Free Radical

After land art: database and the locative turn

Brett Stalbaum

I want to live in Los Angeles
Not the one in Los Angeles
No, not the one in South California
They got one in South Patagonia
- Frank Black

Abstract

This essay asks whether we might learn something from the history of land art that might be important for any re-evaluation of the ontology of art after modernism and conceptualism. It examines the tensions between the 20th century notions of modernism and conceptual art, underscoring their constant interoperation as art system. After exploring the history of database in computation and tracing how the concepts and implementations of database in computer science were taken up by artists, the essay proposes that the binding of abstraction to material actuality (also known as database) allows us to move on to 21st century model of art practice that focuses on producing located actions instead of visualization.

Land Art: Modern and Conceptual

Land art was the practice that emerged from 1960s conceptualist strategies, which managed to take conceptualism full circle back to modernism, or rather, into a stable orbit around these binary stars of 20th century art. As with all expanded forms -- idea systems, combinatorics, performance, re-evaluation of audience interaction, deconstruction, pastiche, negation, appropriation, the textualization of form (and the consequent intertexualization of all forms) and the de-objectification of the art object -- land art, too, can be said to have marched away from modernism into unexplored territories for art making. Genealogically, land art finds its initial point of self-organization in the conceptual, but it nevertheless constantly oscillated back to and away from the gravity of modernism -- a fact that today gives it a special resonance for artists who are concerned with re-evaluating the virtual in terms of data and material relations, and conjuring the parameters of 21st century art.

Land art did not enter into its steady oscillation between modernism and the conceptual for reactionary reasons, such as the maintenance of modernist memes, but rather due to simple formal consequence. In land art, conceptualism and modernism are basic aspects of a cultural art-ontology balancing user interaction and the shape of relations (spatial, cultural, and cybernetic) with modernist art-identity and materialist / formal matters. It manifested in material form based on place; land art is a priori concrete and situated, even if concept is the only adhesive binding a practice to a place. Indeed, conceptually, land art made possible a new artist / audience relationship to place through a navigable relationship to the landscape's actual scale: 1:1. Being there. These are crucial matters in a world where greatly expanded personal mobility collides with an improving awareness (both scientific and psychosocial) of the complexity and beauty of our planet and its systems (both physical and cultural) and where the integration of data and location-based services into planetary systems has become a dominant mediator of those systems.

In the same maneuver relative to the modernist and the conceptual, land art managed not to reach the unfortunate escape velocity that ultimately ends in projection into the void, avoiding the slingshot around the conceptual basin of attraction and projecting into empty space, as did a few conceptual voyagers that we will never hear from again. [1] Neither did land art demonstrate an assumptive dematerialization into performance, schematics, onto screens, or into communications networks. [2] Land art conceptually maintained a tie between the abstraction of its currency [3], and the material basis for the abstraction's value. Place functions as the material bonding a conceptual practice to the conceptual abstraction of its value, just as gold once anchored the value of national currencies.

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Even non-sites (such as Robert Smithson's gallery installations) are always tied conceptually to place as a form of literal grounding, even if that grounding was viewed as a negation of the original site. What can we learn from land art that might be important for any re-evaluation of the ontology of art after modernism and conceptualism? [4] Land art most clearly reveals not the teleological tensions between the modern and the conceptual, but rather their constant interoperation as art system in which abstraction is bound to material existence. This binding of abstraction to material actuality is of central formal consequence, as we shall see, to database.

Database: The Third Attractor

By the 21st century, data has become a dominant new attractor that alters the dynamics of the entire art-ontological system described above; allowing for even more complex interoperations, arguably transformative. The role of data in its interoperation with culture has become critical, as database has become a ubiquitous form of mediation in even the most mundane of daily social and economic interactions. If "Software" and "Communications" were the operative memes in the transcoding [5] between culture and technology in the 1960s through the 1990s, database should be viewed as their tacit substrate. Database, the technical form that mediates data relations between the cultural / social and the material world, functions as a third attractor after the modern and the conceptual.

Database art and related transcoding [6] are necessarily broader than the database art of purely technical form in ways that have only begun to be explored. However, beginning with an analysis of technical form has the advantages of exposing how data literally connects up to and influences the material world. [7] The figure of land art is important here because it reminds us that artists have had no trouble situating place, *real estate*, in an organizational relation to conceptual abstractions of the real (such as, but not limited to maps), undercutting the notion that data is imaginary, immaterial, or unreal. Mapping in the cartographic sense has long foregrounded the material consequences of data relations. For example, Lansford W. Hastings' "Emigrants Guide to Oregon and California" -- and his famous cutoff -- doomed close to half of the Donner-Reed party in 1846. Data is indeed always an incomplete representation of its referent, a factor that certainly contributed to that cannibalistic disaster. But it is also true that data is itself actual and quite often profoundly determinant of what happens through abundance, instead of paucity. With the motorization of data and information through computational machinery and communication, data is now tightly coupled with the actual. [8] In 2004, the Donner-Reed party would have the opposite problem: not too little data, but too much. The coupling of data to the real today is perhaps so rigorous that the landscape is now as often transformed through the assistance and mediation of electronic mapping tools (such geographic information systems) as emigrants are transformed by the landscape.

Database Art?

Any definition of "database art" is at this time bound to be immature. At least, we have not seen enough self-conscious "database" practice on the part of artists to define it in a way that takes into account *both the broad* and *narrow* applications of database in art practice. We need to take into account the broad observation that all new media artwork implies a relationship to database. Lev Manovich has pointed this out in his important work on the cultural objects of new media. [9] For example, the creation of new multimedia objects often involves the selection and organization of a variety of different digital media objects such as pictures, movies, sound, and user interface controls into an organized presentation of some sort -- be it a digital movie consisting of video clips, or a Macromedia Director project and its "cast" of media elements. The collection and management of the individual objects that are nested within other new media objects does in fact constitute a database of new media materials, making it correct to claim that all digital media practice implies some relationship to database. But a narrower and more specific view of the history of digital database is needed to specify an aesthetic and conceptual theorization of the trajectory of database art today -- one that brings artistic practice into alignment with the social ubiquity of database beyond the terms of new media art.

The classic definition of a database is that it is an organized store of data. Historically, the development of systems for managing and manipulating data stores lagged behind the development of digital computation, generally due to technical priorities. The development of digital processors necessarily prefigured the development of sophisticated digital storage systems. Alan Turing specified an imaginary discrete state machine (later known as a Turing machine) that has conceptual similarities to modern computing in 1936, when he published his mathematical proof relating to decidability: the *Entscheidungsproblem*. But this imaginary machine, though possible to construct physically in terms of its logical rules for processing, specified an impossible infinite paper tape for storage / memory. [10] His proof was followed by actual computers, such as the Atanasoff-Berry computer in 1937, Turing's Colossus in 1943, and Mauchly and Eckert's ENIAC in 1946, all of which had finite memory.

The latter machine, which is sometimes referred to as the first fully electronic computer, was aided tremendously by the stored program concept, invented in 1945 in the United States by the Hungarian émigré Jon Von Neumann. The concept is that the machine's reprogrammable memory should hold not only the data

to be processed but also the instructions that are used to operate on the data. This was made possible by an important quality of electronic memory -- random access to the contents of addressable memory locations. Processors could, as a consequence of instructions, fetch or store either a datum or another instruction from any arbitrary memory location with equal ease. Before Von Neuman, computers were single function devices that had to be physically reconfigured (actually rewired) to execute a different program; memory was only used as scratch space for data. By storing the instructions in volatile memory, arbitrary instructions could be loaded and executed, allowing the computer's processing task to be redefined symbolically instead of physically, at will of the operator. In a sense, Von Neumann invented computers as we know them today.

Von Neumann's insight and its major impact on facilitating virtual algorithms --both technically and culturally as "software" -- are commonly understood today. But his concept also implied something more subtle about data: the fact that memory was something more than random-access scratch space in which to store data during processing implied in turn that a semi-random management of data storage might also yield revolutionary optimizations. The storage of data during this era was tied closely to the input and output media: from the 1940s through the late 1950s, data had to be entered into memory sequentially by utilizing panels of switches, or media such as punch cards and magnetic tape reels. The "organized store," the database, could be described in concept during this period a simple sequential list -- not worth formal consideration, except perhaps in archeological or genealogical analysis. While electronic memory was random access, storage was bound to sequential access. Random access to the organization of computer memory was what allowed programs and data to interoperate more flexibly. Soon, semi-random access to storage would create its own revolution, although it was a less visible one.

Work on more organizationally complex data stores designed for faster and more flexible access would not begin to gather full steam until the 1960s [11], just as artists were first beginning to pick up on software [12] and cybernetics [13] -- concepts that had crystallized within the development information technology in previous decades. The lag between the development of the computing concepts / implementations and their filtration into art culture is partially significant for an analysis of database art in that any kind of digital database beyond simple sequential lists of data (used as input to software programs in data processing) was not possible until after the delivery of semi-random access storage hardware (the magnetic disk drive) by IBM in 1957. Only at that time was it technically possible for significant amounts of data to become un-tethered from a relatively trivial sequential form, allowing for the development of database models that concentrated on the physical and logical organization of data in forms that would support various kinds of computational efficiencies when processing large data sets. [14] But it would be many decades before the implications of the emerging technical ontology of data would be taken up as significant issues for artists. Data would not be recognized in terms of its own explicit aesthetic and conceptual consequences until the middle 1980s, for example, in the work of Frank Dietrich. [15]

This lag between the development of database technology, its aesthetic and conceptual consequences, and adoption by artists is not the whole explanation for the delinquent primacy of database in the arts. Database, which in many ways should have been the next logical (and ultimately fundamental) technological consequence of computation taken up by artists after software, was overshadowed by the cold war-inspired rush to merge nascent computational systems with communications systems. Nam June Paik is an example of an artist who early indexed database formally in his work. Take for example his 1963 sound installation titled Random Access, in which Paik unraveled a reel of audio tape, affixing it in a web-like pattern on a galley wall. Audience members were invited to pick up a magnetic recording head and play random sections of the tape by running the recording head across the strips manually. The association with the random access magnetic disk drive is literal. But in Paik's case, it is impossible not to take into account that the accelerated interest in the development of communications technology (from Arpanet to space-based communications satellites) might have implied a shift in focus from database to "Cybernated Art" [16], and the art world meme of the "communications artist" that he would popularize. There is a certain banal logic of assumption that would seem to apply here: notions of "communication" might have more congruence with the historical identity of artists, and this might have made "communications artist" a more appealing and seemingly strategic label than "database artist." Database may simply have suffered from marketing problems in relation to the sexier notions of software (which implies agency) and communication (which implies a potential recuperation of the public function and influence of art), thus deferring an awareness of the critical importance of database until relatively recently.

Taking computation (processing via algorithm), database, communication, and additionally user interface as purely separate entities would of course constitute a dicey proposition, and I do not wish to imply such a separation in technical terms. Rather, I am suggesting that art world memes derived from technical means in a classic example of Manovich's notion of transcoding. The general point is that the conceptual basis of the technical form in which computation is manifest (database, software, communications, and user interface)

entered into the world of art ideas unevenly over time, and -- whether we attribute the dilatory interest in the implications of database on the part of artists to database's square-ish-ness, or the sluggish uptake of scientific discoveries into the art world, or both -- database did not for the most part enter markedly into the work or discourses of artists until the early 1990s when the social consequences of database began to impinge more apparently on issues of identity and power. [17] By that time unfortunately, most of the political battle was de facto already over.

Database Politics

Database reigns victorious as a lynchpin of social control and power: the model through which all subsequent social relations will be mediated. This was accomplished long before a significant social analysis of a decentralized, nomadic power elite enabled by data would become a key concern for artists. The first artists to read the radar scope and consciously incorporate the consequences of the rise of database into their practice were the Critical Art Ensemble:

> *As the electronic information-cores overflow with files of electronic people (those transformed into credit histories, consumer types, patterns and tendencies, etc.), electronic research, electronic money, and other forms of information power, the nomad is free to wander the electronic net, able to cross national boundaries with minimal resistance from national bureaucracies. The privileged realm of electronic space controls the physical logistics of manufacture, since the release of raw materials requires electronic consent and direction. [18] (1994)*

After CAE, the political implications of database representation came to ride shotgun with the political concerns of representation and power generally. Artists have certainly been active in scoring polemic points in both theory and practice regarding the asymmetry of power relationships surrounding database and the ironies that often occur as a database mediates subjects [19]; the various perversities of information as property [20]; and the sense of bodily loss or detachment given the existence of our data bodies. [21] I suggest that much work needs to be done before the reactive / critical stance of today is transformed into a proactive / constructive social movement that equates social and economic investment in data bodies to real bodies (because they are now bound to one another). However, I will not examine the critical and political reaction on the part of artists (sometimes referred to as "database politics") in this writing in favor of continuing the trajectory through the formal aspects of database, which to no surprise, are organized technically to facilitate the nomadic flow of data.

Formal Aspects of Database in Computation

Software programs called Database Management Systems (or DBMS) manage the data store, allowing for data to be inserted, deleted, updated and selected from the store. Most introductory textbooks on database make quite an issue out of the distinction between database as the organized store of data, and the database management system as software that manages the store. Indeed there are important consequences that result from the two. But in a broader analysis, the DBMS is typically situated within three-tier models that separate the user interface layer (such as a html) from the application logic (software implementing what are often called "business rules" that control the application), and the data management software that manages the database itself. At this level of "zooming out," database more generally refers to a conflation of data and the DBMS that manages it. In systems modeled in three tiers, the data access layer is most often considered as the tertiary layer. [22] Although there are important aspects to the relationship between the DBMS and the store that I will touch on, a "zoomed out" perspective of database in computation is for now most useful in terms of getting a sense of how database is formally situated in contemporary systems.

The database tier is not necessarily isolated or discrete. Viewed from this tiered perspective, it is important to note that even the database layer can be distributed across multiple physical locations, just as the other tiers themselves may be. Various functions of data processing and storage can be spread out between multiple DBMS installations located physically

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in corporate / government headquarters, secure sites, or even on end user systems such as peer-to-peer applications. [23] End user systems are commonly fed by multiple secure data centers, co-location sites, server farms, backup sites, or other peers that ensure -- above all else -- redundancy and backup for data assets, but also for technical issues such as geographic load balancing. Database servers organized in three-tier (often exploded into complex N-tier) configurations allow a data flow that is distributed: not between no-place and every-place, but between somewhere(s) and potentially anywhere within a global (arguably solar [24]) reach. Web servers, web services [25], and database servers typically exist physically as separate machines, or even as virtual servers [26], in many different locations. Grid computing and peer-to-

peer computing take this all a step further, creating a network context for computation where the tiers instantiate whenever and wherever they need to (or want to) by accessing mobile (from a network perspective) resources, with facilities for discovery and description of services. [27] So while a database is just an organized store of data in theory, database, in de facto terms, often refers to data management software executing on specially configured database servers -- perhaps connected to a SAN (storage area network) or a peer-to-peer network -- but in any case accessing data stores that exist in a third or deeper tiers, most often connected by TCP/IP networking. In order to leave behind us, and perhaps to leapfrog over, our art / cultural tardiness regarding the social implications of database, we need to consider database in these computational terms.

The illusion that an Ebay or an Amazon.com is "one site" exists at the user interface level. "There is no discrete computer." [28] At the same time, these applications maintain identity. For artists, this implies that how software maintains identity in a distributed physical medium is a key issue culturally. As an aside, it also implies that the international "net art" movement of the mid- to late 1990s, operating under the assumption of a network meme, was for the most part not a formal "network" movement. If the network is the computer [29] in a formal sense, then net art was always fundamentally computer art, albeit a movement with a special concern for the communicative aspect of data transport. But how is identity maintained, given a holistic view of ubiquitous computation as a medium? The base of the entire technical complex (the lowest tier) is the database tier. If form maps to technical foundation, computer art is all about data. How data is processed, transported, and viewed is more about the how than what. Form over content.

Although software and network (also various protocols allowing these to be implemented) have been privileged memes for artists, the fact is that the very object and objective of computation has always been data and its potential for yielding information through processing, even when machines were "hard-wired" single function devices and data organization was simple and sequential. That this desire and activity of processing data well predates contemporary digital processing is simply an indicator of the very self-evidence generated by the question: what motivated the development of computational techniques (for example algebra) and much later electronic computers, software, and networks in the first place? For what resources and to what end? It was data -- the realization that meaningful facts could be placed into a symbolic form and processed into something useful -- and the challenges involved in processing data, that inspired the development of all the latter. Cybernetics and screen culture are certainly important considerations for artists and critics. I do not call them into challenge in any way. But what I want to clarify is that the a priori motivation for computation is data and data processing. Data (and by extension database) turn out to be the motivating foundation and basis of computation. The fact that this formal influence -- conceptually and aesthetically -- has been, to some degree, historically overlooked by artists says a great deal about our plight, especially in relation to the sciences. [30] Therefore, understanding the parameters of database as technical form is a critical foundation for computer artists moving forward.

Zooming back into the conceptual level of the DBMS and the data store, we can observe that they provide an abstraction between the physical data, based on a database model, and logical structure of the data, based on a human-defined logical model describing the facts being stored. [31] The database model (i.e. relational or object-oriented) specifies the characteristics of the DBMS and its related data store, whereas the logical model describes the societal view of the systems being modeled. Take, for example, a sales database containing products, customers, and suppliers, or a GIS database of geo-locations, geo-names, and land use. It is at the level of the logical model that database interfaces with the "business rules" of application logic. In order to position the contemporary zeitgeist of database logic we need to give some attention to the interface between physical and logical at this level as well.

In database development, the negotiation between the physical organization of data (database model) and the social organization of data (logical model) is what determines many important aspects when it comes to how easily and for what kind of output the data can be processed by various algorithms. Different applications of data imply not only different logical models (first name, last name, address, phone number) but also different database models, such as hierarchical, network, relational, object-oriented, multi-dimensional. Today's dominant database model is the relational database model, developed by IBM researcher E.F. Codd in the early 1970s. It utilizes entity and attribute containment of data characteristics (metadata) in order to facilitate data processing. Data is logically modeled in tables of rows and columns, where the names given to the tables represent a tracked entity; the columns represent individual attributes of those entities; and the records represent individual instances of the general entity. Tables can be related to one another by using unique key values, thus allowing redundant data to be mitigated. By naming the attributes of data, and abstracting the location of the data into named tables representing entities, the relational database allows for strictly prescribed semantics and data typing.

The use of common query language interfaces such as the structured query language (SQL) enables a very flexible abstraction between the logical represen-

tation of data and the structure in which it is physically stored. This allows ad hoc queries to be formed, whereas older hierarchical and network database implementations required logical data modeling to take into account the questions that would be asked of the data at design time. These properties have made the relational database and SQL, the structured query language, popular for data analysis and the management of large data sets since, formally, the relational data model allows for more robust searching and data mining operations to be performed in the gap between the logical (societal) and physical data models. This is a critically important fact for artists to take into account. The relational database model (and its successor, the multi-dimensional database), form the technical basis for most data mining: the search for heretofore unknown relations within and between data sets. This is the technical form through which the power relations altered by nomadic data bodies and their control by the invisible elite are mediated. It is what made Wal-Mart the biggest retailer on earth, and Oracle the second largest software company behind Microsoft, which, by the way, sells a very industrially important product with an increasing market share, Microsoft SQL server. Not surprisingly, SQL server is presently just as important to Microsoft's monopolist ambitions as their Windows operating system is. Political artists working with computation must ask where they have been during the time when database, and relational database in particular, became a mediator of (by today) almost every financial transaction on the planet. [32]

Perhaps the tertiary imagination of database has been an additional influencing factor within the arts -- beyond the lag / slow uptake and lack of sexiness of database. Perhaps information technology, in a post-colonial sense, dissimulates its own power center, hiding it behind the discourses and aesthetics of user interface and application logic, the first and second tiers, respectively. There is a literal lack of visibility of database behind the explicit visibility and interactivity of user interface and its code. Perhaps this has encouraged many artists to pursue the visual artifacts of computation and the software coding that enables human computer interface, leading to a narrow aesthetic focus on interface, and political focus on access. Perhaps. But if mere lack of visibility was in some sense hiding database from the artists' radar, this would hardly square with the excessive interest that artists have shown in network communication. As witnessed by the international net art movement of the late 1990s, the transport of data (communications) once again seemingly became a major meme in spite of a similar lack of visibility, whereas the storage and management of data did not. Whatever the reasons -- which are certainly more diffuse than I could explicate -- "Database Art" did not take form as a broad art world meme. But where the meme has manifested is, not too surprisingly, as database visualization.

Toward Database Art: Beyond Visualization

The major objection that could be raised at this point is that there is there have indeed been many recent projects that explicitly utilize database, particularly in the mode of data visualization. There certainly have. But as Lev Manovich saliently indicates, artists working with data visualization are in some ways culturally snapped to narrow ranges of potential formal expression; something about the pictorial cultural / semiotic assumptions that adhere to artists even after conceptualism seems to imply that visualization is the "proper place" for artists working with data. Add to this the fact that other disciplines have no particular investment in or need from the arts regarding data visualization, and a certain isolation of artist visualization practices within the art ghetto seems likely. Of course it is very early in this particular history -- predictions are dangerous. But while the art world may pay some attention to such work, we can't ignore that there are already well developed visualization practices in other disciplines which may inhibit any potentially broader interdisciplinary impact of artist-created data visualization strategies, which of course implies that there are open questions regarding how artists might imagine / conjure a cultural space of influence relative to database practice in the first place. Manovich argues for a move from a concern with data representation as a visual issue, which I would point out takes place always at the user interface or first tier, to a concern with the portrayal of human subjectivity amidst big data:

> *For me, the real challenge of data art is not about how to map some abstract and impersonal data into something meaningful and beautiful -- economists, graphic designers, and scientists are already doing this quite well. The more interesting and at the end maybe more important challenge is how to represent the personal subjective experience of a person living in a data society. If daily interaction with volumes of data and numerous messages is part of our new "data-subjectivity," how can we represent this experience in new ways? How new media can represent the ambiguity, the otherness, the multi-dimensionality of our experience, going beyond already familiar and "normalized" modernist techniques of montage, surrealism, absurd, etc.? In short, rather than trying hard to pursue the anti-sublime ideal, data visualization artists should also not forget that art has the unique license to portray human subjectivity -- including its fundamental new dimension of being "immersed in data."* [33]

He refers to, among other works, Lisa Jevbratt's *1:1*, Josh On's *They Rule*, and John Klima's *Earth*, all of which are interactive visualizations of data. Thus we can infer a key question: is being immersed in data exclusively a matter related to visual (or textual) cul-

ture, as typified by the types of screen-based (or scree-mediated) projects that Manovich is examining, [34] or are there are other societal modes of interaction with data which are ripe for exploration by artists? Are we also immersed in data when Wal-Mart, the organization with the most powerful database and computing systems in the world, monopolistically cuts its prices based on database-driven analysis enabled by their massive intelligence corporate / retail spy network? Or when the carrot juice we purchase from a cooler at a local market is fresh? Or when our credit report and other background checks determine the outcome of financial transaction such as a home purchase? Or when a package arrives at your house on time? Or the police arrive at your door?

Immersion in data is not only screenal in nature, though computer screens are certainly part of the social distribution of "what happens" in one way or another. Data is truly integrated and inter-operative not only in our immersive experience of computation and data before the user interface, but also as part of a socially distributed cognition that influences everything that happens socially. Ubiquitous computing driven by database has been with us for many years; perhaps we don't always imagine it "off the screen" because we don't always directly witness the data flow (though perhaps apparent on *someone else's* screen) involved in almost every transaction from a daily, lived, being-in-the-world perspective. In a Heideggerian analysis of the situation, we may not really understand database until it is broken -- perhaps causing your ATM to no longer work, or producing a long cue at the supermarket, or causing a medical error, or the quite severe personal consequences of identity theft. Or rotten carrot juice. Database is total and totalizing.

Conclusion: Database as Third Attractor
Database impinges far beyond visualization in daily life -- so why should the analysis of database in the arts restrict itself to screen-based works? This is not an argument against visualization, however. It is simply a call for artists to be aware of visualization and human machine interaction as computational artifacts -- not the limit of possibilities. We need to explore a holistic practice that includes data as a mediating agent, allows data its say in a form of a two-way collaboration (instead of two-way subjugation), and possibly moves the body to behave in ways that are (at the extremes) arbitrary: as if by ceding certain control to the data body we regain a freedom to experience the data-mediated world through unfamiliar performances or activities. This of course can only take place if the control of data is transparent, regulated, and democratic. But the resistance or reluctance of those who fear database to explore the possibilities of such mediation could also be a serious inhibitor to 21st century art. The potential exists for artists working with database to inflect the actual, projecting new activity [35], rather than merely reflecting data analytically or providing access to data through an alternative computer interface. I believe these speculations might answer Manovich's difficult question regarding the subjective experience of being-in-data by speculating on an expanded practice that is not necessarily screen-based. Visualization normally implies an attempt to interpret data, but this potential approach to database is to use it to generate / mediate alternative experiences and perhaps create new data for further analysis; enabling a database practice that is "off the screen" and in the world in ways as of yet largely unexplored by artists.

In the recent trajectory of art, modernism contained the seeds of the conceptual in terms of how increasing abstraction in the 20th century eventually revealed the medium itself. With the curtain lifted on the mechanics of representation, art was free to explore new abstractions such as idea systems, happenings and combinatorics. Conceptualism for its part contains the seeds of database in terms of organization and interpretation of collections -- the exploration of frameworks for presenting artifacts or social relations, and even place. [36] Now database enters both as technology and metaphor into the interoperation with modernism and conceptualism. Database is not a teleological break, but rather a third attractor whose influence is becoming more and more visible to artists. How it will interoperate will be born out in practice. But we can observe that the disruption of the binary oscillation of the modernist and the conceptual allows the influence of other, once thought antiquated, art attractors. Manovich may be correct that data visualization is anti-sublime, but this does not mean that database art need be. Indeed, at least part of the material interest I have expressed in my discussion of land art is purely romantic. Maybe there is room for the sublime in data art, but we should query for the other Los Angeles in South Patagonia in order to go there in a locative turn, specifically because the data made us do it, and not in order to visualize data.

References:

[1] For example, Rudolph Schwartzkogler, regardless of the circumstances of his death.
[2] I intend this only from the perspective of the art object. Performances, screen-based art works and network forms all have their own material substrate, though they are not as concrete as place.
[3] The term currency intended in the sense of value by fiat.
[4] This assumes the hypothetical case that there exists any possibility of yet another "after" emerging from the circular logic of the art world. Maybe it is our fate as artists to let science go on without us for a few hundred more years while we spin, but I hope not. I ask that -- if there is nothing to disrupt the environment, the modern, and the conceptual in which artists

today breathe and eat -- then let's try to go someplace that is, if not new, at least unvisited.
[5] Lev Manovich, *The Language of New Media* (The MIT Press: Cambridge, MA / London, 2001)
[6] Ibid. Manovich's use of the term transcoding refers to the interplay and mutual influence between computer science concepts and cultural concepts.
[7] I theorized this process in "Database Logic(s) and Landscape Art" (originally 2002), http://www.noemalab.com/sections/ideas/ideas_articles/pdf/stalbaum_landscape_art.pdf
[8] When the notion of the abstract as the antithesis of the concrete is operative, we are discussing the unreal. When the notion of the abstract as a formative influence on the real is operative, we are discussing physics.
[9] Lev Manovich, "Database as Symbolic Form," http://www.manovich.net/docs/database.rtf, Originally 1998. See also *The Language of New Media*, Chapter 5. Ibid. [5]
[10] Storage and memory were not separate notions at the time.
[11] I offer a brief genealogy of different database models in a research report for C5 corporation titled *Toward Autopoietic Database* (2001), http://www.c5corp.com/research/autopoieticdatabase.shtml
[12] Jack Burnham, "Systems Esthetics" in: *Artforum* 7:1 (Sep 1968)
[13] Roy Ascott, "The Construction of Change" (original publication 1964), reprinted in *The New Media Reader,* ed. Noah Wardrip-Fruin and Nick Montfort (The MIT Press: Cambridge, MA / London, 2003)
[14] For example, the trade-offs between the speed of query (how fast the database can retrieve something) and the flexibility with which you can form queries (how arbitrary your questions can be) are expressed in the hierarchical and relational database models, respectively.
[15] Frank Dietrich, "Digital media: Bridges between data particles and artifacts" in: *The Visual Computer 2:* 135-151 (1986)
[16] Name June Paik, "Cybernated Art" (originally published 1966), reprinted in *The New Media Reader*. Ibid. [13]
[17] Lynn Hershman's *Roberta Breitmore* performance in the 1970s incorporated the creation of Hershman's alternative identity, including the acquisition of credit cards, and marked perhaps the first constructed (in a specifically social "database" sense) "data body" as part of an art performance; however, database is mostly implied here. More recently, artists have taken a significant interest in "database politics," examining the power relationships that emerge around information as private or public property. Many works by Natalie Jeremijenko, for example, have explored the political implications of database, quite stunningly.
[18] Critical Art Ensemble, *The Electronic Disturbance* (Autonomedia: New York, 1994)
[19] Again, refer to the work of Natalie Jeremijenko.
[20] Diane Ludin's IPB-e project (2002 - present), http://dev.ibiology.net/
[21] Victoria Vesna's *Bodies© INCorporated* (1995 - present), http://www.bodiesinc.ucla.edu/
[22] Database is typically visualized as the bottom layer in diagrams depicting three-tier systems, with business logic in the middle and a presentation layer on top.
[23] Add to this notion some logic for automatic resource allocation and some flow control applications, and you essentially have grid computing.
[24] NASA's Voyager 1 spacecraft is still sending data to Earth even as it nears the edge of the heliosphere, http://www.wired.com/news/technology/0,1282,61106,00.html
[25] Web servers run an http program that serves pages at which people are supposed to look. Web services, by contrast, utilize http as transport, but instead of providing something to be looked at by humans, offer computational services for other distributed applications. XML, WSDL, SOAP, and UDDI are the markups and protocols for web services at this time.
[26] Servers can simulate multiple discrete servers.
[27] UDDI and WSDL respectively.
[28] Joel Slayton and Geri Wittig, "The Ontology of Organization as System" (1999), http://www.c5corp.com/research/ontology.shtml
[29] This phrase was once the slogan of Sun Microsystems.
[30] Data, by contrast, has certainly not been overlooked by science, which has maintained a holistic attitude toward data, computation, and communication -- instead of allowing aimless wanderings through the visual artifacts of computation.
[31] I make no commitment to any relationship between "fact" in a database sense, and truth in the philosophical sense.
[32] CAE, of course, excepted.
[33] Lev Manovich, "The Anti-Sublime Ideal in Data Art" (2002), http://www.manovich.net/DOCS/data_art.doc
[34] Another piece mentioned by Manovich is Natalie Jeremijenko's *live wire* (1995). While it is not a screen-based work, Jeremijenko's installation is certainly a data representation.
[35] One could argue that Jevbratt's *1:1* does exactly this, because it exposes the unseen World Wide Web; enabling an exploration of the Web's back roads -- which as it turns out are mostly private, password protected domains, default installations of http servers, and forgotten sites. It is clear that her visualizations are not meant to represent data as much as allow alternative access to a space otherwise culturally defined by search engines.
[36] The finest example of the latter may be found in the work of The Center for Land Use Interpretation, http://www.clui.org