Notes for disputation of Erik Persson's "Shadows of cavernous shades"

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Updated draft for Disputation Friday March 7 2003 in Gamla Carolinasalen i Kungahuset, Lundagård, of doctoral dissertation by Erik Persson:

Persson, E. (2002). *Shadows of cavernous shades: Charting the chiaroscuro of realistic computing.* Lund: Lund University, Dept. of Computer Science. (Doctoral diss. No. 20, 2003, LU-CS-DISS:2003:1, ISSN 1650-1268, ISBN 91-628-5512-3, xiv+727 pp. with a bibliography of 4448 entries, and 2877 notes. See esp. chap. 5 on "Science, metaphysics and computing". Abstract at <http://www.lub.lu.se/cgi-bin/show_diss.pl/sci_560.html>, accessed 25 Feb 2003.)

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Introduction: summary of the dissertation
(page references in parentheses)

The overall view, impression, title

In this dissertation the author Erik Persson starts depicting himself as a traveler who starts as a computer programmer and software consultant and realizes that a great portion of all software projects fail to produce the intended results in the intended time. His attempts to understand and grapple with the problem, or, what he calls "the logic immanent in his researches", caused him to stray further and further in other directions than his original practical work (page 1) This was the more so since he perceived that the specialized approach of much ongoing

research in computer science did not address his problems as practitioner, requiring an in--depth understanding of *computing* at large (3).

Persson assumes that there is some sort of software crisis, since it is not his purpose to establish beyond any doubt the soundness of his problem formulation. The reader is expected to be able to appreciate in any case the ideas and results to be presented, even granted that Persson declares himself as primarily concerned with a limited domain, that is of client/server-based GUI systems, which "may" in inportant respects differ from other domains of software (3).

The chapters

Chapter 1-Prolegomena

Based on the trends that dominated the late 80s the author believed that a solution to the software crisis was coming in the form of a mixture of "software components" and "rapid application development", usually in the form of *Visual Basic*. He embarked on a study of so called business objects and their relationship to or reconciliation with software component technology and graphical user interface GUI technology. Consequently he got the idea that GUI-technology would gain from being extended in three dimensions as or, as he calls them, 3-D virtual reality-style interfaces as found in much so called *virtual reality* applications. This led in turn to his formulating an "agenda" of realistic computing. It was the author's encounter with the philosophically oriented literature on virtual reality that started him on somewhat different track, namely to understanding the roots of computing and of science in general, in its relationship to mainly philosophy and theology. Persson suggests that he may have been prompted in this respect by his early academic grounding in the classics, classical philology and in the history of ideas, and his interest for theology, religion, and parapsychology, which also influence his language and way of expression in a more humanistic direction. (4-5)

Persson then dwells on questions of methodology after expressing some scepticism about the doctrinaire and ritual character of such matters, including peer-reviews and conferencing. His study is said to be influenced by the classicist, scholarly, and hermeneutic traditions, but very little from latter-day hermeneutics in the tradition of, say, Heidegger, Gadamer, Habermas, and Ricoeur. The influence of the former variety shows in elucidation through comment, interpretation, and historical sketches attempting to "break the tyranny of the probable in order to proceed towards truth" [avh]. Thesis writing is then not only about publishing "results" but also a labour of self-development and self-expression. (7-11)

Chapter 2-Software components

This chapter is intended as a cursory survey of the topic of distributed objects and components including its backdrop in the software crisis and its history back to the visions in the late 60s and early 80s by two eminent computer scientists, Doublas McIlroy and Brad Cox. It covers their different definitions in contexts such as reuse-oriented software engineering, object-oriented programming, visual programming, module- or package- oriented programming languages such as

Modula and Ada, and also lately in an own domain of COP, standing for component-oriented programming. It also covers a survey of three great technologies of the field, Microsoft's *COM/.NET, Object Management Group OMG's CORBA, and Sun's JavaBeans/Enterprise JavaBeans.* The emphasis is on the infrastructure technologies and standards, including economic incentives, rather than on on the components or the programming *per se* (13).

As in many parts of the thesis the content of this part consists of an ambitious "tutorial" and summary which also explain the volume and number of pages of the work, completed, however, with valuable overview of strenghts and weaknesses of the various technologies (e.g. p. 73). It also results in the insight of two main different understandings or conceptions of the term component as oriented towards architecture vs components, that the author characterizes along such dimensions as origins, producer/consumer communities, technology bases, project style, and publication style. The author's research questions continues to be whether these differences can in some sense be integrated, as expressed in the often used word "synergy" (100). In this context the author notes that technically oriented researchers who do not work for the few dominant computing companies' infrastructural strategy cannot hope to make an perceptible impact on the development of technology per se, but must content themselves with producing reviews, criticisms and proposals. (-102) In the context of the so called "objects and component wars" this would mean technology comparisons in terms of purely theoretical exercises or, rather, experiments, tests, and benchmarks with mostly and extremely ephemeral relevance and value. The author concludes stating some criteria for "successful" component technology in terms of reuse and productivity, and notes that these criteria are mainly non-technical in nature. One main criterion is even particularly commercial, that is, payment or *revenue collection mechanisms* for the sale of components. (-106). Cf. "rational ways to do business with software components" (p. 221).

Chapter 3-Business objects

This chapter deals with the idea that program units could at the same time correspond to some perceptible unit in the real world., as addressed in the trend of so called Business Process Reengineering BPR (cf also p. 132). With this purpose Persson disentangles various meanings that have been attributed to the term *business object* in the literature in the field of computing science and related fields like information systems. This approach to reality itself raises methodological and philosophical matters like those found in the definition of, for instance, *autonomous agent* with obvious couplings to both mathematical-logical computation or programming and the real world of computer users. Eventually the author frames the question in terms of contrast between a *machine metaphor* of the component notion suited for software development process, and a *world metaphor* of business objects suited for the man-machine user interface. (-122) Later on in the text (144ff) the author remarks clearly one main thought, that the usability of a "system" is largely dependent on how well its user interface mirrors the user's conception of the real-world objects understood by end-users, as contrasted to an *application*-centric organization of the interface. This is a key-insight that also stimulates reflection on the often taken-for-granted concept of

application as related to objects as well as to business and computing processes. In the author's own words, a new era is sometimes envisaged, of atomized, anthropomorphic organization of computer software reflecting man's cognition of the world (173). A bridge is envisaged to the subsequent chapter 4 by observing that its main idea of so called *realistic computing,* in its meaningful contrast to the now trendy term *virtual reality,* can be formed on the basis of some of the business objects concepts and three-dimensional 3-D user interfaces.

The rest of the chapter explores then the intellectual roots of the concept of objects so far back in Greek philosophy, and forward in Western philosophy, psychology, and the first obvious applications of the object idea in certain simulation languages and in human-computer interaction., particularly graphical user interfaces, such as desktop metaphors of modern personal computers. (131) It also dwells on the roots of BPR and business modeling. He notes that numberless variants of business modeling do not care much about the technical-implementation, or infrastructure aspects of business objects, but are primarily concerned with organizational and management issues. (135)

Possibly because of this the latter part of the 1990s saw a growing disappointment with object-oriented programming, causing a sort of reversed trend for thinking of business objects in terms of components rather than objects. This happened in concert with an increased interest for the "visual" component-based Rapid Application Development RAD as typified by Visual Basics, and information systems like Enterprise Resource Planning ERP. (139)

The rest of the chapter is dedicated to the more detailed study and evaluative comparison of three different infrastructural approaches to business aspects by different commercial and professional actors. The approaches are identified by acronyms that do not say much except to the initiated: the Newi architecture associated with the name of the pioneer Oliver Sims, Business Object Modeling Special Interest Group/Business Object Domain Task Force BOMSIG/BODTF initiative with its final Combined Business Object Facility or CBOF proposal, and finally the Distributed interNet Architecture DNA and Component Object Model COM technologies. Persson concludes that the earlier mentioned COM/ActiveX and .NET technologies offer the most promising infrastructural foundations for a business object facility, although the task of inserting genuine business objects upon such component infrastructures remains yet to be done, something which the author suggests in the subsequent chapter 4 on realistic computing.

Chapter 4- Realistic computing

This chapter deals with the agenda of realistic computing, where the author uses the term agenda as a better choice than similar terms like paradigm, or research program which together also would cover alternative agendas like artificial intelligence, man-computer interaction, interconnectionism, or industrialization of software production. Persson's particular agenda is seen as requiring some clarification of the nature and essence of computing, for opening the way for an integration of business objects and components in the realm of so called three-dimensional virtual worlds. The author proposes the thesis that the latest trends such as object orientation, business objects, and 3-D user interfaces are the

founding elements and signs of long-ranging thrust towards what he denominates the grand synthesis of realistic computing. This is the transformation of the computer into increasingly more realistic "mirror worlds" or "habitats". At the same time he sees realistic computing as an attempt to stop the protean predicament of computing by means of the pervasive and systematic use of real-world metaphor and real-world modeling as tools of intelligibility and usability.

All this is seen to be both a technical and economic or organizational matter. The technical dimension requires such things as component-based business objects, semantic messaging, forms-based style of programming, decreased class fragility by means of restrictions on the inheritance mechanisms. The economic and business or organizational dimension requires restraint in the choice of equipment avoiding expensive immersive VR and preference for desktop or non-immersive virtual reality, sometimes called artificial reality (262), as well as "rational ways to do business with software components". (-221). That is, beyond technological advances, there must be also strong economical and socio-organizational advances, which the author sees in terms of users growing increasingly computer-knowledgeable, independent, and responsible while organizations become increasingly agile, virtualized and decentralized (219).

The chapter is then structured in sections betitled (1) Infrastructure foundation, (2) Encapsulated programming and (3) Worlds in a grain of sand. The first one proposes the use of Microsoft's COM/DNA or .NET foundation and discusses opportunities and obstacles of a messaging mechanism aimed at integrating the world of co-operative business objects with that of established components technologies.

The second one struggles with the distinction introduced earlier in the text, between *object*-orientation and *software componentry*, which the author sees as being underpinned by the two attitudes to software labelled *animism* and *mechanism* (228), corresponding to *world* and *machine* metaphors (257) since "objects" are seen as differing from those of the real world, insofar they possess a capability to send and receive messages and thus appear more like animate beings than thing-like objects (231n, cf. also p. 228-229 on animism vs. mechanism and the superimposition of the mechanistic principles of software componentry on the intrinsically animistic discipline of object-orientation). This second section of the chapter concentrates then on the issue on *inheritance* in programming, both interface and implementation inheritance, seen as a major issue for the envisaged integration. The question is whether components intended for distribution on an open market should support inheritance or not, and the debate has focused on the so-called *fragile class* problem (232). The dissertation continues with an extensive tutorial explanation of this problem concluding that *dynamic linking and compiling* will resolve the syntactic fragility problem and after comparing three options for drastic solutions to the *semantic* fragility problem concludes with what is supposedly the author's main *technical* contribution. It is the author's own option of so called *encapsulated programming* a viable most satisfactory solution, including the elimination or alleviation of a few other difficulties of implementation inheritance (256).

The third and last section of the chapter with the title of "Worlds in a grain of sand" deals with the principles for design of three-dimensional graphical user interfaces that match various concurrent small object-worlds, or task-centric (261) compound documents, of the user's reality, beyond the historically earlier praxis of big monolithic "applications" (259) and also beyond personal computing, for instance in ubiquitous computing. The question of *desirability* of such development is postponed until the next and last chapter 5 where consequently the ethical, above the economic and political dimensions of such a technology are addressed. This section also includes, like often in the dissertation, proper "tutorials" of user-interfaces' principles of design, of virtual reality, and critical debates about them. The author expresses probably his very personal conclusions of these surveys in the following revealing statements: "It seems that the perceived desirability and usefulness of a new tool often defeat any concerns about its poor usability" and "Clearly, the dispute on usability also reflects a deeper clash in philosophical outlook between different understandings of what the computer, cosmos, and man essentially is or ought to be - as well as the combatants' vested interests in competing agendas and visions of the future of computing."

The end of the chapter seems to disclose the author's increasing grasp of various developments in the VR-field, and his malaise with the rhetorical misuse of, and addiction to what has been called "electronic LSD" and the spectacular possibilities of data visualization in combination with multiple workspaces and different metaphorical approaches. He remarks the particular requirements that serious economic business would put upon VR-technology and that this is a hitherto almost unexplored research territory (285). I suspect that Persson would have put that on his agenda for "future research" if it were not for his deeper and more pressing ethical concerns awaken in this chapter 4 and treated extensively in the following chapter 5.

Chapter 5 Philosophy and ethics of computing

This is considered by the author as the central and most important of his dissertation, and this most extense chapter encompassing almost 250 pages starts on page 287 of the text, where most other writers of traditional dissertations would already have terminated it, with a quotation by Eric Voegelin: "The most important means of regaining contact with reality is the recourse to thinkers of the past who had not yet lost reality, or who were engaged in the effort of regaining it." One does not need to subscribe to, say, the philosopher Martin Heidegger's very trendy philosophy today is order to suspect that an important reason for this trendiness can be the general recognition of present western academic and intellectual circles of the problem of reality disguised into the otherwise vague issue of "being".

The author does not shrink from his immense project and starts so to say from ground zero, looking for a legitimate starting point in a "typology of worldviews", roughly what in the German cultural sphere has been named "Weltanschauung". In this way he avoids the reader's expectation of his declaring allegiance to some particular philosophical school. This is followed by sections on "Scientism and the decline of truth, "Plumbing the depths of modernity, and "Computing and the

evergreen themes of gnosticism". In this way, it can be said, the author transcends the margins of science in order to attempt to discuss what science is and should be, entering the realms of not only philosophy including ethics and psychology, but ultimately also theology and religion.

I will be shorter in my account of this chapter since I guess that most of my questions and most of the time spent in the disputation will be dedicated to and centered on this chapter. The author basically states that he was "baffled by the pervasive religious, or perhaps rather pseudoreligious overtones of the discourse on virtual reality" and, in particular, by becoming increasingly aware of to what extent this had affected his own mode of thoughts and expression. The writing of this whole chapter, then, was his way of coming to terms with his own apprehensions of what his whole research was about and whatfor, science, technology, and science in general, and virtual reality and computer technology in particular.

In this endeavour Persson seems to find most guidance in the work by the thinker Eric Voegelin and in J. Poortman's distinction bewteen six "metaphysical standpoints" identified by 6 letters at the beginning of the Greek alphabet, alfa to zeta. Nevertheless, already at the beginning of the chapter the author hints at his conviction that what is going on when a man adopts a certain worldview, or a metaphysical standpoints is basically a religious phenomenon which in his case in anchored in Christianity. He sees his insight as complemented by the studies that indicate that all theories, also those that apparently are religiously neutral, mathematical and scientific ones, are regulated by "religious belief" (307). He then sets out to differentiate between the traditional and scientific worldviews in order to show how scientism neglects various core dimensions of the traditional worldview with consequent loss of contents of the concept of truth.

The chapter's second section on "scientism and the decline of truth" addresses such decline of truth in terms of loss of aesthetic and teleological dimensions of moral will and "intelligent design" that are defined away by darwinian "modern bio-nihilism" and by means of such catchwords as evolutionary self-organization and emergence. Furthermore

In a third section on the roots of modernity or "plumbing the depths of modernity" the author tries to characterize modernity historically against the backdrop of gnostic thought as defined by Eric Voegelin, with similar motivation as, but contrasted to Karl Popper in the interpretation of Plato and in trying to defend the classical Christian basis of Western civilization. (342). For this purpose Persson also tries to consider a Christian interpretation of history and presents a synopsis of heretical thought having in mind the hypothesis that modern science can be seen as a modern counterpart of gnostic heresies in general and in particular heretic responses to Christianity such as Kabbalah, Neoplatonism and Hermeticism (377). The influence of Islam is also considered as a parallel source of changes in the character and perceptions of Christianity making itself felt also in the Renaissance and Reformation (381). A particular Shiite-Gnostic sect, of the Ismailis, is seen by Persson as having a crucial role in the formation of the so called Faustian spirit now usually associated with Western Europe, technology, science and business (394). Other factors besides

this "Ismaeli gnosticism" are also considered (398) to have worked early for the transmutation of Western civilization towards a problematic Modernism through technical innovation and scientific revolution: namely Aristotelianism, the Jewish Kabbalah, and Catharism. This transmutation was then accelerated by the Church's well-intentioned reaction against the dubious mystical tendencies leading eventually to voluntarism, to the fostering of experimental science (Galilei) and the split between intellectuality and spirituality. The involved school of William of Ockham, known in science because of the alleged "Ockham's razor" made simplicity a criterion of truth and instead of defending religious orthodoxy against the increasing philosophical speculation, it enhanced subjectivism, scepticism, naturalism , reductionism and secularism (408).

Subsequent items of this third section on the roots of modernity attempt to track the further, sometimes paradoxical, development towards what came to be known as modernism and scientism. The contact with computer science appears occasionally in Persson's text by means of reference to the rise of scientific technology, the experimental method, and the new role of mathematics starting with Francis Bacon, Descartes, and then Galileo,but already suggested in antiquity and Renaissance by Plato, Pythagoras, Euclid, and others (418). The further development towards the modern project and secularization, from Renaissance through Enlightenment is then marked as a heretic commitment to Gnosticism, as impersonated by Freemasonry, the Royal Society, and the ultimate unfolding of Protestantism (429). The text follows with a discussion of why science and technology did emerge in the Christian Latin West, refuting recent theses that this was triggered by Christianity per se. (429). "Immanentization" is also characterized in terms of various cultural manifestations in the history of the West, including German mysticism's influence on German Romantic philosophy (453). This third section concludes with an attempt to express the author's feeling, shared with named historical and contemporary scholars, of "strong delusion" regarding science and modernity as expressed in various "isms" and others: "Strong emotions and vehement actions may be warranted if one really has something worth protecting" (467) [cf. USA after 11 September, and Iraq]. But, the author claims that his is not an attempt to provide an apology for Christianity. Rather, it is a support for the view that Christian religion is a preferable reasonable basis for intellectual pursuits, despite of being banned in the academic world. A restoration of this basis requires among others a reinstatement of theology and metaphysics, as well a vindication of the experiential basis of religion (471). [I myself would remind that this recalls the present-day rebirth of (secular) "phenomenology" and "design" in universities.]

The final section of this last fifth chapter deals with virtual reality as an expression of gnosticism, and starts with a section on the occult and mystical roots of computing, where the computer is seen as part of a metaphysical programme. In this chapter Persson comes indeed close to struggle about the essence of the computer and one example of this struggle is given by his reference to a study by Dauben from the Journal of the History of Ideas, 1977 on mathematics, theology and the infinite (478, 638). The discussion in framed initially in terms of the mystical-occult quest for the *perfect language, creation of*

artificial life, number mysticism, cyberspace as Anima Mundi, and *microcosms or worlds* with connections to the work by e.g. Boole, Frege and Russell (479-483). The computer, furthermore is, seen against the background of computer and media history, an icon for a second coming of Christ [cf. television as idol], a post-biological era or age of the spirit, a post-literate second orality that succeeds the excessive rationalization of literate alienated man and promotes the "global village" and "anarchist-liberal" participatory collectivity in "cyberspace" and virtual reality (489). The author brings together many strands of the latest developments and their originators in order to show that they have a more or less explicit spiritual or theological agenda which explains the fascination exerted by the "post-human" predicament of "agents", "society of mind", "hybrids", etc. (493). In other words, Persson sees that the computer from its very beginning was an instrument for playing God by making metaphysical thought experiments (495) [cf. Frege]. VR could have suggested that the usual world of senses may, after all, also be deception or construction, fostering some kind of idealism of dualism, and a recognition of the irreducibility of the spirit. Instead it has led many to the belief that all reality is virtuality or that virtuality also is reality (498). This in turn lead to continuous "boundary overstepping" [gränsöverskridande], not only in sports and art, but also in "extreme science", furthered by value subjectivism and neutrality or freedom from deeper moral considerations or responsibility for misuses (508).

The whole section ends with a discussion of the typology in table-matrix of 3x3 fields where "three ways of being with technology" are "matched with three strands of Western thought" (513). Ways of being with technology are Ancient skepticism, Enlightened optimism, and Romantic uneasiness. Strands of Western thought are Traditional theism, Mystical syncretism, and Modernism (516) . The author confesses that he stands in the intersection of Traditional theism with Ancient skepticism or Romantic uneasiness, possibly to be referred to as *Pragmatic uneasiness* (528, cf. Churchman in West71b seen as such uneasiness). His position is then consistent with his rejection of what he identifies as a Gnostic depreciation of God which lead to the belief that the world is so imperfect that it needs to be "fixed" on the basis of daydreams that fill man with pride and greed, keeping him busy with futile project that distract him from more important tasks. Perhaps symptomatically, the author remarks that historically men of pious bent have repeatedly had to make a radical break with an ambience that through idolatry, excessive materialism, superficial rationalism or moral deficiency have tried to impose iniquitous or distracting demands on them (517). Historical examples of similar but not so extreme attitudes of restraint that are adduced are e.g. Archimedes, and Leonardo. With VR in mind, the typology-matrix is further used (519-520) for reflection on historical and possible future attitudes to technologies, and on their possible effects. On one of his pages (523) which wholly consists of part of one note he even suggests the controversial and blasphemous thought experiment of giving up the belief in the "laws of nature" in order to see how the creative scientist or engineer has worked and works much in the same manner as the practitioner of magic, something that today is in a way systematically preached in certain strands of so called "design theory" (523-524). [My allusion.]

In all this the author preaches ultimately a doctrine of restraint, a reinstatement of the scientific legitimacy of attitudes of faith, piety, and goodness, contrasted to the present-day's pervasive scientific scoffing at religion, Christianity, and anything holy or sacred (525) [cf. Greek "hubris".]. And the tries to check what he perceives as the ultimate dangers of the distancing from reality strived at by the internet-based generalized virtual reality of cyberspace, paradoxically grounded in the "cult of experience" (529). In a final sub-section that serves to round out, conclude or summarize, and yet having an interest of its own (coda) the author finally makes his own apology, on a note of humbleness . Apologia, excuse, plea, pretext, and alibi, are synonyms for apology given the Webster's Third New International Dictionary, unabridged. In Swedish it might also include the understanding of "brasklapp". Persson recognizes that this last chapter is a work of "armchair scholarship", with many loose ends, and incomplete evidence, but consistent with his overall goal of assessing the validity and ethicality of technoscience in general, and realistic computing in particular. At the same time he invites to criticism of the weaknesses inherent in his transgressing of artificial disciplinary boundaries. He hopes, however, to have shown how science is guided by misleading assumptions about reality and by political correct research trends, preventing a truly open quest for the truth. He also explains the strong wording and controversialist tone that did not intend to offend and that he wants to contrast to the style of bald soporific scientific writings, sterilized from anything that smacks of religion, metaphysics or personal opinion which usually are equated to subjectivity. Finally the author wants to assert his skepticism concerning the possibility of progress in general and progress in computing in particular. This he does by expressing his own skepticism as to man's capability of understanding history, if not framed in a Christian sense.

APPENDIX-Networked components in Microsoft's DNA

A 82-pages' case study of Microsoft's distributed interNet Application Architecture, referenced to on pp. 141, 218, 222, especially 218. The objective to investigate whether business objects can be implemented on an available component-based client/server infrastructure that purports to integrate the two most compelling ideas of the computer age, the personal computer and the Internet. For that purpose the appendix "treats" the XML and MOM technologies and the problem of harmonizing of the Web User Interface WUI in the form of the hyperlink-oriented HTML interface of the web browser page, and the Graphical User Interface GUI in the form of WIMP (Windows, Icons, Menus, Pointers) . Nevertheless the appendix is explicitly not intended to present the results of this inquiry which are postponed to a future study (537).

Bibliography

4448 entries, to a great extent generated from references in 2877 notes

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DO YOU AGREE WITH MY ACCOUNT OF THE THESIS?

MY RECOMMENDATIONS FOR OUR COMING DIALOGUE/QUESTIONING

Introductory general question

The key words you use in your abstract are: software components, client/server database access architectures, business objects, object-orientation, virtual reality, realistic computing, philosophy of computing, philosophy of technology, history of computing. Against this background I cannot see in the tile any word among those which occur among the key words, except computing.

Would you like, please, to explain, not the least for the benefit of our audience, the title of your dissertation, which I have not seen discussed or reflected upon in a distinct explicit way in the text.

Questions

Chapter 1 (pp. 1-12) Prolegomena, methodology, philosophy, and science

1) Page 10-11, first form of hermeneutics: elucidate through comment, interpretation, and historical sketches. Difference between comment and interpretation? How do you check whether it is "elucidated"? Or do you rely on own intuitive judgment of "conscience" and on others' judgment, and then it is a question of mainly agreement in a scientific community sub-culture?

2) Page 11 Feyerabend's more pluralistic science: How do you avoid that pluralism ends in relativism? Is pluralism the plea of the oppressed only so long as they are oppressed? Also positive attitudes to Feyerabend on pages, 461, 465, 466

3) Page 11 Systematic study of "anomalies" and break of the tyranny of the probable in order to proceed towards truth. Cf. relativism above. What about deviant behavior in society, recommending more study of criminality or sexual deviations? What system does "systematic" refer to?

Chapter 2 (pp. 13-108) Software components

1) Page 14 Software crisis? Did not satisfy the initial requirement specification? Or "did fail to produce the intended results"? Intended by whom? Cf. productivity vs. effectiveness. Cf. evolutionary development, or satisfies other unexpected requirements, or initial requirements were not legitimate or "realistic" raising various actors legitimate resistance to change. Is requirement specification part of the software development process, or is it more of a social-organizational issue? You also write (page 3) that you are primarily concerned with the domain of client/server based graphical user interfaces, which may in important respects differ from other domains of software construction. What if this field happens anyway to be in a sense trivial since user interface design wants often to enable doing more things in the same time and as many things in shorter time - do you agree? Interesting to note that, in any case, The Economist not long ago had a summary about the so called new economy, with the aftermaths of the famous Solow criticism of ambiguous overall effects of computer technology on the USA economy. Cf. latest development of share market "bubble"

2) Page 17 the first time I see a very often used word, "complexity": software component technology addresses the correct problems, viz. the complexity of software development. (Cf. easy vs. simple, or clear and distinct vs. obscure in polemics of Leibniz vs. Locke, Ptolemaic system vs. Copernican revolution, "The less we understand the more we want to know"?). Does it make any difference how it is (not) defined? Same for "infrastructure" (capitalistic rigidity or fixed costs?), and "standard" (a means for reaching agreements?)

3) Page 100: which are the potential effects of synergy in the felicitous combination of software components and software architecture. Difference between combination and synergy, or is synergy the effects themselves? Cf. systems theory by Churchman (West in the bibliography). Regards for economic business realities, cf. standards (OK below p. 104)? Same as (p. 102) "Thus technically oriented academic researchers, only having a toehold in these organizations, will largely have to content themselves with producing reviews, aperçus, criticisms, and proposals about already existing technologies. Your choice, against the software engineering and architecture perspective. But why?

4) Page 104-105: I will not attempt to compare technologies...daunting task...the relevance and value of the outcome will mostly be extremely ephemeral, most companies' choice of technology guided by long-ranging commitments and strategies rather than range of features and performance. Does this already indicate the ending of your dissertation? Why not? (And page 105) none of the above concerns is technical in nature. What do you really mean by "technical" (not standards, market, simplicity,.language independence, and payment and revenue collection mechanisms (of a component technology).

Chapter 3 (pp. 109-214) Business objects

1) Page 113. Congratulations for the example of careful source investigation, ref to librarians of the U.S. Library of Congress (note 465)!

2) Page 113 What do you think about definitions mixing persons, places or concepts, as well as active things? Cf. also p. 177

3) Page 114. You refer to HKL95 from the field of information systems research, but I am not clear whether you followed up (why not?) this field of research with own professional groupings, and their emphasis on organizational aspects of software development and maintenance (Swedish ADB/ADP-Informatics)? OK BPR and "Methods and Procedure Analysis" on p. 132n, ERP and SAP on p. 139-140? What do you think about the place of such research? Stated on last § of p. 135?

4) Page 119. Grasp the essence of a concept, vs. find the essence of business objects. Difference between concepts and objects? Why not business concepts (like cost, or your own text p. 144-145)? Can you manipulate on the screen "concepts" (or objects, pp. 144-145)

5) Page 121n. What you think about the definition of "autonomous agent"? Same as for intentional human subject? Teleological object (ex. of submarine)? Churchman's teleological "system"? Consequences for all this kind of inquiry?

6) Page 122-123. "It is my thesis (hypothesis, conclusion, of the dissertation?) that the world metaphor is especially well suited for the user interface level, in particular when implemented by directly manipulable business objects, while the machine metaphor is usually preferable in software development." Is this not an implicit endorsement of positivism (differentiation between objects or black boxes independent from any observer vs. observing and intentional quasi-organisms, agents, actors or models (or actors characterized by having a model)? Cf. the roots of business objects on the following p. 124. Ref. also to the "correspondence between [given?] reality and computer models (page 125). You refer to second-hand sources on Plato and Aristotle, but what do you think about Aristotelian "practical knowledge" as in the operation-analysis conceptualization of information, vs. Aristotelian logic? Accessible through Churchman 1971 [wrongly listed as West 71b]. Cf. page 278 on language for specification of behaviour, and note 1345 on p. 267-268 on virtuality actuality, etc.

7) Page 137 "Clash in outlook between object-orientation and software componentry" could be the same as between aristotelian practical knowledge and logic?. It looks as a search for teleological systems (Churchman)

8) Page 151. And if it is a question of such logic, is it not deadly confusing to talk about "business logic" as contrasted to user logic and data access logic, where business logic is responsible for the overall "integrity" [system?] of the data [or the results of its use?] handled in a process?

9) Page 153 "Semantic data stream" (or "semantic coupling" on p. 173), similar to Sweden's (KTH) Börje Langefors' logical positivistic "Elementary message of information" in his Theoretical Analysis of Information Systems (1966) and interest in Dataflex (P. 177) seems to have an important role in your account of reasoning about your problems. It recalls the question of "roots" that one of your main ideas. What is or should "semantics" be? Vs. syntax and pragmatics? OK Charles Morris' "General Theory of Signs" (1971) or C.S. Peirce but are you leaning towards pragmatism (or eclecticism?). And how does it square with the later statement (page 216) that object-orientation has taken up a truly *pragmatic* and conservative attitude. embracing what is known to be good and useful...Cf. also with the suddenly clear distinction between syntactic and semantic fragility in encapsulated programming (p. 228). Corpses in the garderobe when on page 229 "traspires a fundamental, almost philosophical tension in outlook between object-orientation and software componentry." A new systems theory cf. Churchman, West71) or (page 245) "Kuhn's famous statement that "premature optimization is the root of all evil". Premature = short run greed versus long run salvation? Example of possible direct coupling to chapter 5?

10) Page 173. " I will suggest below that a new paradigm of computing, which I call realistic computing, can be formed on the basis of Newi-style [Newi = New World Infrastructure, p. 143] business objects and 3-D user interfaces. One main contribution of yours? Does it fall with its probable positivistic presuppositions? In such a case is it a paradoxical justification for your main investment and hope in chapter 5? Symptomatic on page 186n-187n of the

Technical Resources Connection TRC report on "insufficient attention to the issue of domain understanding"? And page 194n, problematic handling of "states" and implementation of "during" are problematic in the Business Object Component Architecture BOCA?

Chapter 4 (pp. 215-286)Realistic computing

1) Page 215. "The computer is not just a calculating tool, but the provider of a universal noetic substance, the intellective matter of a "universe" or "microcosm" -- or shall we say "microverse" --in its own right, and inside this digital microverse man has to take on the quasi-divine task of creating order...". Do you really subscribe to this statement, and do you take for granted what intellect to begin with is or should be in its adjectival form of intellective, and what would "its own right" be, and why do you choose the adjective "digital" and e.g. not logical, and do you discuss what "order" is or should be? I am asking this because I got the impression you are critical about all these assumptions but seem to contribute to their perpetuation by means of a statement that you do not clarify as being purely rhetorical, in the expectation of chapter 5.

2) Page 219. Your Panopeus project can be construed as part of a much larger Promethean plot, staged by multiple developments, including also strong economical (expert-independent software development) and socio-organizational (users growing increasingly computer-knowledgeable independent-decentralized and responsible). Do you feel the need of some dialectics here regarding the need of increasing dependence of more responsible software experts, and such, and have you addressed these socio-organizational aspects in your dissertation, and if not, how do you evaluate this? Do (page 221) "rational ways to do business with software components" deal such socio-organizational and/or business-economic matters? Cf, (p. 225) "The world of co-operative business objects coalesce with that of established commercial component technologies". Is there any connection between spirituality and economy? Cf. possible religious implications in Simmel's *The philosophy of money*, 1909; Hallmark's, *Potenta pengar: Jung, känslor och myte,1991; Buchan's* Frozen Desire: An enquiry into the meaning of money, 1997; Viderman's *De l'argent en psychanalyse et au-delá*, 1992.

3) **Page 251ff. "I would like to suggest..I will outline and discuss a proposal...", page 255 "Although it will not possible to argue this point at the proper length....I firmly believe that...", page 256 "Encapsulated inheritance eliminates or alleviates a few other difficulties", page 282 "The 3-D approach...will enhance comprehensibility and make for conceptual integrity", and "A simple experiment may give an inkling of what can be done...", page 287 "some years ago, I thought it appropriate to conclude the work...by the implementation of some kind of simple prototype, thereby trying to demonstrate the feasibility of my own ideas about "realistic computing" according to the 'proof of concept' model popular in computing Academe...My encounter with the philosophically tinged literature on virtual reality had, however...Instead of embarking on the 'proof of concept work...I thus decided to try to come to terms with my own apprehensions by devoting...to a broader

investigation into the issues that troubled me", p. 303 "This line of reasoning of reasoning of course, partly rests on...which, however are justified by...premises, provided, of course, that one accepts them"? OK as (little) experimental as it can be e.g. in plasma physics, and exemplary research openness, including towards "The success of failure" (Churchman's Thought and Wisdom, 1982) but...? The more important the coupling between chapters 2-4 and 5!? And what if one does not accept the premises? The whole Plato dialectic when premises are not fixed?

4) Page 272. Masterly: "The perceived desirability and usefulness of a new tool often defeat any concerns about poor usability. Clearly, the dispute on usability also reflects a deeper clash in philosophical outlook between different understandings of what the computer, cosmos, and man essentially is or ought to be - as well as the combatants vested interests in competing agendas and visions of the future of computing." But taking into account your deferral of this question to chapter 5 which is your suggestion for facing this clash? Only evangelization?

5) Page 282. "Provided acceptable performance can be attained, there are many advantages to the 3-D approach. Firstly, realism in metaphor will enhance comprehensibility and make for conceptual integrity...information visualizations may be used to present data in new and thought-provoking ways." Indeed, depending upon what comprehensibility and (or) conceptual integrity is or should be, and whether thought provoking leads necessarily to better thoughts?

6) Page 282. A simple experiment may give an inkling of what can be done and how the 3-D GUI of tomorrow may appear to the users...What do you really mean by "experiment". Which are the limits of thought experiment? Difference from "example" and "illustration" and "illustrative example", or "case study", or "scenarios" (tendencies of late "qualitative explorative research" graduate research).

Chapter 5 (pp. 287-534) Science, metaphysics and computing

1) Page 287 "Baffled about the pervasive religious, or perhaps rather pseudo-religious, overtones of the discourse on virtual reality", leads to issues like "What are the real point and true roots of virtual reality and ultimately of the Faustian spirit of Western science and technology", "What is computer technology, and ultimately technology really all about?" Any priority among these questions? E.g. "What I should do next and dedicate my life to"? Can you advance an explicit answer to this question?

2) Page 289 Identification of the point where to stop stepping further back...constant re-interpretation in the light of our deepening understanding in concert with the principle of hermeneutic circularity...What differentiates what you ultimately are doing from this? Possible role of dialogue if not dialectics in your understanding of hermeneutic circularity? Versus your choice (page 290) of "inductive, typological, top-down approach" especially in view of your heavy reliance on Poortman's six "metaphysical standpoints"? Are they a metatheory or meta-metaphysics, and can you/he step back from

your unknown assumptions, like choosing one religion among many available? Is it possible that you have found an "Archimedean" point of support for "the bird's-eye" view of reality (your page 288), and why not start by stating your "pre-rational commitment or act of faith" which "fundamentally determines our conclusions" (page 290). Confusion in my mind on whether you yourself paradoxically do choose a gnostic approach (salvation through knowledge and magic instead of through faith and works in obedience of the Supreme Power, cf. http://www.newadvent.org/cathen).

3) Page 291. "One can ask what are science's hermeneutic ideas or principles supported by evidence". But is it then given what is to be understood and counted as evidence? By philosophy or theology?

4) Page 296ff. Example of sheer prolix documentation of own search, and therefore paradoxically on the verge of positivistically or phenomenologically "descriptive", instead of "systematic"? Cf. also the risk of being a symptom of "The less you understand the more you want to know" (R.L. Ackoff)? See also prolixity on page 359, 382

5) *Page 306n. "The philosopher Hans Larsson advocated the 'principle of convergence', according to which the different views on many issues can be made to converge, if their advocates take the trouble of trying to understand the real import of their seemingly clashing standpoints as well as the underlying motives and intentions of their adversaries." Why not use this idea for a link to scientific and technological matters such as "standards" and "measurement", as in Churchman [West71b]? What do you believe on this, and why are you writing this dissertation, as an application of the observation (page 307) that "all theories, also prima facie religiously neutral mathematical and scientific ones, are regulated by 'religious belief' refuting the myth of religious neutrality." [cf. Galilei]

6) Page 310. Granted that metaphysical presuppositions condition research, have you really addressed what conditions metaphysical presuppositions (for instance Poortman's classification of metaphysical standpoints (296ff)? Good to know at least more "ad-hominem" about Poortman (cf. page 303 where ad-hominem is advocated?

7) Page 310. "How he sifts out the problems he deems worthy of study...how he selects the facts and data.." Is this passive attitude to sifting and selecting a conscious distancing from the "constructionism" of an active intentional intellect which constructs or manufactures its own data, e.g. by means of invention of own measurement instruments? (Cf. data vs. facta and capta)

8) Page 316. In the contrast between traditional worldview (affirmation of the concepts [?] of a spiritual world, a soul, a Supreme Being, and miracles, vs. the naturalistic scientific worldview with its commitment to this world, Darwinist materialism, the ["humanistic"?] kingdom of man and the magic of technoscience: is there a place for the most relevant for formal computer science, i.e. mathematics and logic, or mathematical logic?

9) **Page 318. Were really the "independent metaphysical disciplines (science studies) the ones to unsettle the positivistic constructions fatally (cf. the Sokal scandal) or was it Romanticism and post-Romanticism with its derailment into postmodernsim, to the point that one most famous science study scholar, Latour aggressively ridicularizes Platonic philosophy? Cf. my own attack on postmodern "design theory". But, paradoxically, OK acknowledgment in the condemnation of (page 336 and 452) "Romantic emotionalism"...but at the same time (page 512-513) the turning away from strong will (albeit to technology?) is an abandonment not to faith and trust in nature or divine Providence, but to masked emotionalism in guise of Buddhist-inspired postmodern "bricolage"

10) Page 320-330, esp. 336. It is correct with such a violent attack on Darwin (and darwinism) without a single primary reference to Darwin himself? How would it feel if done against Persson himself?

11) *Page 336n. Why not, in this most relevant context, Husserl's "The Crisis of European Science", with its occasional emphasis on the role of mathematics? Not the least in order to explore the difference between technology in general (steam, electricity) and information technology IT in particular!

12) Page 338. I myself agree with the need of relating critically to superficial expressions of feminism and egalitarianism, but is it not symptomatic that, as far as I could see, you never explain the source for your apparent contempt? (Pages 338, 340n, 390, 396, 407, 450f, 458, 467, 473, 497, 501, 505, 510, 514, 527; esp. on egalitarianism 388, 422, 425, 450, 476)

13) Page 348. "Although it can hardly be denied that the plight of mankind indeed seems mor inauspicious and calamitous than ever today..." I think I happen to understand what you mean, but do you think of most people's and readers' opinion? After forty years of cold war and immediate danger of worldwide nuclear annihilation, decreasing rates of poverty in many poor countries, albeit with wider gaps between rich and poor, etc.?

14) Page 427. Acknowledgment but no priority to political and social dimensions to these upheavals of thought, but wouldn't that require a more explicit explanation of Christianity's understanding of the social and economic dimensions. (e.g. encyclical Laborem Exercens?)

15) *Page 432n. Some theologian should testify whether it is correct that St. Thomas viewed sin as a kind of intellectual error rooted in a lack of proper understanding, when such an attitude also was found in Greek philosophy prior to Christianity? Pierre Aubenque in La Prudence chez Aristote seems to claim that it was the particular gift of Christianity to allow for sin as being the corruption of the will.

16) Page 459. "As the various corpora of such anomalies will be of crucial importance for man's proper orientation in the world, the ban the adherents of naturalism try to put on the unbiased study of this counterevidence either by just disregarding it or by brushing it away by some knee-jerk verbal conjuration...". What do you mean by "unbiased" and how does religious and

political (e.g. in matters of national security) relate to your statement -- is this a tautology in the sense that you and many others assume knowledge of truth and define bias as the deviation from it? Cf. "confirmatory bias" by "peer review" (page 461n)

17) Page 459. "Additionally, the perpetual changes in scientific interpretations and paradigms demonstrate that "science" is...rather an even-changing stream of opinions and vogues, of fleeting theories and biased selections of 'facts'." Do you mean that e.g. physics has not displayed some sort of stability and progress, or that irreligious men would not say the same thing about shifting opinions about religions and gods?

18) Page 475. "The entrenched fervour with which naturalism is espoused and defended will not be unrelated to the fact that naturalism is a presupposition [but why - caused by what?] and starting-point for a wide range of ideological agendas that function as *ersatz religions* , such as scientism, secular humanism, positivism, skepticism, Marxism, Freudian psychoanalysis, etc." Where is pace for sheer *greed* (Plato's "pleasure") in this schema? More provokingly concrete: why in the nutritionist debate, of e.g. 60% overweight population in the USA, never is mentioned the hypothesis that people are incontinent (even Greek, no need to be Christian virtue, and where is virtue today)?

19) Page 477n-478n. "Theological implications of the mathematical concept of infinity..." Why not done here with respect to mathematical logic of software construction, possible implications of formalist vs. intuitionist schools, etc. [But: decidability, closed formal systems, Brouwer vs. Hilbert, and von Neumann, "metaphysical presuppositions of algorithms"...]

20) *Page 489-490 . On the edge, risk of libel for defamation (Crowley)? (Cf. also page 492 (William S. Burroughs drug addict convicted criminal and perpetrator of depraved exploits, intermixed with Minsky and Dawkins), 509 (practical atheists and criminals), 527 (drug prophets, cyber-feminists, jargon -laden decadent style) but OK retraction on page 532 (strong wording and controversialist tone - my intention has not been to offend)? Cf. also ambiguous association by contiguity of satanists (note 2254), frenzied technomaniacs (note 2255), and less frenzied interpretations of history (notes 2258-2260). What about the sheer possibility that a decadent façade may be that "many authors, for various reasons, do not discuss -- or deliberately conceal -- their deepest convictions and thus may appear to be secular modernists or religiously and philosophically indifferent, although they perhaps are not" (page 511). Also a way for inside-guerilla, like Ivanov's professor chair in 1984 creating a niche for beyond-technology, catholic systers who do not work in uniform. "Pious as a dove and cunning as a serpent"?≈

21) Page 496. Why "conscious" negligence of fundamentals facts of human existence? Is not the whole point of the dissertation and its plea for spiritual religious revival (not to talk about depth psychological therapy and unconsciousness) to arise consciousness?

22)**Page 498. "Still, virtual reality may perhaps awaken those ready to be illuminated to the irreducibility of the spirit." Why not also refer to possibly positive therapeutic applications of VR, e.g. treatment of phobias, dyslexia, assistance to the handicapped, etc.? Because "The road to hell (VR misuses listed on page 528 and Stallabrass' "Is the game world coming of age" in the British Prospect Magazine, March 2003) is paved with good intentions? (Samuel Johnson?) and all technology is excused in this way?

23)Page 500. Missing the possibility of theorizing about "extreme art" or obscenity as a misplaced recognition of the longing for a Kantian "sublime"? (Cf. Hyeronimus Bosch?)

24)**Page 509-510, 513 (matrix). Typical results of extreme "classificationism" to the point of at least the reader forgetting why this is done. Cf. Churchman's "teleological measurement" and "coding", as a way of fostering right and good choices. Do you mean choices of whom to read or not read, a reader's guide, disregarding any particular problem, especially IT-related? And, most importantly, name-boxing risks to disregards the persons' social role-situation and kind of "pragmatic uneasiness" (doing/stating the same thing for different purposes or doing/stating different things for the same purpose). This attitude may be triggered by the author's inadvertedly placing himself in the role of neutral observer or creator, as suggested by he himself not being present/included in the matrix of attitudes to technology. Cf. "inconclusive bewildering attitudes in same group"?

25)*Page 523. "If we give up the belief in "the laws of nature", as indeed seems reasonable to do if we are to take the results of parapsychology seriously, one effect will be that the division-line between phenomena created by magic and by science and engineering may become rather indistinct...[But THIS IS THE PROBLEM, how to demarcate what should be called science...?] Perhaps, scientific experiments and the feats of engineering are not as "objective" and independent of our minds as we tend to take for granted..." Is that not dangerous in view of the postromantic derailment and explosion of unbridled subjectivity such as in German post-Weimar politics and present day's postmodern subjectivity? And scientific or artistic creativity bought at the expense of borderline conditions or pathological narcissism? Factuality submerged in pure myth (cf. science as degenerate magic, page 524) vs. Christianity's pragmatism about the existing world or "to make the best of it – techno-science cannot be given up or abolished -- least of all overnight" (page 519)? [Cf. why not "schizophrenia" ≈ VR absurdities, satanism, etc. Cf. Jung.]

26)Page 528. Is it "personal conscience" as related to "decency and reasonability" that may forbid to eat pork, or is conscience to be understood in a more stringent, if not philosophical Kantian-ethical way, as in cardinal Ratzinger's more collective Church-community understanding in his essay "Conscience and truth"? (Swedish trans. by Yvonne Werner, Lund university).

Appendix Microsoft's DNA (pp. 535-616)

No results of case study? Tutorial?

Bibliography (pp. 617-723)

Number of references 4448 (and of notes 2877), and after reviewing your dissertation I am pretty confident that they have been seriously consulted and used. At the assumed minimum average of the cursory reading of one hour per reference this is well more than two years' common working hours, say, three years. And this excludes the time for getting hold of the reference, and inquire with librarians of the USA Library of Congress, etc. Any comments about this reflection?

General questions (greater number of asterisks≈higher priority)

1.   ***How do you perceive the purposes vs. results or conclusions of your dissertation ex-post, if not from the beginning, given that both seem to have changed in the course of your work, and of your writing too? No conclusions, only for chapter 5? Stronger in exploring rather than synthesizing? And therefore congratulations for the "courage and tolerance also of academic advisors in charge..." What about any earlier attempts in the same spirit, inside and outside the country? Cf page 3: It is not the purpose of the current study to establish the soundness of my problem formulation Page 2: Why failure of software development, why object-orientation did not live up to expectations, why component-based rapid-application-development fared so much better, can and should object-orientation and component-orientation be reconciled, how to further the state of the art of RAD. Further formulations of purposes on (totally about 50) pages 5-7, 9, 10, 28, 100, 102, 104, 111-112, 123, 139, 173-174, 208, 213-214, 218-219, 228-229, 251, 257-260, 285, 287, 289-291, 310, 312, 320-321, 323, 332, 338, 343, 351, 357, 395, 428, 438, 456, 465, 469, 518, 531. Should conclusions include "what to do, what I ought to do next?", and which is your answer to that? Will it also answer what a Christian computer scientist or researcher ought to do? And what about the matching of conclusions and the legitimate requirements on a Ph.D. thesis?

2.   ***Why not apply chapter 5 to some IT-computer related issue? Distressing gap between chapter 2-4 and 5! For the rest there is enough understanding that a better systematization or shorter dissertation would require a prohibitively longer work. But an urgent task would have been a critique of the forms of presently academically fashionable Heideggerian "theology without God" (Karl Löwith) to particular IT-contexts. What would a pious and genuine Christian catholic computer scientist look like? How is this related to the question of whether or not "the redemptive work of Christ is not something of the future what we have to wait for" or whether it is going on and guides us in our lives.

3.   Obviously the volume of the work 700 pages in A4-format that correspond to 1400 in normal book format? Does it represent, say, four dissertations or, paradoxically 1/4 dissertation in view of the fact that to make it shorter would have required still more time and effort?

4.   Page 338 (Long sentence, as page 356), thirteen lines, perhaps 180 words. And 2877 notes including more than whole-page notes like pages 388 and 523. How do you understand the idea of "note"? Conscious of how problematic are the present-day appeals to write short sentences and common words I still wonder how you

yourself justify this style of writing (disregarding the polemical tone etc.) and the use of perhaps an average of 3-4 difficult exclusive words on each page (e.g. 407, 425, 432, 492 technodules=slaves servicers venerators of technology), requiring the reader to consult continuously a good dictionary.

5. Long dissertation, OK, but carried away by repetitions and long tirades or diatribes as towards the end on page 525. How about the heuristic rule that the effort spent on the dissertation at least equals the total man-hours of expected effort by the whole collectivity of readers? It might pass the test. And fine, informative tutorials and accounts of various authors and schools of thought. "I am afraid it is bound to be read by a few specialists only...It is apparently not written with the reader in mind, or clearly the reader comes second after the author's adventure of intellectual self-realization."

6. Is this science? What is really the "method"? OK that hermeneutics itself is problematized, e.g. page 410. Which is the basis, beyond the typology of metaphysical standpoints? Not explicitly encyclicals on the Splendor of Truth or Faith and Reason, not even mentioned. But OK Erik Voegelin, and partly Max Scheler (as the Pope), Frances Yates, Jacques Ellul, C.S. Lewis, Poortman Kierkegaard, Virilio, and, in Sweden, the most notable Tage Lindbom. In common: placement in matrix page 513? But the author capitalizes over his particular gifts, experience, engagement, and erudition, for questioning what science could and should be, analog to the polemics not only of the Greens but historically e.g. between Goethe and Newton on the theory of colors, alive in anthroposophical contexts. My competence and my motivations: I learn while examining attempts with same intent as mine. My own misgiving, latest about the trend of "design theory", heideggerian studies of technology with a "theology without god", and "edutainement industry" [Swedish "upplevelseindustrin"] (ref Prospect Magazine March 2003). And, thinking on virtual reality, games worlds, and cyberworlds: does Erik Persson echo Carl Jung in Collected Works vol. 10 (CW10) §988 of *The Dreamlike World of India*: "It is quite possible that India is the real world, and that the white man lives in a madhouse of abstractions".

7. Page 532 on apology for strong wording and controversialist tone - the intention has not been to offend. But may be our real problem is to make sense of the fact that YOU (and past generations, including martyrs...cf. "kränkt rättskänsla vs. rättshaverist!) feel offended, or, rather, outraged, injured, worried, disgruntled or whatever word is the best one, by the ongoing developments, which also can explain, if not wholly justify the aggressive if not bold profile. Do you see any problem of principle in your Christian orientation in the probable fact that the style of dissertation lacks a certain Christian "pietas", or outright "charity"? But let me say that I am sensitive to the problem of the need to balance Christian charity with justice, where present-day's "postromantic-emotional" tone tends to inflate and pervert the feeling for what charity is or should be, turning it into a as well misunderstood meek "tolerance", equal to indifferent "laissez-faire".

8. ** This work, cf. my priority focus: ethics, philosophy and theology (philosophy starts where science ends, and religion starts where philosophy ends) should be developed within each discipline. But the interplay between these

different levels of branches of whatever must also imply the possibility of reviewing their relatives limits and contents, for instance not only what science is but also what it ought to be and or what should be called science, with all its political and economic implications concerning funding and such. [cf. Churchman's Prediction and Optimal Decision].

9. In the account of Terry Winograd's talk on occasion of CPSR's 1988 award for professional and social responsibility to prof. Joseph Weizenbaum (http://www.cpsr.org/cpsr/weiz.htm, access. Feb 28th 2003) it is stated that Wiener's books on science and society are a "reminder that wisdom and technical mastery are not the same, and that we confuse them at our peril". And that Weizenbaum challenges those of us with comfortable positions in the computer profession to look seriously at how our work is being used. Furthermore, JW "has questioned some of the most sacred dogmas of our culture, including the pre-eminence of the rationality of science...He rejects the common view of progress...reminds us that in losing sight of human values this quest can turn from progress to madness...that Joe has been characterized by his critics as a Luddite - as having an irrational fear of all science and technology. It is not surprising that such allegations would come when someone dares to question the sanctity of the modern scientific enterprise and to argue that there is a more fundamental kind of wisdom...[cf. Aristotle's kinds of knowledge and wisdom] *His criticism is not of technology, but of our uses of technology*..." And TW quotes from a paper by JW some years earlier: "Perhaps the computer, as well as many other machines and techniques, can yet be transformed...into instruments to enable us to live harmoniously with nature and one another. But one prerequisite will first have to be met: there must be another transformation of man. And it must be one that restores a balance between human knowledge, human aspirations, and an appreciation of human dignity [cf. Kant] such that man may become worthy of living in nature." ---Which is your opinion about the difference between Weizenbaum's and yours position on these matters?

10. What are your justifiable expectations from the disputation? What is the meaning of an opponent's and grading committee's few days' study, and a disputation act of some hour, of a text that has taken the author years, or half of his life, to complete? Results, or process? A long way, ending at the beginning? "With the drawing of this Love and voice of this Calling We shall not cease from exploration And the end of all our exploring Will be to arrive where we started And know the place for the first time" (T.S. Eliot, Four Quartets–Little Gidding–1942)

11. Not dealing with improving and perfecting software systems? "They constantly try to escape From the darkness outside and within By dreaming of systems so perfect that no one will need to be good." (T.S. Eliot, Choruses from "The Rock"–1934)

12. Not dealing with data and information systems? "Where is the Life we have lost in living? Where is the wisdom we have lost in knowledge? Where is the knowledge we have lost in information?" (T.S. Eliot, Choruses from "The Rock"–1934)

13. Cf. Norman Mailer - interview in The American Conservative, <http://www.amconmag.com/12_2/mailer.html> ≈ page 304n, note 1500 on lip-service to a faith: "I think there are elements in the remains of left-wing philosophy...that are worth maintaining...On the other hand, I am not a liberal. The notion that man is a rational creature who arrives at reasonable solutions to knotty problems is much in doubt as far as I'm concerned. Liberalism depends all too much on having an optimistic view of human nature. But the history of the 20th century has not exactly fortified that notion. Moreover, liberalism also depends too much upon reason rather than any appreciation of mystery. If you start to talk about God with the average good liberal, he looks at you as if you are more than a little off. In that sense, since I happen to be - I hate to use the word religious, there are so many heavy dull connotations, so many pious self-seeking aspects - but I do believe there is a Creator who is active in human affairs and is endangered. I also believe there is a Devil who is equally active in our existence (and is all too often successful). So, I can hardly be a liberal. God is bad enough for them, but talk about the devil, and the liberal mind is blown....There are two types of conservatives in America now. What i call "value conservatives" because they believe in what most people think of as the standard conservative values -- family, home, faith, hard work, duty, allegiance -- dependable human virtues. And then there are what I call "flag conservatives," of whom obviously the present administration would be the perfect example.

14. The author as Carl Jung in CW10 §1012 of *What India Can Teach Us*: The Indian does not fish out infinitesimal details from the universe. His ambition is to have a vision of the whole. He does not yet know that you can screw the living world up tightly between two concepts. Did you ever stop to think how much of the conqueror (not to say thief or robber) lies in the very term 'concept'? It comes from the Latin *concipere* , 'to take something by grasping it thoroughly.' That is how we get the world. But Indian 'thinking' is an increase of vision and not a predatory raid into the yet unconquered realms of nature." NOW FOLLOW EDITED COMMENTS BY "OUTSIDER" COMMENTATORS THAT I SELECTED ON THE BASIS OF MY OWN JUDGMENT OF POSSIBLY INTERESTED PEOPLE IN MY OWN PROFESSIONAL "NETWORK". THIS LISTING DOES NOT IMPLY THAT I ENDORSE ANY OF THE COMMENTS. THEY ARE RATHER PUT AS "QUESTIONS" TO BE RESPONDED.

15. COMMENTATOR.
Overall Structure

The work is characterizable as a play in 3 acts. The first is the critique of object oriented (OO) programming (and OO mechanisms). This highlights the semantic constraints of the OO approach. Playing on the notion of 'objects', Persson goes on to posit the elaboration of user engagement into 3-D immersive virtual reality (VR), then further posits what he terms 'realistic computing' (hereafter 'RC'). I could easily be wrong, but my cursory interpretation is that RC represents a possible, if not probable, computing orientation that Persson sees as either imminent or likely. The primary emphasis appears to be on 'semantics' -- i.e., the

viability of software realizing an 'ontology' (as that term is used in applied computing) of use for real world applications.

Persson also focuses on the idea of a 'component-oriented' paradigm (hereafter 'CO'), its distinctions from the OO paradigm, and its characteristics. Both OO and CO emphasize 'objects' (in the sense of discrete units of functionality). However, the CO approach provides less open access to these objects' 'semantics' (i.e., making CO programs more likely to be seen as 'black boxes'). This semantic opaqueness is apparently the basis for Persson turning to consider programs as 'worlds' populated with 'objects' serving as literal or figurative simulacra for relevant elements of the application domain. This metaphor of 'world' is then leveraged to open up a discussion of 'virtual worlds', leading to the aforementioned attention to VR - particularly of the immersive variety.

The second act is a massive critique of Western thought in the Enlightenment, with particular regard for those themes having to do with semantics. This section reads more like a tome from a history or philosophy department, and in isolation would never be mistaken for a monograph in computer science. It is also clear (sometimes brutally so) that Persson is arguing from a heartfelt Christian perspective which often crosses the line from discreet scholasticism to outright evangelism.

The third act (Section 6, labeled an Appendix) is a detailed description and analysis of Microsoft's DNA (Distributed interNet Application Architecture). The inclusion of this was apparently motivated by Persson's experience with DNA and his self-professed preference for it as a software architecture.

The Coherence of the Manuscript

At the page-by-page level, I find Persson to be a capable and even eloquent writer. At the top-level, I find myself baffled by the structure of the thesis.

I don't know why Persson included Section 6 (the Appendix on DNA). It is a sizeable chunk of prose that simply hangs there in space, with little or no discernible relationship to the structure or the themes of the thesis' main body. It is also anomalous in the sense that the viability and future of DNA as a product is now in question, given recent legal rulings that require Microsoft to more explicitly acknowledge and honor Sun's Java environment. One gets the impression it's included only for 'tactical' reasons (e.g., to reinforce the appearance of solidity with respect to computing).

I also find myself wondering how the first and second sections interrelate. These are two quite distinct works -- one on computing architecture, and the other on philosophy of science or technology (or, perhaps more accurately, on philosophical projections _onto_ science and technology). Both sections are well written, well researched, and commendable as descriptive essays.

The primary point at which Persson 'formulates' (as opposed to simply 'describing') is in the latter stages of his first act - when he projects immersive / 3-D / VR 'worlds' (and RC) as the outcome toward which he seems to assume software architecture is heading.

What's problematical about this is that (a) it's a very old argument and (b) Persson only employs what he's developed here as a straw man (an excuse to criticize Western thought). It strikes me that the massive central critique in this thesis is motivated by a scenario (not fact, but scenario) which is of the author's own fabrication (the very definition of a 'straw man').

This troubles me from a scholarly point of view because even 4 years ago (Persson states his temporal reference point is circa 1999) debates over the viability and ethics, etc., of AI and VR were 'old news'.

This also troubles me from an editorial point of view. It would seem to me Persson's line of argumentation would have been stronger and more compelling had he done the philosophical critique up front, _then_ turned his attention to software architecture, etc., as an illustrative example of the themes he'd already cited. This approach would have made the thesis move from philosophical framing to application / analysis, and would have contributed to the intended outcome of seeing this as a contribution to knowledge in computer science. As it stands now, it spins off from detailed discussion of software architecture to personal philosophizing. No matter how well done this philosophizing is (and it is quite well done), the current sequencing of the manuscript leaves one with an impression that Persson's personal beliefs are the core of the thesis, not the more detailed analysis of software architecture issues.

In other words, I think the current structure undermines the perceived value of the thesis as a contribution in computing.

The Focal Theme of Software Architecture

 I do _not_ think Persson's motives / themes correlate well with his choice of level of analysis (software architectures per se). Whether you're programming in old-fashioned assembly language or a new slick 3G or 4G environment, you are ultimately sculpting logic for a Turing machine. This underlying mechanism sets the parameters for _all_ software viability (logically, ethically, whatever...).

Any of us old enough to remember Fortran and COBOL know full well that in principle there's nothing you can do with (e.g.) DNA that you couldn't do (albeit with much more labor and frustration) in those older languages.

The newer-generation 'architectures' of OO and CO upon which Persson focuses are discriminable not in terms of their ontological prowess, but only in terms of software engineers' and software managements' convenience. OO didn't revolutionize software applications or usability -- it revolutionized the ability of software engineers to address applications in a usable fashion within reasonable

cost constraints. OO streamlined development by facilitating (not introducing, just facilitating) code reuse and establishing a coherent basis for more detailed code documentation.

To analyze ethical, human, or social implications of computing at the level of software toolkit architectures strikes me as being as suboptimal as debating the implications of 'murder' with primary attention on knives versus guns versus hands, etc.

I believe Persson's arguments would have been more compelling had he anchored his analyses either (e.g.) 'higher' - at the user interface / end application engagement or 'lower' - at the level of Turing machines, finite logic, etc. The problem is that to have anchored his argument thusly would have more strongly highlighted the fact that his type of argument has a long history in the contexts of those other levels of analysis -- making his dissertation look like 'old news'.

The Focal Theme of Christian Critique of Western Thought and History of Science:

It seems obvious to me that Persson's 'passion' was the central act of this manuscript -- the critique of Western thought, the Enlightenment program, etc. It's also clear that the impetus for this 'passion' was his fervent Christianity. It also appears to me that his 'passion' may have worked to the detriment of his _perceived_ contribution to his chosen field of dissertation (i.e., computer science).

Persson's scholarly and writing skills are quite good, and the dissertation is solid evidence of these things. However, in the context of a disputation, the candidate is expected to demonstrate his qualities as a scholar, not as a believer. Insofar as Persson deferred the philosophical critique until after the introduction on software architectures, he had left himself a wide-open space in which to philosophize. In other words, by having never 'framed' a general issue (other than the RC straw man) Persson was perfectly free to spin off on any tangent he chose in the subsequent critique.

Phrased another way -- had he established a specific focal object of reference and analysis in the opening section, he would have been obligated to consider all sides of the attendant philosophical issues and argue their pros and cons. Instead, he left himself unconstrained by any rhetorical obligation to 'circle back' to address a previously-posited central issue / question.

In the end, Persson's philosophical critique moves outward in any direction he likes, with no final target apparent to the reader. Although the scholarship and writing are quite good, it turns into a personal essay that essentially rambles far away from the original theme of architectures.

Furthermore, this lack of framing or target-setting leaves Persson unconstrained

as to examining and comparing divergent points of view. He cites (e.g.) postmodernists and others only to the extent they can be pilloried as wrongheaded. At the extreme, there are multi-page passages of wonderful prose which can only be taken to be 'one man's opinion', free of context. I think this seriously undermines or even negates the value of the philosophical critique as a component of an effective dissertation.

Lack of Resolution/Closure

The 'open-ended' opportunity the thesis' structure afforded Persson had the effect of 'biting him in the end'. The biggest flaw in the thesis is that Persson seems to believe that the conclusion of the philosophical essay is the conclusion of the dissertation he started. I don't see this at all. In effect, the dissertation 'drops dead' at the end of Section 5, leaving the reader to wonder how the preceding 250 pages illuminated or resolved the issues raised in Sections 1 - 4. This flaw is highlighted by the subsequent mysterious appending of an otherwise-irrelevant Section 6 (detailed descriptive analysis of DNA), as if Persson realized he'd wandered too far from his original point of reference and had to throw something (anything!) into the manuscript to give the appearance of achieving closure.

Even on cursory inspection, I was struck by the lack of a concluding section in which Persson summarizes his points, his contributions, and how the different components of this manuscript tie together as a whole. In effect, I think the manuscript fell into the same trap as Persson's choice of software architectures as the focal initial topic -- it concentrated on the 'components' or 'objects' at the expense of the 'big picture'.

Summary/Conclusions

I'm very impressed by Persson's research and writing skills. I certainly think he warrants a doctorate for the effort he invested in this dissertation.

That doesn't mean I would claim this is a good dissertation. Persson's loss of focus and 'wandering off' halfway through the document erode the perceived coherence one expects of a doctoral thesis.

Persson elected to work 'in the large', as the artists say. This proved to be a problem, because he did not sculpt a whole out of his competent (and in some cases beautiful) component pieces. Some writers are good at short stories and poor at novels. This is metaphorically how I see Persson as a writer.

I believe section 5 is the most impressive portion of the document. Though it ended up contributing little to (and arguably undermined) the coherence of _this_ document as a dissertation, I think it would be a very good piece to export as a monograph or article.

Section 4 is similarly impressive, but I believe it would take substantial rewriting to make this portion into a standalone publication.

A Final Note

Because Persson attempts to link the software / 'object' architecture to the semantics of a virtual 'world', he places himself on the same general territory as Churchman in _Design of Inquiring Systems_ (in West71b, i.e., how theoretical 'structure' correlates with workable 'knowledge'). It would have been interesting to see in which of Churchman's categories Persson would have placed his focal OO and CO elements (my initial guess = Leibnizian), and how Persson would have analyzed OO and CO in light of Churchman's analysis. This strategy would also have afforded Persson a stronger basis (via Churchman's eventual focus on 'ethics' and the 'guarantor') for justifying his subsequent spin-off into a broader philosophical critique (which as I stated in my notes neither clearly contributes to his originally stated themes nor results in any coherent closure for the document as a whole).

16. COMMENTATOR

This Ph.D. thesis is both with respect to its size and intellectual scope quite exceptional. A thesis in computer science comprising more than 700 pages that explores the underlying philosophical fundamentals of 'realistic computing' can no doubt be qualified as what I like to call good old-fashioned scholarship, nearly forgotten in our contemporary age. The author, Dr. Erik Persson, shows to be aware in which respects his "study differs considerably from most Ph.D. theses" (p.7), while giving account of his ambitious project in the Introduction. It is important to notice that Persson's good old-fashioned scholarship is by its very nature not anti-metaphysical but sensitive for the perennial and fundamental human questions and the "deeper" religious roots of science in general and computer science in particular. I fully agree with Persson that "what we need to do is nothing less than to overcome the deep-seated fear of depth characteristic of Western science and technology" (p.288). Indeed, Persson is undoubtedly right that science and computer science is not a neutral affair, it is, to say it with a reference to Augustine, part of a world-historical struggle between two irreconcilable powers, the *Civitas Dei* on the one side and the *Civitas Mundi* on the other.

It is impossible to give here a detailed and in-depth discussion and evaluation of Persson's study. After one full day reading I cannot do more than presenting some comments about issues that have catched my attention and seem to play a key role in Persson's argument. I focus here on two issues.

First, I would like to comment to the worldview concept adopted by Persson "as my lodestar in navigating the muddy waters of human thought" (p.290) and his distinctions between "primary" and "secondary worldview" (p.291) and "traditional" and "scientific worldview" (p.310-316). The term "primary" refers to the "worldview" that precedes the scientific process and as such is guiding and regulating the whole scientific endeavour. The "secondary worldview" does not

precede science but arises from the pursuit of science.

I agree with Persson that by its nature a worldview plays a guiding role in the scientific process of knowledge acquisition, that is to say that certain metaphysical presuppositions flow into the scientific endeavour. This guiding role is, I would say, a structural condition for all human activity and thus also for his scientific thinking. The problem is than of course that we need a reliable guide, a reliable "primary worldview". So Christian scholarship has to be founded on a biblical worldview, an understanding of the world that is in agreement with the biblical revelation. The results of the scientific process do not have the same status as the primary worldview. The scientific endeavour may lead to some theoretical understanding of the world, however, the latter has to be integrated in the primary pre-theoretical understanding or believing understanding of the world. If I understand Persson correctly, I do not agree therefore with his idea of a secondary worldview following from science. A worldview precedes science and is not the result of science.

I agree with Persson's critique on the "scientific worldview". However, from the preceding it follows that my critique is more radical. Persson rejects the dominant "scientific worldview" that is feeding a reductionistic naturalism. "…. the modern scientific is *not* an approach to truth, but rather a gnostic departure from it …." (p.464) And I agree with him. However, as said, I reject also the concept of a secondary, theoretical worldview as such. The weakness of that concept is that it gives priority to theoretical thinking and understanding above pre-theoretical thinking and understanding.

Second, I would like to make a short comment about the issue of the Christian or biblical worldview and the consequences for our view on science and technology. Framing a Christian worldview (cf. 468-469) Persson takes into account the fall as a fatal event in history of the whole creation (cf. also p.348). I had no time to inspect carefully and in detail Persson's understanding of the relation between creation, the fall and the redemption achieved by Jesus Christ. However, the whole idea of Christian scholarship and also the view on our technoscientific activities is strongly dependent on this understanding. I agree with Persson that from a biblical point of view "the thrust for innerworldly salvation through science, technology, wealth, politics, etc. appears as an entirely mistaken approach." (p.516) However, it seems to me that the redemptive work of Christ is not only something of the future that we have to wait for. It is becoming manifest already in the lives of his followers, at least partially. Therefore I don't believe that it is proper to speak about "Jewish-Christian pessimism about man's capability for the good" (p. 516). I also reject the opposite stance of optimism. We have to take as starting point that in Christ and through the working of His Spirit we are new creatures and that this is also a solid basis for truly Christian scholarship striving for a renewal of science while awaiting for His return. To make the latter concrete I would like to raise the question if in Persson's view there is a need and possibility to point a liberating perspective for developing computer science and in particular for his field "realistic computing"?

17. COMMENTATOR:
 "The man raises the question of the meaning of his professional activity, transforms his doubts into a methical investigation and construes articulate answers. It requires a very strong commitment, which is rare. Agree that there is in modern technology more than the expression of an utilitarian drive for efficiency, it is metaphysics. Agree that there is a quasi-religious dimension in the uncritical optimism about technology, and displaying gnostic and hermetic features. Hermetism and the Kabbala may help to understand the "mythogenic" power of computer technology. He has a serious knowledge of secondary sources about the history of spirituality and mysticism. BUT the writing style...reading requires too much efforts from a sympathetic reader, tendency to intellectual incontinence, dispense one third of the 5th chapter with all the twists and dead-ends of the path. It is important that the idea should be understandable by readers who do not necessarily share his ideas and beliefs....A sometimes paranoïd mode of argumentation (ex. p. 466 "The mountain of untruth...") weakens what he has to say [cf. also Strunk & White, Elements of Style, 1979]. Too many typologies and genealogies of families of thought, and e.g. his Matrix of attitudes towards progress seems rather odd to me. I studied with both J. Ellul and H. Jonas and I do not understand what makes the former a traditionalist Christian and the later a modernist. I think it is legitimate to use the gnostic-hermetic model for an analogical interpretation of modern technological ethos, but not necessary that the idea of technological control was inherited from the early gnostics and to make them part of an historical causal explanation. We are all capable of having by ourselves "bad" and "heretical" thoughts, cf. the original sin, but it is true that studying earlier occurrences of such attitudes enable us to understand better the recent ones."

18. COMMENTATOR
 "Struggling further to pick up the core ideas of the thesis, I encounter the kind of sweeping claims that usually (but not always justly) suggests that the candidate has troubles defining or delimiting his topic, e.g. 'a comprehensive enquiry into many branches of knowledge, faith, and speculation...'. But then, reading on, I recover my balance: 'As a result of my studies, I finally...abjure the whole project of realistic computing as an unwholesome techgnostic fantasy." The circle closes, the purpose (Ph.D.) is accomplished and everyone can relax. Well done! I'll certainly be curious to see the work...degree of self-assured irony or ironic self-assurance. But I confess, I find it certainly more appealing if a Ph.D. candidate uses the unique opportunity of a dissertation to stretch himself to the limits of what s/he can handle, and reflect/speculate about these limits, rather than contenting him/herself with the usual kind of overspecializing dissertation."

If I should sum up my impression in one sentence, perhaps I would have to say that I am at the same time impressed and dismayed about the study.

Impressed, because of the obvious effort that goes into writing such a piece, and because of the sophistication with which the author mastered the task he set himself. One of the reasons that such "unbounded" writing is not usually encouraged for dissertations is of course that many a candidate will be

overpowered by the dangers of allowing his topic to unfold into ever larger issues. Not so this author. His study is for me a remarkable example of a Churchmanian "process of unfolding". The author follows through where his topic takes him, even though it means expanding the boundaries of his "problem" to the point where either heroism or mental breakdown are the only remaining options.

The author has managed to avoid mental breakdown, and in style! The thesis is ambitious and bold not only with regard to the scope of its subject but also with regard to its apparent literary ambitions. He manages to apply the style of the "second culture" (the arts, humanities) to a topic of the first culture (science, technology). The result is beautiful, in the most everyday aesthetic sense of the word. I find it really quite remarkable to see a thesis in computer science written in this elegant kind of language. Clearly, the thesis is well-written and carefully edited, which alone makes for a remarkable difference to the bulk of "ordinary" theses.

I am impressed also about the courage and tolerance of the academic advisors in charge, who allowed their Ph.D. student to follow the consequences of his problem rather than restricting him to a narrowly defined (technical) topic.

Congratulations to everyone involved, then!

Dismayed, too, I am, because reading the study as it presents itself is clearly beyond my resources of time and energy (and physical fitness). Who, except retired people, can mobilize the time it takes to read this study comprehensively, appreciating its detail as much as its scope? Hence, despite its all-encompassing ambitions, I am afraid it is bound to be read by a few specialists only... a few specialists who not only understand its programming and IT language but also are open-minded and patient enough to follow the author's "plumbing into the depths of modernity". As elegant and impressive the thesis is, it is apparently not written with the reader in mind, or clearly the reader comes second after the author's adventure of intellectual self-realization. Given that it is written as a Ph.D. dissertation, this order of priorities is understandable; yet it is somehow regrettable as it might impede so many others from sharing the fruits of this adventure.

If a good book is one that allows the reader to understand the author's message in a way that is effective (the book's message "reaches" the reader), efficient (the reading effort is economical in relation to its message and conclusion), and enjoyable (the book is written so as to provide easy reading), then this dissertation is probably not a very good book. In particular, I note two shortcomings that might have been avoided relatively easily, and as an advisor I would surely have insisted on their being avoided:

a) A book of this magnitude could be better organised. In my opinion the hierarchy of its organisation, as represented by the table of contents, is probably too flat, so that as a result the table of content does not provide the easy overview it should. Organizing a text of over 600 pages of small print into only five

chapters is not very helpful either, I think, although this is only a minor point. More importantly, given their size, the five chapters would merit substantial introductory and concluding sections that should offer résumés of what is expecting the reader when he engages to read a chapter, or of what he is supposed to have understood in the preceding chapter. I do not find any sections in the book that would merit the title "Conclusion". Clearly, the thesis is stronger in exploring new territory in a careful, and carefully written way, than in synthesizing the discoveries made into cogently argued conclusions. What is all the effort good for if at the end no clear conclusions are articulated, be they even open questions?

b) The book uses a lot of jargon, drawn from both computer science and the humanities, without offering a glossary or at least a subject index that would refer the reader to where terms and abbreviations are first defined. The book is replete with sentences such as these (just to take two chance examples): "Another *BOF*-provided manager *XO* is the *Event Manager XO*, which provides a *push* model *publish-subscribe* event service" or "*Catharism* was a missionary, dourly *dualistic-Manichaean* sect, originating in *heretical Gnostic* groups on the Balkans (and perhaps also, in the Orient)." Some jargon is inevitable in every original study; my point of objection is not the use of such terms as such -- I do appreciate the author's scholarly motive, of using the authentic language of his sources rather than some arbitrary paraphrasing (again a laudable scholarly attitude that distinguishes this study from the sloppy kind of scholarship that is common nowadays) -- but merely their massive use without any help being given to the reader who does not understand them all. Given that this kind of writing prevails over hundreds of pages, which reader could possibly be expected to know and understand all of the terms he is confronted with? Without a glossary or detailed index, this massive use of jargon clearly undermines the readability of the book as a whole, as much as it may be appropriate in every single instance and as much as the writing is careful and admirable.

It is for this kind of reasons that I do not feel I can mobilize the time and effort to read the study. So much more as its small type face make reading it very tiring indeed for someone like me who does not have the best of eye-sights.

However, these few critical remarks should not deflect attention from the true achievement of the study, of (somehow) mastering such an impressive process of unfolding its topic. They are rather meant to articulate a recommendation in case that some publisher would consider publishing the study, and to explain my feeling of not being able to do justice to it -- by reading and appreciating it in much detail.

19.   COMMENTATOR:
"Agree that Christianity is relevant to our view of science, but it is Galilei who separated ethics from science and forbade moral views of science. Concerning worldviews. Sure Max Weber did inherit the German idealism from Dilthey and Rickert but his worldview occupies a central place in modern sociology where it quits Durkheim's "collective representations". This is the essential thing. In one

case one builds a culture my subjects' interactions, and in the other case one collective subject exists by itself. Weber opens up to philosophical reflection, to disenchantment. On Voegelin...the gnosticism which comes from Christian Manicheism (but has its source in Zarathustra, the indian and chinese philosophy) has always conceived this world as the spirit of evil, it is not at all Faustian, on the contrary. The spirits of good and of evil are equally powerful (in radical dualism), and in the material world the spirit of good is overpowered by the spirit of evil, and this world is damned. There is a book by H.C. Puech on the search for Gnosis, and the Iranian shiism stands close to it, as Henri Corbin, Heidegger's first translator, shows in his work on an Islamic Iran. Furthermore, the prophet of the German Greens, Hans Jonas, dedicated his work to gnosticism and in his basic book for ecology on the principle of responsibility he addresses the question whether this world is damned because it is evil. Cf. the sources of dualism in the Bogomiles and the Cathars. But, in fact, Persson's reflections on Christianity are very interesting albeit confused and contradictory. At the end one no more knows who is responsible for what. His thesis circles around our world as based on a naturalistic worldview, a possibility among others, which invalidates science as objective knowledgte. But the argumentation should be more sober, more built upon his own thoughts. Too many references kill the reference. But the thesis is really of a very high quality despite my criticism.

20.   COMMENTATOR:

Is the author open to discussion and concerned for the spiritual and cultural problem or is he rather a fundamentalist gnostic? There is no connection beyond the most general terms between the historical and ideological of chap. 5 and the informatic praxis or his activity of informatic engineer and Persson could give to some the impression of being a satan-possessed fundamentalist, similar to those who, for rescuing the lives lost in abortions, set fire to the clinics and also attack and kill. There is nothing so bloody in Persson, of course, but the tone is similar. He supports credible theses and positions, he is even inspired, but then he uses with his adversaries the same tone and the same despising attitude of which he accuses them. There is no piety, not to say charitas.

Some more specific consideration. The denouncement of darwinism, interesting and ideologically giustified, is of anedoctal evidence on the level of facts. He ignores the discussion (Horckheimer and Adorno, for instance) on the disturbing coexistence of technology and occultism in the nazi 1900s and elsewhere. [Ivanov's remark: compare with the following reference. Herf, J. C.,1984, *Reactionary modernism: Technology, culture and politics in Weimar and the Third Reich*. Cambridge, Mass.: Cambridge University Press.] Curiously enough this is strange for somebody who ought to and would like to articulate his informatic expertise with a profound scientific-philosophical Weltanschauung. He does not grasp the metaphysical problems of the algorithm, and in his treatment of virtual reality, of artificial intelligence and the cognitive movement he repeats well known banalities. He does not refer to Pylyshyn, Newell, Simon, Haugeland, and ridicularizes Minsky without understanding him, just to mention some names.

My overall positive evaluation is despite of it all positive. It is fine that there are such works, even if one would like them more balanced. I am curious about what he will do after having completed this dissertation. If he continues to write as fundamentalist he is going to make good or evil depending upon who reads him. Worse if he enters academia, because his extremism could be deleterious for many young people. Anyway... thank you for having given me the occasion of the acquaintance of this strange personality. Who knows, perhaps he is in person quite sweet and sympathic.

21.   COMMENTATOR

I flipped through the pages for some time reading here and there. It is literally and non literally a heavy piece of work. For instance the introduction is already a little philosophical technical treatise about the thesis which gives the reader a lot of meta-information, but does not tell him what is presented where and why in the specific sequence of argumentation. It does not provide a reading aid but rather makes the story more complicated for the yet uninformed reader. Second, there are too many details and aspects rewritten which have been presented elsewhere. It starts with the Nato conference and goes all the way up to muds and moos and more modern context. The history is retold, not that complete as it should be for each topic to serve as a new frame of reference, but on the other hand too extensive to help the reader grasping the general argument; and most of the footnotes were too lengthy.
I am afraid, that due to the sheer amount of pages and the problems stated above, I cannot read a bit of it ever once and a while or between different tasks. But when the alternative is reading all or nothing then it quickly comes to nothing which is a pity. However, I have not given up yet.

22. COMMENTATOR:

I am thoroughly impressed by the vastity and keenness of the author's, at the very least twofold, cultural background. Also the quality of the English language he uses, the subtle taste of archaic or recherche' terms, the terseness of the phrasing has been a refreshing pleasure. I heartedly approve of the university department's acceptance of a dissertation that, according to oppressive custom the author himself gives eloquent examples of in his pivotal Chapter 5, might have been persecuted as deviant or irrelevant or worse. I am in no position to technically appreciate the huge technical work. I feel it is of the best engineering level, but of course the peculiar interest of the dissertation lies in the juxtaposition of this high grade technical work with the discussion on computing and metaphysics. I think the author might be interested in the work of Brian Cantwell Smith, who started with 3-Lisp and in fact initiated reflective computing and has published "The Origin of Objects" and "God, approximately". He is to be found on the Web.

Although I am definitely an alpha person, according to the author's classification in 5.1, I try to entertain a lucidly contradictory and tolerantly skeptical position so that I often concur with the content of many of his views, seldom with the

feeling of his stance. Still it is reassuring that in the midst of our consumer dominated contemporary society such voices do arise and are being listened to.

23. COMMENTATOR

Some brief and superficial comments may be better than none at all as my position leaves me very little time for lenghty study. I will state my honest opinions without taking into the account the likely collegial and political problems that might also intervene: I would and could not except this as a thesis for purely formal reasons. I pity the student as it is clearly the advisor's fault that it has come this. The student's amazing literature background with good guidance could have resulted into a good thesis. If asked officially, I would probably decline to review this work. Here is why the current manuscript fails on elementary grounds:

(1). I could not find a clear statement of purpose, why the work is undertaken and to what kind of tradition or stream of literature it is supposed to contribute. Early on around p. 2, it sounds as if the work is supposed to address the software crisis, but this focus is soon lost. I also I miss any description of the study's methods: what is the work to accomplish for whom and using which methods or approach is never reflected.
(2). There is no clear introduction and there are no identifiable conclusions
(3). It is therefore unclear what the contribution to new knowledge is - most of it reads like a text book on a wide range of topics from the technical to the philosophical (e.g. section 5.3). Other parts are rather polemical and as such in-appropriate for the genre of a thesis and yet other parts simply recount how certain computing architecture or standards evolved - so what??
(4). Important literature appears to be misinterpreted with wild claims (e.g. check p. 11 - this is not what Kuhn says)
(5). The connection between chapters 1 to 4 and chap. 5 is not clear - it seems as if two projects have been combined; I could not find a meaningful interpretation of the title that would somehow bind these 2 parts together (but then I did not spend inordinate amounts of time looking for it; it should be explained in the introduction.)
(6). The whole format is unacceptable for a thesis beginning with its length and style. Even from a European perspective it violates the purpose and expectations that define the very nature of a thesis: an identifiable contribution to new knowledge as judged by an recognized community. (For which academic community is this written?) Too many and too long footnotes (look at p. 405 to 426, almost half the text consists of footnotes!) are a symptom that the work lacks a well-planned structure.

Comment to author/advisor:
To salvage this work it will have to be focused on something that is new and *of interest i.e. on a clear contribution for a recognized community. This contribution is most likely either in lessons learnt from the candidate's practical work with various programming environments or in chapter 5 or in some connection of the two but it is up to the author to clearly identify and communicate it. This currently is not the case. The fact that in spite of these deficiencies, parts of this voluminous work make interesting reading, is not sufficient for an acceptable

dissertation.

Finally Is this work defendable? Not in a real defense as it contains too many shots from the hips. Next is the question - what is new here? can you tell me that? What is the "thesis"? If the people at the defense are good, I would like to listen to it. I am quite open to unusual work, but it must pass the first test of intelligibility and coherence plus reasonable length for a thesis. It fails on these grounds alone. I would probe into the background how this student was guided.

APPENDIX: "Traditional" criteria for evaluation of doctoral dissertations

I do not wish to pre-empt the task of the grading committee by trying to formulate any evaluation which formally is not my responsibility. By I will be allowed to participate passively in the committee's subsequent meeting. If, despite of it all, I should express some evaluative feeling, it would be by the word "exceptional", this dissertation is exceptional, to begin with in the pure literal sense of the word. And I feel that it has been of great interest for me to read it, it has been also an intellectual, ethical, and also aesthetic experience not the least because of the honesty and righteousness of the author's purpose, his passioned serious engagement, his elegant and erudite English language, his ambitious finishing if one disregards readability of font-sizes because of economic reason, his erudite "good old-fashioned scholarship, nearly forgotten in our contemporary age" not the least in universities. All this has been a consolation and encouragement for me in face of my recent feelings of deep concern, distress, and outrage in face of what I perceive to be the ongoing transformation society in general and the universities in particular.

A summary-collection of evaluation criteria that have circulated around at various universities and departments. Preliminary judgement/evaluation criteria (suggestion to the evaluation committee):

The goal of the doctoral program is to give the graduate student a broad overview of research methods and the present state of knowledge in the chosen subject and to develop the ability to perform and present independent research. The quality of the doctoral thesis should be of the standard required to fulfill the scientific and formal criteria for publication in recognized international scientific journals. The opponent and the grading committee should consider the following points:

1) Is the quantity and quality of the work representative for a four-year doctoral training period?

2) What are the main merits (originality, scientific imagination, new methodology, new scientific information, etc.)

3) Which are the deficiencies of the thesis?

Or, in particular:

1.   Subjects and problems taken up in the dissertation

Has the candidate demonstrated sufficient originality in the main theme of the dissertation? If the problem has been investigated earlier, why has the candidate

taken it up again? (Development within the field of research has indicated that the previous results are no longer valid, the candidate has had access to unique material or a new technique, etc.)

2. Previously published work

Are the references to previously published work sufficiently representative of other investigators in the field? Are they truly reflective of the current status of research in the field concerned? Does the dissertation contain a critical analysis of the papers referred to?

3. Methods

Are the methods conventional or new? Are they well-controlled regarding possible sources of error and appropriate to the subject?

4. Results and conclusions

Do the results of the dissertation contribute to the particular field of research? Have logical conclusions been drawn? Has the candidate shown stringency in drawing his conclusions (are the conclusions reflective of the results as presented in the body of the dissertation)? Does the candidate discuss the results with adequate scientific precision?

5. The formal presentation

Is the dissertation well-composed and the language clear and unambiguous? Have experiments and results been presented lucidly? Are tables and figures clearly and adequately explained?

6. Summing up

a) with   Is the quantity and quality of the candidate s work in accordance requirements stated above?

b)   If the dissertation is based on team-work, can the candidate**s** contributions be clearly distinguished?

c)   Are there any deficiencies in the dissertation?

d)   What are the main merits of the dissertation (originality, new methodology, new scientific methodology

ALTERNATIVE APPROACH (in Swedish)

1) Ämnesval och -perspektiv: betydelse och avgränsning

2) Kunskapsintresse/ärlighet (men samtidigt: vad vill vederbörande, om något? Varför?)

3) Resultat: bidrag/originalitet

4) Försvaret vid disputationen

5) Anknytning till tidigare forskning

6) Omfattning

7) Metod

8) Teori

9) Empiri

10) Hantverket

11) Individuell utveckling och potentia

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