood Hegel on both occasions” (p. 368). In Floridi (2003c) I've tried to show the Idealistic roots of the renaissance of epistemology between the two wars.

<sup>10</sup>For an insightful reconstruction see Sandbothe (2003).

<sup>11</sup>I have tried to articulate and defend this thesis in terms of a dialectic of reflection in Floridi (2002).

<sup>12</sup>On philosophy as conceptual constructionism see Deleuze and Guattari (1994).

<sup>13</sup>This view is defended in Floridi (1999a) and Floridi and Sanders (2002).

## References

- Anderson, A.R. (ed.) (1964), *Minds and Machines*, Englewood Cliffs, NJ: Prentice Hall.
- Berkeley, G. (1710–1734), *A Treatise Concerning the Principles of Human Knowledge*, Oxford: Oxford University Press, 1998.
- Burkholder, L. (1992), *Philosophy and the Computer*, Boulder, CO: Westview Press.
- Bynum, T.W. and Moor, J. (eds.) (1998), *The Digital Phoenix: How Computers Are Changing Philosophy*, Oxford: Blackwell.
- Cassirer, E. (1910), *Substanzbegriff und Funktionsbegriff. Untersuchungen über Die Grundfragen Der Erkenntniskritik*, Belin: Bruno Cassirer. Trans. by W.M. Swabey and M.C. Swabey in *Substance and Function and Einstein's Theory of Relativity*, Chigo, IL: Open Court, 1923.
- Copeland, B.J. (2003), 'Computation' in L. Floridi, ed., *Blackwell Guide to Philosophy of Computing and Information*, Oxford, New York: Blackwell.
- Deleuze, G. and Guattari, F. (1994), *What Is Philosophy*, New York: Columbia University Press.
- Dummett, M. (2001), *La Natura e Il Futuro della Filosofia*, Genoa: Il Nuova Melangolo.
- Floridi, L. (1999a), 'Information Ethics; On the Theoretical Foundations of Computer Ethics', *Ethics and Information Technology* 1(1), pp. 37–56.
- Floridi, L. (1999b), *Philosophy and Computing: An Introduction*, London, New York: Routledge.
- Floridi, L. (2002), 'What Is the Philosophy of Information?' *Metaphilosophy* 33(1-2), pp. 123–145. Preprint available at [www.wolfson.ox.ac.uk/~floridi/papers.htm](http://www.wolfson.ox.ac.uk/~floridi/papers.htm)
- Floridi, L. (ed.), (2003a), *The Blackwell Guide to the Philosophy of Computing and Information*, Oxford, New York: Blackwell.
- Floridi, L. (2003b), 'On the Intrinsic Value of Information Objects and Infosphere', *Ethics and Information Technology* 4(4), pp. 287–304. Preprint available at [www.wolfson.ox.ac.uk/~floridi/papers.htm](http://www.wolfson.ox.ac.uk/~floridi/papers.htm)
- Floridi, L. (2003c), The Renaissance of Epistemology 1914–1945, in T. Baldwin, ed., *The Cambridge History of Philosophy 1870–1945*, Cambridge: Cambridge University Press, pp. 531–541.
- Floridi, L. (2004), Open Problems in the Philosophy of Information, *Metaphilosophy*. Forthcoming. Preprint available at [www.wolfson.ox.ac.uk/~floridi/papers.htm](http://www.wolfson.ox.ac.uk/~floridi/papers.htm)
- Floridi, L. and Sanders, J.W. (2002), Computer Ethics: Mapping the Foundationalist Debate, *Ethics and Information Technology* 4(1), pp. 1–9.
- Frege, G. (1982), Über Sinn und Bedeutung, *Zeitschrift für Philosophie und philosophische Kritik* 100, pp. 25–50. Eng. tr. On Sense and Reference, in *Translations from the Philosophical Writings of G. Frege*, ed. and trans. by M. Black and P. Geach, Oxford: Blackwell, 1960.
- Kolakowski, L. (1968), Karl Marx and the Classical Definition of Truth, in *Toward a Marxist Humanism*, New York: Grove Press.
- Moor, J.H. and Bynum, T.W. (eds.) (2002), *Cyberphilosophy: The Intersection of Philosophy and Computing*, Oxford: Blackwell.
- Pylyshyn, Z.W. and Bannon, L.J. (eds.) (1970), *Perspectives on the Computer Revolution*, Englewood Cliffs, NJ: Prentice-Hall.
- Rockmore, T. (2001), Analytic Philosophy and the Hegelian Turn, *The Review of Metaphysics* 55, pp. 339–370.
- Sandbothe, M. (2003), The Pragmatic Twist of the Linguistic Turn, in M. Sandbothe and W. Eggington, eds., *The Pragmatic Turn in Philosophy: Contemporary Engagements between Analytic and Continental Thought* Albany, NY: State University of New York Press.
- Sloman, A. (1978), *The Computer Revolution in Philosophy: Philosophy, Science, and Models of Mind*, Hassocks, UK: Harvester Press.