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Data Retention and the Panoptic Society: The Social Benefits of Forgetfulness*

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Modern information systems not only capture a seemingly endless amount of transactional data, but also tend to retain it for indefinite periods of time. We argue that privacy policies must address not only collection and access to transactional information, but also its timely disposal. One unintended side effect of data retention is the disappearance of social forgetfulness, which allows individuals a second chance, the opportunity for a fresh start in life. We examine three domains in which social policy has explicitly recognized the importance of such a principle: bankruptcy law, juvenile crime records, and credit reports. In each case, we frame the issue in terms of the social benefits of forgetfulness, rather than in terms of individual privacy protection. We examine how different policy approaches to privacy might handle the retention of data and propose a comprehensive policy that includes a variety of strategies. The broad conclusion of the article is that data retention and disposal should be addressed as a part of a broader and comprehensive policy approach, rather than in a piecemeal fashion or as an afterthought.

It is not enough to keep repeating that memory is socially structured. To have come so far invites a further step. The next thing is to discover what qualities of institutional life have distinctive effects on remembering. (Douglas, 1980, p. 80)

Cheerfulness, the good conscience, the joyful deed, confidence in the future—all of them depend, in the case of the individual as of a nation, on the existence of a line dividing the bright and discernible from the unilluminable and dark; on one’s being just as able to forget at the right time as to remember at the right time; on the possession of a powerful instinct for sensing when it is necessary to feel historically and when unhistorically. This, precisely, is the proposition the reader is invited to meditate upon: the unhistorical and the historical are necessary in equal measure for the health of an individual, of a people and of a culture. (Nietzsche, 1997, p. 63)

On December 28, 1997, Swiss cellular phone users were distraught to learn that the position of their phones (within a few hundred meters) was automatically and continuously registered by their service provider, Swisscom. While this is an inevitable feature of cellular telephony (in order to forward a call to a particular user, service providers must first ascertain the position of the phone with respect to the network), what made this revelation particularly disturbing from the privacy standpoint was the fact that Swisscom retained the data for a duration of 6 months to a year and half (American Press, 1997).

This incident is paradigmatic of a problem that has been largely overlooked in the privacy literature to date: Control over personal information is not only affected through selective access, but also through selective retention of such information. That is, control is not only a question
of who has and who does not have access to personal information (nowadays, seemingly everyone has access but its producer), but who gets to retain or discard it. Most privacy commentators focus on access and control, and address retention only as an afterthought—if at all. A central concern of this article is to make the importance of this component explicit: We argue that data retention must figure as an important element of any comprehensive account of informational privacy.

We begin by framing the data retention issue within broad concerns over the lack of privacy protection in modern democratic societies. Second, we place the issue in the context of a tension between the importance of institutional/public memory and forgetfulness. Once the issue is framed as such, we go on to examine three domains of life in which the idea of the “fresh start” (where individuals move on, leave their past behind them, and begin anew) plays an important role. We conclude that social forgetfulness is best addressed through a comprehensive approach that includes a variety of policy strategies. We describe how data retention can be addressed through the general principles of a code of fair information practices, legislation, self-regulating markets, a property right, and privacy-enhancing technologies.

PUTTING THE DATA RETENTION ISSUE IN CONTEXT

An enormous literature now documents concerns about and threats to personal privacy arising from new information and communication technologies. Concern heightens each time new technologies give rise to new forms of data collection. In the 1990s attention was focused especially on transactional data (web browsing, credit-card use, intelligent highways), in contrast with the 1970s and 1980s when concern was with the scale of record-keeping and collection of personal data. We do not describe the practices or technologies that give rise to such concerns, as an abundant literature already documents this, as well as the privacy policies extant in many countries. The European Union (EU) has become a focus of attention as it struggles with the harmonization of privacy policies of EU countries and with transborder data flows to non-EU countries.¹

We agree with others who have suggested that the apparatus of a panoptic society is slowly, but surely, being put into place in the United States (Gandy, 1993). Democracies are generally thought of as societies in which individuals have a high degree of individual liberty and government power is limited and checked. Yet it appears that information and communication technologies are moving us rapidly toward a panoptic society. The panopticon is Bentham’s prison environment, as described by Foucault (1975), in which prison cells are arranged in a large circle with the side facing the inside of the circle open to view. The guard tower is placed in the middle of the circle so that the inside of each cell is in plain view of the guards. The amount of data currently collected as we go about our everyday lives—intelligent highway systems, consumer transactions, traffic patterns on the Internet, medical, educational, financial, and insurance records, and so on—strongly suggests we are moving into a panoptic society. Even if the data are not collected by a single, Orwellian-like entity, but rather by a mixture of public and private institutions, and even if what is observed is not necessarily amalgamated into a single dossier, the possibility of synthesis remains. Clearly, such a panoptic society presents fundamental challenges to the exercise of democratic freedoms and responsibilities.

Again, most of this is not new and we do not belabor the point. Rather we want to draw attention to the fact that most of the work that has been done on this issue has focused almost exclusively on how to control access to data (and the corresponding value of privacy), and neglected retention (and the corresponding value of social forgetfulness). Data protection policies have not proceeded from any comprehensive analysis of the problems occasioned by data retention. Instead, sector by sector, decisions have been made regarding the length of retention of data, with little attention being paid to the cumulative effect of these piecemeal decisions.

Our approach to data retention begins from the insight that the endurance of data is a feature that has invisibly but powerfully changed with the shift from paper-and-ink to electronic systems of record-keeping. In the paper-and-ink world, the sheer cumbersomeness of archiving and later finding information often promoted a form of institutional forgetfulness—a situation with parallels to human memory.² The forgetfulness of the paper-and-ink world was implicit in the material being of institutions, the available storage space, the budget for file cabinets, etc. Often the institution’s memory/forgetfulness was not even recognized as a policy issue but dealt with as a matter of physical facilities.³ In many cases, as storage technologies have gained in practicality, ease of remote access, and lowered in price, the shift to an electronic medium changed the default position from one of forgetfulness to one of memory.⁴

Whether the paper-and-ink environment or the electronic environment favors data retention, the point remains that decisions about length of retention of data may be made unintentionally or in an ad hoc manner, rather than with an eye to privacy policy or institutional memory per se.⁵ We find ourselves in a world that captures endless data on us and then decides (sometimes by failing to decide) how long to retain this data. When data are lost or deleted, our behavior is forgotten. When data endure, our behavior is not forgotten and some important values may shrink with it—values that are fundamental to democratic
society. In other words, we must ask, what are the social implications of a lack of institutional forgetfulness?

We begin our investigation of this question within the U.S. context, for several reasons. First, there is a general consensus that in the United States too little is being done to stop the onslaught of personal data collection. There is even, to some extent, a consensus on the nature of the problem in the United States. It is that privacy protection policy has been ad hoc and piecemeal, rather than comprehensive (Regan, 1995; Gellman, 1997). At the same time (and perhaps ironically), the United States has traditionally understood itself to be a place where individuals could get a “second chance.” The idea that an American citizen can sometimes “wipe the slate clean” and start anew is, no doubt, tied to the immigrant, pioneer histories of so many Americans. Whatever its origins, the idea is in tension with current U.S. data collection and retention policies.

The idea that Americans value the opportunity for a “fresh start” was recognized in the early literature on privacy, and periodically recurs in current literature. Westin and Baker (1972), in their seminal work, Databanks in a Free Society, understood that this value was perceived to be under siege because of computers:

> Many citizens assume, out of a variety of religious, humanistic, and psychiatric orientations, that it is socially beneficial to encourage individuals to reform their lives, a process that is impaired when individuals know (or feel) that they will automatically be barred by their past “mistakes” at each of the later “gate-keeping” points of social and economic life. Because the computer is assumed not to lose records, to forward them efficiently to new places and organizations, and to create an appetite in organizations for historically complete records, the computer is seen as threatening this forgiveness principle. (Westin & Baker, 1972, p. 267)

Interestingly enough, Westin and Baker went on to point out that the key question about erasure or noncirculation of derogatory information was not a technical matter in the organizations they visited. It was an issue of social policy, on which society has to choose between the “forgive-and-forget” and “preserve but evaluate” theories of recordkeeping in each substantive area (p. 268). In his study of police surveillance practices, Gary Marx has underlined how surveillance information “transcends time”—that is, “it is available for analysis many years after the fact, and in totally different interpretive contexts” (Marx, 1986, p. 150). He remarks that this threatens to undermine some basic American values:

> The idea of “starting over” or moving to a new frontier is a powerful concept in American culture. The beliefs that once a debt has been paid to society it is forgotten and that people can change are important American traditions. Americans pride themselves on looking at what a person is today rather than what he may have been in the past. Devices, such as sealed or destroyed records, prohibitions on certain kinds of record keeping, and consent requirements for the release of information, reflect these concerns. However, with the mass of easily accessible files, one’s past is always present, for erroneous or sabotaged data, as well as for debts that have been paid. This can create a class of permanently stigmatized persons. (Marx, 1988, p. 223)

Of course, the extent to which Americans truly have valued, or continue to value, the opportunity to move on beyond one’s past (especially when it is weighed against other goods, such as law enforcement) is an open question. By contrast with Westin and Baker, and Marx, Gandy (1993) more recently articulated the value of forgetfulness, but with a more defensive thrust. Referring to “the right to be forgotten” as one of the fundamental principles of data protection identified by Flaherty (1989) in his study of privacy policies in Western industrialized societies, Gandy explained:

> The right to be forgotten, to become anonymous, and to make a fresh start by destroying almost all personal information, is as intriguing as it is extreme. It should be possible to call for and to develop relationships in which identification is not required and in which records are not generated. For a variety of reasons, people have left home, changed their identities, and begun their lives again. If the purpose is non-fraudulent, is not an attempt to escape legitimate debts and responsibilities, then the formation of new identities is perfectly consistent with the notions of autonomy I have discussed. (Gandy, 1993, p. 285)

But while Westin and Baker, Marx, Gandy, and yet others have drawn attention to the value of starting over, of having a portion of the past forgotten, the issue has been cast, implicitly or explicitly, as one involving a tension between personal or individual privacy and social goods. They have portrayed the issue as a matter of balancing individual privacy against such social goods as law enforcement, government efficiency, or national security. Yet there is reason to believe that this framing of the problem is inaccurate and biased against individual privacy.

The lesson of the 1980s and early 1990s is that when personal privacy is put into a cost-benefit analysis, it generally loses. The needs of government agencies and private organizations or institutions for more accurate and efficient information systems so as to further their goals (law enforcement, national security, administrative efficiency) overpower the desire (need, interest, or right) of individuals to have information about them kept private. Regan (1995) describes how this framing of the issue has led to the loss of privacy protection in several major public policy contexts. She argues against such a reductive framing of privacy on grounds that it does not recognize the social importance of personal privacy. Hence, in our analysis of institutional forgetfulness, we want to argue for forgetfulness as a social good, not just an individual good.
THE VALUE OF SOCIAL FORGETFULNESS

Privacy as an individual good and privacy as a social good are inextricably tied together. To see this, one need only appreciate that the kind of world we live in makes us into certain kinds of beings and certain kinds of beings are essential for a certain kind of world. Democracy depends on individual citizens who are capable of formulating plans for their lives, taking action, thinking critically, and making decisions. Yet individuals of this kind can not develop in an environment of constant surveillance. The problem is not just that democracy is squelched when individuals live in fear of repercussions for any nonconforming behavior; it is also that the mere fact that one is being watched changes the way one behaves, as Bentham and Foucault have taught us. Individuals change their behavior when they believe they are being watched, and come to see themselves as they believe they are seen by their watcher. The very nature of self and the kinds of personalities that develop in a surveillance society are different.7

The argument for privacy as a social good thus encompasses privacy as an individual good; the argument includes both. Privacy is not just something individuals want because it makes them feel good or is good for them; rather, privacy is good for society insofar as it promotes the development of the kinds of individuals who are essential for democracy. A world in which there is no forgetfulness—a world in which everything one does is recorded and never forgotten—is not a world conducive to the development of democratic citizens. It is a world in which one must hesitate over every act because every act has permanence, may be recalled and come back to haunt one, so to speak. Of course, the opposite is equally true: A world in which individuals are not held accountable over time for the consequences of their actions will not produce the sense of responsibility that is just as necessary to a democratic society. Thus, achieving the appropriate degree of social forgetfulness is a complex balancing act, ever in tension between the need to hold accountable, and the need to grant a “fresh start.”

In order to begin understanding the requirements of retention policies, we examined three policy arenas in which forgetfulness seems to play an important and explicit role: bankruptcy law, juvenile crime records, and credit reporting.8 Bankruptcy law involves civil law, juvenile crime records involve criminal law, and the regulation of credit reporting is more concerned with private institutions. We examined these domains to find out if the apparent forgetfulness in these policies is real, to learn how forgetfulness was understood in the development or implementation of each policy, and to understand how the tension between memory and forgetfulness has been played out in American social policy. We also examined the arguments in these domains with an eye to re-deploying them in other domains and to helping us construct a comprehensive approach to data retention.

Bankruptcy Law

The first thing to note about bankruptcy law is that the discussion surrounding it does, indeed, recognize forgetfulness (and forgiveness) as a social good. In the first pages of a 1989 study of bankruptcy and consumer credit in America, the authors write:

Bankruptcy is a powerful phenomenon. It is financial death and financial rebirth. Bankruptcy laws literally make debts vanish. When a judge signs a paper titled “Discharge,” debts legally disappear. (Sullivan et al., 1989, p. 4)

And later:

At the heart of all bankruptcy law, for individuals and for businesses, is the discharge of debts and other legal obligations, the “fresh start.” The notion of beginning anew, of rebirth, lies near the center of our restless, westward-moving culture and is also the central proposition of its dominant religions. Whether a bankrupt debtor, given more time, can pay in full or can pay little or nothing, the relaxation of strict legal obligations is the indispensable centerpiece of American bankruptcy law. (p. 20)

Of course, the textbooks on bankruptcy law and historical accounts of the development of these laws also make it clear that bankruptcy serves the interests of creditors as well as debtors:

Bankruptcy law is a supercollection device for creditors. Indeed, American bankruptcy law arose from two separate bodies of English law, one designed to protect debtors and the other to aid creditors. . . . Ordinary debt collection law has serious flaws from a creditor’s point of view. Its two most important weaknesses are that it is purely statute law, making collection across the country very difficult; and it is competitive, with every creditor for itself. Bankruptcy law immediately captures all the debtor’s assets in one country-wide net after a single filing. It also restrains actions by any individual creditor, permitting creditors to act collectively, often through a trustee, to preserve asset values and to ensure a fair distribution. (p. 20)

While the literature we examined did express the concern for forgiveness for mistakes and the good of letting individuals move on, there are reasons to believe that these values alone would not have led to the forgiveness of bankruptcy, were it not for the fact that creditor interests were also served by the forgiveness. Moreover, government (social) interests were at work insofar as there was a perceived need to respond to periodic national financial crises and to facilitate individuals (especially those involved in business) in getting back into economic activity (Warren, 1935).

The literature on the history of bankruptcy law supports Regan’s idea that when policy debates are framed as a
tension between individual interests and social good, individual interests do not win. In bankruptcy law, the tension between individual and social interests was finally (and perhaps, only) resolved when there was a coming together of institutional interests (creditors’ interest in a noncompetitive way to obtain whatever they could), individual interests in being able to start afresh (having their mistakes forgiven and forgotten), and social interests (in responding to major economic crises and getting entrepreneurs back into the economy).

Our research on bankruptcy law thus supports the idea that Americans recognize a social good of forgetfulness. Moreover, the research supports Regan’s conclusion that arguments in favor of social forgetfulness (and privacy protection in general) are more likely to succeed when they are cast in terms of a social good rather than purely in terms of individual interests.

### Juvenile Crime Records

Juvenile justice has evolved considerably over the last few centuries, concurrently with changing social conceptions of both children and the role of the state. Although there are many different and competing visions of how the state should intervene with regard to juvenile crime, one prominent train of thought has been the liberal (progressive) view of the state as protector of juveniles. Such a view primarily aims at rehabilitating juveniles through deemphasizing their offenses and highlighting their treatment needs (Guarino-Ghezzi & Loughran, 1996). Judge Mack powerfully echoes the sentiments underlying the liberal view:

> Why is it not the duty of the state, instead of asking merely whether a boy or girl has committed a specific offense, to find out what he is, physically, mentally, morally, and then if it learns that it is treading the path that leads to criminality, to take him in charge, not so much to punish as to reform, not to degrade but to uplift, not to crush but to develop, not to make him a criminal but a worthy citizen. (Mack, 1909, p. 107)

Of course, any such goal of rehabilitation must be carefully reconciled with other principles of justice, such as punishment and offender accountability. Juvenile justice statutes, both in the United States and in England, clearly indicate how the courts are expected to hold a balance between the protection of the public and that of the individual child. Section 1 of the Uniform Act states as one of its goal:

> Consistent with the protection of the public interest, to remove from children committing delinquent acts the taint of criminality and the consequences of criminal behaviour and to substitute therefore a program of treatment, training and rehabilitation. (Parsloe, 1978, p. 182)

However, the public interest is here not only defined in terms of protection from delinquent elements, but also in terms of a “reserve capital,” that is, the need to safeguard society’s future. Not only has society an immediate interest in protecting itself from criminal elements, but in the case of juvenile delinquents, it has a future interest in preventing “the deprived and delinquent children of today from becoming the deprived, inadequate, unstable and criminal citizens of tomorrow” (Bean, 1981, p. 126). Clearly, the state has much to gain in avoiding the huge social and economic costs that follow from committing individuals, from an early age, to a lifelong relationship with criminal justice.

Note that such a rehabilitative program is congruent with a number of different philosophical views on the nature of juvenile crime (and the concomitant views with regard to the most appropriate form of punishment). Whether one holds that a child’s criminal behavior is truly criminal or rather simply “naughty,” whether the child is held competent or not to understand the consequences of his or her actions, it is nevertheless understood that, following a certain purgatory, a young person’s mistakes should not unduly burden his or her future goals: “For those offences that could be called ‘crimes’ a child should not be expected to have a criminal record for behaviour that may be transient or reflect a particular stage of development” (Bean, 1981, p. 131). This is the justification for the special provisions within juvenile crime statutes aimed at removing the stigma of a juvenile court history. For example, the Code of Virginia includes provisions for the automatic expungement of juvenile records, for offences that would be felonies if committed as an adult, at the age of 29. All other offences may be expunged at age 19, if five years have elapsed since the juvenile’s last contact with court…. An individual may petition for expungement of all records pertaining to his/her case after 10 years since the date of the last hearing in juvenile court. (Virginia State Crime Commission, 1996, p. 4)

There is thus recognition of the value of social forgetfulness embodied in policies on juvenile crime records. However, echoing our previous discussion on bankruptcy, it is important to note that the background discussion of these provisions points to a coming together of social and individual interests. Individuals are allowed to move on beyond their juvenile criminal records not just because it is good for them, but also because society has an interest in turning juvenile offenders into law-abiding adults. Social forgetfulness serves individual and social interests.

### Credit Reports

Consumerism, as a way of life, would be significantly dampened without the availability of consumer credit. Without it, families simply could not afford the houses, cars, appliances, and electronic gadgets nowadays synonymous with the good life. The credit-reporting industry has
grown out of the desire for businesses to maximize opportunities for consumers to acquire such goods and services, while attempting to exclude those likely to default on their loans. As Rule explains, “The art and science of credit management lie in determining, in advance, who will pay and who will not, and in screening credit applicants accordingly” (Rule, 1973, p. 178).

Credit evaluation is based on the simple principle that past actions provide a good indication of future behavior. Credit bureaus thus seek to acquire the most complete information possible on individuals, so that their clients (businesses, credit-lending institutions, insurers) may make the most educated guess possible about whether or not to extend credit to applicants. Far from being limited to financial information, the reports assembled by credit bureaus may contain information relating to convictions, suits, employment history, past addresses, family status, etc. In fact, before regulators stepped in, almost any information that could be legally obtained was seen as fair fodder for the credit bureaus’ files, but most importantly:

Credit bureaus place a special emphasis on seeking unfavourable or ‘derogatory’ information. . . . It is much more efficient to aim at excluding bad risks than at including good ones, and derogatory information is to this extent at a premium. (Rule, 1973, p. 193)

Thus, with regard to our previous discussions of bankruptcy and crime records, credit bureaus’ activities would seem to go directly against the idea of granting the opportunity for a fresh start. Such past blemishes are precisely what the credit bureaus are paid to look for:

Worst of all, in the eyes of the credit grantors, are bankruptcy petitions, since they indicate a desire to shirk all debts, which is the most serious sin of all in an industry which pro/逼ts only from willingness to pay. (Rule, 1973, p. 194)

In the 1960s, more and more people availed themselves of the services of credit-reporting agencies, for an ever-widening range of purposes. The potential for abuse grew to the point that Congress felt compelled to regulate this booming industry through the Fair Credit Reporting Act (1971, revised 1997). The act was designed to cover a broad range of issues with regard to the activities of credit bureaus; its stated purpose was to protect individuals from the deleterious effects of credit reports, by establishing precise rules under which personal information can be reported. Most pertinent to our discussion, it defined certain categories of information that are subject to obsolescence: bankruptcies, suits and judgments, paid tax liens, accounts placed for collection or charged to profits or loss, and records relating to a crime. For each category, the act established precise time limits after which information must be deleted from credit reports. The FCRA thus ensured that the social forgetfulness principles established in the case of bankruptcy and juvenile crime records were not overwhelmed by the new data collection and aggregation practices of credit bureaus.

In fact (perhaps inadvertently), the act went even further. It prohibited the reporting of “any other adverse item of information” predating the report by more than seven years. It also omitted to make clear not only what it meant by “item of information,” but also how, and from what point in time, it should be judged “adverse.” This is problematic since, as one analyst noted, ‘Items’ may well be continuing matters, such as divorce proceedings or, in investigative reports, disputes with neighbors or employers” (Willier, 1971, p. 55). The interpretive flexibility afforded by such loose formulation, combined with fears of noncompliance with the act, would seem to naturally force upon credit bureaus a conservative reading of what legislators sought to include within the category of “adverse information”:

Since what may be adverse to one creditor, insurer or employer may not be adverse to another, absent any uniform and objective criteria for judgment, almost any items of information must be treated by the agency as adverse. In the extreme, this includes places and time of residence. . . . In short, a consumer reporting agency should look upon any item of information as adverse for purposes of the seven years rule. (Willier, 1971, p. 55)

That is, except for the special categories already mentioned, the act essentially limited credit bureaus to a memory of 7 years or less. Were it not for the generous conditions under which these obsolescence rules may be altogether skirted, the FCRA might have thus provided for some of the strongest policy in current legislation to implement a right to have certain aspects of one’s life forgotten.

Despite its implementation flaws, the FCRA clearly represents a continuation of the philosophies outlined in the case of bankruptcies and juvenile crime records. If the judicial system has sought to provide individuals with some (if limited) means to unburden themselves from their past, the FCRA extends these policies to the new threats posed by data collection, aggregation, and reporting.

THE NEW THREATS TO SOCIAL FORGETFULNESS

While these three cases illustrate historical recognition of the social value of forgetfulness, the trend in recent decades has been in the other direction. Nowhere is this more evident than in the case of transaction-generated information (TGI) which records the details of our interactions with organizations and individuals (phone calls, purchases, geographical location, banking transactions), facilitating aggregation and inordinately increasing our capacity for social memory. As is often the case with computerization, there is in principle nothing fundamentally new about TGI; rather, it is both the scope of and the new possibilities offered by the enterprise that promise to alter social memory in both subtle and dramatic ways:
Quantity: As more and more of our activities are taking place over electronic networks, more categories of data are being collected every day. From an initially fairly limited set including phone calls, banking and credit card transactions, the list now includes highway tolls, e-mail, web browsing, cellular phones, grocery shopping, etc.\textsuperscript{12}

Granularity: For each category of transactions, a finer granularity of data collection is possible; a phone call over a cellular network may be recorded in terms of originator, destination, duration, time of day, type of device used for the call, geographical location of device, movement of device during the call, network services used, etc. This increased capacity for precise metering of user’s activities is part of the tremendous attractiveness of TGI for organizations.

Cross-correlation: Once collected, TGI is easily aggregated and correlated with other kinds of data: Web browsing, demographics, credit card transactions, and cellular use together provide a much finer resolution of the digital persona than each can by itself.

Predictive power: Most importantly, quantity plus diversity plus cross-correlation combined lead to the possibility of “discovering” information not (explicitly) present in the data collection process itself. In other words, such data have predictive power. Because data are collected in electronic format, they are easily amenable to a variety of treatments: multidimensional and statistical analysis, neural networks, information discovery systems, all technologies precisely aimed at extracting new information from the vast warehouses of electronic information gathered by organizations. Even when the information is not available in a suitably discrete format, image-analysis software or text-analysis algorithms may be used to extract pertinent data from video or free-flowing texts. Such technologies may be used with regard to marketing, network management, credit-risk analysis, sales productivity, etc., with the hope that they may help discover rules and patterns of behavior, and predict the future with some reasonably good probability.\textsuperscript{13}

While critics of the panoptic society have justly remarked on the ubiquity of data collection practices, we underline how such practices invisibly extend the persistence of social memory and diminish social forgetfulness. What the preceding list points to is a subtle yet dramatic change in the nature of this memory. Human activities and interactions that were, at one time, not part of the public record now have the possibility of being recorded in varying levels of detail. In most cases, however, there seems to be little concern over the effects of data retention. In fact, organizations have come to see and use such transaction-generated information as a legitimate and highly useful competitive asset.

POLICY STRATEGIES FOR DATA RETENTION

We have argued, then, that social forgetfulness is an important social value that is quietly slipping away because of the increasing use of increasingly sophisticated personal data together with a neglect of data retention policies. We have also argued that privacy policy debates should not be framed as a matter of balancing the social goods of information against individual rights or interests in privacy. Rather, the issue should be understood as involving tensions between social goods, the social good of privacy (and forgetfulness), and other social goods. When the value of social forgetfulness has been recognized, such as in bankruptcy law, juvenile criminal records, and credit reporting, legislation has been developed to provide a form of forgetfulness.

The question remains as to what can and should be done to more broadly address the loss of social forgetfulness caused by data retention. Of course, we are not arguing that social forgetfulness should trump all other social values. Our claim is only that it should be given proper consideration in information management decisions and practices.

To begin to answer this question about what can and should be done to address the loss of social forgetfulness, we do two things in this section. First, we sketch what we take to be the most promising policy model for data privacy in general. Our claim is that data retention cannot be addressed in isolation. It can only be addressed effectively as part of a broader privacy policy. We argue for a comprehensive approach encompassing a variety of mutually reinforcing strategies. Second, we review several of these strategies and consider the adequacy of each for addressing data retention.

A Comprehensive Approach

Our focus is the United States, and it is well recognized that the U.S. approach to data protection has been piecemeal, ad hoc, and reactive. Unlike Europe and the European Union, the United States has resisted comprehensive legislation in favor of a patchwork of national and state laws. The patchwork of laws addresses government and private-sector use separately, as well as discrete domains within each separately. For example, there are separate laws addressing credit records, driver’s license information, family and educational privacy, telephone records, and video rental records. In many domains, such as records of Internet use, there are no laws, in anticipation that the market will take care of privacy.

Of course, privacy policy in the United States is contested and is becoming increasingly visible, in part, at least,
because of the pressure for harmonization of policies that will be needed for an intensely global economy. The public discussion has led to a variety of proposals for addressing data privacy. These proposals include:

- More (and/or improved) legislation aimed at discrete domains, such as medical records.
- Harmonization of U.S. policy with the EU Directive.
- Creation of an information market for secondary use of personal information (Laudon, 1996; Hunter, 1999).
- No action in the private sector, so that the marketplace has a chance to mature and develop responses to consumer interests in privacy.
- Increased use of privacy-enhancing technologies (PETs).

Initially, when addressing the question of what can and should be done to address data retention, we “seem” to be thrust into the heart of an impossible dilemma. It appears that we must choose between the limitations of a piecemeal approach to data protection and the limitations of comprehensive legislation. Since data retention issues arise in such a wide variety of contexts—any time personal information is collected—comprehensive legislation covering the expanse of data collection would seem to be the only viable approach. Without it, we risk creating a patchwork of inconsistencies and we risk missing domains as we react to incidents of abuse. On the other hand, the nature of the personal data, the context in which it is collected, and the values its use can promote all seem to necessitate that distinctions be made in the way various data is treated. Consider, for example, the differences in the appropriate retention period for birth and death records, medical records, purchase records, membership records of political organizations, and records of use of a parking lot. The appropriate retention period for each would seem to vary widely; for example, birth and death records might be kept (effectively) forever, while records of entry into and exit from a parking lot might be kept for only 24 hours. If distinctions must be made, then it would seem that a piecemeal approach is the most feasible strategy.

This impossible dilemma is, however, a false dilemma, and it can be avoided by means of a conceptual shift in understanding what constitutes a comprehensive policy. We propose that a comprehensive data protection policy be thought of not as a single piece of legislation, the “magic bullet” that will apply to all domains and solve all the problems. Rather, a comprehensive policy should be understood as a policy approach that makes use of a variety of policy strategies consistent with one another and mutually reinforcing. In other words, a comprehensive policy is one that begins with a set of general principles defining broad standards for personal data protection.

The general principles are then implemented in a variety of strategies including legislation in specific domains, structured markets, self-regulatory practices, and privacy-enhancing technologies. Our proposal is consistent with Lessig’s (1999) insight that individual behavior is regulated in four ways, by law, norms, technology, and the market. Lessig emphasizes how the four work together in mutually supporting ways.

The elements of a comprehensive policy are, essentially, already “on the table” in the United States: The Code of Fair Information Practices and the EU Directive provide a set of model general principles; existent legislation provides models for legislation in specific domains; proposals for addressing secondary use via markets have been put forward; PETs are actively being developed.

We next discuss each of these elements and their potential for effectively addressing data retention and social forgetfulness as part of a comprehensive privacy policy.14

**General Principles of Fair Information Practices**

The cornerstone of a comprehensive policy is a set of general principles that serve as standards to be followed in implementing practices in various domains and sectors, both public and private. The Code of Fair Information Practices (CFIP, developed and recommended in the 1973 Report of the Secretary of Health, Education, and Welfare’s Advisory Committee on Automated Personal Data Systems) and the EU Directive provide good models for development of general principles. Bennett and Grant (1999) have identified a similar set of principles about which, they claim, there is already a broad international consensus.

The principles include the standard that information collected for one purpose cannot be used for another without consent of the individual; they give individuals a right of access to information about them, a right to contest inaccurate information, and so on. Data retention is not explicitly addressed in the CFIP, though it is addressed in the EU Directive and the principles to which Bennett and Grant refer. The principle in the latter is general in specifying that data should be retained “for no longer than necessary.”

It might be argued that a set of standards of this kind, and especially the data retention standard, is not likely to be effective because it is too general to be effective or enforceable. However, we are not proposing that these standards alone constitute a comprehensive policy. Rather, we propose the standards as part of a set of policy strategies. The standards are the starting place but not the ending place of the policy.

It is important to note that these standards may allow exceptions. There may be certain kinds of records such as criminal records of pedophiles that should be treated differently than all other records. The value of the guidelines is that they provide the backdrop against which exceptions
must be justified. In this way, the standards keep the burden of proof on those who would use data in ways that are nonstandard. In the current environment, the burden of proof is the other way. Personal data are used whatever way possible unless it can be shown that there is a reason to restrict their use.

Consideration of adoption of a broad set of standards is timely since the United States and the EU are currently in a struggle over standards. The European Directive on data protection requires that data flowing out of the EU meet certain data protection standards (European Community, 1995). This means that U.S. companies doing business in Europe must meet those standards. Many U.S. firms have used what leverage they have in Europe to fight against the directive, fearing that it will make it much more difficult and costly for them to do business in EU countries. On the other hand, the EU Directive puts pressure on the United States to develop data-protection principles that are in harmony with those of the EU, for this will make data flows between Europe and the United States seamless. U.S. citizens would have greater data privacy if the EU were to win this struggle.

**Legislation**

The three case studies discussed earlier—bankruptcy law, juvenile criminal records, and credit records—provide examples of legislation that has effectively addressed data retention and social forgetfulness. The legislation we examined was not comprehensive in the broadest sense, but comprehensive within specific domains. Bankruptcy law, juvenile criminal records law, and the Fair Credit Reporting Act define the ground rules and structure practices within a particular domain. Bankruptcy law, in effect, defines the “rules of the game” of financial life. Juvenile criminal records laws specify a limitation on what law enforcement agencies can do in pursuing their goals. Similarly, the Fair Credit Reporting Act specifies the ground rules for engaging in the activity of determining an individual’s creditworthiness based on the person’s credit history.

Legislation of this kind, specifying the treatment of certain kinds of records in certain domains of activity, should be a part of a comprehensive approach to data privacy. Our point is only that it need not be the only strategy for addressing data protection. The sector-by-sector, piece-meal approach has several dangers. When each domain is viewed separately, lengthy data retention practices may seem justifiable, and there is no way to take into account the cumulative effects of decisions made in multiple separate domains. Giving up a little social forgetfulness here and there may seem reasonable until we experience the cumulative outcome of having hardly any whatsoever. Other dangers of the piecemeal approach were mentioned earlier.

There is the danger of missing important areas of data collection of retention and the danger of inconsistency from domain to domain. Thus, legislation should be used to protect social forgetfulness, though alone it is not likely to do an effective job.

**The Market and Self-Regulation**

Strong arguments can be made for letting the market take care of data protection (including data retention), though these arguments are generally coupled with the idea that self-regulatory, fair information standards will develop. Culnan and Bies (1999) provide just such an argument emphasizing the importance of trust in long-term marketing relationships. They argue that trust is achieved when companies inform customers about how their personal data will be treated. This information can then be taken into account in the customer’s decision to do business with a company, and with this information in the marketplace, the market will produce greater privacy protection or, at least, the kind of data protection that consumers want. Culnan and Bies argue that fair information practices will emerge because of the importance of trust in consumer transactions.

We are less optimistic about the market yielding significant privacy protection, especially when it comes to secondary use of data and data retention. Among other things, data that are retained (but not legally protected) become extremely vulnerable when companies change ownership and/or change their policies. We are inclined to think that legislation is necessary to require, at a minimum, that companies publish their data retention policies, much as food producers are required to display the ingredients in food containers.

However, our point is not to argue against the use of the market, but rather to emphasize the importance of structuring markets to ensure that they promote data protection standards. In other words, markets alone are not likely to achieve a desirable degree of data protection or social forgetfulness. However, markets together with model standards articulated in the overarching general principles of a code of fair information practices can support markets and facilitate the development of trust between consumers and companies. This was the original intention of the CFIP.

**Personal Data as a Personal Property**

Recently, several analysts of privacy policy have proposed schemata for giving individuals more control of their personal data while at the same time facilitating its exchange. Laudon (1996) proposed a National Information Market (NIM) not unlike the U.S. stock exchange, and more recently Rule and Hunter (1999) proposed a schema involving information agents. In both proposals, individuals own their personal data and can make them available for sale,
through the clearinghouse or through agents. In these proposals, individuals can specify the conditions under which their personal data may be sold, and they receive royalties when the data are sold.

While we will not go into the details of these proposals, systems of this kind would seem to hold great promise for addressing data retention and social forgetfulness. Of course, they could not address all data use and they would not work in isolation from other policy strategies. Their promise lies in eliminating the free, secondary use of personal information. Currently, data about us are obtained from a variety of sources and then bought and sold to a variety of users, especially direct marketers. The new proposals eliminate free use and give individuals control of who obtains access and how it is used, but they allow marketers to continue to acquire personal data.

Of course, these proposals require two major changes from current practice, changes that could only be implemented through major legislation. The first change that would have to be made would be to declare that all personal data are the property of the individual. The second change would be to prohibit all secondary use of data without the consent of the individual. The second is a corollary of the first, though it is important to mention because there are different kinds of property. The second change specifies that personal information is a kind of property that one does not lose when one sells it to someone else. In effect, the owner licenses the use of the data for a specified purpose and only for the specified purpose.

Thus, these markets in personal data would have to be implemented as part of a comprehensive policy in which the fundamental “rules of the game” of personal data acquisition, use, and retention are specified.

Once these two principles were articulated as part of a set of data protection standards, the best schema for a marketplace in personal data could be debated and chosen. As mentioned earlier, such a market would not involve all personal data. For many activities such as applying for credit or a job or insurance, individuals could be required to release relevant data. Moreover, some personal information such as criminal records would not be in the control of the individual. Use and retention of these records would be addressed by legislation. Nevertheless, the use of data collected for one purpose, in one domain, could not be sold to others without permission from the individual. Indeed, in these secondary market schemata, individuals could decide for themselves how long certain kinds of data remained in the system. For example, if an individual wanted to receive advertisements from financial services but did not want to release his or her financial history, the individual could restrict the sale of his or her personal data as such. If an individual wanted to receive advertising about vacation properties but didn’t want the advertisers to know all the places he or she had lived in the past, the individual could specify this.

To be sure, these proposals for markets in personal data do not address all data protection or data retention issues. Nevertheless, they could be a significant component of a comprehensive policy.

### Privacy-Enhancing Technologies

Technology can intervene in two different ways with regard to data retention: It can altogether prevent the collection of identifying data before it accumulates, or it can help anonymize data after collection has taken place. In both cases, the trick lies in cutting off the link between individuals and data.

The first scenario has been extensively explored by cryptologist David Chaum in a series of widely circulated papers (Chaum, 1981, 1985, 1992). Chaum argues for a computerized world in which cryptography plays a central role in providing individuals with some degree of control over their electronic privacy. His vision is highly original in that it posits no fundamental antagonism between two seemingly conflicting concerns: protecting the individual’s privacy, while ensuring organizations of all the expected benefits of computerized bureaucratic rationalization. In fact, Chaum’s work has been a powerful example of how highly original scientific and technological work may flow from a research program articulated around precise societal concerns.15

Although Chaum’s contributions touch many areas within digital security—electronic cash, network anonymity, electronic wallets, signature systems, to name a few—one particular aspect of Chaum’s work is especially relevant to our concern over data retention. Chaum has observed that computerization brings about an important change with regard to the ways in which individuals obtain and present credentials (academic degrees, permits, etc.) to and from organizations. Individuals are less and less involved in the process, and simply do not possess the relevant documents—e.g., universities exchange transcripts directly, without the student’s mediation. Clearly, for Chaum, if information about individuals is stored in remote databases and freely exchanged between organizations, there is no hope for them to regain control of their personal information:

> The trend today is toward taking monitorability and control of the credentials process completely away from individuals by allowing organizations to be the repositories of all credential data. Individuals would merely provide the identifying information that allows linking to their own credentials. (Chaum, 1985, p. 1039)

Not only do organizations bypass individual control by detaining and exchanging personal information, but using universal identifiers (Social Security numbers, SSN)
makes it possible to crosslink credentials between organizations, creating, in effect, a “dossier society.”

Evertse & Chaum (1987) have suggested the use of “digital pseudonyms” whereby each individual is known to an organization by a pseudonym. When an individual receives a credential from an organization, he or she can present it to another organization in order to gain access to some service, but no linkage is possible between the two databases. Because the individual maintains different pseudonyms for each organization he or she interacts with, no crosslinking is possible, and no dossier may be constituted. More relevant to our purpose, Chaum remarks:

There are additional benefits to changing pseudonyms aside from the weeding out of obsolete information. The periodic reduction to essential information also prevents organizations from gradually accumulating information that might ultimately be used to link pseudonyms. (Chaum, 1985, p. 1042)

That is, the system also provides a structural mechanism by which information linked to individuals can be “forgotten.” A simple change of pseudonym in effect removes any possibility of linking past information to the individual.16

While Chaum’s approach effectively prevents the linking of transactional information to individuals, other approaches attempt to sever the link after data has been collected, by removing all information that can lead to identification. Unfortunately, such scrupling of data is extremely difficult to achieve in practice. Sweeney (1997) and Schneier (2000) list some of the limitations of securing the privacy of data in this way, showing that for every strategy for removing identifying information, there exists a counterstrategy that can be used to infer identities from contextual information gathered from a group of related records. At a more fundamental level, the concept of individual anonymization may not be sufficient. As Vedder et al. (1998) point out, the privacy of groups is also challenged by the practices of data collection, retention, and mining.

In spite of these difficulties, PETs can and should play an important role within the general framework of a comprehensive policy. Their use would be facilitated by principles that would sketch the contours of the landscape to be achieved through technology, and they, in turn, would support the achievement of those principles.

NOTES

1. See Schwartz and Reidenberg (1996) for an extensive review and analysis of this question with regard to the United States.

2. This is somewhat echoed by the European Directive on Data Protection (EU Directive), which extends its protection only to cases where “the processing of . . . data is automated or if the data. . . are contained. . . in a filing system structured according to specific criteria relating to individuals, so as to permit easy access to the personal data in question” (European Community, 1995, p. 15).

3. Of course, retention policies are influenced by a variety of factors beyond the availability of archiving technologies, most notably fear of litigation and regulatory requirements—see Grady (1996) and Skupsy (1993) for arguments on how retention of records may both expose to and protect against litigation.

4. In some respects, though, data may well endure longer in paper form than in an electronic environment, depending on a variety of
As David W. Charmichael, county records manager and archivist for Westchester County in New York, testifies, “Westchester County still retains its first book of records from 1684, but its first computer tapes from 1977 are unreadable after just 21 years.” (Charmichael, 1998, Personal communication). In other words, institutional memory can turn out, in an electronic environment, to be a function of how often and what kind of technological changes an institution makes. When new technology is accommodating, data endure and it takes an intentional act to delete them, whereas when new technology is not accommodating, data may become effectively unusable.

This is echoed by Schwartz and Reidenberg’s (1996) survey of American data protection law: All requirements for retention of data are requirements of minimum duration, motivated by administrative requirements. In their analysis, Schartz and Reidenberg place great faith in the need for institutions to divest themselves, for reasons of efficiency, of the burden of accumulated data, thus enacting an ad hoc institutional forgetfulness, but also acknowledge that marketing divisions may well wish to keep the data, in order to establish long term consuming patterns (Schwartz & Reidenberg, 1996, sections 10-1(a)(4), 10-2(a)(4), 11-1(a)(4), 11-2(a)(4), 12-1(a)(4), 12-2(a)(4), 13-1(a)(4), and 13-2(a)(4)).

This is echoed in Frederick Turner’s classic thesis on the American frontier ideal, The Idea of the Frontier in American History: “In the long run, the effective force behind American democracy was the presence of the practically free land into which man might escape from oppression or inequalities which burdened them in the older settlements” (Turner, 1986, p. 274).

See Reiman (1995) for a lucid articulation of this argument.

There are of course several other mechanisms within law concerned explicitly with mediating the tension between social justice and the opportunity to start over, such as free pardon, remission of sentencing, amnesty, statutes of limitations, etc. The precise makeup of such devices is naturally highly dependent on the social mores of the times: In France and Britain, for example, free pardon proved a useful mechanism to increase the size of both royal armies and new colonies (Foviaux, 1970).

See McNamara (1973) for a more complete legislative history of the Act.

Even within those rules, credit bureaus found ample room to gnaw at the forgetfulness principle: “[In Equifax, Inc., an FTC administrative law judge found that the reporting agency violated the Act by inserting phrases in its reports such as, ‘[i]n compliance with the Fair Credit Reporting Act, no additional information can be reported from this former employer concerning employment experience prior to seven years ago.’ The quoted phrase was inserted in consumer reports only when Equifax believed it had adverse obsolete information” (Sheldon, 1994, p. 160).

The rules limiting retention are waved under conditions easily met by almost any substantial credit, job, or insurance application. As a manual from the Associated Credit Bureaus explains, “Congress accepted the argument of some ‘specialty’ consumer reporting companies who make reports on consumers where large sums are involved, and exempted certain reports from the obsolescence section and any adverse item, no matter how old, may be reported if the report is being done for a credit transaction or life insurance policy which will be for at least $50,000; or for employment purposes where the annual salary will be at least $20,000” (Associated Credit Bureaus, 1975, p. 710).

Although not yet quite of the same nature, videotaping of public spaces will eventually also fall within this category, especially when coupled with face recognition technology (Thomas, 1998). In the United Kingdom alone, an estimated 200,000 cameras cover public spaces (Davies, 1997).

13. For a more detailed discussion of the technologies of data mining and knowledge discovery, see Mattison (1996).

14. Although we do not discuss them here, systems such as the W3C’s “Platform for Privacy Preferences” (P3P) are part of such a comprehensive privacy policy, insofar as they are “designed to inform users about any secondary use of their data so they can make informed choices about whether or not to provide data that might be used for these purposes” (W3C, 2001, p. 24). Such systems are, however, unable, in and of themselves, to either prevent collection or enforce disposal.

15. Chaum’s highly innovative work has not translated into market share: His celebrated anonymous cash business, Digicash, filed for bankruptcy in 1998. Many of Chaum’s idea about anonymity and pseudonymity have been implemented within Freedom, an “identity-management kit” for the Internet produced by Zero Knowledge. Whatever their commercial success, privacy-enhancing technologies such as those developed by Chaum will have, at the very least, “initiated a shift of imagination” (Agre, 1997).

16. This is precisely why changing personal names is a severely restricted process in some countries—see Lapierre (1995).

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Introduction to a Critique of Urban Geography

Guy Debord

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Translated by Ken Knabb

Of all the affairs we participate in, with or without interest, the groping search for a new way of life is the only thing that remains really exciting. Aesthetic and other disciplines have proved glaringly inadequate in this regard and merit the greatest indifference. We should therefore delineate some provisional terrains of observation, including the observation of certain processes of chance and predictability in the streets.

The word *psychogeography*, suggested by an illiterate Kabyle as a general term for the phenomena a few of us were investigating around the summer of 1953, is not too inappropriate. It does not contradict the materialist perspective of the conditioning of life and thought by objective nature. Geography, for example, deals with the determinant action of general natural forces, such as soil composition or climatic conditions, on the economic structures of a society, and thus on the corresponding conception that such a society can have of the world. Psychogeography could set for itself the study of the precise laws and specific effects of the geographical environment, whether consciously organized or not, on the emotions and behavior of individuals. The charmingly vague adjective *psychogeographical* can be applied to the findings arrived at by this type of investigation, to their influence on human feelings, and more generally to any situation or conduct that seems to reflect the same spirit of discovery.

It has long been said that the desert is monotheistic. Is it illogical or devoid of interest to observe that the district in Paris between Place de la Contrescarpe and Rue de l’Arbalète conduces rather to atheism, to oblivion and to the disorientation of habitual reflexes?

Historical conditions determine what is considered “useful.” Baron Haussmann’s urban renewal of Paris under the Second Empire, for example, was motivated by the desire to open up broad thoroughfares allowing for the rapid circulation of troops and the use of artillery against insurrections. But from any standpoint other than that of facilitating police control, Haussmann’s Paris is a city built by an idiot, full of sound and fury, signifying nothing. Present-day urbanism’s main problem is ensuring the smooth circulation of a rapidly increasing number of motor vehicles. A future urbanism will undoubtedly apply itself to no less utilitarian projects, but in the rather different context of psychogeographical possibilities.

The present abundance of private automobiles is one of the most astonishing successes of the constant propaganda by which capitalist production persuades the masses that car ownership is one of the privileges our society reserves for its most privileged members. But anarchical progress often ends up contradicting itself, as when we savor the spectacle of a police chief issuing a filmed appeal urging Parisian car owners to use public transportation.

We know with what blind fury so many unprivileged people are ready to defend their mediocrite advantages. Such pathetic illusions of privilege are linked to a general idea of happiness prevalent among the bourgeoisie and maintained by a system of publicity that includes Malraux’s aesthetics as well as ads for Coca-Cola — an idea of happiness whose crisis must be provoked on every occasion by every means.

The first of these means is undoubtedly the systematic provocative dissemination of a host of proposals tending to turn the whole of life into an exciting game, combined with the constant depreciation of all current diversions (to the extent, of course, that these latter cannot be detourned to serve in constructions of more interesting ambiances). The greatest difficulty in such an undertaking is to convey through these apparently extravagant proposals a sufficient degree of *serious seduction*. To accomplish this we can imagine an adroit use of currently
popular means of communication. But a disruptive sort of abstention, or manifestations
designed to radically frustrate the fans of these means of communication, can also promote at
little expense an atmosphere of uneasiness extremely favorable for the introduction of a few
new conceptions of pleasure.

The idea that the creation of a chosen emotional situation depends only on the thorough
understanding and calculated application of a certain number of concrete techniques inspired
this somewhat tongue-in-cheek “Psychogeographical Game of the Week,” published in
Potlatch #1:

In accordance with what you are seeking, choose a country, a large or small city, a
busy or quiet street. Build a house. Furnish it. Use decorations and surroundings to
the best advantage. Choose the season and the time of day. Bring together the most
suitable people, with appropriate records and drinks. The lighting and the
conversation should obviously be suited to the occasion, as should be the weather or
your memories. If there has been no error in your calculations, the result should
satisfy you.

We need to flood the market — even if for the moment merely the intellectual market — with a
mass of desires whose fulfillment is not beyond the capacity of humanity’s present means of
action on the material world, but only beyond the capacity of the old social organization. It is
thus not without political interest to publicly counterpose such desires to the elementary
desires that are endlessly rehashed by the film industry and in psychological novels like those
of that old hack Mauriac. (As Marx explained to poor Proudhon, “In a society based on poverty,
the poorest products are inevitably consumed by the greatest number.”)

The revolutionary transformation of the world, of all aspects of the world, will confirm all the
dreams of abundance.

The sudden change of ambiance in a street within the space of a few meters; the evident
division of a city into zones of distinct psychic atmospheres; the path of least resistance which
is automatically followed in aimless strolls (and which has no relation to the physical contour of
the ground); the appealing or repelling character of certain places — these phenomena all
seem to be neglected. In any case they are never envisaged as depending on causes that can
be uncovered by careful analysis and turned to account. People are quite aware that some
neighborhoods are gloomy and others pleasant. But they generally simply assume that elegant
streets cause a feeling of satisfaction and that poor streets are depressing, and let it go at that.
In fact, the variety of possible combinations of ambiances, analogous to the blending of pure
chemicals in an infinite number of mixtures, gives rise to feelings as differentiated and complex
as any other form of spectacle can evoke. The slightest demystified investigation reveals that
the qualitatively or quantitatively different influences of diverse urban decors cannot be
determined solely on the basis of the historical period or architectural style, much less on the
basis of housing conditions.

The research that we are thus led to undertake on the arrangement of the elements of the
urban setting, in close relation with the sensations they provoke, entails bold hypotheses that
must be constantly corrected in the light of experience, by critique and self-critique.

Certain of Chirico’s paintings, which were clearly inspired by architecturally originated
sensations, exert in turn an effect on their objective base to the point of transforming it: they
tend themselves to become blueprints or models. Disquieting neighborhoods of arcades could
one day carry on and fulfill the allure of these works.

I scarcely know of anything but those two harbors at dusk painted by Claude Lorrain — which
are in the Louvre and which juxtapose extremely dissimilar urban ambiances — that can rival
in beauty the Paris metro maps. I am not, of course, talking about mere physical beauty — the
new beauty can only be a beauty of situation — but simply about the particularly moving
presentation, in both cases, of a sum of possibilities.

Among various more difficult means of intervention, a renovated cartography seems
appropriate for immediate utilization.
The production of psychogeographical maps, or even the introduction of alterations such as more or less arbitrarily transposing maps of two different regions, can contribute to clarifying certain wanderings that express not subordination to randomness but complete insubordination to habitual influences (influences generally categorized as tourism, that popular drug as repugnant as sports or buying on credit).

A friend recently told me that he had just wandered through the Harz region of Germany while blindly following the directions of a map of London. This sort of game is obviously only a feeble beginning in comparison to the complete creation of architecture and urbanism that will someday be within the power of everyone. Meanwhile we can distinguish several stages of partial, less difficult projects, beginning with the mere displacement of elements of decoration from the locations where we are used to seeing them.

For example, in the preceding issue of this journal Marcel Mariën proposed that when global resources have ceased to be squandered on the irrational enterprises that are imposed on us today, all the equestrian statues of all the cities of the world be assembled in a single desert. This would offer to the passersby — the future belongs to them — the spectacle of an artificial cavalry charge, which could even be dedicated to the memory of the greatest massacrers of history, from Tamerlane to Ridgway. It also reflects one of the main demands of the present generation: educative value.

In fact, nothing really new can be expected until the masses in action awaken to the conditions that are imposed on them in all domains of life, and to the practical means of changing them.

"The imaginary is that which tends to become real," wrote an author whose name, on account of his notorious intellectual degradation, I have since forgotten. The involuntary restrictiveness of such a statement could serve as a touchstone exposing various farcical literary revolutions: That which tends to remain unreal is empty babble.

Life, for which we are responsible, presents powerful motives for discouragement and innumerable more or less vulgar diversions and compensations. A year doesn’t go by when people we loved haven’t succumbed, for lack of having clearly grasped the present possibilities, to some glaring capitulation. But the enemy camp objectively condemns people to imbecility and already numbers millions of imbeciles; the addition of a few more makes no difference.

The primary moral deficiency remains indulgence, in all its forms.
A New Way of Walking

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By Joseph Hart,
Utne magazine

Artist-explorers called psychogeographers are changing the way we experience the city

In May, a few dozen conventioneers descended upon New York City for the second annual Psy.Geo.Conflux. But they didn't trade business cards over Salisbury steak at a Holiday Inn -- the city itself served as their conference room. Psy.Geo.Conflux gathered artists, writers, urban adventurers, and others from around the world who are interested in "psychogeography," a slightly stuffy term that's been applied to a whole toy box full of playful, inventive strategies for exploring cities. Psychogeography includes just about anything that takes pedestrians off their predictable paths and jolts them into a new awareness of the urban landscape.

A duo of artists from Copenhagen led participants on a tour of the city -- using a map of Copenhagen instead of New York. D. Jean Hester from Los Angeles hung posters and magic markers in public places soliciting answers to questions like "What smell reminds you of home?" and "Where were you the last time you cried?" Another conferee asked his fellows to perform "reverse shoplifting" by placing subtly redesigned products on the shelves of area grocery stores.

Still others practiced "generative psychogeography," or algorithmic walking, pioneered (as far as I can tell) by a Dutch artists' collective called social fiction. Participants walk an algorithm or fixed pattern, such as "first right, second left, first left, repeat." In other words, you head in any direction, take the first right, then go two blocks to the second left, then at one block take a left, and then repeat the pattern as often as you wish. The result is a remarkable style of travel -- neither goal-oriented nor random, structured but always surprising.

I asked Christina Ray, one of the conference organizers, what common thread holds these urban adventures together: Just what is psychogeography, in a nutshell? "Break it down into its two parts," she says. "It's the psychological and the geographical. It's about how we're affected by being in certain places -- architecture, weather, who you're with -- it's just a general sense of excitement about a place."

Most of us, she explains, just follow a small set of preprogrammed instructions as we wander through the city: office, day care, grocery store, home. And she's right. If you track your own path through a typical day, you'll soon discover that your journey is habitual, that you're slowly wearing a canyon through the same streets, the same sidewalks, day after day.

Psychogeography encourages us to buck the rut, to follow some new logic that lets us experience our landscape anew, that forces us to truly see what we'd otherwise ignore. "Chance and randomness," says Ray, "are what's exciting." (The Web site of Ray's art group, Glowlab -- www.glowlab.blogs.com -- is a great source of information on psychogeographic happenings.)

For Dave Mandl, a photographer and avid psychogeographer who attended the Conflux, this transformative power lies at the heart of what makes psychogeography worthwhile. "When you remake your environment, or find wonderful things in it," he says, "it breaks you out of the machine."
The word *psychogeography* was coined in the late 1950s by the letterists and the situationists -- French artists and social theorists who adopted the playful-serious agenda of the dadaists and surrealists in an effort to break through the crust of postwar conformity. But modern psychogeographers are equally influenced by earlier strains of urban adventure, including the 19th-century concept of the flaneur, the idle man-about-town who observed and commented on the urban scene. The most flaneur-like style of psychogeography, of course, is algorithmic walking -- that "first right, second left" approach. I first experienced it last year, shortly after I first discovered Ray's projects online.

I'm a fan of urban history and adventure and am happiest poking around in the city's blind alleys, forgotten haunts, and dusty corners -- physical and historical. So "generative psychogeography" made sense in light of what I know to be true about the city: Surprises lurk around every corner. In practice, algorithmic walking proved even more interesting and just plain fun than I had expected when I tried it with a group of writer and artist friends.

We chose Albert Lea, Minnesota, for our walk. It's a small town on a lake not far from the Twin Cities, and I had never spent much time in it. We began in the downtown area with our algorithm: first left, second right, first right, repeat. We also decided that if we ran into a dead end, we would turn around and restart the algorithm. At the end of the first leg of our journey, we found ourselves outside the Masonic temple -- and at a dead end. Left to my own devices, I would have headed down toward the lake and a pleasant swath of green grass that I spied through the buildings. Instead, we dutifully followed the algorithm: made a U-turn, and soon found ourselves creeping down a dusty alley toward a busy four-lane highway.

I'll admit I had some doubts about the wisdom of our walk as we hustled, heads down, through the stream of traffic. But after we had made it across, the algorithm proved itself. On a semi-deserted dead-end street we discovered a massive fiberglass statue of a farmer, complete with seed cap, neckerchief, and overalls. Surprise! A little further on, past some elegant gang graffiti and a crowded swap meet, we stumbled upon another surprise -- a set of square concrete lane dividers painted all over with ornate Nordic runes. Six or seven of them were positioned in an empty warehouse parking lot, each slathered with bright paint depicting primitive masks, warrior figures, and cryptic hieroglyphics. Later, as we were talking over the experience, we all agreed that the algorithm had operated like some higher force. We felt as if we were moving in a strange new zone exactly halfway between randomness and order. No one could predict where the left-and-right pattern would take us, yet we weren't wandering. The firm logic of the algorithm was constantly taking us away from the directions and destinations our whims might have chosen.

And the pattern had done more than simply lead us to hidden surprises. It had also conferred significance on seemingly insignificant spaces like an empty alley, a fresh tree stump, a set of hidden stairs, a bank sign, an abandoned church. In either goal-oriented walking or ordinary strolling, we might have ignored or discounted these things. If we had been striving to get somewhere, we would have been thinking only about our destination. And if we had been following our own noses, we might have been consciously or unconsciously searching for things and places that were more beautiful, restful, or obviously significant -- like parks, forests, restaurants, shops, or monuments.

Instead, there was something about tracing out this strange, secret, but inevitable itinerary through the landscape of Albert Lea that turned just about everything into a significant marker or a station on our way. We felt as if we were constantly on the verge of discovering something that would give us secret knowledge of the town -- and, of course, we were right. Our consciousness of what was important and unimportant, beautiful and dull, in a small town had been completely altered. Our psyches had a new relationship with geography.

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Locative Dystopia 2

2004.

2004 opened with the cancellation of a number of commercial airline flights at the bequest of the US administration. This serves as a reminder of the mundane and arbitrary operation of power ("Its got to the point where if there's anybody called Mohammed aboard, your flight's got a problem" - senior airline source, quoted Guardian, 3 January 2004), and also of the renewed focus on surveillance and the ability to accurately locate potential suspects (1).

This is an obsession shared by Locative Media, albeit in another name. Locative Media uses portable, networked, location aware computing devices for user-led mapping, social networking and artistic interventions in which geographical space becomes its canvas. It gestures towards a near future in which virtual and geographical space converge - towards the Internet of Things, a location specific internet that is organised semantically and accessed via mobile networked devices - and the course it plots towards this future demands not only that data be made geographically specific but also that the user, if not defined by their location, at least offers up their location as a condition of entering the game. In this respect, not to mention its choice of tools - which bring with them an unprecedented capacity to pinpoint and to connect the individual to ever proliferating databases that are the new repositories of power - the course Locative Media plots parallels the neoconservative agenda of Total Information Awareness. It operates upon the same plane as military tracking, commercial and State surveillance, its concern for pinpointing and positioning - rendering the world readable and known, or in this case placed - shared with coercive forms of social control. Technology is taking another lurch into the unknown, with consequences that should not be seen as simply good or bad, to be celebrated or feared. But in the rush towards the Internet of Things the phrase internet security takes on new dimensions, forcing a consideration of the critical context of Locative Media, and of how it might challenge, or be complicit with, the operation of power.

Locative Media is in a condition of emergence, its own territory still being mapped. It is here understood here to refer not to positioning technologies, such as GPS, so much as the critical art or social movement that engages with them, and to the independent networks of artists, technologists and theorists that make up this movement. The need to deliver contextual information within wireless environments, or to engage in proximity and co-location, has meant that rather than distance becoming irrelevant, the ability to determine location has become central for a wide range of applications. A number of initiatives, such as the Mobile Digital Commons and Pervasive and Locative Media networks, are exploring collaborative links between independent cultural producers, university research labs and industry. But while much industrial and academic research remains tied to old metaphors, it is currently these grass roots networks that are often doing the most original work, opening up horizons not foreseen by the marketers of the corporate technology push.

Mobile Digital Commons Network
http://mdcn.iesanssfl.org/

Pervasive And Locative Media Network
http://www.pal-network.org

In an elegant metaphor for the exploratory movements of Locative Media, Teri Rueb compares the digital annotation of space with trails left in freshly fallen snow: The steady, silent accumulation of snow, weightless and ephemeral, stills the echoing canyons of endless traffic and tumult. A hush covers the land that waits now, like a blank slate, to be written upon by so many footfalls and improvised architectures. Here different rules apply, it is a fluid space of overlapping fields and frequencies, [it] is characterized by connectedness as opposed to the discrete boundaries and territories suggested by physical architecture and visually based constructions of space (Syncopated space, Receiver #10, 2004: p.2). This metaphor vividly conveys a sense of virtual space overlaying physical space, a zone both of liminality and of unlimited potential. And there is an inference here that the clean slate offers a new start, capturing the optimism that
characterises much work in Locative Media.

Artists are responding to new technical possibilities by asking what can be experienced now that could not be experienced before, in some cases producing more-or-less conventional artistic representations using location data, in others playing with the possibilities of the media itself. Approaches range from the screen-based sketches of GPS Drawing, projects such as Geograffiti and Urban Tapestries that "geo-annotate" space with digital content or interlocking narrative threads, to projects that explore relationality or embodiment such as Hlemmur in C, Sound Mapping and .walk. In Choreography of Everyday Movement Teri Rueb reveals Locative Media’s own conditions of possibility by contrasting the richness of experience and physical presence within geographical space with the reduction of the individual to a point within cartographic space, movement and physical presence reduced to the most basic abstraction. These projects point to the beginnings of a critical art practice that challenges the top down approach of conventional cartography to open up a manifold of different ways in which geographical space can be encountered and drawn, and looks beyond the reductive understanding of location that comes from GIS - in which place is considered as a set of geographic coordinates or a wireless cell - to explore context, co-location and material embodiment. A loss of opacity and difference is one consequence of convergent processes of globalisation and digitization, and yet difference arises on other levels, between data sets and between bodies and their digital representations. This suggests that introducing play and distortion is not trivial but an important response to the ever encroaching homogeneity of contemporary societies. Locative Media’s associative mapping, localised interaction and its articulation of memory within a plurality of intersecting data trails results not in a singular totalising view, but in multiplicity and the heterogeneity of the local, not in giving everything its proper place but in mobility, opening up rather than pinning down. Where the coordinate system and the coordinates themselves are brought into the frame, the operation of electronic tracking systems is exposed. And in examining location-aware experience or perception and its relationship to the dominant logics of representation, such forms of cultural production can create distortions or moments of ambiguity by which mechanisms of domination become both apparent and less certain.

GPS Drawing
http://www.gpsdrawing.com/

Geograffiti
http://www.gpster.net/geograffiti.html

Urban Tapestries
http://urbantapestries.net/

Hlemmur in C by Pall Thayer
http://130.208.220.190/hlemmC/

.walk by Wilfried Houjebek
http://www.socialfiction.org/dotwalk/

Sound Mapping by Iain Mott
http://www.reverberant.com/

The Choreography of Everyday Movement
http://userpages.umbc.edu/~rueb/trackings/

Some find in Locative Media a transformative potential and the basis for an emerging sociality, a means to create a better world driven not by marketing but by networks of reciprocity and trust. Locative Media builds open source architectures that may be used to share, deposit and access contents across location-aware, peer-to-peer networks. It offers communities the opportunity to map their own environment, and to combine local memory with social network maps and responsive environments, creating “social interfaces” to the built environment and new possibilities for collective action and community organization. With the focus on the grass-roots and the social, on the user-led and collaborative, on social computing and open tools, the emphasis is placed on building these possibilities from the ground up. Surveillance too is a social project, but by appropriating and refashioning military technologies such as GPS, and dispersing code and skills outside of a command and control infrastructure, Locative Media transforms a system of domination into a participatory milieu. Creating new visions and worlds is perhaps the most vital intervention in the face of the crushing realities of the post-911 world. And the optimism currently generated by Locative Media provides an antidote to our fears about ever encroaching forms of surveillance, and an important answer to the politics of fear. In place of an oppositional stance towards surveillance, or a conventional politics of dissent, Locative Media suggests a politics that is “collectively constructive rather than oppositional” (headmap.org), offering the opportunity to build another world, to create a space that can stand up as an alternative, a localised utopia.

Headmap
http://www.headmap.org/

Locative Media Lab
http://www.locative.org
The claim is often made that Locative Media at once exposes the operation of surveillance technologies, and reverses, multiplies and diffracts the gaze by giving people the opportunity to take ownership over the tools and the data generated. And yet comments occasionally appear on lists extolling the potential security applications, and more generally ideas can be appropriated, information misused and trust networks abused, as previously marginal practices are incorporated, the greater the transgression the greater the potential market value. In competing with the corporates in the race to produce a locative operating system, a location-aware internet or geo-repository Locative Media risks being just another player in the Location-Based Services market. And in opening up new ways of understanding the technology and its social implications, and in contributing to the development or testing of real-time sensing and mapping techniques as well as to ever growing data banks of personal information, such independent networks risk acting as a voluntary RND lab for the corporate sector and a proxy vanguard for the military-industrial technology push. It faces being swept away by the corporate juggernaut in what Rueb describes as the hand rush moment in location-based content delivery (Syncopated space, Receiver #10, 2004: p4), perhaps even that applications developed for community activism are repurposed by the military or as tools of coercive control, its appropriation of military technologies reversed, hoisted by its own petard.

Before we can identify the point at which Locative Media and surveillance diverge, or that marks Locative Media's critical distance to systems of domination, we need first to see how the nature of surveillance and control have themselves changed. Surveillance is no longer the exceptional fate of the few, a state sanction requiring an extensive network of agents, or requiring the covert installation of costly and sophisticated, specialist instruments. In recent years there has been an exponential rise in new forms of surveillance, and a proliferation of ways in which information about individuals may be generated, filtered and retrieved. This is illustrated by the use of RFID tags to track products beyond point of purchase and the mining for consumer profiles, as well as by mobile phones which, unlike GPS which immediately betray the user's position, have created an unprecedented capacity for tracking and monitoring individuals (2).

The mobile phone puts the Panoptic eye in your pocket and places the body within the circuits of dataveillance, not only extending the reach of surveillance but also changing its form. With the arrival of Location-Based Services control mechanisms are marketed as consumer products, such as services that enable parents to track the movements of their children 24 hours per day, without consent if the child is under fifteen, even if with often unpredictable results (3). These - like the use of picture phones and the rise of 'cellphone vigilantes' (Mitchell) - highlight the arrival of lateral or 'synaptic' surveillance, in which the top-down model of State-sponsored surveillance is displaced by a situation in which contents are generated within and circulate across horizontal networks, and it is increasingly difficult to distinguish the subjects of surveillance from its agents.

The nature of control is also changing. Deleuze has argued that the disciplinary society of factories and prisons has given way to the control society, where mechanisms of domination are less evident but far more pervasive and operate through codes and passwords, not restricting or regulating behaviour but modulating and organising it. Here control is seen less a means of controlling deviancy, crime or terrorism, more a way of managing consumption and the smooth flow of goods and desires, producing not docile subjects so much as better consumers. It is not imposed but embraced for both business and pleasure, a system of power spread through marketing and accessed through subscription services. This too is illustrated by Location-Based Services, where control mechanisms are transformed into consumer products, deployed for cell based marketing or remodelled as entertainment and a source of pleasure (4). As with the spectacular success of Big Brother, surveillance and control here become cultural entities in their own right, in which the locative capacity itself is embraced and consumed like any other service, as a form of culture or leisure.

To the extent that it simply celebrates the ability to locate all things at all times, a politics of pleasure locked within the surveillant machine, Locative Media might be seen as little more than a marketing wing for this branch of the control society, its autonomous space but a rebellious younger sibling in a post-Big Brother world. As a cultural project it helps to create the conditions for the agenda of Total Information Awareness to be realized. And the peer-to-peer networking of Locative Media could be described as a test bed for new forms of synaptic surveillance, its circumvention of the centralised telco model only serving to expand their power and reach (5). Locative Media's critical distance to the mechanisms of the control society is precarious, a parallelism characterised by interchange and mutual implication rather than any kind of hermetic seal, with the possibility of incorporation never far away. We might compare this with the case of Free Software, which has grown alongside proprietary code as its double and other. Open Source has succeeded in part because it could be adopted by different people for different reasons, some seeing in it the basis for a fairer world, others simply greater efficiency. Crucially it has remained disruptive because, even when turned to the pursuit of profit by IBM and the corporate world, its discontinuity with the proprietary model endures. It is not clear that the same may be said for Locative Media. For unlike Free Software there is no fundamental discontinuity between Locative Media and its troubling big brother; while the method and motivation may vary, grass roots cultural production and coercive control applications occupy the same plane. If its autonomous space is to persist and affect change, Locative Media, alongside other techno-social projects such as the Free Networks and Free Software movements, needs to continue to develop social protocols of sustainable self organisation (Medosch) as well as models of remuneration and exchange (Russell). But - perhaps more than is so in these other projects - Locative Media needs also to examine its own critical context, to know when to push the accelerator and when to develop countermeasures. Crucially it needs to engage in and seek to influence wider research and development agendas, to help to embed in new technologies and standards social values that are developed from below. One example might be to show how encryption may be used to create safe zones in wireless environments.
before this possibility is foreclosed by the drive towards maximising openness to the potential commercial applications of the future, a Windows moment for the Internet of Things.

The outlines of control are becoming harder to discern, and yet we might say that this presents a paradox that is not there to be resolved, but which is productive of the conditions of emergence for a location-aware information society. An intersection of cultural production and coercive power is not new. The invention of the chronometer in the eighteenth century as an on-board ship location device gave rise to new ways of exploring our relationship to the world, new forms of representation, and a new form of global power: here power and representation intertwined, navigation enabling the projection of naval force, the mapping of new territories the first stage in their conquest. As with the maps of the eighteenth century, locative repositories might be both important cultural representations and instruments of power. Drawing maps has always been political, and what is always at stake is not just the contours of cartography, but also contours of control.

Another term, that speaks neither of utopia or dystopia, and which holds this paradox open, might be political, and what is always at stake is not just the contours of cartography, but also contours of control. Drawing maps has always been political, and what is always at stake is not just the contours of cartography, but also contours of control. Another term, that speaks neither of utopia or dystopia, and which holds this paradox open, might be embedded media. Like ambient technology or augmented reality, the term highlights the way media technologies pervade every aspect of the social domain, while its other meaning, signifying the placing of journalists in military columns during the war in Iraq, serves as a reminder of an inherent complicity in the operation of power. As a descriptive term it would highlight the way in which Locative Media is embedded not only in geographical space but political and cultural space as well. And as a metaphor it might be reclaimed as a rhetorical strategy for inhabiting this ambiguous and conflictual space, for intervening in the membranes of the multifarious datastreams (of military surveillance, criminal databases, immigration authorities, financial transactions, etc) that constitute the invisible threads of an emerging social fabric. To stretch the analogy yet further, we might say that a critical engagement in Locative Media would seek where the pockets of resistance might lie, the moments of disturbance or sites of interruption not of the telos of technological war, but of social control.

In holding open ambiguity, and in its constructive collectivism, Locative Media marks both the power and the limit of new forms of surveillance. Locative Media's political moment might not be despite its complicity in mechanisms of domination but because of it, residing in the acceptance of the paradox and occupying the ambiguous space it creates, creating a site of resistance by working from the inside. But at the same time as the creative and transformative potential of new logics is celebrated, there needs to be a corresponding engagement in the economic and political forces that work to retterritorialise this space according to familiar axiomatics of exploitation and control. Perhaps as well as falling snow we might speak of shifting sands, and of the way that time sculpts a desert landscape. When standing in the eye of the storm all that can be done is to stake out some land, to try to ensure that the right points are connected, that by the act of walking and continuing to walk new paths not only emerge but endure. But for this network of interlocking paths to be more than an orchid in the desert it needs not only to respond to the forces shaping the landscape around it, but also to provide new channels that redirect them, new routes along which research and development can flow. And if the shifting sands are not to overwhelm us we need to ensure that when the storm clears we are left with an oasis we can enter or leave.

Drew Hemment
8 August 2004
http://www.loca.org.uk

(1) Here this takes the form of data-matching between watchlists and airline passenger lists accessed worldwide, something predicted by advocacy group Statewatch many months in advance, as was the application of anti-terrorism legislation against protesters and activists, first seen during the protests and peace camp at Fairford RAF airbase in the build-up to the Iraq War.

(2) Location data from mobile phones is widely in court cases in the UK and by the intelligence services (most spectacularly in the case of the assassination of Chechnya's rebel leader Dudayev by the Russian security services, reportedly with NSA support). Mobile phones routinely generate location data so that calls can be routed, data which is recorded by the Operators. This is sector based, offering low resolution, and unpredictable results due to reflections and multi-path propagation. Triangulation data is more precise, calculating location to within 25m from the time delay in signals received by different masts, and mobile phones also increasingly incorporate GPS technology. Even pay-as-you-go phones, for which details of owners are not recorded, offer no respite, as they can be easily hacked to obtain their unique EMEI number. And as mobiles and PDAs merge it will not be just location and phone logs that can be accessed, but diaries, contacts, et al. Yet more forms of surveillance are in development that exploit the flood of radiation created by the global coverage of GSM, such as the radar-like Cellar(TM) system, developed by a UK subsidiary of Siemens for anti-terrorism defence, security and road traffic management, which offers the capability to see in real-time through walls or view moving objects hundreds of miles away by measuring deviations in mobile phone radiation patterns.

(3) Initially introduced in Finland, such services have now proliferated. They are extremely unreliable, however, and tests by Duncan Campbell and others have demonstrated that they can locate people in a different town or more 20km away from their true position.

(4) In the place of the internalisation of an external gaze that characterised disciplinary societies, we see the emergence of a complex of control and communication that is no longer externalised in a central
command but rather operates on a social and psychological level. Such a shift has been identified in a number of contributions to ZKM's CTRL[SPACE] catalogue: whereas Orwell's 1984 expressed and embodied a fear of the future as a place in which all people and all things would be observed at all times, we now live in a present, it is claimed, characterised by "scopophilia", a mix of voyeurism and exhibitionism, and an ontological need to be observed. While this perspective may have its limits beyond the still-exceptional cases of web-cams and reality TV, with the everyday use of consumer devices such as mobile phones surveillance is being dispersed and also transformed, a technical capacity to locate becoming a tool to help us consume better and a new form of entertainment (CTRL [SPACE]: Rhetorics of Surveillance from Bentham to Big Brother, ZKM, Karlsruhe/The MIT Press, Cambridge, Massachusetts, 2002).

(5) Locative media also parallels the direction this agenda is taking, which is moving away from a single all-encompassing system to multiple, smaller, interconnected systems.

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A fictional narrative is an agitated space. A story world is constructed with attention to selection of detail and level of its description (setting and its establishment of tone, subtext and above all, physical place). The traditional role of the author has been to carefully use these tools to create the other world. The city is also an agitated space. A city is a collection of data and sub-text to be read in the context of ethnography, history, semiotics, architectural patterns and forms, physical form and rhythm, juxtaposition, city planning, land usage shifts and other ways of interpretation and analysis. The city patterns can be equated to the patterns within literature: repetition, sub-text shift, metaphor, cumulative resonances, emergence of layers, decay and growth.

A city is constructed in layers: infrastructure, streets, population, buildings. The same is true of the city in time: in shifts in decay and gentrification; in layers of differing architecture in form and layout resonating certain eras and modes in design, material, use of space and theory; in urban planning; in the physical juxtaposition of points and pointers from different times. Context and sub-text can be formulated as much in what is present and in juxtaposition as in what one learns was there and remains in faint traces (old signs barely visible on brick facades from businesses and neighborhood land usage long gone or worn splintering wooden posts jutting up from a railroad infrastructure decades dormant for example) or in what is no longer physically present at all and only is visible in recollection of the past.

The project “34 North 118 West” utilizes technology and the physical navigation of a city simultaneously to forge a new construct. The narrative is embedded in the city itself as well as the city is read. The story world becomes one of juxtaposition, of overlap, of layers appearing and falling away. Place becomes a multi-tiered and malleable concept beyond that of setting and detail to establish a fictive place, a narrative world. The effect is a text and sound based virtual reality, a non passive movement, a being in two places at once with eyes open.
The participants walk the streets of a city with a G.P.S unit attached to a lap top computer. Headphones for up to 5 at once are attached to the computer and worn by the participants. On the laptop is a map with a marker that identifies the participants’ location. The marker moves along the map tracking location and movement through the city grid. Data triggers are set along points in the physical city by latitude and longitude. Some triggers or “hot spots” are marked as squares on the map while others are left to be discovered. All written narratives are read by voice actors to create an overlap experience in real time of experiencing two places at once. The only visual is the map that tracks one’s movement and shows hot spots and the distance readings on the g.p.s unit.

The city is rich with layered semiotic systems on even a cursory, immediate reading.

There is at present a dual city to be read, the denotative and connotative city, if you will. The city exists to navigate and “read” on a literal level of interpretation of architecture, shifts, movement, traces of past and the patterns that form as one walks through the city. This is the denotative city. The author utilizing the concepts and form of narrative archaeology can form a reading of the second city (the connotative city or semiotically charged) with points in street layout pinpointed to address the resonance of multiple readings and resonances of buildings, street signs, navigation, infrastructure.
A novel is a singular artifact yet can contain narratives from great ranges in time, a story may accomplish this on the page as well. The new paradigm finds the layers able to exist in the city and in layers of time to be experienced and agitated into being only by the participant’s reaching the spot as set to latitude and longitude trigger, a voice in the headphones, a character and narrative, a “ghost”, shifts and contrasts in time, etc...

35 years I cleared the tracks. Those men, along the rails, tired. Death by train we called it. They waited and wandered. Hoped....for the sound that comes too lateTo take them from this life.It was my job to assist..........to help......kind words.....or help clear the tracks after the impact...Such failures. My failures. Such small horrors. And it is not the most dramatic: an eye open tomato red with blood, a nose with ice covered
nostril hairs that looked like a crab emerging from a shell, an ear lying by a man's feet like some dead wingless bird, a cheek punctured with teeth exposed, a wound open steaming in the snow. Those are so few, so specific, so clearly cut from men with faces I cannot help but still see. It is what never comes clear, not faces, not expressions, not the dignity of person, something that had a name. There is a sort of mutant slot machine, it comes to me at night: an odd collection, ever shifting, not bells and lemons but eyes, scars, blood, mouths, wounds, meat, an eye hanging alone gleaming wet and alien yet from some lost moment in 35 years, a nostril disconnected a failing island of memory from some dead man's face like an odd little lost cave. Those are the ones I truly failed. (1946)

This narrative appears in 34 north 118 west at the end of a vast empty lot. Train tracks appear at the end of the lot along with a section of asphalt split to reveal turn of the century cobblestone street. The tracks suddenly stop and it is at this stark end that the story is triggered by satellite. The physical placement is highly metaphorical on several levels. The vast empty lot resonates with a sort of melancholy in its dust and debris akin to the man's mind and his dark forgetting and shards of memory. It also is where the rails suddenly stop that is physically jarring and stark in itself in the physical city and this is akin to the narrative in the dead men at their end of life and the narrator looking back at ill formed phantoms in his memory. It is also where a homeless tent city once stood in the 1980's that was well documented at the time in the press and of which there is no physical trace as well as where a building identical to the mile and a half long former turn of the century freight depot now used as Sci-Arc (an architecture college) once stood and again there is no trace, as though it is spatially forgotten and thus failed.

All of the intellectual endeavors utilized to analyze the data of the city from architecture to ethnography and history are part of the narrative. The author in this new model can work with all the data of the city itself as well as narratives written to symbiotically function within the city details past and present made open to experience and interpretation by the reader walking the city. A fantastic thing has occurred. The creative and critical voices are fused as the participant walks the city. The key is the usage of sound. Walking the city with sounds from different points in time and metaphorical relationships with what is being seen allows the author to guide a fused experience of critical analysis and creative writing. By researching the city itself before writing and selected key places to trigger narratives, the author establishes an experience where the participant is navigating both fictive/story world and present world (which flies in the face of the basic concepts of virtual reality and reading of novels historically......of passively sitting in one world and imaging active movement in the other....now there is movement in both and it is simultaneous) but a sort of light shined of analysis lit on specific points in the city in their layers and reading.

I would love to spend the day in the dome here at La Grande.......watch......well......the day......see the changes......little things .....in the sky......shadows...the light different coming in......morning turned to afternoon....the light brighter................anyway.........I'm in the kitchen......my mind drifts a lot more as we cook the hot dinners....it's not just that it is late .....its........steam .....the flames...........The drama of it all....not like some cold sandwiches and salads...... turkey on
This narrative is strongly tied to its physical placement and is a weighted narrative. The narrator is based on a composite of the many latina women who worked in railroad and related industry in the 1940's. The narrator would have only known weather reports as based on ship reports as that was the g.p.s equivalent of the day in the sense of data transmission from certain points in space to formulate larger data patterns. It also in retrospect left much room for error and is one of the reasons that concepts like "surprise storm" in research were found to be quite pervasive in newspaper headlines in earlier eras. Weather forecasts from newspapers at the turn of the century made forecasts for up to a week in advance, which is even now statistically low percentage forecasting with satellite and radar. She also is referencing absence as presence when she describes the food “the neat little cheddar square....gone ....but there it is” This is one of the larger issues addressed, of how what is gone remains, and how what is unsaid or not initially visible can carry great weight.

The building described in the story may be gone and in its place something completely in opposition. .....the La Grande station was also home to both Japanese Americans shipped to interment camps and just after it was closed before being demolished, Judy Garland smiling in the same doorway singing the song of the Santa Fe railroad ("Atchison...Topeka ....and the Santa Fe") in a Hollywood musical....a beautiful glass domed building once the main passenger station in Los Angeles before Union Station and now in its place is electrified fence, garbage and a storage facility.
The participant/reader experiences the literal and semiotically charged cities simultaneously. The awareness of metaphor and sub-text builds along with a casual walking through the city.

This occurs without the authoritative tone of critical language as it is to be inferred experientially as the author has written the analysis into being by the very places selected to trigger sounds and narratives as well as their content and its layers of resonance and reference. The present city and past incarnations are experienced at once.

The author now is to function like an ethnographer and archaeologist. The pop culture notion of archeologist is one of the scientist digging in desert Africa or Egypt. In this general sense, the archaeologist is digging vertically into the ground. Presumably, in a good dig site, layers will emerge as one digs deeper. Artifacts will shift as one digs deeper into what was once topsoil. Time and its artifacts are thus presented vertically to navigate and uncover. The author, however in the new writing of narrative archaeology is working within the city, its streets, layers of cultural resonance and population, and, of course, buildings...many of which may remain unchanged over time. Thus, the navigation, as in the walk in a city, is a vertical one. In this vertical movement artifacts are also available and layers in time exist. They are held in data and in the past. In 34n118w stories, population distributions and points of resonance in the physical city may be from 1937 then a hundred feet ahead 1903 then 1960.........all creatively and
intellectually formed from elements in research and from the past. The author by composing and placing narratives and sound is establishing artifacts culled from layers in time.

The creative texts composed for insertion into the city are constructed in a way that allows for the charms of the “traditional” text as well as of the “experimental” The narrative is constructed in individual unit as a short short or prose poem. The piece can stand alone as a work of creative writing with rich language, imagery, detail, and a sense of narrative arc fulfillment in resonant ending. It also is constructed to be read such that at certain key points in the city, to be read on multiple levels. The narrative may have detail but only enough to create a half sense of place thus enhancing the awareness of two places at once in the physical city. The narrative may be written in style as well as detail and content to enhance the discontinuity of place being experienced by the viewer/reader, of the disjunction between what is imagined and referenced and what physically, at present, is.

The author also has a physical distribution of stories along city streets and landmarks to work with in writing and placing texts and sound. Much of 34n118w was composed in final revisions by working with a physical map and notes from multiple walks through the space. This aids in the building of meta-text. Certain texts distributed through the grid at key places as well as intervals in navigation are built to be “weighted” or “enhanced” text.

A basic construct of semiotics is of the dual readings of meaning, an obvious example being “soda” .....the can handed to you is accepted as soda at face value at a county fair, but isn’t “can” what has the name printed on it and the opening you are using to drink from? Soda is the shapeless fluid held inside the can. Also, the same occurs in association with a word marker such as “Car” .....dictionary definition: .....internal combustion engine.....rubber tires.......bla bla bla.......but you may have been born in a taxi, you may have just gone to the circus and saw 15 men pile out of a tiny mini cooper, you may have seen a horrible wreck years past that you can’t shake from your memory, you may drive only station wagons........thus, again a word is a container...............car is the container and the associations inform it from within like an unseen fluid.

The selected texts as weighted are constructed by the author to specifically reference metaphorically the larger issues and concepts to be addressed. These short short narrative vignettes are to be constructed with the sort of image play that informs allegory to a degree.

In 34n118w's meta-text are analysis of issues and concepts such as the resonance of data as rich with meaning, the lineage in technology of communication and transference of information from g.p.s (back through ship reports, railroad infrastructure, morse code...), and the many metaphorical readings of absence as presence and “ghost”.

The meta text is informed by the details and metaphors in individual narratives that are written to reference these ideas, again without the intrusion of the critical voice and dry authority.

Instead, what is allowed to build is a cumulative resonance. The author can slowly build through repetition and subtle similarities in detail and of course physical placement and interaction of story space with points in the physical city. The author can place the larger concept references and resonances in sequences of his/her design both thematically and to build through repetition but also in the streets and city-scape. The author now has the freedom and range to build “traditional” and “experimental” tools and forms in a new way that makes the author able to structure for effect within individual texts, within a larger
sequence of texts, within individual and multiple physical points, readings and placements in the city, within a meta textual construct built in both the narratives and city cumulatively, and even more importantly with a powerful component of play.

One of the fascinating elements of writing and constructing a work such as 34 north 118 west is in its multiple physical and thematic interfaces. The work is not a linear start to finish along prescribed path in city and story blocks. The participant has multiple cohesive experiences and thus work depending entirely on their chosen path. A 15 minute jaunt up one street, through an alley and down the next street will be fulfilling and follow all the elements of construction, possibility and meaning previously described. Another jaunt up and around a completely different set of streets will have the same effective richness in perhaps a half hour, and a walk of all the streets, narratives and sounds in its totality will be equally fulfilling as an experience and as an exploration of narratives of the many layers of the city.

And they will all be different.

The work is now not only removed from the page, from the separation of critical and creative voice, from the gallery and its long mined semiotics of exclusion and disconnect by nature of presentation as well as of published book or magazine as fetish object connected to the finality of form and translation into being as “finished”, but also removed from a non-multiplicity. The author now in narrative archeology is to construct a work that has many different permutations by design, and the participant experiencing it in their choices of navigation whether based on time, interest in physical streets and buildings in particular or just by intuition will be in a sense an ultimate generative author. Utilizing global positioning satellites allows the viewer to trigger and thus build the experience and resonance by their physical presence and movement.

The fact that the written narratives are read by voice actors and appear only as sound in
headphones upon activation not only enhances characterization and tone through speech pattern, cadence and inflection, but creates a sense that every space is agitated (alive with unseen history, stories, layers) The city is to be read and publication becomes one of the streets, zeroes and ones in code, and in the air. Movement and reading now brings a narrative of what was unseen and what has been lost in time, only for it to quiet again once passed. Narrative Archeology awaits cities to be read.... further narratives to be constructed with the physical city, the past, and a new story structure at once richly complex in new possibilities within form and construct and the long standing tradition of stories told well.

Visit the **34 North by 118 West** website at [http://www.34n118w.net/](http://www.34n118w.net/)

**Right as Rain** is another interesting new media / narrative project project with which the author is involved. Jeremy Hight writes,

[Right as Rain] is a new narrative form set to flux patterns in live weather conditions in different cities at that second. The story has different endings and details that shift with weather data measured live........so the city and its elements at one moment in time determine the narrative to be read and experienced......there are about 23 cities running live.......  

It is displayed at [http://thepharmakon.org/RightAsRain/](http://thepharmakon.org/RightAsRain/)  
(requires Shockwave).

(c)Jeremy Hight 2003
Looking out and up

In Caspar David Friedrich’s (German, 1774-1840) “The Polar Sea” (1823-24) we look out on an endless inhospitable ocean of ice, and a shipwreck - a trace of an attempt to do the impossible, to go “there”, to reach for and understand the unbearable void.

We look up at the starry sky and we sense a fear of not comprehending and being engulfed, a fear of the unknown, and simultaneously we experience a longing for the inaccessible, impenetrable darkness.

These are the classical visuals of the sublime. Images of a sense of grandeur we can’t reach, which we can’t penetrate or grasp. It is in the very far distant, it is hidden in layers of mist, or made inaccessible by a climate not suited for us and it instills a sensation of deep fear. Yet we urge for it, we are fascinated and attracted by it.
2004. We look down. We consume satellite and aerial photography in all its forms; on the web we can access detailed satellite and aerial photographs looking down on our houses or whatever we want to surveil from above, we are capturing mountains far below with our first digital camera, we have the poster of “lights emitted from the earth” on our walls (maybe pondering what it says to bypassing intelligences – gods, aliens and others), and we rely on satellite imagery to predict weather and track fires.

We look in. The genome is mapped and we are trying to figure out how to look at it. New technologies for looking in towards and inside cells, RNA and nano structures are rapidly developing, and the methods of making peripheral evidence of them and their processes are constantly refined. We look at our networks that produce data about ourselves in sublime quantities.

*Peripheral evidence*: two dimensional polyacrylamide gel.
Anti-Sublime

The datasets we are looking at now are of no less dimension, vastness and grandeur than the datasets that were the subject of the classical sublime; and the sensations of the sublime harvested by the romantic artist and others is of great interest to us when trying to make sense out of our datasets today. However, a quite logical argument against the possibility of the sublime acting within data visualization can be made. It has been well formulated by Lev Manovich in “The Anti-Sublime Ideal in Data Art”.

“If Romantic artists thought of certain phenomena and effects as un-representable, as something which goes beyond the limits of human senses and reason, data visualization artists target the exact opposite: to map such phenomena into a representation whose scale is comparable to the scales of human perception and cognition. For instance, Jevbratt’s 1:1 reduces the cyberspace – usually imagined as vast and maybe even infinite – to a single image that fits within the browser frame.”

Push,pull

While the datasets of today are as substantial as the ones dealt with in the classical romantic sublime, there is a difference in direction and force.

In the original sublime the force is attraction. The object of desire is over there, far away and we want to reach it. We want to go there, we are scared and intimidated but our longing and effort is ‘towards’. When our force (engine, energy, luck) fails the ship stops, it does not get closer. The forces of nature push us away - we urge to approach. The classical sublime was the extreme tension of not knowing and wanting to know; we were attracted by the fact that we didn’t know.

Now, looking in and down the force is reversed. If the engine in a plane stops, it approaches the ground; the natural force is gravity and we want to stay up and away. We are pulled down and respond by retracting. The forces of nature pull us down, in - we urge to repel. The sublime now is the extreme tension between (hypothetical) familiarity - the earth is our home, the cells and DNA are in our bodies, the networks are our creation - and a methodological distancing.

Esthetic decision-making

In the article “Systems Esthetics” Jack Burnham wrote about the new complex process - or systems - oriented society, culture and economics he saw emerging: a new era in which systems analysis would be the most relevant method for making understandings in any discourse. Burnham argues that because we can’t grasp all the details of our highly complex systems (economic, cultural, technical, etc), we cannot make “rational” decisions within them or understand them by analyzing the systems or their parts. The way to make decisions within them and to understand them is by making more intuitive, “esthetic decisions”, a concept he borrows from the economist J. K. Galbraith.

This idea has an intriguing parallel in the philosopher Emmanuel Kant’s reasoning about the mobilizing effect the sublime has on our organizing abilities. He claims that in experiencing the sublime, by facing large amounts of information, huge distances and ungraspable quantities, our senses and our organizing abilities are mobilized. Contrary to what might be believed, we feel empowered, able to make decisions, and capable to act.

How then can data visualizations utilize the (or be) sublime? Why should they aim to?
However, humans are capable of sorting through enormous amounts of visual information and making sensible and complex decisions in a split second, (the ability of driving a car is one example). Supported by Kant's idea I propose that under the right circumstances, drawing on sensations of the sublime, people can, when faced with huge quantities of data, be mobilized to make intuitive understandings of the data. Many information visualizations and displays are a result of the mistake of compressing the information too much and decreasing the amount of information through calculations that embody assumptions that are never explained. The most common mistake in data visualizations, artistic or scientific, is not too much information but too little. The “images” of the data landscape are not high resolution enough for an esthetic decision to be made.

**Meaning is opportunistic**

Why is low-resolution, highly-compressed data representation less meaningful? If it is counteractive to a sublime, why is that? How does that sense of awe and “aha” that the fear and force of the sublime helps us experience transpire?

Meaning behaves like a parasite. It is opportunistic, taking “immediate advantage, often unethically, of any circumstance of possible benefit” (the definition of opportunistic at http://dictionary.com). If meaning in fact is opportunistic, and opportunism implies an unethical stance, then it could follow that meaning does not thrive in an ethical environment. This reasoning is more interesting if one understands the term “ethic” as an opposition to “faith”. “Ethic” is a stance in which one in any moment is aware of one’s goals and choices. One has a plan and a way in which to carry it out. “Faith” is a stance in which we let go, where we are submerged and surrendered, when we are trustingly accepting a “truth”, an emotion or a calling. (At the conference “Derrida and The Question of Religion” at UCSB in fall of 2003, Derrida mentioned during a discussion between him and a presenter the concept of the calling and reflected on how that concept is not that different from how animals follow traces. This constitutes an interesting point for the thoughts in this paper.)

Culture then is extremely meaningless because so many choices have been made, and nature is extremely meaningful since no choices have been made. It seems like we strive to cut the extremes, the very meaningful and the extremely meaningless. To make culture more meaningful we create unstable conditions for decision making, i.e., to reduce the number of ready-made choices, we create unpredictable and arbitrary events and expressions within it. It is interesting to see that younger people are more prone to produce these. Quite likely a young mind has more difficulty dealing with the burden of meaninglessness, and thus tries to minimize it by generating arbitrary signs (such as the expressions, fashion and sounds of various subcultures). To make nature less meaningful we organize and categorize it and its data decreases in meaning.  If we semantically categorize and search for meaning, it is as if we try to look at the dust on our corneas - we can’t see it unless we stop looking at it. Everything becomes meaningless when we attempt to “capture” the meaning. In the task of visualizing huge datasets this means that we need to avoid making assumptions about the meaning of the data in order to allow meaning to find an opportunity to occur. Perhaps the answer to the question in the beginning of this topic is that we need to allow the interplay between the extremes, allowing the meaningfulness and the meaningless to happen by not attempting to reduce either.

**Identity in the non-intended**

Some years ago a student of mine made an interesting discovery in a project he made. It was Web software that returned the result of a search for something on a selection of search-engines in the reversed order, i.e., the most relevant, however the search-engines define that, was last on the list and the least relevant of the relevant sites was shown first on the list. The result was striking. The least relevant sites, the ones usually so many clicks away we don’t bother to look at them, varied greatly between the different search engines. The most relevant results, the ones usually displayed on top, were all the same.

A similar finding was made some centuries earlier by Giovanni Morelli (1874-1876). He sought to find a method of determining authorship of paintings and came upon the fact that authorship is more detectable in the parts of a painting done with less intention - the parts which are not significant for the author or the genre in which the painting is made, such as earlobes and fingernails. His method is now called “The Morelli Method”. In art historian Edgar Wind’s words it is interesting that “Personality is found where personal effort is the weakest”.

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Even more strikingly, what seemed to be true on the Web is also true in biology, according to Albert-Laszlo Barabasi in his book, *Linked: The New Science of Networks*.

Barabasi is doing research on the network structures and linkage systems of various fields from computer networks to biology. He finds that “For the vast majority of organisms the ten most-connected molecules are the same.” (p. 186)

These highly connected molecules, hubs in Barabasi’s terminology, are equivalent to the most relevant pages in a web search or the traditionally most “important” features in a painting. These are the items, nodes, with the most intent. Just as the least relevant web pages are the most dissimilar, and the least important features such as earlobes say more about the painter, the difference between different organisms and the production of their identity lies in the least-connected, least-used or significant molecules. “[O]nly four percent of the molecules appear in all of them. Though the hubs are identical, when it comes to the less connected, least-used or significant molecules.” (p. 187)

Via Negativa

These are all evidences that reality does not show itself to us in an expected manner, through intention and expression, but it reveals itself to us indirectly in small fragmentary pieces. The method of searching out those bits and pieces without preconceived notions of what to find has been an important method in various mystic traditions, and the term *Via Negativa*, possibly coined by Dionysius the Areopagite, a late 5th century mystic, is used to describe it. *Via Negativa* is a method of distancing, of negation, in which we claim or pretend to not have any preconceived notions of the systems that we are looking at. The method has a lot of similarity with artist methodologies (such as Joseph Beuys) and now also with some contemporary scientific methods.

For example, the process of harvesting, sequencing and mapping the human genome has been described as that of a group of people in a dark room fumbling around not knowing what is in the room, how the room looks or what they are looking for. Someone bumps into a thing with four sharp corners and starts to look for other things with four sharp corners. Someone else decides to move along what seem to be walls and feel their texture, yet another sits still and waits for the others in the room to pass by, taking notes on their activities or maybe on their scents.

The value in *Via Negativa* for data visualization is that it creates that opposing force of not falling into a repelling force counteracting the gravity pulling us down. The *Via Negativa* enables the sublime to operate.

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1 Walter Koprolin, *Counterweening*, 2002
2 Koprolin/Photo/SandPCase_Peri_50mm.html
4 http://www.jeffbratt.com/1_to_1/
5 Burnham Jack, Artforum, September 1968
10 Gielow Ryan, San Jose State University, 1999
Our Own Devices: Heterotopic Communication, Discourse, and Culture in the Information Society

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The main premise of this article is that in information societies generally, and in virtual social contexts particularly, a distinctive style of interaction to facilitate the communication of difference, heterotopic communication, has emerged. It rests on two cultural foundations: an ideological belief in the positive, socially integrating power of communication, and a prevailing ethic of instrumental rationality, subjective individualism, and strategically practiced self-interest. The former is demonstrated by the use of simulation and spectacle as sources of information; exhibitionism/voyeurism as a communicative style; and the awareness of surveillance. The latter is seen in the competitive use of knowledge as a commodity; a surface globalism masking deep parochialism; lateral as well as vertical information inequity; and the use of public versus private as strategies for engagement rather than as spaces. Those who engage in heterotopic communication resort to their “own devices” both in the sense of personal agendas, strategies, interests, and interpretations, and in the form of the telecommunication tools that help realize them. These personal and technological devices allow individuals with the right educational and technical resources to avoid exposure to disagreement, difference, or other information that does not serve their direct purposes or reflect their particular views of the world; yet they also help convey the appearance of openness, availability, and cooperation. This style of interaction is used strategically in combination with information and communication technologies to gain social or economic advantages, but it may encourage social separatism and parochialism, inhibit the negotiation of disputes, and emphasize competing interests.

Keywords communication and culture, communication technology, discourse, heterotopic communication, information society, social theory, virtual culture

In recent decades the term “information society” has become a widely used shorthand for complex social, economic, and institutional changes related to the proliferation of information and communication technologies. Researchers continue to debate whether the term stands for fundamental social change or merely the extension of the principles of industrial capitalism into new areas of society (Beniger, 1986; Hepworth & Robins, 1988; Slack & Fejes, 1987; Garnham, 1990; Webster, 1995). But the term is used uncritically in the mainstream media, and has caught on in the popular imagination.

People in self-styled information societies attempt to make sense of the growing importance (or at least visibility) of information and communication in everyday life. We engage with each other across time and space using a seemingly endless proliferation of high-tech gadgets, in a cultural context dominated by the financial and political power of organizations that proffer consultancy, expertise, networking, healing, wealth, entertainment, or other kinds of “software.” Some observers argue that the prevalence and use of new information and communication technologies (ICTs) has fostered a new social milieu, sometimes referred to as virtual community or culture (Rheingold, 1993; Stone, 1992, 1995; Doheny-Farina, 1996; Jones, 1996).

The main premise of this article is that in information societies generally, and in virtual social contexts particularly,
a distinctive style of interaction, *heterotopic communication*, has developed. It rests on two cultural foundations: an ideological belief in the positive, socially integrating power of communication, and a prevailing ethic of instrumental rationality, subjective individualism, and strategically practiced self-interest. The former is expressed in the use of simulation and spectacle as sources of information; exhibitionism/voyeurism as a communicative style; and the awareness of surveillance. The latter is seen in the competitive use of knowledge as a commodity; a global perspective masking deep parochialism; lateral as well as vertical information inequity; and the use of public versus private as strategies for engagement rather than as spaces (see Table 1).

In heterotopic communication, we resort to our “own devices” both in the sense of our personal agendas, strategies, interests, and interpretations, and of the ICT tools that help us realize them. Our personal and technological devices allow those of us with the right educational and technical resources to avoid exposure to disagreement, difference, or other information that does not serve our direct purposes or reflect our individual views of the world, yet they also let us convey the appearance of openness, availability and cooperation. We can use honesty or self-disclosure and employ interactive information technologies strategically to gain social or economic advantages while presenting a collaborative face to others. Heterotopic communication protects us from the encroachment of “data smog” (Shenk, 1997), but it may also encourage social separatism, inhibit the negotiation of disputes, and emphasize our competing interests, while we maintain the appearance of communication and joint action.

In the remainder of this essay I discuss heterotopic communication, drawing on selected ideas from the research literature and criticism of information societies to frame a series of insights about the ways that the communication ideology and instrumental rationality/self-interest are reflected in contemporary interpersonal interactions and larger social discourses (of both the real and virtual sort). Each characteristic of heterotopic communication is briefly described, and some of the possible implications are suggested. Because this article is an attempt to synthesize a wide range of issues in a very limited space, some points are not as fully developed as might be desirable. Nonetheless, it is offered as a starting point for further exploration and theorizing. I conclude by suggesting several hypotheses for future study.

**DEFINITIONS**

The term *heterotopic communication*, from the Greek for “different places,” is adapted from Foucault’s notion of *heterotopias*: “other spaces” created as “countersites” to the rest of a given culture (Foucault, 1986). These sites—which are not tied to physical space or proximity—are a kind of effectively enacted utopia in which the real sites, all the other real sites that can be found within the culture, are simultaneously represented, contested, and inverted. Places of this kind are outside of all places, even though it may be possible to indicate their location in reality. (p. 24)

Foucault outlines five principles related to heterotopias: First, all cultures create and constitute them; second, a society can change the function of a given heterotopia according to its time and place; third, a heterotopia can juxtapose several incompatible sites simultaneously in a single real place; fourth, heterotopias are linked to certain “slices” of time, or *heterochronies*; and fifth, heterotopias may “open” and “close” in way(s) that “both isolates them and makes them penetrable” (p. 26). Though Foucault used theater and cinema as his principal examples, the description seems to apply equally well to the experience of communicating via the World Wide Web, MUDs and MOOs, mail lists, virtual reality, and other new media (e.g., see Turkle, 1996; Stone, 1992, 1995).

The term also echoes Bakhtin’s notion of *heteroglossia*, which according to the “Glossary” of *The Dialogic Imagination* (Bakhtin, 1981, 428), is the base condition governing the operation of meaning in any utterance. It is that which insures the primacy of

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context over text. At any given time, in any given place, there will be a set of conditions—social, historical, meteorological, physiological—that will ensure that a word uttered in that place and at that time will have a meaning different than it would have under any other conditions.

Though Bakhtin’s level of analysis differs from Foucault’s—one examines individual speech, the other sites of cultural action—both heterotopias and heteroglossia are about the communication of difference, whether of meaning or of place. Heterotopic communication is a framework for analyzing the communication of difference that broadly reflects both ideas and levels of analysis.

Heterotopic communication also aligns with Stuart Hall’s dual definition of culture (1986): first, that culture is the way that people in a given society understand ideas and ascribe meaning to everyday life: “[this view] relates ‘culture’ to the sum of the available descriptions through which societies make sense of and reflect their common experiences. . . ‘culture’ is itself democratized and socialized. . . ‘culture,’ in this special sense, is ‘ordinary’” (1986, p. 35). Second, culture involves the cultural practices of people in that society (including the demarcation and representation of cultural sites through discourse). The second meaning is inseparable from the first; that is, to understand practices, we must also understand the ideas behind them—to understand social formations or sites we must also understand the meanings attributed to them.

I also use discourse in two senses, as the interpersonal exchange of ideas, and as the social formations and relationships that support and are produced by those exchanges. For example, it is possible to consider marital discourse in a conversation between a husband and wife, but also in the larger legal, moral, and social expectations surrounding the institution of marriage. Or the discourse of technology can be observed in the routine exchange of e-mail messages, but also in the larger infrastructure policies, engineering practices, and economic assumptions underlying the Internet.

HETEROTOPIC COMMUNICATION AND VIRTUALITY

Though heterotopic communication is becoming a common feature of interaction and discourse throughout information societies, it seems especially notable in virtual social forms and relationships, that is, those in which people “delegate their agencies to body representatives that exist in marginal spaces” (Stone, 1995, p. 121). As one “web-mistress” describes it, “what’s there and you can see is reality. What’s there and you can’t see, is transparent. What isn’t there and you can see, is virtual” (Psaros, personal communication, 1997). The features of virtuality that are most important to interaction and discourse are that the communicator’s presence and presentation of self or identity in an intangible and fluid network of social links take precedence over his or her proximity to others in physical space. As Druckrey (1996, p. 20) puts it, virtual interaction/society are experienced as a kind of distributed embeddedness—or better, immersion—of the self in the mediascapes of teleculture, which must generate a communicative practice, whose boundaries are mapped in virtual, transitory networks, whose hold on matter is ephemeral, whose position in space is tenuous, and whose agency is measured in acts of implication rather than mere coincidences of location (emphasis in the original).

The natural mutability of social networks, enhanced by the switching capability of new ICTs, lends itself to the formation of many “other spaces” around our particular interests—we construct virtual realities, virtual worlds, virtual communities using our own “devices.”

Virtual social forms, then, may tend toward segmentation and segregation of interests when we can make, break, and remake network ties more easily via new media than might be possible face to face or in close physical proximity. This tendency may help explain why virtual communities generally have not been the basis for broad-based political or social movements. As Jones (1995, p. 22) points out, “CMC...rarely functions to produce solidarity.” Since people tend to create and maintain hierarchies and boundaries via new media just as they do in other aspects of social life, he says, it is difficult to understand just how hierarchy and community can coexist in CMC. . . A common denominator linking hierarchy and community is identity. . . CMC provides ample room for identity, but not for its fixing or structuring. (Jones, 1995, p. 30)

Presently, virtual culture appears to be a collection of many disparate sources and sites connected by transient links, an arrangement that promotes social and cultural differentiation rather than integration or collective sensibility or action. We navigate this shifting social environment using our personal identities or self-presentation as a “course” and heterotopic communication to work around around differences and variability. An overview of key themes in the research literature on information societies suggests that many features of this varied cultural landscape appeared well before “virtuality” was commonplace.

FOUNDATIONS OF HETEROTOPIC COMMUNICATION IN INFORMATION SOCIETY RESEARCH

The research literature exploring the presumed or anticipated shift from industrial to information society is now several decades old. Most early studies focused on economic and technological factors as evidence, either to
support the claim of a new society (e.g., Machlup, 1962; Bell, 1973; Porat & Rubin, 1977; Nora & Minc, 1980; Masuda, 1981), or to maintain that such developments represented the latest phases of late-stage industrial capitalism (e.g., Slack & Fejes, 1987; H. I. Schiller, 1987; Robins & Webster, 1988; D. Schiller, 1988; Mosco & Wasko, 1988; Hepworth & Robins, 1988; Lyon, 1988; Garnham, 1994). Some observers noted that phenomena with their roots in industrialism seemed to be evolving into new forms (e.g., globalization, the commoditization of information, political participation, or surveillance). Others argued that the main institutional forms of the information society, its economic relations and its technological history, were carryovers from industrialism (e.g., the rationalization or Taylorization of work; corporate and bureaucratic forms of organizing; the compartmentalization of work and leisure, public and private lives; the nuclear family as the ideal). The contrasting views have been labeled the “discontinuity” and “continuity” perspectives, respectively, though both focus on somewhat similar sets of economic and technological assumptions and data (Schemer & Lievrouw, 1987; Shields & Samrajiva, 1993; Webster, 1995).

The industrial/informational, continuity/discontinuity dichotomy is paralleled in social and cultural theory generally by the ongoing debate over whether postmodernity has succeeded modernity as the dominant cultural form in developed societies. Broadly, modernity refers to social forms and cultural practices (including technology) that express and reify the liberal Enlightenment values of rationality, progress, individualism, objectivity, empiricism, efficiency, logic, equity, a predisposition toward change, the systems perspective, and so forth (Giddens, 1990; Haferkamp & Smelser, 1992; Alexander, 1992). Postmodernity denotes a newer sensibility involving subjectivity, randomness, arationality, reflexivity, the shrinking or collapse of distance and time, relativism, and so on. The two differ epistemologically and ontologically, and therefore would tend to produce different types of interaction and discourse based on their respective sets of values and beliefs about the world.

Daniel Bell, in The Cultural Contradictions of Capitalism (1976), was one of the first theorists to address explicitly the cultural changes associated with the shift from industrialism toward an information economy. His work, and the responses of some of his critics, illustrate several important themes about social life and ICTs that continue to be problematic today. Bell alleged that modernity has been “exhausted” by tensions among the technoeconomic, polity, and culture realms of society, and he looked forward to a cultural renewal in postindustrialism, in the form of the “public household” that would retain the liberal focus on both individual achievement and market forces.

Subsequent writers, however, found problems with Bell’s scheme. Calling him “the most brilliant of the neoconservatives,” Habermas (1983, p. 6) argued that Bell blames modern culture for social problems and beliefs that actually stem from capitalism, and that Bell’s rejection of modernism and promotion of capitalism, under the postindustrial or postmodern rubric, is really a strategy for reviving a premodern authoritarianism and reaction while preserving the social relations and privileges of a capitalist economic system. Poster (1990, p. 27) criticized Bell’s privileging of the market, particularly the establishment of a market for information, “reversing a longstanding liberal principle that, in a democracy, knowledge and information in general must be freely accessible. [...] Bell sees fit to authorize the restriction of information to those who can foot the bill.”

Bell’s treatment of information/knowledge as a commodity exchanged in a totalizing postindustrial social frame, rather than as shared action and understanding, leads him to see information “as an economic rather than a linguistic fact” (Poster, 1990, p. 28) and therefore to disregard the role of individuals’ interactions in the continual remaking of culture. Instead, Poster proposed the “mode of information” as a defining characteristic of contemporary culture, in which social relations and discourse are actually transformed by the introduction of electronic communications and information technologies. The mode of information in a culture is situated, and must be studied, Poster says, at the level of language and discourse.

Stehr and Ericson (1992) make much the same point about Bell from the perspective of sociology of knowledge. Postindustrialism, they say, is predominated by a concern with the movement of vast quantities of commodified data,

But every society has to transmit information. Less, or very little, is said about the genesis and/or the substance of information, for example, the essentially contested character of information, the media of communication, especially human ones, or the reasons for the demand for, and changes brought about by, the contents of the information which is communicated. (emphasis in the original; Stehr & Ericson, 1992, p. 8)

Moreover, they argue, discussions of the information society or postindustrial society generally treat knowledge itself (and, by implication, its knowers) as a black box—looking at the consequences or effects of knowledge/information in society rather than at the phenomenon of knowledge itself. Stehr and Ericson propose the construct of “knowledge societies” based on more grounded investigations of social and cultural action.

In a subsequent work, Stehr (1994) describes the “texture of knowledge societies,” especially what he calls the “extension of the capacity to act” (p. 233) gained by individuals and small groups through their increased knowledge and use of information technologies. This permits
individuals and small groups to withdraw from institutional involvement, and so tends to diminish institutional influence (e.g., government; Stehr discusses current debates about the "governability" of developed societies). Withdrawal contributes to social fragility in general and the "heightened contingency of social relations" (p. 259).

Though it is seminal, the debate surrounding postindustrialism is only a small part of the body of research and criticism examining the cultural changes associated with ICTs. Other writers concerned with the psychological, sociological, or political effects of information technology have contributed useful insights or constructs, such as information overload (Klapp, 1986), the undermining of information as a public good (H. I. Schiller, 1987), access to information (Cherry, 1985), the proliferation of indirect social relationships via new media (Calhoun, 1991, 1992), or the dislocation or "distribution" of the self (Meyrowitz, 1985; Gergen, 1991). Specific arenas such as political participation (Winner, 1977; D. Schiller, 1988; Tehranian, 1990; Doctor, 1992; Lievrouw, 1994), education (Williams et al., 1987; Postman, 1992), or urban centers (Dutton et al., 1987; Castells, 1989; Graham & Marvin, 1996; see also Berleur et al., 1990) have also been examined.

The information society literature spans many disciplines and perspectives and cannot be summarized simply here. However, even this limited overview reveals important themes that continue to inform contemporary views about information society and its expression in virtual social contexts: the commoditization of information versus contextualized knowledge; individual agency versus mainstream social institutions; and issues of self and identity, globalization, surveillance, and social participation and equity. Scholars today recognize that studies are moving from the economic and technological, whole-society characterizations that dominated the early literature to examinations at the level of action (language and discourse). Nor is it enough to say that "information" or "knowledge" in the abstract is somehow being generated and moved, as other commodities are; the content and contingent meanings of knowledge must also be accounted for. If our interpersonal and small-group interactions are the principal sites of cultural production and action, they must be understood as contested and subject to the changing needs and perceptions of the participants.

Two organizing principles, the communication ideology and instrumental rationality/self-interest, help to relate these diverse themes and perspectives into the framework of heterotopic communication. Each principle involves several important characteristics of contemporary interaction and discourse. The two principles and the characteristics associated with them are illustrated in Table 1.

THE COMMUNICATION IDEOLOGY

A common *leitmotif* of contemporary American culture (often caricatured in the popular media) is our belief in the positive social power of communication, and our corresponding desire to appear open and communicative. We believe that communication and its attendant technology promote social integration and community, and are the key to easing conflict and the universal solvent for social problems. Communication itself has become a social virtue: We must maintain the appearance of communicativeness regardless of whatever real differences may exist among us. This is suggested by what Dan Schiller has called "the UNESCO fallacy"—that once people with apparently diverse and even contradictory interests encounter and interact with one another, they will naturally recognize their overarching mutual similarities and negotiate their conflicts (Schiller, personal communication).

In everyday life all kinds of social relations are cast as fundamentally communicative and subject to the extensions and improvements of information and communication technology. More communication (and therefore, technology) is good; less is not only bad—it is dis-integrating. The popular belief in communication as an all-purpose resolver of disputes is essentially ideological, that is, accepted uncritically as a "natural" or common-sense way of relating to others and seeing the world. Accordingly, we think of the information society as good insofar as it fosters new technologies that cultivate openness to communication and information exchange.

Researchers and scholars have problematized and studied communication in every aspect of social relations. Communication research was established as an academic discipline distinct from sociology and social psychology during the same period that mass and then telecommunication media developed and diffused across cultures (Rogers, 1994). The field focuses not only on communication technologies, but takes an increasingly integrated view encompassing technological, interpersonal, and rhetorical processes. Similarly, organizational studies and management have shifted from a structural, authority-based approach to the human relations and more recently to the organizational culture perspectives. Management styles now emphasize communication and cooperation among various levels of organizational workers (Euske & Roberts, 1987). Communication is also central in clinical psychology and counseling, which has influenced aspects of daily life ranging from education, child rearing, and religion to law enforcement and health care. The New Age and self-help movements have made effective interpersonal communication skills a prerequisite for personal and social progress. And politics in the United States is so preoccupied with communication and image (via the press or consciously devised campaigns, or "spin"), critics charge,
that the actual work of political negotiation and governing may have been seriously compromised.

Perhaps the source of the communication ideology can be traced to the emergence of communication/information technologies as the central or master metaphor for developed societies. The identification of a society with its key technologies has a long social history (e.g., Innis, 1950); in recent decades the mass media and then computers have filled this role (Carey, 1989). Early discussions of the information society tended to highlight individual technologies, like satellites or computers, that promised to transform society. Later, observers recognized that even more important were the social and technical processes merging telecommunications and computerization into networks for the movement and manipulation of symbols, just as transportation networks had done previously for raw materials, labor, and manufactured goods (Castells, 1996). The information infrastructure is increasingly cast as the new key technology and master metaphor for society (Graham & Marvin, 1996; Star, 1997).

The communication ideology, then, is at work across society: in the corporate and government rhetoric associated with expanding telecommunication networks, such as the promotion of the information superhighway via corporate mergers (e.g., Gore, 1991); in the speculations of progressive social critics who see new technologies as the means for recapturing a sense of community or political mobilization (e.g., Rheingold, 1993); and in our interpersonal interactions, where communication is considered the key mechanism of positive racial, gender, class, family, or work relations.

Simulation/Spectacle as Sources of Information

The first characteristic of interaction that reflects the communication ideology is that simulation and spectacle have become dominant modes or sources of information, and so have subtly changed the ways that people understand and talk about what is “true” (Postman, 1992). Baudrillard (1983, 1987), Eco (1986), Debord (1995), and others have noted a related phenomenon, “hyperreality.” “It is the generation of models of a real without origin or reality: a hyperreal” (Baudrillard, 1983, p. 2). Both simulation and spectacle (and their relative, hyperreality) are elements of “virtuality.” While simulation generates representations that may or may not be grounded in physical experience, spectacle elevates “real” events, expanding their symbolic meaning and significance by heightening their visual appeal and the size of the audience.

Poster (1990) argues that interaction via electronic media is dominated by “informational simulations.” “Realistic-looking” effects, locations, movements, and so forth are fabricated entirely using computer imaging, which itself is based on models of objects and their relations that may bear little resemblance to ordinary “real” objects or relations. Drawing on Heidegger’s notion of thrownness in an analysis of virtual reality technologies and simulations in architecture, Coyne (1994) notes the tendency of virtual reality (VR) designers to stress a high degree of detail and conformity to real-world models, despite the fact that such literalness is not always needed for effective or meaningful representations. In other contexts, scientists no longer need to observe natural events (e.g., weather, financial markets, biological evolution, social networks) to analyze or understand them. Instead, it is cheaper and faster to model complex events by submitting selected variables to computational manipulation to create a simulation that can be studied at the researcher’s convenience. In short, knowledge (even scientific knowledge) is increasingly derived from what were once thought of as imaginary or fantastic situations, but now are deliberately designed, fabricated, and presented as plausible alternatives to “reality.”

Many recent analyses of computer-mediated interaction and discourse focus on the simulation of physical features, identity, spaces, and things in virtual social settings. Researchers have described the experiences of MUD participants in meticulous detail: how they adopt “avatars” or create other alternative identities, “move” through imaginary places, and interact with other actors whose fantastic features and meanings are carefully interpreted. Stone (1995) describes the elaborately furnished environment of Fujitsu’s Habitat, in which avatars can change body parts and gender as well as clothes (in contrast to the starkly unadorned environments offered by commercial on-line service providers, which she calls “the Motel 6 of virtual systems”; Stone 1995, p. 69). Likewise, system users can simulate or “play” with alternative identities—whether in the relatively weak form of e-mail aliases or the strong form of invented characters (Turkle, 1984, 1996). Several studies have examined cases in which characters engaged in activities that would be considered deviant in “real world” situations, such as rape (Dibbell, 1996) or gender switching. Other cases have been reported in which system users invented and presented whole personas that other participants believed were real people, like “Julie Graham” (Stone, 1995).

Clearly, simulation is considered to be a definitive feature of virtual reality and interaction. However, spectacle is also involved, though it is more often associated with conventional media like film or television. Though we might hesitate to call them “real,” nonsimulated events in the “real world” must take on a larger-than-life scale to get attention at all: they must be spectacular. Likewise, virtual events and interactions can rise to the level of spectacle, and may provide the same kind of spectacular experience for “viewers.” The “Julie Graham” episode took on a spectacular quality as more people got to know “Julie’s”
story while her creator spun a melodramatic story for a growing and sympathetic on-line community/audience. A different example can be seen in the NASA/Jet Propulsion Laboratories’ World Wide Web site, which relayed minute-by-minute updates and pictures from the Mars lander and Sojourner Truth rover in July 1997. The site itself became a spectacular source of news and even cutaway video shots for conventional cable and print media coverage.

Baudrillard argues that the main form of response to spectacle is watching, not necessarily acting or participating in the event. Indeed, he notes that perhaps the only powerful or meaningful response is passive—not watching—because there is little effective opportunity for audience members to stage or fabricate alternative spectacles of their own. Dayan and Katz (1992), in their discussion of classic examples of spectacle that they call media events, take a more positive view and claim that watching such staged events is a new kind of social or political participation on a larger scale than has been possible historically. Virtual social forms may add a new dimension, since systems not only give users unprecedented ability to “see,” but also the choice of whether to create “counterspectacles” of their own.

One of the main implications of the growing reliance on spectacle and simulation is that they modify cultural ideas about truth and falsity. Virtuality implies a constructed reality, without reference to truth or falsity in the traditional sense. Baudrillard (1983) points out that the word “simulation” (as in “simulated pearls”) has conventionally implied something false or faked (just as “virtual” has conventionally meant an approximation or almost, as in “virtually complete”). Flusser (1996) notes that we tend to distrust alternative (virtual) worlds because they are made and not given. By and large, however, people perceive most of the on-line world, from chatroom interactions to web pages, as “true,” though it is often difficult to ascertain the accuracy or even the source of much Web-based information (as librarians point out, it has poor “authority control”).

In this context, it is not surprising when people resort to defining truth in more personal ways, as belief shared by “me and my closest friends and family.” As a result, they may withdraw to smaller and smaller spheres of interaction, both face-to-face and mediated, where they can be sure that others share their special meanings and biases.

Exhibitionism/Voyeurism as a Communicative Style

The second characteristic of interaction and discourse related to the communication ideology is the use of exhibitionism and voyeurism as styles of expression. Baudrillard (1987) refers to this phenomenon as obscenity, seeing what should not be seen. In contemporary culture, the revelation of private and personal information has become a normal aspect of communication, as people want to be perceived as accessible and open. Those who are protective or reluctant to disclose information themselves are often negatively labeled as dishonest or hiding something.

The atmosphere of voyeurism or obscenity is crystallized in talk shows and “reality-based” TV, which feature personal problems or police/ambulance calls on hapless and otherwise anonymous citizens who are presented at their worst. It is an undercurrent of many virtual social environments like MUDs or MOOs, where we may “watch” other characters’ interactions, even their simulated intimacies. There is also a voyeuristic connotation in the term we use for members of listservs or discussion groups who do not contribute to the conversation, but instead only read others’ messages—“lurkers.”

This prevailing atmosphere, however, has to some extent precipitated a privacy backlash among people who have the economic and technical means to erect stronger boundaries between their private lives and others’ invasive demands for personal information. Telecommunication and computer technologies can give us the means to exclude others as well as to reach them (e.g., via caller ID, caller ID blocking, answering machines or voice mail, computer e-mail aliases, cable channel blocks). Jones (1995), commenting on Ross (1990), notes that the “fervor” surrounding data encryption and PGP indicates the extent to which privacy has become a key issue for users of computer-based systems and media. Similar concerns underlie the adoption of web filters by public libraries in response to parents’ demands that their children be prevented from gaining access to certain types of on-line content. Recently the American Library Association issued a policy statement rejecting the use of web filters in public libraries, on the grounds that such use violates the spirit of the 1997 U.S. Supreme Court ruling overturning the Communications Decency Act.

When personal revelation becomes the norm, new adaptations may evolve for people who traditionally have been exempt from disclosure or who find it uncomfortable (adult males, authority figures) (e.g., sensitivity training, counseling, participatory management techniques). Or people may simply withdraw from communication situations that require self-disclosure. For example, fewer citizens may run for public office if it necessitates the revelation of everything from tax, medical, and educational records to personal friendships—regardless of whether the information bears on their qualifications for office. A more elaborate tactic might be to invent or change an on-line identity, so that we can protect our “real” personal information while disclosing the most intimate details about the lives and experiences of alternative, virtual selves.
Awareness of Surveillance

A third feature of communication-ideological interaction and discourse is people’s growing sense of being under surveillance, and shaping their self-presentation accordingly. Giddens (1984, 1990) argues that surveillance activities characterize modern societies. Gandy (1993) expands on this view and Foucault’s concept of panopticis to argue that information technologies help reproduce and reinforce the modern sense of being watched, to the point that individuals modify their behavior unconsciously. He calls this self-monitoring behavior “the panoptic sort.”

The growing awareness of surveillance, made ubiquitous through the use of ICTs (Bogard, 1996), is based in our common experience of surrendering all kinds of personal and economic information on demand under the threat of being denied essential services like health care, housing, or credit (Laudon, 1986). This information is then commonly shared with other institutions, often without our knowledge or explicit consent, for purposes other than those for which the information was originally demanded. Accordingly, we modify our behavior, making personal choices and presenting ourselves to others in ways that conform with what we assume to be the expectations of those requesting the information (e.g., banks, insurance companies, the IRS or state tax agencies, other governmental bodies, creditors).

It reasonably follows that we may try to control the terms of engagement with the “watching” institutions. Giddens (1990) describes individuals as “knowledgeable agents” able to respond to surveillance. Lyon (1994) and Lyon and Zureik (1996) caution against seeing surveillance entirely in a negative light and suggest that people can use ICTs themselves for countersurveillance. Electronic commerce and commercial uses of the World Wide Web have met considerable consumer resistance, which may indicate that users understand the privacy and security risks of sending personal identification or credit information over the Internet. And as more of us learn (often to our dismay) that our web browsers leave traceable identifying information, called “cookies,” at each site we visit on-line, we try to “turn off” or disable this function in the browser software.

Alternatively, control may take the form of withdrawal, as noted already for self-disclosure, or as rationalization, that is, when we justify our compliance with demands for information “because otherwise they wouldn’t give me the mortgage,” “because they’d audit me.” A classic example is the job prospect who submits to urine drug testing though it may be humiliating and even irrelevant to performance, in exchange for work when jobs are scarce. Via rationalization, we can feel that we have at least maintained some degree of choice in a social situation where we may in fact have little influence.

Instrumental Rationality/Self-Interest

Alongside the communication ideology, a contrasting idea in contemporary culture also influences people’s interaction and social discourse. Even those of us who communicate openly and honestly have competing interests and conflicts, which can become exacerbated as consumer culture, political disenchantment, economic uncertainty, and individually targeted media encourage us to focus on our personal situations, desires, and experiences at the expense of our social and community ties (Gitlin, 1995). Several writers have asked what the notion of “community” means when a substantial proportion of social interaction is conducted on-line. Jones (1995) provides the best overview of this body of work, though he (like many of those he cites) finds no clear answer to the question.

It seems clear that the individualism and Weberian instrumental rationality that were such influential features of modernity continue to flourish in contemporary culture. Analysts have noted the growing tendency of people to segregate themselves into ever smaller communities of interest rather than to participate in more pluralist activities like political parties, large religious congregations, or social clubs (Lasch, 1978; Wuthnow, 1994; Putnam, 1995). Social differentiation, they argue, and not integration, marks society today, even to the point of breaking down the “public sphere,” a modern social formation mediating between the private realm and the state (Elliott, 1986; Habermas, 1974, 1989). The modern “public” cannot exist without a shared arena for interaction among groups with different interests—a function that has been performed, if inconsistently, by the mass media.

Though critics have charged that the “public sphere” is an idealization, and that the mass media have tended to serve elite interests, others now worry that even that arena is being eclipsed by increasingly narrow niche media. A sense of alienation and dissatisfaction is broadly reported (Postman, 1992; Hughes, 1993; Gitlin, 1995). Even the most developed societies have experienced disruptive fragmentation among groups with contrasting beliefs, ethnic backgrounds, cultural heritages, and economic resources. In reaction, social elites sensing their declining influence strive to reclaim and hold a high/canonical culture base against the incursions of multiculturalism.

In contrast, Hondrich (1992) believes that social differentiation into “niche societies” is a positive evolutionary trend that spreads risk across social groups instead of concentrating it in the single world society. Bell (1973, 1979, 1980) may have anticipated the discursive style associated with differentiation and self-interest in the “games between persons” he predicted for postindustrial society.

In general, the longstanding modernist tension seems to be tightening between the tendency toward social
integration, cultural assimilation, and traditional norms of community, like that associated with industrial mass or world society, and the tendency toward social differentiation and cultural diversity like that associated with niche or tribal societies (depending on whether one takes the post- or premodern view of the second tendency, respectively). Again, we can look for evidence of instrumental rationality in people’s interactions and discourse.

**Competitive Use of the Knowledge “Commodity” and Communication**

The widespread assumption that information/knowledge is or should be treated as a commodity encourages individuals and groups to acquire and use it competitively, as they would any other commodity. The common understanding of information has shifted from freely attainable knowledge to a tradable good with monetary value (e.g., Branscomb, 1985; Buckland, 1991). This is not a new development (societies have always treated certain kinds of information in certain situations as economic goods), and many researchers and policy analysts continue to point out the problems inherent in commodification (e.g., one can sell information but still own it, unlike other commodities). However, in everyday life we increasingly view information and even communication in terms of economic exchange, not social relationship, value. Communication has become one more form of trade in a “market” where information is the commodity. It is natural in this framework for us to use communication and information (and the associated technologies) competitively to maximize our personal advantage, instead of collaboratively to share meaning and reinforce social ties. Commodification fosters competition, which may ironically lead us to disengage with others selectively and strategically, lest they gain an unreciprocated advantage.

**Globalism/Parochialism.** The global frame of reference that many people espouse may in fact mask a deeper separatism or parochialism. The interconnectedness or “global village” idea is a popular one, not just as an economic strategy but as a political world view, dating back at least to McLuhan (1964), which emphasizes the commonalities among cultures and the merits of electronic communication as a cultural bridge.

However, globalism may be a superficial phenomenon for most people. Using new electronic media and ICTs, we may witness events globally, but still act as locally as ever—whether our localities are of geography, education, ethnicity, religion, expertise, language, work, or leisure. We seek to distinguish ourselves from each other and reject the “melting pot” metaphor, though we want to see how others live. Technological networks are often considered to be intrinsically homogenizing because of their potential reach, echoing earlier beliefs about mass media. However, because they also employ powerful switching capacity, they have allowed us to segregate ourselves more effectively and finely than ever before.

Members of new social movements, the vanguard of differentiation, no longer find it necessary to secure the support of (and to compromise with) large publics in order to achieve their goals. Small groups can organize via e-mail networks, direct mail, or fax distributions. We use the new media to reach others who share our same specialized interests, to exclude those with different interests, and to avoid encounters with the larger public. That is, we do not need to interact among or mobilize across groups, do not need to face disagreement or the risks of persuasion, in order to find a critical mass of others who share our point of view. We join small on-line chat groups, create alternative personae in virtual cafes, publish personal “zines,” update our web pages, and watch specialized cable channels. As Joe Turow notes, “Diversity is being defined by people going in their own little media areas and talking about themselves to each other” (Alderman, 1997).

This contrasts with the usual conceptualization of the larger public as comprised of many small but interacting communities that constitute a collective culture (“melting pot”) that is simply reported or reflected in the mass media. A mainstream culture is portrayed in the mass media, though it may be a pastiche of less visible peripheral or niche cultures. The contradiction surfaces in recent social commentary as well—while globalism and multiculturalism are seen by some to be complementary economic phenomena (Rieff, 1993), globalism is viewed by others as a homogenizing threat to local culture that has provoked multiculturalism as a response (Barber, 1995; Gitlin, 1995).

**Vertical Versus Lateral Information Inequity**

A third characteristic of discourse under the influence of instrumental rationality, and which follows from surface globalism/deep separatism, is the emergence of multiple forms of information inequity. Conventionally, information inequity is associated with class, income, and education, so that those with greater resources are also assumed to have the greatest access to information, and vice versa (Golding & Murdock, 1986; D. Schiller, 1988; Braman, 1989; Siefert et al., 1989; Doctor, 1991, 1992). This can be thought of as vertical inequity. However, lateral inequity may also develop when people with similar economic and educational backgrounds differ widely in their access to and use of information, according to their social “niches.” Because we can limit our interaction with other groups by using new media technologies, we can avoid exposure to and persuasion by more diverse (i.e., contradictory) types of information. This suggests that
people who are considered well informed in some ways may in other ways be information “have-nots.” As lateral inequities increase, our ability to mobilize effective public action at the whole-society level may decrease, not only because certain groups will not affiliate with each other, but also because some of us will simply not know about issues that are vital to others. We can recall Stehr’s point that the “extended capacity to act” enjoyed by individuals and groups is accompanied by a diminishing capacity to act on the part of institutions (Stehr, 1994).

Public Versus Private as Strategies, Not Spaces

A fourth feature of interaction and discourse based on self-interest, and stemming from our increased identification with separate niche social groups, is the use of the public versus private contexts as strategies for handling difference or conflict. We relegate noncontroversial information to public communication channels, while we confine our controversial or disputable views to carefully segregated private forums where the possibility of challenge is minimized. Meyrowitz (1985) and others have suggested that media (especially television) blur the line between public and private life and so encourage people to self-disclose inappropriately (i.e., in public situations). However, using networked ICTs, we no longer treat mediated communication as exclusively public and face-to-face communication as exclusively private, and do not violate norms or etiquette when we cross these boundaries. “Public” and “private” today refer to differing strategies for handling difference and potential conflict, no matter what communication channels are used.

Generally, we do not express certain biases, prejudices, or unpopular beliefs (or, if they are expressed, they are rhetorically bracketed as deviant) in a public context or medium (e.g., mass media, or to every member of an organization via e-mail). But we may express and even nurture these same beliefs in what we have come to think of as private media, where we can express such ideas (e.g., MUDs, religious television, talk radio, bulletin boards, fax networks).

At the same time, and paradoxically, our most intimate self-disclosures have become appropriate and usual content in the public mass media (television, print). Perhaps this is because even our most personal revelations (e.g., sexual practices, illness, psychological trauma) are merely titillating or outrageous, and cannot be factually disputed by others, therefore they are safe topics for public airing. Our personal revelations, whether among friends, at work, or on TV, are reassuringly open and communicative. They reinforce the communication ideology and draw large audiences. On the other hand, if someone’s claim can be factually disputed or logically argued—for example, whether the Holocaust “really” happened, or whether the U.S. government deliberately created AIDS—they may be more likely to avoid mass outlets and instead circulate their views in forums where they will be cultivated instead of questioned. As Curry (1996, p. 5) points out, privacy “provides a basis for the maintenance of one’s identity” by creating the possibility of a place where we establish and maintain habits and routines. Seen from this perspective, the private sphere, whether face-to-face or virtual, is reinforcing and reassuring.

By using the new media technologies, members of nonmainstream social and cultural groups can express perspectives and values that would be marginalized or invisible in a mass-media-dominated environment. They can extend their spheres of influence far beyond the local geographic community (for testimonials, see Rheingold, 1993). Similar groups occasionally have been able to exert social and political influence that appears to threaten the pluralist values of modern societies (e.g., the rise of fundamentalist Islam or Christianity as political forces that are intolerant of dissent; see Barber, 1995).

At the same time, mass social interests (e.g., broadcasting and publishing corporations, consumer goods manufacturers, marketers and advertisers, and political parties) often ignore or discount such groups and their new uses of technology, for example, by depicting the information superhighway mainly as more channels for delivering information “goods” such as home shopping or movies on-demand to audiences of consumers (Lievrouw, 1994). Mass society institutions try to preserve the familiar centralized structures of mass production and consumption that have buttressed their prosperity and growth. On the other hand, the centrist tendencies of those same institutions have helped to neutralize the influence of extreme or dislocating social and political views, extend the interests of the majority, or even suppress change. Therefore they have been depicted by some observers as inherently democratic (Gurevitch & Blumler, 1990) or inherently conservative (Exoo, 1987).

Recent legislation, such as the Communications Act of 1996, indicates that federal agencies are anxious to place restrictions on speech via these channels to control divergent or deviant ideas, even when the channels in question are not public (e.g., on-line services) (though, as noted previously, the U.S. Supreme Court has struck down such restrictions in the Communications Decency Act). Historically, regulatory control over content has extended only to those media that the government actually licensed in the name of the public interest because of their presumed natural scarcity (i.e., broadcasting). Now there are moves to regulate media that are neither scarce nor licensed, where there is not a clear public interest stake in the content they carry. Whether by social segregation or government regulation, the current zeitgeist prompts us to control the expression of controversial ideas.
The characteristics of interaction and discourse associated with the communication ideology and instrumental rationality/self-interest—the elements that comprise heterotopic communication—can be summarized: On one hand, we increasingly seek information from simulation and spectacle; we express ourselves in an exhibitionistic/voeureuristic style, and our interactions and self-presentation are influenced by our sense of surveillance or being watched. On the other hand, we acquire and use information competitively, treating communication as a commodity exchange; we adopt an outward perspective of globalization while practicing a kind of electronic separatism, creating many small and specialized channels for interaction with others who share our particular beliefs; we share less and less general knowledge with different people or groups; and we tend to present incontestable information via large shared channels and our more controversial beliefs via specialized channels.

At the most general level, heterotopic communication allows us to communicate our differences. We can convey our openness and willingness to disclose or “share” while preserving a private or backstage domain of separate interests or beliefs that is resistant to persuasion. By engaging in heterotopic communication, we can avoid the appearance of conflict in a social milieu populated by many divergent and even opposing interests. While we have the sense of being seen, heterotopic communication via new media also gives us the power to “see” others and control what they see of us.

So a contradiction exists: Social life, by definition, is enacted in groups whose members share certain interests. Our joint actions are based on the assumption that shared interests “naturally” outweigh or are more beneficial than individual interests. Certainly, some balance between self-interest and shared interest has long been recognized as a basic necessity of social behavior.

Yet today many of us have an unprecedented ability to define and communicate our personal priorities, needs, and perceptions using new media technologies. Through heterotopic communication we can routinely avoid overt (public) disagreement and can easily segregate ourselves away from the mass and into ever smaller communities of interest. The ideal is to appear communicative while advancing one’s particular interests. We may use certain prosocial and normative kinds of communication behavior, such as honesty or self-disclosure, in this context to advance our personal or local advantage. Self-interest can overthrow the traditional self-interest/shared interest balance, even as we retain the appearance of communication and cooperation. Our communicative actions conceal and allow us to avoid opposition and conflict. Communication and information technologies can help both ways, enabling us to make contact and communicate with others, but also, critically, to exclude or screen encounters with other people or messages. The source of this sensibility may be modernity itself; Gouldner notes “the schismatic character of modern consciousness: its highly unstable mixture of cultural pessimism and technological optimism” (1990, p. 313).

HYPOTHESIZING HETEROTOPIC COMMUNICATION

The observations offered in this essay only begin to suggest the possible contours of interaction and discourse in information culture. They also seem to contradict some of the expansionist, progressive, or homogenizing visions that are frequently associated with claims about information society. Informational or virtual culture may not just be a matter of “everything all the time,” of information overload or endless access or homogenization. Individuals use information resources and technologies in ingenious displays of strategic self-interest, multicultural differentiation, and resistance to persuasive mass appeals. People may have more informational choices than ever before, but they monitor and limit their interests closely and tend to select information that conforms generally to their existing prejudices and world views. The legacy of modernism is seen in the monocultural assumptions about equity, universalism, rationality, or individualism played out in the mass media, but single-issue politics, religious and ethnic separatism, and preoccupation with claims of moral superiority or “victim” status pervade our multicultural, separate discourses.

The discussion presented here suggests a series of hypotheses for exploration in future research:

- As reliance on spectacle and simulation for information increases, notions of “truth” and “falsity” may become more fragmented.
- As discourse becomes more exhibitionist/voeureuristic (i.e., is legitimized by self-disclosure), individuals may resort to using personal “spaces” and representations made possible by new ICTs (e.g., the creation of alters or avatars in on-line chat rooms, personal Web sites).
- As individuals become more aware of surveillance and the pressure to adapt their behavior to conform with surveilling institutions’ expectations, they may try to control the level or type of engagement with such institutions using new ICTs.
- Increased commodification of knowledge/information will encourage increased competitive uses of information, rather than increased information sharing, and so will tend to exacerbate both vertical and lateral information inequity.
- As lateral information inequities increase, the potential for movements or mobilization across diverse social groups decreases.
Vertical information inequities are associated with the bifurcated use of different media as information sources: Those with greater resources will grow to rely more on new network-based information sources, while those with fewer resources will continue to depend on conventional mass media sources.

The greater the reliance on mass/public media, the more mainstream (noncontroversial) the content; the greater the reliance on networked/private media, the more “fringe” the content may become, targeted to small groups of sympathetic recipients.

As globalism is adopted as a political/economic/cultural strategy or framework, there is a parallel rise in interest in local, single-issue, narrowly defined interest groups and networks that may be supported by new ICTs.

Heterotopic communication is by no means a fully developed framework, but perhaps a reconsideration of our interactions and discourse from this perspective will reveal that the information society is neither entirely utopic nor dystopic—neither is it a wholly “new society,” nor is it merely revived industrialism. More development of these ideas, and their empirical application, may help sort out the complexity.

NOTES

1. The information society is considered here to be a social formation involving numerous large technical systems (LTSs), especially telecommunication and information systems, although it embodies much more than technologies alone. In John Law’s words, it is emergent, having “attributes possessed by none of its individual components” (Law, 1987, p. 115). It is a cultural work-in-progress, more than the sum of its technological and economic parts.

2. Robert Hughes (1993) has identified an analogous belief in the enlightening power of art, which he calls the “therapeutic fallacy.”

3. The choices involved in modeling, as well as system design, pose ethical problems for technologies such as global information systems (GISs) (e.g., Curry, 1994, 1995).

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The Anti-Sublime Ideal in Data Art

Visualization and Mapping

Along with a Graphical User Interface, a database, navigable space, and simulation, dynamic data visualization is one of the genuinely new cultural forms enabled by computing. Of course the fans of Edward Tufte will recall that it is possible can find examples of graphical representation of quantitative data already in the eighteenth century, but the use of computer medium turns such representations from the exception into the norm. It also makes possible a variety of new visualization techniques and uses for visualization. With computers we can visualize much larger data sets; to create visualizations which are dynamic (i.e. animated and interactive); to feed in real-time data; to base graphical representations of data on its mathematical analysis using variety of methods from classical statistics to data mining; to map one type of representation into another (images into sounds, sounds into 3D spaces, etc.)

Since Descartes introduced the system for quantifying space in the seventeenth century, graphical representation of functions has been the cornerstone of modern mathematics (if you need to remember how it works and you have a Mac, start Graphing Calculator and run the demo.) In the last few decades, the use of computers for visualization enabled development of a number of new scientific paradigms such as chaos and complexity theories, and artificial life. It

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1 Graphical User Interface itself includes a set of techniques: interactive control, direct manipulation, multiple views, and others. Used not just for data access or computer control but also for media access and manipulation, each of these techniques itself opens up a new paradigm in cultural representation. For the discussion of a database and navigable space, see my The Language of New Media (MIT Press, 2001). Simulation (as in The Sims) will be discussed in my next book Info-Aesthetics.
also forms the basis of a new field of scientific visualization. Modern medicine relies on visualization of body and its functioning; modern biology similarly is dependent on visualization of DNA and proteins. But while contemporary pure and applied sciences, from mathematics and physics to biology and medicine heavily relies on data visualization, in the cultural sphere visualization until recently has been used on a much more limited scale, being confined to 2D graphs and charts in the financial section of a newspaper, or on occasional 3D visualization on television to illustrate the trajectory of a space station or of a missile.

I will use the term visualization for the situations when quantified data which by itself is not visual – the output of meteorological sensors, stock market behaviors, the set of addresses describing the trajectory of a message through a computer network, and so on – is transformed into a visual representation.\(^2\)

The concept of mapping is closely related to visualization but it makes sense to keep it separate. By representing all data using the same numerical code, computers make it easy to map one representation into another: grayscale image into 3D surface, a sound wave into an image (think of visualizers in music players such as iTunes), and so on. Visualization then can be thought of as a particular subset of mapping in which a data set is mapped into an image.

Human culture practically never uses more than four dimensions in its representations because we humans live in 4D space. Therefore we have difficulty imagining data in more than these four dimensions: three dimensions of

\(^2\) Of course, if we also think of all 3D computer animation as a type of data visualization in a different sense – after all, any 3D representation is constructed from a data set describing the polygons of objects in the scene or from mathematical functions describing the surfaces – the role played by data visualization becomes significantly larger. After all, 3D animation is routinely used in industry, science and in popular culture. But I don’t think we should accept such an argument since 3D computer images closely follow traditional Western perspectival techniques of space representation, and therefore from the point of view of their visual appearance do not constitute a new phenomenon.
space (X, Y, Z) and time. However, more often than not, the data sets we want to represent have more than four dimensions. In such situations designers and their clients have to choose which dimensions to use and which to omit, and how to map the selected dimensions.

This is the new politics of mapping of computer culture. Who has the power to decide what kind of mapping to use, what dimensions are selected; what kind of interface is provided for the user – these new questions about data mapping are now as important as more traditional questions about the politics of media representation by now well rehearsed in cultural criticism (who is represented and how, who is omitted). More precisely, these new questions around the politics of quantified data representation run parallel to the questions about the content of the iconic and narrative media representations. In the later case we usually deal with the visual images of people, countries, and ethnicities, in the former case, the images are abstract 3D animations, 3D charts, graphs, and other types of visual representation used for quantified data.

**Media + Software = Meta-Media**

Before moving to the discussion of data visualization (i.e., mapping of data into the visual domain) in media art, let’s dwell a little longer on the concept of mapping itself. It is possible to think of all representational art as a kind of mapping: taking the wealth of the experiences of an individual and/or a community and reducing it to a single image, a narrative, or another artistic structure. It is also appropriate (and more interesting) to use the term mapping for describing what new media does to old media. Software allows us to re-map old media objects into new structures – thus turning media into what I call “meta-media.” With software, the data can be mapped into another domain – time into 2D space, 2D image into 3D space, sound into 2D image, and so on. In addition,

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3 See my “Avant-garde as Software” (www.manovich.net).
the media object can be manipulated using all standard interface techniques: search, filter, zoom, multiple views, summarize, etc. More complex and unusual mappings are also possible – and the search for such new mappings that allow us to access old media objects in new ways congruent with information interfaces we use in our everyday life – represents one of the most fruitful research directions in new media art.

Let me provide a few examples of meta-media which all involve new interfaces to cinema. For instance, software developed by Steve Mamber (Los Angeles) allows the user to “map” the feature film into a matrix of still images, each image representing a shot from a film. Here time is mapped into space. Another software tool written by Mamber takes shots from the film and reconstructs their architecture as 3D navigable spaces (thus reversing the normal procedure of computer animation). Here is the mapping goes from 2D to 3D - from a flat surface of a movie screen into a virtual computer space. The project “Invisible Shape of Things Past” by Art+Com (Berlin) maps historical films of Berlin into new spatial structures that are integrated into a 3D navigable reconstruction of the city.4 Another groundbreaking mapping project by Art+Com is a virtual opera set whose parameters are interactively controlled by actors during the opera. In this case positions of a human body are mapped into various parameters of a virtual architecture such as the layout, texture, color, and light. For the designer of this project Joachim Sauter it was important to preserve the constraints of the traditional opera format – actors fore grounded by lighting with the set behind them – while carefully adding new dimensions to it.5 Therefore following the conventions of traditional opera the virtual set appears as a backdrop behind the actors – except now it not a static picture but a dynamic construction that changes throughout the opera.

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4 www.artcom.de
Note that the mappings in these examples preserve the granularity and the syntactical structure of the old media object, while giving us new ways to navigate it, to experience its structure, to compress and expand our views of the object, and to interactively control it. In the case of Mamber’s project, the film still consists from shots that can be played from beginning to the end – or we can use the new representation of all the shots in a film as a single interactive 2D image matrix. In the case of “Invisible Shape” we can similarly play the historical film segment from the beginning to end – or we can navigate the 3D model of Berlin to see where these films were taken.

This is why I refer to this type of new media as “meta-media.” A meta-media object contains both language and meta-language – both the original media structure (a film, an architectural space, a sound track) and the software tools that allow the user to generate descriptions of this structure and to change this structure.

If you think that meta-media is a conservative phenomenon which “betrays” the movement of computer culture to develop its own unique cultural techniques – Artificial Intelligence, Artificial Life, simulation, etc. – you are wrong. Since the late 1960s modern computing has been grounded in Alan Kay’s concept (influenced by previous groundbreaking work in human computer interface, most importantly Sutherland’s 1962 Sketchpad software) of a computer as a “personal expressive media.” After he arrived to Xerox PARC, Kay directed the development of a word processor program, a music composition program, a paint program, and other tools that redefined the computer as a simulation machine for old media. So while the routine use of computers as media simulators did not become possible until the 1980s, the paradigm itself was already set around 1970. Gradually, other roles of a modern computer - a machine for computation, real-time control, and network communication – became less visible than its role as “simulation engine” (although the development of the World Wide Web since 1993 obviously made network communication also very important). In summary,
the computer’s ability to simulate other media (which means simulating their interfaces and “data formats” such as written text, image, and sound) is not an after-thought – it is the essence of a modern post-1970 computer.

What is crucial to realize is that computer’s simulation role is as revolutionary as its other roles. Most software tools for media creation and manipulation do not simply simulate old media interfaces – a book page and a table of contents in Acrobat, a pan and a zoom of a virtual camera in Maya, time code count and a razor blade in FCP – but also allow for new type of operations on the media content. In other words, these tools carry the potential to transform media into meta-media. Re-mapping media data into a new domain is one of the most important among these operations.

The fact that today meta-media – rather than other seemingly “truly” original computer techniques – is in the center of computer culture is not accidental. The logic of meta-media fits well with other key aesthetic paradigms of today – the remixing of previous cultural contents and forms of a given media (most visible in music, architecture, and fashion), and the second type of remixing – that of national cultural traditions now submerged into the medium of globalization. (In the first approximation, the terms “postmodernism” and “globalization” can be used as aliases for these two remix paradigms.) Meta-media then can be thought alongside these two types of remixing as the third type: the remixing between the interfaces of various cultural forms and the new software techniques – in short, the remix between culture and computers.

(If we look at interfaces of media access and manipulation software from this perspective, they begin to look like the work of a radical DJ who mixes operations from the old interfaces of various media with new operations of GUI in somewhat erratic and unpredictable ways. My favorite example of such remix is the interface of Adobe Acrobat Reader. It combines (1) the interface from time media software (VCR style arrow buttons); (2) the interface from image
manipulation software (a zoom tool); (3) the interface elements which have strong association with print tradition - although they never existed in print (page icons also controlling the zoom factor); (4) the interfaces which have existed in books (the bookmarks window); (5) the standard elements of GUI such as search, filter, multiple windows).

Data Modernism

Mapping one data set into another, or one media into another, is one of the most common operations in computer culture, and it is also common in new media art. Probably the earliest mapping project which received lots of attention and which lies at the intersection of science and art (because it seems to function well in both contexts) was Natalie Jeremijenko’s “live wire.” Working in Xerox PARC in the early 1990s, Jeremijenko created a functional wire sculpture which reacts in real time to network behavior: more traffic causes the wire to vibrate more strongly. In the last few years, data mapping has emerged as one of the most important and interesting areas in new media art, attracting the energy of some of the best people in the field. It is not accidental that out of 10 Net Art projects included in 2002 Whitney Biennale, about a half presented different kinds of mapping: the visual map of the space of Internet addresses (Jevbratt), 3D navigable model of Earth presenting a range of information about the Earth in multiple layers (Klima), another 3D model illustrating the algorithm used for genome searches (Fry); the diagrams of corporate power relationships in the United States (John On & Futurefarmers).

In order to ground my general observations about data mapping in art in concrete material, I would like now to briefly discuss a few projects by some of the best

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6 Most mappings in both science and art go from non-visual media to visual media. Is it possible to create mappings that will go into the opposite direction?

artists dealing with data visualization. One of my favorites is John Simon (New York). His work is unique for a number of reasons. First of all, he makes explicit connections in his pieces between the new ideas of new media and various traditions, movements and figures of modern art, in particular Mondrian, Klee, and Sol Levitt. Given that art world and culture at large are still largely treating new media as a phenomena in itself which has no connections to the past, Simon’s explicit and systematic explorations of conceptual linkages between new media and modern art is very important. In addition, while new media art field has been rapidly growing in size over the last years, and while artists in all disciplines are now routinely computer as a tool in their work, there are still literally only a few artists out there who focus on one of the most fundamental and radical concepts associated with digital computers – that of computation itself (rather than interactivity, network, or multimedia). Simon systematically researches how real-time computation can be used to create engaging artworks which are both conceptual and strongly material, offering the viewer rich visual experiences. In his earlier work online piece Every Icon (1998) and his wall-mounted pieces included in Bitstreams exhibition at the Whitney Museum (2001) Whitney uses real-time computation to create artworks that have a starting point in time but no end point; as the time progresses, they constantly change. While we can find certain precedents for such artworks in modern art (for instance, kinetic art, early computer art of the 1960s, and conceptual art), Simon pursues a unique strategy of his own: he uses artificial life, cellular automata and other computational techniques to create complex and nuanced images which combine figurative and abstract and which explicitly insert themselves within the history of modernist visual research.

If Simon’s images are the result of real-time computation internal to a work itself, whose of Lisa Jevbratt (Santa Barbara) often are driven by the Internet data. Jevbratt received her training at CADRE.8 This program was created Joel Slayton at San Jose State University who was able to strategically exploit its unique

8 http://cadre.sjsu.edu
location right in the middle of Silicon Valley to encourage creation of computer artworks which critically engage with commercial software being created in Silicon Valley for the rest of the world: Internet browsers, search engines, databases, data visualization tools, etc. With his ex-students, Slayton formed a “company” called C5 to further develop critical software tools and environments. Jevbratt is the most well known artist to emerge from the C5 group. While “software art” has emerged as a new separate category within new media field only about two years ago, Jevbratt, along with other members of CADRE community, have been working in this category for much longer. In their complexity and functionality, many software projects created at C5 match commercial software, which is still not the case for most new media artists.

In her earlier well-known project 1:1 Jevbratt created a dynamic database containing IP addresses for all the hosts on the World Wide Web, along with five different ways to visualize this information. As the project description by Jevratt points out:

When navigating the web through the database, one experiences a very different web than when navigating it with the "road maps" provided by search engines and portals. Instead of advertisements, pornography, and pictures of people's pets, this web is an abundance of non-accessible information, undeveloped sites, and cryptic messages intended for someone else…The interfaces/visualizations are not maps of the web but are, in some sense, the web. They are super-realistic and yet function in ways images could not function in any other environment or time. They are a new kind of image of the web and they are a new kind of image.

In a 2001 project Mapping the Web Infome Jevbratt continues to work with databases, data gathering and data visualization tools; and she again focuses on the Web as the most interesting data depository corpus available today. For this project Jevbratt wrote special software that enables easy menu-based creation of Web crawlers and visualization of the collected data (crawler is a

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9 http://www.c5corp.com/1to1/
10 http://dma.sjsu.edu/jevbratt/lifelike/
computer programs which automatically moves from a Web site to a Web site collecting data from them). She then invited a number of artists to use this software to create their own crawlers and also to visualize the collected data in different ways. This project exemplifies a new functioning of an artist as a designer of software environments that are then made available to others.

Alex Gallaway/RSG collective uses the similar approach in his network visualization project Carnivore (2002). Like Jevbratt, RSG collective created a software system that he opened up to other artists to use. Physically Carnivore is styled like a morth between a non-distinct box for telephone surveillance such the ones used in GDR, and a modernist sculpture; connected to some point in the network, it intercepts all data going through it. This by itself does not make it art, since a number of commercial software packages perform similar functions. For instance, Etherpeek 4.1 is a LAN analyzer that captures packets from attached Ethernet or AirPort networks and uses decodes to break these packets into their component fields. It can decode FTP, HTTP, POP, IMAP, Telnet, Napster, and hundreds of other network protocols. It performs real-time statistical analysis of captured packets and it can reconstruct complete e-mail messages from the captured packets. As it is often the case with the artist software (software by CADRE community being an exception), Carnivore only offers a small fraction of the capabilities of its commercial counterparts such as Etherpeek. What it does offer instead is the open architecture that allows other artists to write their own visualization clients that display the intercepted data in a variety of different ways.

Some of the most talented artists working with the Net have written visualization clients for Carnivore. The result is a diverse and rich menu of forms, all driven by the network data. Just as in the first decades of the twentieth century modernist artists of the mapped the visual chaos of the metropolitan experience into simple geometric images, data visualization artists transform the informational chaos of data packets moving through the network into clear and orderly forms. And if modernism reduced the particular to its Platonic schemas (think of Mondrian, for
instance, systematically abstracting the image of a tree in a series of paintings), data visualization is engaged in a similar reduction as it allows us to see patterns and structures behind the vast and seemingly random data sets. Thus it is possible to think of data visualization as a new abstraction. But if modernist abstraction was in some sense anti-visual – reducing the diversity of familiar everyday visual experience to highly minimal and repetitive structures (again, Mondrian’s art provides a good example) – data visualization often employs the opposite strategy: the same data set drives endless variations of images (think of various visualization plug-ins available for music players such as iTunes.) Thus, data visualization moves from the concrete to the abstract, and then again to the concrete. The quantitative data is reduced to its patterns and structures that are then exploded into many rich and concrete visual images.

**Meaningful Beauty: Data Mapping as Anti-sublime**

Having looked at the particular examples of data visualization art, we are now in the position to make a few observations and pose a few questions. I often find myself moved by these projects emotionally. Why? Is it because they carry the promise of rendering the phenomena that are beyond the scale of human senses into something that is within our reach, something visible and tangible? This promise makes data mapping into the exact opposite of the Romantic art concerned with the sublime. In contrast, data visualization art is concerned with the anti-sublime. If Romantic artists thought of certain phenomena and effects as un-representable, as something which goes beyond the limits of human senses and reason, data visualization artists aim at precisely the opposite: to map such phenomena into a representation whose scale is comparable to the scales of human perception and cognition. For instance, Jebratt’s 1:1 reduces the cyberspace – usually imagined as vast and maybe even infinite – to a single image that fits within the browser frame. Similarly, the graphical clients for Carnivore transform another invisible and “messy” phenomena – the flow of data
packets through the network that belong to different messages and files – into ordered and harmonious geometric images. The macro and the micro, the infinite and the endless are mapped into manageable visual objects that fit within a single browser frame.

The desire to take what is normally falls outside of the scale of human senses and to make visible and manageable aligns data visualization art with modern science. Its subject matter, i.e. data, puts it within the paradigm of modern art. In the beginning of the twentieth century art largely abandoned one of its key – if not the key – function – portraying the human being. Instead, most artists turned to other subjects, such as abstraction, industrial objects and materials (Duchamp, minimalists), media images (pop art), the figure of artist herself or himself (performance and video art) – and now data. Of course it can be argued that data art represents the human being indirectly by visualizing her or his activities (typically the movements through the Net). Here again I would like to single out the works of Simon who makes explicit references to the tradition of modernist abstraction (one of his works, for instance, refers to Piet Mondrian’s Broadway Boogie-Woogie, 1942-43) – and also includes figurative elements in his compositions, such as outlines of Manhattan Midtown buildings and street traffic. In fact, Simon refers to this piece as a view from his studio window – a type of image that has a well-known history in modern art (for instance, views of Paris by the impressionists).

Another important question worth posing is about arbitrary versus motivated choices in mapping. Since computers allow us to easily map any data set into another set, I often wonder why did the artist choose this or that mapping when endless other choices were also possible. Even the very best works which use mapping suffer from this fundamental problem. This is the “dark side” of mapping and of computer media in general – its built-in existential angst. By allowing us to map anything into anything else, to construct infinite number of different interfaces to a media object, to follow infinite trajectories through the object, and
so on, computer media simultaneously makes all these choices appear arbitrary – unless the artist uses special strategies to motivate her or his choices.

Let's look at one example of this problem. One of the most outstanding architectural buildings of the last decade is Jewish Museum Berlin by Daniel Libeskind. The architect put together a map that showed the addresses of Jews who were living in the neighborhood of the museum site before World War II. He then connected different points on the map together and projected the resulting net onto the surfaces of the building. The intersections of the net projection and the design became multiple irregular windows. Cutting through the walls and the ceilings at different angles, the windows point to many visual references: narrow eyepiece of a tank; windows of a Medieval cathedral; exploded forms of the cubist/abstract/supermatist paintings of the 1910s-1920s. Just as in the case of Janet Cardiff's audio walks, here the virtual becomes a powerful force that re-shapes the physical. In Jewish Museum, the past literally cuts into the present. Rather than something ephemeral, here data space is materialized, becoming a sort of monumental sculpture.

But there was one problem which I kept thinking about when I visited still empty museum building in 1999 – the problem of motivation. On the one hand, Libeskind's procedure to find the addresses, make a map and connect all the lines appears very rational, almost the work of scientist. On the other hand, as far as I know, he does not tell us anything about why he projected the net in this way as opposed to any other way. So I find something contradictory in fact that all painstakingly collected and organized data at the end is arbitrary "thrown" over the shapes of the building. I think this example illustrates well the basic problem of the whole mapping paradigm. Since usually there are endless ways to map one data set onto another, the particular mapping chosen by the artist often is not motivated, and as a result the work feels arbitrary. We are always told that in good art "form and content form a single whole" and that "content motivates form." Maybe in a "good" work of data art the mapping used have to somehow
relate to the content and context of data - although I am not sure how this would work in general.

One way to deal with this problem of motivation is to not to hide but to foreground the arbitrary nature of the chosen mapping. Rather than try to always being rational, data art can instead make the method out of irrationality.11 This of course was the key strategy of the twentieth century Surrealists. In the 1960s the late Surrealists – the Situationists – developed a number of methods for their “the dérive” (the drift). The goal of “the dérive” was a kind of spatial “ostranenie” (estrangement): to let the city dweller experience the city in a new way and thus politicize her or his perception of the habitat. One of these methods was to navigate through Paris using a Map of London. This is the kind of poetry and conceptual elegance I find missing from mapping projects in new media art. Most often these projects are driven by the rational impulse to make sense out of our complex world, the world there many process and forces are invisible and are out of our reach. The typical strategy then is to take some data set – Internet traffic, market indicators, amazon.com book recommendation, or weather – and map it in some way. This strategy echoes not the aesthetics of the Surrealists but a rather different paradigm of the 1920s left avant-garde. The similar impulse to "read off" underlying social relations from the visible reality animated many left artists in the 1920s, including the main hero of my 'The Language of New Media – Dziga Vertov. Vertov' 1929 film A Man With a Movie Camera is brave attempt at visual epistemology – to reinterpret the often banal and seemingly insignificant images of everyday life as the result of the struggle between old and the new.

Important as the data mapping new media projects are, they miss something else. While modern art tried to play the role of "data-epistemology," thus entering in completion with science and mass media to explain to us the patterns behind

11 Read “against the grain,” any descriptive or mapping system which consists from quantitative data – a telephone directory, the trace route of a mail message, etc. - acquires both grotesque and poetic qualities. Conceptual artists explored this well, and data visualization artists may learn from these explorations.
all the data surrounding us, it also always played a more unique role: to show us other realities embedded in our own, to show us the ambiguity always present in our perception and experience, to show us what we normally don’t notice or don't pay attention to. Traditional "representational" forms - literature, painting, photography, and cinema – played this role very well. 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.”

Berlin, August 2002
Consider the following paradox. The same few decades of the nineteenth century that gave us the most detailed artistic representations of human emotions and inner feelings, including romantic love, also saw the rise of statistical and sociological imagination. While Flaubert and Tolstoy were putting the emotions of their heroines under the artistic microscope of their prose, a different paradigm was emerging in which the individuals were nothing but dots contributing to a social law, a pattern, or a distribution. In 1838 August Compte coined the term 'sociology' for the new discipline that was to study the laws governing the life of society. (He also proposed the term 'social physics'). According to another founder of the discipline, Emile Durkheim, sociology is the science concerned with 'social facts' - phenomena that have an independent and objective existence separate from the actions of the individuals. In his major work *Suicide* (1897) Durkheim set out to demonstrate how such seemingly individual acts as suicides in fact follow general statistical patterns and can be explained in terms of structural forces that operate in society at large. Compare this to Anna Karenina (1877) where Tolstoy meticulously follows the last hours and minutes of Anna's life with a kind of anti-sociological gaze - looking at her not from the outside as a social scientist, but on the contrary, depicting how the outside world appears as seen by her.

In general, representational art has depicted individuals rather than social groups, classes, and institutions. Even in the case of modern realist literature and painting, including socialist realism, which consciously aimed to represent social types and classes, what the writers and painters actually show us are individual human beings. In other words, regardless of whether a painting or a sculpture is named 'worker', 'farmer', 'miner', etc., it shows a single concrete individual. And when artists have tried visually to represent really big groups, the typical result has been a crowd in which individual differences are hard to read. The same relationships between the zoom function and the level of detail holds today - consider the individual figures in Mathew Barney's *The Cremaster Cycle* versus the groups of veiled women in the films by Shirin Neshat, or the panoramic views of Andreas Gursky which reduce individuals to swirling dots.

It appears that we may be dealing with some essential characteristic of art. Or maybe this limitation is simply a general characteristic of all images in general - their inability to represent abstract concepts and logical relationships. After all, if in the course of evolution human species developed two different representations systems - one linguistic and one image-based - it would make sense that they should complement each other, and that images would not do what language does best.

But what if this limitation is simply a result of the representational techniques that artists had at their disposal? Consider, for instance, how the techniques of films invented in the first two decades of the twentieth century - editing and different types of shots - have allowed film directors to alternate between close-ups showing individuals and long shots showing the groups
to which these individuals belong. Given this example, what can we expect from computers? Can computer media be used to create artistic representations that link the individual and the social without subsuming one in the other, i.e. the particular in the general? If we consider the range of computer techniques available for organising and viewing data, things look quite encouraging. We can switch between multiple views of the same data, traverse the data at different scales, and move between multiple media linked together. And we can do this in near or close to real time. We can also instruct software to search through and mine very large amounts of data - such as the data produced by the millions of real people who engage in online chat, write blogs, send emails, upload their photos on Flickr and so on. What types of representation can be created if we combine these computer techniques and new ways of gathering data as well as of structuring and displaying it?

Although The Dumpster by Golan Levin (working with Kamal Nigam and Jonathan Feinberg) can be related to traditional genres such as portraiture or documentary, as well as established new media genres such as visualization and database art, it is something new and different. I would like to call it a 'social data browser'. It allows you to navigate between the intimate details of people's experiences and the larger social groupings. The particular and the general are presented simultaneously, without one being sacrificed to the other.

The Dumpster application window shows a large 'crowd' of circles at the same time. While in a typical painting individual differences would be lost at this scale, here you can click on any circle and read the corresponding blog fragment. And this is just a beginning. Consider the way in which Levin structures the navigation. In typical hypermedia you move horizontally between pages or scenes connected by links. In typical information visualisation you 'move upward', so to speak - from the level of individual data to larger patterns that become visible when the numerous data points are turned into a single image or a shape. But in Levin's group portrait, you are encouraged to navigate both horizontally, vertically, and diagonally between the particular and the general. You can, for example, simply click on different circles, jumping from one breakup case to another and randomly explore the overall data space. Or you can explore the circles that are similar in color - which means that the corresponding postings are similar in some ways. Or you can explore the circles that have an opposite color and thus belong to a different grouping. In short, the seemingly incompatible points of view of Tolstoy and Durkheim - the subjective experience and the social facts - are brought together via the particular information architecture and navigation design of The Dumpster.

But if we simply limit ourselves to describing the work as it appears visually, we will miss the crucial characteristics of the social data browser constructed by Levin. We need to consider how the data presented in The Dumpster was obtained and processed before it was presented to us. Using a variety of methods, Levin and his collaborators have filtered the huge data space of online blogs isolating the postings from 2005 where teenagers narrated their breakups. The result was 20,000 postings describing 'confirmed' breakups. These postings were subjected to further analysis in order to derive various metadata about them: reasons for the break-up, who broke up with whom, the age and sex of the author, as well as their emotional state. Most of this metadata was not explicitly contained in the postings but is inferred with a high degree of probability by the project's authors.
The result is a group portrait appropriate for the age of data mining, large databases, and global surveillance programs such as Echelon. The group 'painted' by *The Dumpster* did not commission this portrait itself but rather was created by the artist by searching though the digital traces that people leave online. The ordering of individual members within this very large group of 20,000 people is the result of mathematical analysis. As a result, each individual breakup experience becomes a point in a multi-dimensional space that we are invited to explore. In short, we are invited to mine the data prepared by the project's authors who used sophisticated computer methods.

More than two decades ago, William Gibson accurately predicted the cyberculture of the 1990s with its idea of virtual navigation through data. By naming his recent novel Pattern Recognition, Gibson points to the new period we are living in now. It is a period when more prosaic but ultimately more consequential ways of exploring data have come to the forefront, including search engines available to the masses and data mining as used by companies and government agencies. *The Dumpster* uses industrial strength data gathering and data analysis strategies that normally are not easily accessible for single individuals to show how they result in new kinds of social representations.

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Easy Information

Right now, at the beginning of the twenty-first century, there are a great number of artists working on, what could be called, projects of information visualization. "Information visualization," as a named area of research and development, was originally an outgrowth of the pragmatics of contemporary science and engineering. Faced with huge volumes of data, scientists and engineers write computer programs to render data as images making it possible to visually search for and scrutinize patterns in the data. Generally speaking, as an area of investigation and experimentation, information visualization comprises a set of tools and techniques for distinguishing the “forest” from the “trees,” for literally drawing out the big picture from a myriad of data details. It is, in short, a means for providing context.

"Mapping" data into a visual form has an obvious meaning when the data in question is geographical in nature. For example, we are all familiar with the isotherms that depict temperature differences across states or even continents and that commonly illustrate news about the weather on television and in newspapers. Less obvious is what it means to map volumes of data that have no geographical or physical "atlas" associated with them. What, for example, might a map of the stock market look like? How would one render stabilities and dynamics of the market in a manner more detailed than simply a graph of one summarizing index?¹ Information visualization, as a scientific and technical endeavor, is now a relatively well-established sub-discipline with an annual conference (InfoVis: IEEE Symposium on Information Visualization), a prestigious journal (Information Visualization, Palgrave Publishers), and even edited collections of "classic" papers (see Card et al., Readings in Information Visualization, 1999).

Beyond the technically challenging questions of how data can be mapped are the questions of why one should map the textual or numerical into the visual. By asking why, this chapter provides an art historical and philosophical context for understanding information visualization projects undertaken as artistic research. Specifically, the
question to be addressed concerns the formulation of an aesthetics of information visualization: *What is the critical, artistic value of works in information visualization?* Aesthetics, as a field of inquiry, examines issues of sensation and perception and seeks to understand why something is—or why some group of people finds something to be—emotionally, sensually moving. What is beautiful, ugly, awe-inspiring, emotionally overwhelming, scary or comforting? (For a contemporary overview of the field of aesthetics, see Michael Kelly (editor), *Encyclopedia of Aesthetics*, 1998.) So, to inquire about the aesthetics of information visualization is to investigate the judgment used to decide what about the work is valuable, according to the senses or, in general, the body.

This form of judgment—that focuses on the senses—is quite different from that usually applied in the domains of science and engineering to understand the worth of an information visualization. In science or engineering one decides on the worth of a work according to whether or not it increases the speed, accuracy or efficiency of a well-determined task (cf., Card et al., 1999). For example, a medical visualization is considered good if it helps doctors make a quicker and more accurate diagnosis.

Media theorist Lev Manovich describes artistic work in data visualization as using terms from philosophical aesthetics. Manovich writes

> ...data visualization art is concerned with the *anti-sublime*. If Romantic artists thought of certain phenomena and effects as un-representable, as something which goes beyond the limits of human senses and reason, data visualization artists aim at precisely the opposite: to map such phenomena into a representation whose scale is comparable to the scales of human perception and cognition.

Lev Manovich (2002) "The Anti-Sublime Ideal in Data Art"^2

While Manovich writes about a variety of artist-constructed data visualizations, we should remember that the bulk of data visualization work happens elsewhere; i.e., outside of the art world in computer science, medical and bio informatics, etc. Manovich points out that data visualization is also a project of "economists, graphic designers, and scientists." In a non-art context one might speak of the "anti-sublime" as "that which can be easily understood" or in computer-speak, one might say that many data visualization...
projects are an attempt to create "user friendly" interfaces to huge amounts of data. The notion of a "user friendly" interface is a utilitarian criterion of science and engineering. It coincides with the idea that the primary measure of a good visualization should be that which can assist a user to perform a task more quickly or more efficiently than the user could do without the visualization. These are, for example, the criteria applied to new interface designed when they are reviewed for the annual, international CHI (Computer-Human Interaction) conference (see http://www.acm.org/sigchi/).

Consequently, many data visualization projects can properly be called "anti-sublime." But, the neologism "anti-sublime" is understandable as within the bounds of what scientists and engineers discuss as “user friendly,” or, more simply, as “easy to understand.” This characterization of artistic data visualization as an exercise in beautiful image making to render data “friendly” or "easy" is unsatisfactory for most artists and designers concerned with information visualization. It is tantamount to an understanding that the artistic work is only an attempt to "pretty things up," i.e., to make computer images easy to understand.

The Sublime

Certainly critical alternatives to the so-called "anti-sublime" do exist and are, in fact, viable means of responding to data visualization projects, especially data visualization projects that take place within the art world. For example, one of the pieces Manovich writes about, John Simon's *Every Icon* (1998), is not "anti-sublime." What this work does is exactly the opposite of the anti-sublime (see http://www.numeral.com/appletsoftware/eicon.html). It is, in fact, a meditation on the (almost) infinite that Kant describes as the *mathematical sublime*:

> Sublime is the name given to what is absolutely great. (Kant, 1790, para. 25)

> ..that is sublime in comparison with which all else is small. (Kant, 1790, para. 25)

> We get examples of the mathematically sublime of nature in mere intuition in all those instances where our imagination is afforded, not so much a greater
numerical concept as a large unit as measure (for shortening the numerical series). A tree judged by the height of man gives, at all events, a standard for a mountain; and, supposing this is, say, a mile high, it can serve as unit for the number expressing the earth’s diameter, so as to make it intuitable; similarly the earth’s diameter for the known planetary system; this again for the system of the Milky Way; and the immeasurable host of such systems, which go by the name of nebulae, and most likely in turn themselves form such a system, holds out no prospect of a limit. (Kant, 1790, para. 26)

Simon’s piece enumerates every possible icon of a huge series by systematically filling in a grid of 32 by 32 squares, each of which can be either black or white. It does this at a rate of several icons every second. Since there are 256 squares in the grid (32 x 32 = 256) and since each square can be “on” (i.e., white) or “off” (i.e., black) there are $2^{256}$ possible icons. $2^{256}$ is the product of a series of 256 “2”s, i.e., $2 \times 2 \times 2 \times 2 \times \ldots$ (two-hundred and fifty-six times) which is approximately equal to 10 with 76 zeros following it, i.e., 1000000000….. In other words, to see literally every icon, a visitor to the gallery would have to camp out in front of the piece for billions of years! To date, after running for over seven years, only icons that use some of the first two rows of the 32 x 32 grid have been explored. This does not reduce the (almost) infinite to the easily appreciable finite: it is, I argue, an attempt at an aesthetic of the sublime, not the anti-sublime.
The Uncanny

Powerful visualization projects are also often uncanny in aesthetic—yet another way of departing from the aesthetics of the "anti-sublime." To take issue with another of Manovich's analyses, I would argue that the network visualization project *Carnivore* (2002; see http://www.rhizome.org/carnivore/) by Alex Galloway and the RSG (Radical Software Group) collective is not successful as a project of the "anti-sublime" in the way Manovich describes it. Rather, the reason why the piece works is because it draws attention to the fact that the United States intelligence agencies make use of a piece of software (code-named Carnivore; see http://www.epic.org/privacy/carnivore/foia_documents.html) that spies on network traffic and may, indeed, be spying on you right now by scanning the email you exchange with your friends and colleagues. This fear of being profiled, of having your data copied or
"doubled," the fear of the loss of or dismemberment of identity are exactly the fears that Sigmund Freud identifies with the aesthetics of the uncanny (Freud, 1919).

Carnivore is a “packet sniffer,” i.e., a piece of software that monitors the packets of information flowing through the network. The RSG has created a programming interface to the packet sniffer to facilitate the construction of various, alternative visualization programs to monitored packets. Some of these visualization programs were written by members of the RSG. Others have been written by collaborating artists who are not members of RSG (see http://www.rhizome.org/carnivore/). The visualizations constructed for Carnivore differ widely in their visual appearance.

Artistic projects in information visualization are certainly sometimes beautiful, sometimes "anti-sublime," sometimes sublime, and sometimes uncanny. However, even taken together, these aesthetics do not encompass the general area of creative research in information visualization. A broad enough aesthetics would have to address not only the psychological states discussed by Kant and Freud, but also the social and political implications of information visualization. If the aesthetics of information visualization are not just anti-sublime, sublime or uncanny, then what exactly are these aesthetics? I will argue that--in order to understand artistic information visualization--it is best to explore
beyond Kantian and Freudian aesthetics of visual perception. My argument will be counter-intuitive because if, indeed, artistic practices have something to contribute to information visualization, then--given the term "visualization"--how could the artistic contribution come from anything other than the visual arts? I will argue that a better way to understand artistic contributions in this area is to use the ideas and methods of *conceptual art* rather than those of the visual arts.

**Conceptual Art and the Aesthetics of Administration**

The conceptual artist Sol LeWitt outlined the working methods of conceptual art using the criteria of bureaucracy:

> The aim of the artist would be to give viewers information. ... He would follow his predetermined premise to its conclusion voiding subjectivity. Chance, taste or unconsciously remembered forms would play no part in the outcome. The serial artist does not attempt to produce a beautiful or mysterious object but functions merely as a clerk cataloguing the results of his premise. (Sol LeWitt, 1966)

Given this explanation, the entire notion of conceptual art sounds quite dry and tasteless. Neither is it beautiful, nor sublime, nor uncanny. Art critic Benjamin Buchloh describes this teleology of conceptual art as an "aesthetic of administration."

Commenting on the above quote from LeWitt, Buchloh writes

> Inevitably the question arises how such restrictive definitions of the artist as a cataloguing clerk can be reconciled with the subversive and radical implications of Conceptual Art. And this question must simultaneously be posed with the specific historical context in which the legacy of an historical avant-garde--Constructivism and Productivism--had only recently [circa 1966] been reclaimed... This question is of particular importance since many of the formal strategies of early Conceptual Art appear at first glance to be as close to the practices and procedures of the Constructivist/Productivist avant-garde as Minimal sculpture had appeared to be dependent upon its materials and morphologies. (Buchloh, 1990)
Buchloh responds to his own question of "the artist as cataloguing clerk" with a paradox:

*Paradoxically, then, it would appear that Conceptual Art truly became the most significant paradigmatic change of postwar artistic production at the very moment that it mimed the operating logic of late capitalism and its positivistic instrumentality in an effort to place its autocritical investigations at the service of liquidating even the last remnants of traditional aesthetic experience.* (Buchloh, 1990)

But, conceptual artist Victor Burgin provides one possible resolution to Buchloh's paradox. Burgin writes

*The consolidation of conceptualist practices along the socialist lines which have been implicit from their inception demands a reading of formalist aesthetics, of history, and of current priorities, different from that now [circa 1976] predominating in the Western art community. ... We may integrate the concerns of Russian Formalism and Factography within a modern Western problematic: the first requirement of a socialist art practice is that it should engage those codes and contents which are in the public domain. These present themselves, and thus ideology, as natural and whole; a socialist art practice aims to deconstruct these codes, to unpick the apparent seamless ideological surface they present.* (Burgin, 1976)

By inscribing an art history of conceptual art within a narrative that includes earlier avant-garde artists, especially those of the early-Soviet period, Buchloh and Burgin provide a means for us to understand conceptual art as a line of development within a longer genealogy of art movements concerned with contemporary modes and means of political and social production and reproduction. As outlined above, forms and procedures, as well as the existing orders under scrutiny by conceptual artists, are *administrative*—or perhaps more specifically—*bureaucratic* means of production, reproduction and distribution. Defined negatively, the aim of such artwork is against the rationalizations of bureaucracy and, thus, deductively, counter to the forms of social, political and economic formations that depend upon these rationalizations and optimizations: it is anti-capitalist.
and anti-authoritarian. Described positively its goals might be said to be "socialist," as Burgin described them. However, given the focus of much conceptual art on egalitarian power structures, its goals might, alternatively, be described as *democratic*--i.e., rule by the *demos*, the people, rather than rule by the *bureau*, the office(holders).

To recapitulate then, here is my argument. One could look at the current work on information visualization done by scientists and engineers and conclude that artists might be best equipped to make the visualizations understandable or at least prettier and easier to use. I have nothing against the idea of "user friendly" information, but I think that this understanding of artistic information visualization as the "anti-sublime" is only a small corner of a much bigger picture. In this sense, the "anti-sublime" is the project of only a small group of artist-designers who are usually referred to as *scientific illustrators*. Scientific illustration is only one possible role for art in the field of information visualization. The larger role for artists is best considered using the historical precedents of conceptual art. Specifically, one must consider how conceptual art has reiterated the modes of industrial production and bureaucracy in order to engage, decode and critique them.

These historical precedents, as Buchloh and Burgin make clear--include a series of avant-garde artistic movements including the early-twentieth century Constructivists and Productivists and also the conceptual artists of the 1960s and 1970s. Many of these artists were struggling with what Buchloh calls the "aesthetics of administration," i.e., the methods, means, and materials of that form of political and social production that we call *bureaucracy*.

**Information Visualization and the Aesthetics of Administration**

We can understand contemporary work in information visualization in the same way because metaphorically and literally, computers are an outgrowth of bureaucracy. Alan Turing’s 1936 paper, in which the basic principles of contemporary computers are first articulated, spins an extended analogy between bureaucratic techniques (specifically writing, erasing, shifting and scanning numbers in squares on a paper tape) and the mental activities of a man:
We may compare a man in the process of computing a real number to a machine which is only capable of a finite number of conditions q1, q2, ..., qR which will be called "m-configurations." The machine is supplied with a "tape," (the analogue of paper) running through it, and divided into sections (called "squares") each capable of bearing a "symbol." At any moment there is just one square, say the r-th, bearing the symbol S(r) which is "in the machine." We may call this square the "scanned square." The symbol on the scanned square may be called the "scanned symbol." The "scanned symbol" is the only one of which the machine is, so to speak, "directly aware." However, by altering its m-configuration the machine can effectively remember some of the symbols which it has "seen" (scanned) previously. The possible behavior of the machine at any moment is determined by the m-configuration qn and the scanned symbol S(r). This pair (qn, S(r)) will be called the "configuration": thus the configuration determines the possible behaviour of the machine. In some of the configurations in which the scanned square is blank (i.e. bears no symbol) the machine writes down a new symbol on the scanned square: in other configurations it erases the scanned symbol. The machine may also change the square which is being scanned, but only by shifting it one place to right or left. In addition to any of these operations the m-configuration may be changed. Some of the symbols written down will form the sequence of figures which is the decimal of the real number which is being computed. The others are just rough notes to "assist the memory." It will only be these rough notes which will be liable to erasure.

It is my contention that these operations include all those which are used in the computation of a number. The defence of this contention will be easier when the theory of the machines is familiar to the reader. In the next section I therefore proceed with the development of the theory and assume that is understood what is meant by "machine," "tape," "scanned," etc. (Turing, 1936-1937, p. 231-232)

The "files," "directories," "folders," and "volumes" of contemporary operating systems; the "tables" and "entries" of database systems; the "rows" and "columns" and accounting procedures of spreadsheets; the common algorithms of "sorting," "queuing," and "categorization" all are reminders of the bureaucratic lineage of the computer and
computer science, in general. Most graphically, consider the standard, contemporary, computer interface--based on the so-called "desktop metaphor." This interface was developed as an extended analogy with the furniture, artifacts, and filing techniques of the office--i.e., cutting, pasting, throwing things in the trash. (See, especially, Engelbart, 1962; and, Engelbart and English, 1968).

But, if conceptual art of the 1960s and 1970s was against the mindset and materiality of bureaucracy, and if contemporary artistic work in information visualization can be understood as against the bureaucratic machinery of today, what exactly might be meant by "the opposite of," or "opposition to," bureaucracy? To investigate this idea of opposition, it is useful to consider the word literally. "Bureaucracy" is literally constituted from "bureau"--the office--plus "-cracy"--a term that means governor; thus, "bureaucracy" means government via the office, its techniques and organizations. These techniques and organizations were originally developed, especially, in the eighteenth and nineteenth centuries for the requirements of then-new, large-scale social, political, and economic formations, like the nation-state and advanced forms of capitalism. Consider Max Weber's concise statements on the "characteristics of bureaucracy.

Modern officialdom functions in the following specific manner:

1. There is the principle of fixed and official jurisdictional areas, which are generally ordered by rules, that is, by laws or administrative regulations.

2. The regular activities required for the purposes of the bureaucratically governed structure are distributed in a fixed way as official duties.

3. The authority to give the commands required for the discharge of these duties is distributed in a stable way and is strictly delimited by rules concerning the coercive means, physical, sacerdotal, or otherwise, which may be placed at the disposal of officials.

4. Methodical provision is made for the regular and continuous fulfillment of these duties and for the execution of the corresponding rights; only persons who have the generally regulated qualifications to serve are employed [emphasis added]. (Weber, 1979)
In opposition to this are a variety of other forms of governance. Rather than governance by the office and officeholders, the focus of much conceptual art has been on more egalitarian power structures. Its goals might, therefore, be described as democratic—i.e., rule by the demos, the people, rather than rule by the bureau, the officeholders.

My argument in a nutshell is this: when you look at artistic projects that map out and visualize information, do not worry so much about whether they are pretty, beautiful, friendly or easy to use. Instead interrogate them by asking what sorts of governance they support or reflect: Are they democratic or bureaucratic? In short, I ask that we shift our attention away from visual aesthetics and focus, instead, on an aesthetics of governance.

**Aesthetics of Governance and Self-Representation**

There is (at least) an aesthetics of beauty, of the anti-sublime, of the sublime, of the uncanny and of administration. What is aesthetics if it is so flexible that it can be stretched around such a heterogeneity? Terry Eagleton reminds us that the focus of aesthetics was, at least historically, on the body:

*Aesthetics is born as a discourse of the body. In its original formulation by the German philosopher Alexander Baumgarten, the term refers not in the first place to art, but, as the Greek aisthesis would suggest, to the whole region of human perception and sensation, in contrast to the more rarefied domain of conceptual thought.* (Eagleton, 1990, p. 13)

An aesthetics of governance concerns a different corpus, a different body, than the body of the individual subject posited by a Kantian aesthetics. The “body” of an aesthetics of governance is a “body politic,” a collective, a Leviathan constituted from a group of people articulated together through a diverse set of social and technical means. The philosopher Thomas Hobbes expanded on this metaphor of a "body politic" in his book *Leviathan* (and, strangely enough, arrived at very anti-democratic conclusions):
For by art is created that great Leviathan called a Commonwealth, or State (in Latin, Civitas), which is but an artificial man, though of greater stature and strength than the natural. (Hobbes, 1651)

The "art of governance," the means to steer or navigate or orient the collective body, has of course been the subject of centuries of work in political science and at the center of, for example, modern research projects like cybernetics. "Cybernetics" is a term which, itself, comes from the ancient Greek word kubernhtoj meaning steersman or governor. The inventor of the term, Norbert Wiener, was acutely aware of contending models of governance and politics and worked closely with labor unions to examine the politics of industrial automation (Wiener, 1985). In the contemporary and the ancient world "art of governance" is not, and has not been, simply concerned with the perception of and representation of only things, or objects, but rather the interpretation, organization, articulation and representation of subjects, specifically the representation of people and things woven together.
When artists work together in groups or collectives, the art of governance is often practiced as a response to a collective need to organize and guide the group. Craig Saper has called this sort of art practice "intimate bureaucracy." According to Saper, "intimate bureaucracies" have been designed to mimic, comment on, and appropriate bureaucracy for local needs:

Intimate bureaucracies monitor the pulse of the society of the spectacle and the corporatized bureaucracies: economics as in Big Business, culture as in Museums and Art Markets, mass media as in Studio Systems and Telecommunications Networks, and politics as in Big Government. Rather than simply mounting a campaign against big conglomerations of business, government, and culture, these artists' networks and their publications use the forms of corporate bureaucracies for intimate ends. (Saper, 2001, p. 24)

In short, this form of art practice--the appropriation and détournement of bureaucracy--can be immediately practical for the collective needs of artist groups. We see this practice in older conceptual art work and newer information visualization work applied to online archives of art work. For example, in 2002, Rhizome.org at the New Museum, New York (see http://rhizome.org) commissioned several artworks to serve as graphical interfaces and visualizations to the large database of online artworks stored at rhizome.org. Artist Lisa Jevbratt's work Troika was one of the 2002 commissions:

The Web in general, and the Rhizome community in particular, is an environment for discussion and exchange. The actions we take, the pages we visit, and the objects we select are all ways of expressing and sharing our views and ideas. The Troika interfaces make this explicit by generating mappings of the database that are dependent on the activities of its users.

The Troika interfaces display each object in the Rhizome database as one pixel--the object is accessed by clicking on the pixel. The pixel's color represents the keywords that are associated with the object and the people that have requested it in relation to a specified troika--a conceptual triad such as "body, mind, spirit." The color that represents the object is changed over time as a result of users making traces in the database. The users are marked with the color of the object they first select, and leave a trace of that color on the objects they select.
afterwards. The interfaces are animated to show the colors changing over time.
http://rhizome.org/commissions/troika.php

Figure 4: A screenshot of Lisa Jevbratt's Troika visualization of the rhizome.org art database (http://rhizome.org/commissions/troika.php)

The aesthetics of governance apparent in Jevbratt's visualization of online discussion and exchange is an outgrowth of a genealogy of conceptual artwork on indexing, tabulating, and visualizing discussion and exchange between artists. The term "troika" is etymologically Russian and means an administrative or governing body of three.

In the 1970s, the conceptual art group Art & Language produced a series of related projects that can serve us to better understand contemporary, information visualization work, such as Jevbratt's project.

**Index 01 by Art & Language**

*Indexing problems...are coincident with the difficulties encountered in mapping the space in which our conversation takes place.* (Atkinson and Baldwin, 1972, p. 16)

The conceptual art group Art & Language was invited to participate in the 1972 *Documenta 5* exhibition. The work they created for the exhibition was entitled *Index 01*. It comprised eight metal filing cabinets filled with documents and arranged according to
a posted index designed to articulate the relationships between eighty-six texts authored by Art & Language.

Figure 5: Index 01, 1972; Dimensions variable. Collection Daros, Switzerland.  
Photo: Matthieu Langrand, Lille.

The index related each text to the others using one of three possible relations symbolized as "+" (to indicate that two texts were compatible); "-" (to indicate that the texts were incompatible); and "T" ("signifying that the relevant documents did not share the same logical/ethical space and were therefore not to be compared in advance of some notional transformation," Harrison, 1991, p. 65). This index was rendered as a "map" (entitled, by Art & Language, "Alternate Map for Documenta") consisting of a table in which each text was noted on the top and left hand side of the table and the relationships between each pair of texts was entered in the eighty-six rows and columns. Each text was given a letter from (i.e., A, B, ..., Z, A', B', ..., Z', A", B",...Z", A"", B"", ...,I""). The first ten rows and columns of the map-table looked like this:

A  B  C  D  E  F  G  H  I  J
Logically, each text is considered to be compatible with itself and so the diagonal of the table is filled with "+"s.

This work by Art & Language (which was reproduced as a poster) was motivated by a specific, practical need. One of the main productions of the group was a set of writings (many of which were published in their journal *Art-Language*). As the group increased in size and these writings grew in number, it became necessary to find a form that could be used to exhibit the collective work of the group. Charles Harrison, a member of Art & Language and an editor of the journal *Art-Language*, described the group's imperative like this:

*The adoption of the index as the means to map and to represent relations within a conversational world was in part a consequence of the enlargement of Art & Language itself. ... Through the forum of Art-Language and through less formal means of exchange, a habit of correspondence and conversation developed rapidly if unevenly between members of this extended group and their various interested affiliates. By the spring of 1972 a substantial corpus of written material had accumulated, addressed to range of issues which was not easily circumscribed, but which seemed in need of some form of identification, if only so that the identity of the association itself might be reviewed by those who saw themselves as composing it.* (Harrison, 1991, p. 63)
This description of Index 01 accords with Saper's definition of an "intimate bureaucracy." It is an example of the techniques of bureaucracy employed for the intimate purposes of a small group of artists. The production of the tools of bureaucracy--reference works, indices, collections and libraries of shared resources and multiple-author works--has been undertaken by a variety of artist groups for intimate purposes. For example, the Surrealists compiled a number of "dictionaries" (e.g., Breton and Eluard, 1938; Leiris, 1939; Corvin, 1966). This practice has been continued by contemporary art groups like the "Concise Lexicon for the Digital Commons" (2001) written by the Raqs Media Collective (Jeebesh Bagchi, Shuddhabrata Sengupta and Monica Narula; see http://www.sarai.net/compositions/texts/works/lexicon.htm). More diverse collections were compiled by the Fluxus art group in the 1960s. For example, the collection Fluxus 1 was seventeen manila envelopes containing various items, bound together with aluminum bolts, with pages of text, music and artwork interspersed, issued in a wooden box (Maciunas, 1964). Artworks of collecting, organizing, indexing and archiving the heterogeneous, the mundane and the extraordinary were highlighted in a 1998 exhibition entitled Deep Storage: Collecting, Storing and Archiving in Art held at P.S. 1 Contemporary Art Center in New York City (Schaffner and Winzen, 1998). Works like these and others provide the means and opportunity to reflect on and describe the limits and interrelationships of the many works produced by members of a group.

Clearly, however, Index 01 was not only the practical result of a functional design created in response to a utilitarian need. The form of the Index was also a response to the cultural conditions of another art movement, Minimalism, and the wider environment of the machinery of business and information:

*The principal design decision was that the appearance of the indexing-system should be made compatible with the appearance of other indexing-systems--and not prima facie with the appearance of other works of art. If this suggests that the Index was redolent rather of the office or the library than the art gallery or the museum, it should be borne in mind that metaphorical assimilation of the one form of location to the other was by 1972 an established stylistic tactic of avant-garde art. It was a cultural condition of Minimal Art, and of Minimalism, that powerfully suggestive forms of the iconography of modernity were generated by the furniture of multinational business and by the technology of information*
storage and retrieval systems. These were symbolic of that non-aesthetic world with which any modern art with pretensions to realism was required to engage at some level, and in the face of which--whatever the pretended voluntarism of artists in the sphere of design--it was required to establish its autonomy. (Harrison, 1991, pp. 67-68).

Here then we have a confluence of three criteria that informed the shape and function of Art & Language's Index 01: (1) a practical need for governance, orientation and navigation to create an archive, visualization, and filing system for the group; (2) an artistic need to respond to the visual forms of contemporary art; and, (3) a cultural need to comment on, critique, provide alternatives, and distance the group from the bureaucratic forms and procedures of modernity, especially those of information technologies, government practices, and hegemonic business tools and ideas.

**Corpora: The Bodies of Information Visualization Aesthetics**

The corpus, the body of works, that Art & Language organized and visualized with its Index 01 was a self-defined one. The forms and formats of bureaucracy employed by Art & Language--the filing cabinets, the index cards, the tables of numbers and letters--were used towards what Saper calls an "intimate bureaucracy." Jevbratt's Troika is a similar reuse of the forms of contemporary bureaucracy (no longer the filing cabinet and index card, but the database and spreadsheet) for other means, for artistic goals, for the archive and interface to the body of works stored by Rhizome.org: the corpus of online artworks in its database. While the works incorporated by Index 01 are more intimate--simply because they specifically concern the immediate members of the Art & Language group and the works at Rhizome.org encompass productions of thousands of artists--Index 01 and Troika are comparable because the bodies of works they engage are comparable: they are both collections of artworks.

The criteria of Art & Language suggest a means for exploring the aesthetics of artistic information visualization: we need to look at the corpora, the bodies, that are engaged and how these bodies are articulated, challenged, and represented by the visualizations. Information visualization is an attempt to index and articulate these bodies which--
despite the often-asserted idea that digitally-stored information can be infinitely reproduced--are constantly at risk due to disk crashes, miniaturization, noisy networks, and, in general, disappearance. These bodies are under threat of destabilization, dematerialization, and disembodiment.

Writing about databases, data visualization and mapping, Christiane Paul makes the following observation about embodiment and materiality in the digital age:

_In the digital age, the concept of “disembodiment” does not only apply to our physical body but also to notions of the object and materiality in general. Information itself to a large extent seems to have lost its “body,” becoming an abstract “quality” that can make a fluid transition between different states of materiality._ (Paul, 2003, p. 174)

Paul's diagnosis is acutely accurate and yet troubling in these contemporary, cultural circumstances where a loss of the body is oftentimes promoted as a benefit of information technologies. The central artistic, aesthetic focus on the body is in sharp contrast with the scientific and engineering pragmatics that dematerialized the body over the course of the invention and development of contemporary information technologies. In a history of cybernetics and information technologies, Katherine Hayles shows how the dematerialization and disembodiment of information was seen as a good thing and explicitly pursued as a line of scientific research and development (Hayles, 1999).

In works like Jevbratt's _Troika_ and Art & Language's _Index 01_, the body-in-question is, discretely, a body of artworks. But the body-in-question for Alex Galloway and RSG's _Carnivore_ implies a larger constituency: it is those of us who might be targeted by the intelligence agencies. _Carnivore_’s implied body-in-question is therefore one of the larger, collective, sociopolitical bodies--the Leviathans or the self-governing bodies of democratic societies--that are under not only the threat of de-coupling or dissection but the threat of erasure and disappearance.

The genealogy of information visualization work includes the collection of work done by artists and designers throughout centuries to make these collective bodies visible and give them the means to assemble and connect. There is a specific lineage of this work
devoted to the demos, the creation of spaces, places and representations for the Body Politic of democracy.

In a paper subtitled "The Invention of the Impossible Body Politic," Bruno Latour examines this genealogy of art and design created for the Body Politic of the demos. Latour focuses on Socrates' anti-democratic position in Plato's Gorgias:

All the centuries of arts and literature, all the public spaces--the temples, the Acropolis, the agora--that Socrates is denigrating one by one, were the only ways the Athenians had invented to reflexively seize themselves as a totality living together and thinking together. We see here the dramatic double-bind that turns the Body Politic into a schizophrenic monster: Socrates appeals to reason and reflection--but then he deems illegitimate all the arts, all the sites, all the occasions where this reflexivity takes the very specific form of the whole dealing with the whole. He decries the knowledge of politics for its inability to understand the causes of what it does, but he severs all the feedback loops that would make this knowledge of the cause practical. No wonder Socrates was called the numbfish! What he paralyzes with his electric sting is the very life, the very essence of the Body Politic. (Latour, 1997, pp. 218-219)

In other words, the aesthetics of information visualization concerns the Body Politic and the history of information visualization is the history of art and design created to gather together, reflect and represent the Body Politic. Its history includes the history of public spaces, the arts, and literatures representative or supportive of the Body Politic.

**Incorporating the Little Guy into the Democratic Body**

If the Body-Politic-in-question is representative of democratic politics, then a simple reflection (e.g., a group portrait) or an ironic appropriation of the tropes of administration (e.g., an intimate bureaucracy) is not good enough for the needs of democracy. In an essay on mapping and information visualization, Steve Dietz explains the more demanding criteria of democratic maps and visualizations by posing two questions:
Is there a way to create a wider base of experience without becoming prescriptive; to honor the individual point of view while ending up with an overall point of view that has value for more than the participants? (Dietz, 2004)

Dietz poses these questions as a means to describe the criteria fulfilled by two data visualization projects. The first, produced by Julie Mehretu and Entropy8Zuper!, Minneapolis and St. Paul Are East African Cities (2003) is a website that functions as a map of the life stories of East African immigrants living in the Twin Cities.

Figure 6: A screenshot from Minneapolis and St. Paul are East African Cities: http://tceastafrica.walkerart.org/

The second project, PDPal (2003) was done by Scott Paterson, Marina Zurkow, and Julian Bleecker. PDPal is a mapping tool for recording personal experiences of public space. Using a PDA one can browse and record stories and then upload them to a website. The website is a visual interface to personal stories recorded in Manhattan and the Twin Cities.
Both of these projects, *East African Cities* and *PDPal*, propose visual means for answering Dietz’s questions. In fact, they both contain answers to the question implicit in Dietz’s use of “homunculus” in his title: how, in the representation of the collective Body Politic, can the small, independent voice, the little person, the homunculus be given place? And, simultaneously, how can this place be more than a cog in a giant machine? Furthermore, how can the means of articulating people together be more than an industrial machine or a post-industrial, bureaucracy? All of these are questions at the core of an aesthetics of information visualization. As Terry Eagleton puts it:

*The construction of the modern notion of the aesthetic artefact is thus inseparable from the construction of the dominant ideological forms of modern class society, and indeed from a whole new form of human subjectivity appropriate to that social order.* (Eagleton, 1990, p. 3)

**An Art of Networks: Not An Art of Territories**
The response to these questions provided by both *East African Cities* and *PDPal* is largely conventional and shared by other projects based on geographical information systems (GIS): individuals are given place on a geographical map. In the case of *East African Cities* the map we, the viewers of the piece, see is a map of Minneapolis and St. Paul. Contributors to the map place audio clips, videos, photos, and other representations of their personal stories on the map. Similarly, contributors to *PDPal* position their own work on a map of Manhattan or the Twin Cities. True, this can provide a place, a position, for everyone in the larger Body Politic. But, this Body Politic, based on geography or territory, is a very old one that is more nostalgic than functional in the contemporary, network society (cf., Castells, 1997, p. 60). As Michel Foucault pointed out, the art of governance ceased to be practiced strictly on geography and was conceived of as a network already by the eighteenth century. In the eighteenth century the object of government moved away from the preservation and expansion of a principality to a semi-abstract, statistically described *population*. Foucault indicates that the first steps towards this shift in the object of government was detailed in the sixteenth century in a work by Guillaume de La Perrière, *Miroir Politique* (1567):

...in La Perrière’s text, you will notice that the definition of government in no way refers to territory. One governs things. I do not think this is a matter of opposing things to men, but rather of showing that what government has to do with is not territory but rather a sort of complex composed of men and things [emphasis added]. The things with which in this sense government is to be concerned are in fact men, but men in their relations, their links, their imbrication with those other things which are wealth, resources, means of subsistence, the territory with its specific qualities, climate, irrigation, fertility, etc.; men in their relation to that other kind of things, customs, habits, ways of acting and thinking, etc.; lastly, men in their relation to that other kind of things, accidents, misfortunes such as famine, epidemics, death, etc. (Foucault, 1991, p. 93)

This "government of things" or government of heterogeneous assemblages of people and things sounds a lot like what Bruno Latour has called a "Parliament of Things" (Latour, 1993) or the "network society" as described by Manuel Castells (Castells, 1997). But, the eighteenth century developments that Foucault details precede Latour’s and
Castells’s observations and include a series of record keeping devices (e.g., the tables and taxonomies of government) and calculations (the invention of statistics; cf., Hacking, 1991) that ultimately led to what Foucault calls the "art of government" or--more idiosyncratically--governmentality. These foundations of the art of government are what allows for the development and governance of large centralized nation-states as a statistically created "population." And, it is within this lineage that political scientists--like Oscar Gandy (1993) and his colleagues--find an emerging, computerized surveillance: what Gandy calls the panoptic sort. In short, Gandy et al. see computerization as the latest form of bureaucracy and governmentalization: a new means to artificially, statistically constitute a population for centralized control.

But, as William Shakespeare made clear hundreds of years ago, it does not take an array of computers to organize a Body Politic under centralized control--it does not even require a bureaucracy.

This Realm of England is an Empire..governed by one supreme Head and
King..unto whom a Body politick, compact of all Sorts and Degrees of
People..been bounden and owen to bear a natural and humble Obedience.
William Shakespeare (1532-3) Act 24 Henry VIII, xii.

Consider the topology of Henry VIII’s Empire as a network: it is a “star.” I.e., it is a network with one center (the King) and many “rays” or “spokes” populated by “all Sorts and Degrees of People”; i.e., the “Body politick”. The current fears of surveillance--the uncanny feeling of works like the RSG collective’s Carnivore--are fears that the new technology will be a re-incorporation of a centralized, “star” network in which a small group of people will exert direct control over the rest of the Body Politic. To imagine that technologies--like those of information visualization--autonomously produce Machiavellian nightmares--like the “star” network--is a mistake. It is a mistake made when one forgets the art of self governance.

The art of democratic governance is not the same as a tyrant’s art of governance. A democratic art must reimagine the topology of couplings within the Body Politic as rhizomatic--as multiple and heterogeneous interconnections between people and things that facilitate a self-governance--a governance without a tyrant at the center.
Technological innovation to support this vision contributes to, what Michel Foucault has called, a “technology of the self,” (Foucault, 1997, p. 225): a technology designed and practiced to support self-governance. This is the problem for a democratic aesthetics of information visualization.

Visualizing the Bodies Politic of Social Software

The development of new technologies for self-governance are increasingly being developed under the rubric of “social software.” MoveOn.org, Meetup.com, Friendster.com, IndyMedia.org, weblogs, CVS (Concurrent Versioning System), and SMS (Simple Message Service) are just a recent sampling of new technologies that provide people with opportunities to meet, play and work together.

Some of these do not require any sort of visualization to provide participants with an image of the large Body Politic into which they are incorporated because the technologies facilitate emergent, face-to-face meetings; or, what author Howard Rheingold has termed “smart mobs” (Rheingold, 2002). For example, in January of 2001, the President of the Philippines, Joseph Estrada, was overthrown by a “civilian-backed coup” now known as “People Power II.” Estrada’s impeachment trial was unexpectedly and abruptly ended by eleven senators believed to be under Estrada’s influence. In response, hundreds of thousands of citizens protested in the streets largely self-organized through the use of SMS messages sent via cell phones (Rafael, 2003). This self-organized, self-governed Body Politic was brought together, face-to-face as a crowd on the streets. As a member of the crowd, we do not necessarily need to visualize it, we can see and feel the rest of the crowd.

But, when the body of people is brought together in a mediated space, rather than in physical space, then information visualization provides a means for seeing both the demos and the tyrants. The site TheyRule.org by artist Josh On, of Futurefarmers (http://www.futurefarmers.com), is a good example of the latter. The site is described like this:
They Rule aims to provide a glimpse of some of the relationships of the US ruling class. It takes as its focus the boards of some of the most powerful U.S. companies, which share many of the same directors. Some individuals sit on 5, 6 or 7 of the top 500 companies. It allows users to browse through these interlocking directories and run searches on the boards and companies.

http://www.theyrule.net/html/about.php#overview

Figure 8: A They Rule map of “Haliburton and the Media [top-down]”
(http://www.theyrule.net/2004/tr2.php)

Seeing the assembled, mediated demos, a democratically constituted Body Politic, is as necessary for participants engaged in e-democracy as seeing the rest of the crowd is necessary to those who assemble on the street (with or without cell phones). “Seeing” the assembled, mediated Body Politic is not a new problem. For example, counting the votes cast in a national election is one, simple form of understanding the coalitions and divisions constitutive of a non-local Body Politic. Discovering or inventing a visual form to show the Body Politic itself to itself is the outstanding problem of artistic research in information visualization. As a part of a larger Body Politic in a democratic society we
need to see ourselves and our imagined communities (Anderson, 1983) within our larger political and cultural contexts.

References


Guillaume de la Perrier, *Le miroir politiqve, contenant diverses manieres de gouverner & policer les republiques, qui sont, & ont esta par cy deuant: ocuure, non moins vtile que necessaire à tous monarques; rois, princes, seigneurs, magistrats & autres qui ont charge du gouvemement ou administration d'icelles* (Paris: Pur V. Norment, & I. Bruneau, 1567)


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1 See www.smartmoney.com for an information designer’s answer to this question. Compare the works of artists Nancy Paterson (*Stock Market Skirt*, 1998), John Klima (*ecosystem*, 2000) and Lynn Hershman (*Synthia*, 2001) for various artistic responses to this question. All of these information visualization art projects are discussed in Christiane Paul, *Digital Art* (London: Thames and Hudson, 2003), pp. 183-185.

2 This article can be found online: http://www.manovich.net/DOCS/data_art.doc; According to the website www.manovich.net (February 2004) this article will be incorporated as a chapter in a forthcoming book Lev Manovich, *Info Aesthetics: Information and Form* (forthcoming).
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 intertextualization 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 psycho-social) 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. 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.
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 - and his famous cutoff -- doomed close to half of the Donner-Reed party in 1846. Data is indeed always an

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

**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.
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 gallery 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 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-

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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 representation of data and its physical implementation in a database. SQL is a high-level programming language that is used to manipulate the data in a database. It provides a means for accessing and manipulating the data stored in a database. SQL is a declarative language, which means that it is used to declare what needs to be done, rather than how it should be done. This makes it easier to write and maintain complex queries, as well as to perform transactions on the database. SQL is used to create, read, update, and delete data in a database. It is also used to create and manage databases, as well as to define the structure of the data stored in a database. SQL is the most widely used query language for managing relational databases, and it is supported by most database management systems. It is also used by many web applications to interact with databases, and it is an important part of the client-server architecture. SQL is a standard language, which means that it is supported by most database management systems and is used by most database administrators. It is also used by many web applications to interact with databases, and it is an important part of the client-server architecture. SQL is a standard language, which means that it is supported by most database management systems and is used by most database administrators. It is also used by many web applications to interact with databases, and it is an important part of the client-server architecture.
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-
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 line 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 combinitorics. 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.
[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.


[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.noema-ab.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.


[10] Storage and memory were not separate notions at the time.


[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.


[16] Name June Paik, "Cybernated Art" (originally published 1966), reprinted in *The New Media Reader*. Ibid. [13]

[17] Lynn Hershman's *Roberta Breitmire* 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.


[19] Again, refer to the work of Natalie Jeremijenko.


[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.


[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
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Introduction

There are two common notions regarding the nature (or ontology) of data and information that are important for us to think about when we are considering artistic practice with database. The first is the notion that information is disembodied from its subject, and the second is somewhat of a conflation of the terms "data" and "information". Political concern stemming from the first notion may be most responsible for stimulating "database art", but current art practice with database can be broadly divided into three generally recognizable, though not mutually exclusive modes of practice: database politics, data visualization (the latter related also to sonification, and haptics), and what I will term database formalism. The second notion represents more of a noise in our at-large cultural understanding regarding the meaning of the terms "data" and "information" that when clarified, may sharpen the critical focus on an aspect of data visualization practice. Honing these two notions will provide us with a critical basis for the interpretation contemporary database art practices, perhaps especially as they interact with emerging geospatial and location aware media practices. In this writing, interpretation is distinguished from definition and evaluation, as it is in the tradition of analytic aesthetics. I write from the perspective of a practicing artist; not a trained philosopher or art historian. Thus I demur, at least somewhat, on the issue of defining database practice (beyond the obvious), and I avoid any qualitative evaluation of the examples I give. I only hope to chart the terrain of a contemporary practice with which I am familiar, including the work of many colleagues and collaborators. I hope to form an interpretation of the approaches contemporary artists are taking to database that I hope will be useful in evaluating this territory.

Data Body and Data Politics

I will start by considering works that emphasize the contemporary consequences of disembodiment of data/information from its referent, regardless of whether we are speaking about the human body and its disembodied 'data body', or other material manifestations of reality and the data which refers to it. "Information" and "data", in this narrow context, are viewed as descriptions of the thing described, and are somewhat conflated terms. (See next section.) Christiane Paul patently describes the issues that seem to have been in play for artists surrounding the issue of disembodiment:

“In the digital age, the concept of 'disembodiment' does not only apply to our physical body but also to notions of the object and materiality in general. Information itself to a large extent seems to have lost its 'body', becoming an abstract 'quality' that can make a fluid transition between different states of
materiality. While the ultimate 'substance' of information remains arguable, it is safe to say that data are not necessarily attached to a specific form of manifestation. Information and data sets are intrinsically virtual, that is, they exist as processes that are not necessarily visible or graspable, such as the transferal or transmission of data via networks.”(174)

I will argue that the case is subtly yet importantly different, as this type of disembodiment is not actually a new phenomenon to the digital age. Information/data have always been disembodied, and in fact we do see that the interaction between the virtual with the real is more tightly bound today, and indeed is more materially generative (yet contra-abstract), than at anytime in history. Disembodiment is not the difference making difference that the digital age brings. In order to demonstrate this, I will take a double tact. First I will look into history for precedents of disembodied data and information, hoping to show that "disembodiment" is not a new issue just because we have entered a digital era. Then I will try to show that it is not the disembodiment of the referrer from the referent that creates the radial difference that the digital era has brought, but rather that it is the nature of distributed, high speed data processing that makes all the difference because it radically motorizes, automates and makes ubiquitous the potential for data and information to impinge on daily life. After presenting this idea, I will make reference to a few database artworks that I think map to the various assumptions outlined by Paul, which I think expresses an interpretive critical model in which artistic practice can be specified in terms of 'database politics'.

It only requires a few examples from history to dispel the notion that disembodiment is a novelty specific to the digital era. Edwin Hutchins, in his study of how representations are propagated in systems of cultural computation, points out that the use of bearing logs in sea navigation dates back at least 4500 years, and that "Sumerian accountants developed similar layouts for recording agricultural transactions as early as 2650 B.C." (124) Cuneiform Tablets, a clay tablet inscribed with ideograms and numerals (multipliers), organized in the now familiar column and row format, formed the material basis for the disembodiment of material reality into a clay media for data storage of mundane business transactions. And certainly, the notation on a tablet of "18 unproductive trees" is no more the actual 18 unproductive trees than some contemporary individual's poor credit history (a common example of a 'data body') constitutes the breath of individual personhood. Yet, both such representations are similarly disembodied data representations utilized for economic control and management. In a loose sense cuneiform tablets were the first spread sheets, and one could go further to argue that the first written words and images instantiate a similar disembodiment of referent and referer, not to mention the disembodiment inherent in language itself! This has been a constant issue in aesthetics from Plato (mimesis) through semiotics (sign as combination of signifier/signified), and in postmodern thought; perhaps most notoriously in the writings of Jean Baudrillard where the sign becomes ascendant and begins itself to replace reality through precession.

Similarly, data has for a long time exhibited the quality of being fluidly transferable between forms of materiality in different representational media, and in fact transferal
and transmission of data via pre-industrial 'networks' show that data transferal is in no way a novel phenomenon or a creation specifically of the digital age. Hutchins gives the chip log and the methods of using it as just one example of the propagation and transmission of representational states. The chip log is a device consisting of a reel, a rope line, and the "chip": a piece of wood that would be thrown overboard to remain stationary in the water while knotted line was let out. The passage of time would be marked by crew members singing a hymn (maintaining the system's clock speed), and notations regarding the number of knots unrolled would be recorded in a log at a regular fix interval. The knots would measure the distance that the ship had traveled, from which the term "knots" as a measurement unit for maritime speed is derived. Importantly, Hutchins shows how the chip log was utilized to perform an analog to digital conversion:

"The log gave rise to a computational process that begins with analog-to-digital conversion, which is followed by digital computation, then either digital-to-analog conversion for interpretation or digital-to-analog conversion followed by analog computation." (103)

Through these conversions, the propagation of representations between various crew members aboard ship was enabled. Chip logs were utilized as dead reckoning instrumentation allowing the projection of the ship's future position on nautical charts; nautical charts which are themselves analog computers designed expressly for position-fixing calculations. Logs and analog-to-digital conversions allowed data to be transported, often in digital form, through a ship wide network of crew members utilizing different media to perform their tasks; for example from the memory of the log keeper into the log, then from the log to navigator who would project the future position of the ship onto a chart at some fixed interval, and then from the media of the chart to the mind of the captain who is responsible for the larger journey.

Data and information have qualities of their own, as calculable symbolic representations capturing measurable aspects of material systems. Data and information are not only disembodied in some material form of representational abstraction from their subject (whether clay tablet or digital electric impulses), but can be recorded and transferred from one state to another, propagated from person-to-person in local, perhaps totally linguistic, networks of social computation, or from place-to-place via encoding into media mobilized by material transportation consisting of technology such as sailing ships, or more recently, undersea fiber optic cables. Importantly, this mobile property of data and information has been at play in human culture long before the digital era - perhaps as long as linguistic messages have been carried from place to place by foot and shared among different groups, and certainly since written (doubly coded) and numeric representations began to be transported. Additionally, the example of cuneiform as a particular clay media implementing informational disembodiment from the material world emerged well before the development of the algebraic analysis (as early as 1800 B.C.) and the discrete mathematics concepts (congealing nicely in the figure of George Boole in the 19th century), that would serve as the catalysts for the development of digital communications and computational technologies during the 20th century. The disembodiment of data and information from the real clearly predates the digital era.
Disembodiment does not mean that data and information, and their material reality, do not influence one another. In fact the case is rather the opposite, forming is the basis of the fundamentally materialist-formalist analysis I am trying to forge here. As I have indicated in the past:

"This position is supported by Paul Virilio’s theory of information as the third dimension of matter, (energy being the second), in that information and its effect on identity are not disembodied from the real, but rather become a integral part of the real world projecting directly into the body: a network of people hyperactivated by information machinery which has joined with the body no more or less conspicuously than the pacemaker or the telephone handset." (1998)

The significant difference making difference that does arrive with the digital era is the speed with which the relations between information technology and material systems are implemented: the move from the speed of hand inscribed clay tables, to ships, to trains, to telegraph, to the speed of light on fiber optic and radio networks. (This trajectory roughly paraphrases Virilio's analytic project.) The process has been a teleological one; the move from writing data on clay storage devices and the associated literacy to retrieve and utilize those notations in a local economy has progressed to 'writing' data in informatic media such CPU's, RAM, magnetic storage, optical and wireless networks, and of course this too assumes an associated literacy, in the contemporary case one required to utilize digital media in a global economy. As the transmission speed of the media becomes faster, the ability of data and information to impinge upon or embed itself in material systems itself expands. While clay-based inscription systems improved the management of a local orchards in Sumeria, information systems today, which wrap the Earth in fiber optic cable and paint it with electromagnetic carrier waves, facilitate the transmission of data and information around the world in milliseconds, allowing a global scope of impact for data and information. For example, as Geri Wittig points out regarding the relationship between geographic information systems and the Earth as a complex system:

"With the increasing use of GIS technologies in a wide variety of fields, including art, the data networks generated will disseminate into the expanding networks of information technology. I speculate these GIS generated data networks have the potential to act as bifurcations and coadaptive systems..." (2003)

This means that systems which operate, transport and calculate at the speed of light have greater power become co-operative in the distribution and creation of the real, causing the disembodiment of data itself to bifurcate into something more powerful and integrated with life on Earth due to the speed and intensity of data flows. This allows data and information to play a more immediate, acute, synchronized role in the daily life of persons, as well as non-human ecosystems and flows of materials. It is not disembodiment per se, but rather machinic catalysis of the relations between virtual and real that is the difference making difference in the digital era. Further it is the discrete properties of the digital that enable this speed, as well as enabling the exact quantification of information, ala Claude Shannon. It is the catalytic properties inherent in the material
basis of digital technology that allows the analysis of the difference (that information is) to have a radical transformational impact on every aspect of culture, society, biota, climate, and to some degree, even geology. The disembodiment of information from its referent, which is an archaic and fundamentally ontological aspect of data and information, is now hyper-activated in real time at the speed of light. And indeed, it is the consequences of this speed which many artists working around the issues of ‘database politics’ have responded to.

A small but representative selection of artists who have notably responded to the sudden imposition of database as a mediator of power and social control include the Critical Art Ensemble, Natalie Jeremijenko, Graham Harwood, and Diane Ludin. The Critical Art Ensemble were perhaps the first artists to see the looming threat of database on matters of privacy and power, and to present issues relating to database theoretically in terms of an agent of social control. In their 1994 book The Electronic Disturbance, CAE states:

"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." (CAE, 1994)

While we do read here a direct reference to the concerns of disembodiment in terms of "electronic people", we also see a clear focus on new forms of pan-capitalist power and control over the economy through processes where "electronic space controls the physical logistics of manufacture." This inference on the part of CAE certainly maps to the notion of data and information as disembodied control systems of management, but disembodiment is placed in a context that makes the change less attributable to the original sin of disembodiment than it is to the speed and ease through which social power and control over the material world is deployed via contemporary, digital, highly distributed database systems. CAE's words may be the first shots fired in the art of database politics.

Natalie Jeremijenko's and Graham Harwood's recent work with database share a consistent theme: an attempt to address the asymmetry of power between those who model and manipulate the world through data, (thus enjoying most of the rights to benefit from information garnered from that data), and those who are modeled and manipulated by data. A representative example of Jeremijenko's recent work is the Bit Antiterror Line project, which allows "every phone [home/cell/booth] to act as a networked microphone... For collecting live audio data on civil liberty infringements and other anti-terror events." The files are made available in a simple database of audio files on the bit antiterror line web site (Jeremijenko), one of which recounts the story of a stewardess who threatened a couple with arrest by armed Air Marshal if they continued to draw silly pictures and laugh at her. Harwood's 9 project is a website modeled around the simple square shaped layout of 9 media elements. It allows people to represent themselves, their
neighborhoods, their identity, and their interests, via media elements arranged in this simple, easy to use layout strategy, including a notion of proximity and thus juxtaposition with neighboring 9's. The ease of use at the interface level belies a sophisticated custom database under the covers, coded by the artist. 9 encourages not only self representation, but the exploration of the self representations of others in a shared data commons creating connections between/within communities defined both geographically and informatically, while Jeremijenko's project creates a data commons as both an emergency antidote to, and cultural and social analysis of, the growing fascism apparent in the United States as the "War on Terrorism" progresses. As I write this (original draft, April 2004), CAE's Steve Kurtz is being investigated by a grand jury in Buffalo, NY, essentially for daring to make provocative art works with biological materials. Although he (and CAE) have presented this work publicly in high profile art institutions for many years, his research and materials stored in his home became the subject of a wasteful and misguided anti-terror investigation after being noticed and reported by first-responders following the tragic death of Hope Kurtz from natural causes.

The prevalence of database in biotechnology research has led to many projects dealing with genomic data analysis or critique of the systems in which nature becomes private property. Diane Ludin's "i-BPE, i-Biology Patent Engine" takes on issues of intellectual property and ownership in the high-tech era by setting up a context where real United States patents on genes are themselves claimed as a kind of public property/context for remixing and play with the language of patents, resulting in a "aggressive take-over by i-BPE agents... i-BPE gene patents will return bio-rights to non-governmental, cultural agents for revision." (Ludin) In a presently unpublished manuscript, Ludin discusses, somewhat ironically, how speed has (with its own certain irony), allowed the disembodiment of data from its referent to return directly and literally to the site of our bodies, for which the only prior art is billions of years of evolution. "With the rise of ibiology the circuit between code and patent becomes part of the super speed ecology of Bio Capitalism. ibiology establishes the next level of command and control culture where artificial selection becomes a post-human, globalizing, gene profit system." (Ludin) In Ludin's, and indeed all of the above examples, speed is the difference making difference that the art of database politics ultimately must address across a range of practice; regardless of whether the artist is using database as media to help along the emergence of shared understanding within a culturally mixed global culture, or responding defensively (with database) to the onslaught of database driven assaults on civil rights committed by corporatist or fascist governments.

**Data Visualization, Beautiful Information and Sublime Data**

A formal aspect of data and information that is often overlooked in western culture at large is that the terms "data" and "information" have meanings that are quite different from one another. Although Dictionaries such as Webster's accurately define the terms; information as "an informing or being informed; esp., a telling or being told of something", and data as in "facts or figures to be processed; evidence, records, statistics, etc. from which conclusions can be inferred; information", (Webster's, italics mine), popular uses of the terms often overlap somewhat more than their dictionary definitions
allow. Note that "information" is above embedded in the definition of data, across the semi-colon boundary behind which "conclusions can be inferred", but without a cadence or emphasis that would mark information's definitional difference with the same clarity as it is most commonly defined in computer science. Information as described above could easily be misread as synonymous with "facts or figures to be processed", even given position of the semi-colon. As I will discuss in the next paragraph, there is in fact an issue of transitory states. Nevertheless, information is most usefully defined as the conclusions or news of significant difference that is inferred from the logical processing of a collection data. Data is defined essentially as being raw facts; whereas information is mined from processing those facts.

Of course, the situation it is not that simple. At any one time the same representations (I do not take "representation" to mean exclusively "visual"), might exist in different terminal states (as either data or information) on a larger conveyor belt of ubiquitous digital processing. A simple example: it is common for the output of one program (nominally "information") to be the input data for another, as in the unix command, `ps -ef | grep brett`, which pipes the somewhat lengthy output of the `ps` program (information about all processes) to the `grep` filter such that I might know only of my processes; information can become data to be filtered into more specific information. Another potential breakdown in the distinction occurs due to the graphical user interface, which does a better job of 'making invisible' the user's control data (another kind of input), for example in the form of pointing as interactive input (mouse clicks, mouse drags, etc.) These are definitely forms of control data input, but they are processed more invisibly than control commands given on a command line interface, because the visual half life of clicks and drags as pixel residue on the screen is not buffered as are commands that remain visible in the terminal shell (visible on screen) after being issued in a CLI. Nevertheless, ignoring interactive input and its own important implications, it is still true that data plays its most common social 'role' in the form of input to programs, and it is information that is derived from processing data as output; even if the information is later transitioned by being reprocessed as input back into some other program (potentially somewhere else in the world). The ontology of data and information as input and output is contextually mediated and transitory; existing alternatively between states of data and information. Yet data is still associated in an important way with input and information with output, even if the terms data and information are treated more loosely in culture at large, perhaps due to being seen adjacent to each other so often, a result of their status as quite inseparable siblings or perhaps a digital yin/yang.

A good question for the impatient reader at this point would be "What does this have to do with contemporary database practice in art?" After all, there is no shortage of clarification regarding the distinction between "data" and "information" in engineering and the sciences. The answer is that the conflation of terms seems to pool especially commonly in the humanities discipline areas, such as art. To be fair, it is a common linguistic conflation in culture at large and this is indeed where artists operate, but I do think it merits our attention in any analysis of the works of artists who are working with database, and particularly for artists that are working specifically with data visualization, or the related disciplines of data sonification and data haptics (as in ambient computing).
Lev Manovich has made a very important observation about the aesthetic strategies of Data Visualization practice in an essay titled The Anti-Sublime Ideal in Data Art, (2002), in which he critiques contemporary data visualization practice in art as adhering to a pursuit of beauty in the transformation (or processing) of large datasets into the visual field: the "Anti-Sublime" aesthetic. Beauty is the pursuit of clarity, balance and transparent form, and data visualization is often pursued for the sake of understanding or making clear the behavior of data and the systems represented by data. Beauty in data visualization is opposed to the sublime: the condition under which the data overwhelms its viewer, and the viewer's senses are mobilized in a special kind cognition that allows them to carry on with the formation of an understanding that is, as it turns out, more likely to be satisfactory than a random guess. There are many names for this kind of cognition: intuition, anticipation, instinct, or a sixth sense. The sublime is of considerable interest to the artificial intelligence discipline in computer science. Human intelligence seems able to deal with the sublime condition and can continue to operate intelligently even when overwhelmed or subjected to context shifts, while discrete computational machines have not yet proven this ability. In a sense, the holy grail of artificial intelligence is to create machines that can behave with human like intelligence when similarly thrown by excessive amounts of data under variable context.

Interestingly, the definitions of the terms "beauty" and "sublime" have also been culturally conflated, perhaps even more so, than the terms "information" and "data". Just as information and data are sometimes interchangeable terms in common usage, (often taken to mean information), the meanings of beauty and sublime are today similarly conflated, (often to mean beauty). The notion of beauty, revealing form and making cognizable, as the goal of data visualization art works dealing with large data sets is clearly described by Christiane Paul, writing of Benjamin Fry's 1999 work "Valence":

"The software visually represents individual pieces of information according to their interactions with each other. Valence can be used for visualizing almost anything, from the contents of a book to website traffic, or for comparing different data sources. The resulting visualization changes over time as it responds to new data. Instead of providing statistical information ... Valence provides a feel for general trends and anomalies in the data by presenting a qualitative slice of the information's structure. Valence functions as an aesthetic 'context provider', setting up relationships between data elements that might not be immediately obvious, and that exist beneath the surface of what we usually perceive." (177, 178)

I do not choose to wade into any aesthetic debate regarding the beautiful and the sublime in data visualization; I am sticking to my promise to hold fast to an interpretive framework in this writing. Lisa Jevbratt has written an essay titled The Prospect of the Sublime in Data Visualizations, responding in part to Manovich's use of the 1:1 project (1999, 2002) as an example of the anti-sublime aesthetic. (Jevbratt) For now, I merely want to point out that in terms of how we interpret the art practices engaged in data visualization, beauty as opposed to the sublime is the most critical contemporary
interpretive framework in which such art may be evaluated aesthetically. The criterion for analysis shifts from the effectiveness of any particular visualization (and its ability to facilitate an understanding of the data through beauty), to the role of the user or communities of users in interpreting a visualization via their own ontological thrownness, their own conceptual, computational or cultural methods for processing data, and their own ability to perceive when facing conditions of sublimity. At its extremes, the sublime analysis suggests that access to raw, unmediated data replace visualizations, and that communities should take democratic control of their own data interpretation in a way that best balances their exposure to quantities of data against their need to reduce it to useful information; all of which might only become practical if formal languages for processing data become standard educational assumptions for a baseline notion of what it means to be literate in post-industrial, high tech societies. Microsoft Excel(TM) can not save us. Artists might be able to play an important role in this regard: as guides in data exploration more so than as experts in data visualization.

Additionally, the formal definitions of data and information imply another framework tightly coupled to the issues raised by the beautiful and the sublime. Data visualization practice is certainly bound to the transition of representations between states of being data and states of being information; and as Manovich points out, most contemporary artists working in data visualization are seemingly committed to visualization as information. This is essentially congruent with Paul's discussion of Fry's work Valence as well as her overall discussion of database practice; further implying that much data visualization practice in the arts today seemingly pursues beauty. Interpretively, we may extract from all of this that the pursuit of information is the pursuit of the beautiful and that the pursuit of data is the pursuit of the sublime. The former implies a struggle for understanding, the later an impulse for exploration, including the collection and generation of new data. How artists implement their forms of expression between information and data, and possibly in the transitory states between them, is an aesthetic issue that maps to the transitory states between the sublime and the beautiful. Speaking personally, this seems to be an unresolved area in data visualization as artistic practice, as well as in the related formal practice that I discuss in the next section.

Virtual and Materialist Data Formalism, Data Mining

In this section, my interpretive framework comes full circle back near the issue of disembodiment. In the first section of this essay, I believe that I was able to demonstrate that data and information have always been disembodied from their referent, and I did so by arguing from a materialist stance that views data as an important virtual reality that actually impinges on material reality. In a previous text titled Database Logic(s) and Landscape Art (original, 2002), I presented a more radical, though consciously very speculative and provisional view that data is embedded and operative within the actual through a process in which humans/data/Earth are inextricably implicated: humans mediate the landscape with the assistance of data about the landscape, and the data itself mediates that mediation, not necessarily intentionally, but in such a way that the actual material Earth now speaks through scientific data, thereby expressing a voice in conversation with human culture. In the same essay, I indicate how the term 'virtual' is
also often misunderstood as referring to the imaginary interfacial illusions that computational systems can create, rather than (more appropriately) the abstract mathematics of reality (that can be modeled computationally, well beyond 3 dimensions), that in some sense produces the actual. In other words, the virtual is itself a real space of possible physical states for any system that crystallize into the actual, which is precisely what allows computational models of physical systems (such as engineering or atmospheric simulations) to have predictive power. I made this case in order to suggest that artists should utilize the notion of the virtual for predictive or analytical practices that reveal knowledge about the world, or better, that emerge new behavior, exploration and experience. I think this holds for the humanities. I am in no way concerned if what is revealed functions as conceptual and performance art, and not as science.

There are many database art projects that demonstrate this analytical and productive practice which engage with data utilizing an ethos that maintains an interest in the embodiment (contra disembodiment) that is implied in the relationship between data and its material, actual, real world referents. Although I have avoided definition, I would argue that the preceding does constitute something close to a definition of database art in the bigger picture, the relationship to materialist embodiment being the key. In any case, it clearly fits into my interpretive framework for contemporary database practice as database formalism. These projects are interested in the actual materials that are modeled by data, and seek new, exploratory methods of interacting with the material world that reveal new knowledge about the materials, or the interactions with them, and that allow data to become a cooperative co-participant in the performance. For example, Lev Manovich's *Soft Cinema* (2001-) uses metadata to dynamically organize a Mondrian inspired screen layout for videos shot by the artist in his travels, in which "every clip is assigned 10 different parameters, which are both semantic and formal, so for example one is geographical location... how much motion there is in a clip, which is assigned a number... the contrast, the average brightness, the subject matter...", and so forth. (Manovich, 2003) The parameters are utilized by custom software to control the editing of the video clips and their organization in the layout, allowing data about the (video) data (the metadata) to manifest itself through being granted some level of decision making authority and authorship. Manovich's cinema edits itself; revealing itself in unexpected and often poetic ways that require one to apply a thrown and sublime mode of paradigmatic viewershhip to its interpretation.

David Rokeby's *Giver of Names* (1990-) and George Legrady's *Pockets Full of Memories* (2001) both ask users to interact with real objects in the gallery space, which are scanned and input into a database system for further classification and comparison. While Rokeby's approach utilizes an AI computer vision technique and artificial language processing, and Legrady's uses a clustering algorithm designed to situate the personal objects offered up by the audience with their statistically nearest neighbors, both projects are literally concerned with the relation between real objects and how they are thus mediated (either by naming them or associating them with another) as they undergo analog-to-digital (material to reference) conversion, insertion into a database, and subsequent data analysis. Importantly, an emphasis on the materiality of the objects is maintained in the exhibition space. The materiality is directly experienced by the
audiences who interact with Rokeby's collection of objects lying around the exhibition space that they may situate on a pedestal for scanning and interpretation by an artificial intelligence system. In Legrady's case, a personal object if offered up for analysis. Both systems connect rather literally with the real as an embodied space to be contextualized.

The near unification of referrer and referent is even more literal in recent C5 work, (a group of which I am a member), where geographic information system data (a digital 3D map of the landscape) is mined through the preprocessing of the primary data into a layer of metadata characterizing large areas of topography (currently the State of California), that can be searched via a relational database and related Java API. (The C5 Landscape Database API.) Mirroring the Input/Processing/Output pattern common in classic, non-interactive data processing, C5 takes input samples (collected with GPS), and processes them to identify the most similar landscapes to the original, but that exist somewhere else. As preparatory work for The Other Path (2004-) Geri Wittig set out on a month long trek along the Great Wall of China, starting in the northwest desert and following the Wall eastward to where it runs to the edge of the Yellow Sea. GPS data was collected from twelve separate trekked locations along the length of the Great Wall. Using pattern-matching search procedures developed at C5 (Amul Goswamy and Brett Stalbaum), the 12 most similar corresponding terrains in California were identified. After determining the blocks representing the most similar matching terrains in California, phase two of the Other Path search process identified discrete paths within those terrains expressing similar statistical characteristics, such as simple distance, cumulative distance, and elevation change. To do this, a swarm of virtual hikers, implemented as experimental features of the C5 Landscape Database API 2.0, were unleashed in the virtual California landscape to explore and generate tracklogs, which were then compared to Wittig's original "input" Great Wall of China tracklogs. The results of this search identified the most closely matching virtual tracklogs, which were then exported to tracklog files, uploaded to GPS devices, and physically realized by C5 in a performance of tertiary (after the original, after database) exploration of what is now known as The Great Wall of California. In this performance, walking works in the tradition of Richard Long, Hamish Fulton and perhaps even Dominique Mazeaud are reconceived as input, processed by via database applications that have been granted the ability to tell us where to go by outputting GPS coordinates that we are conceptually bound to follow with our feet. This generates alternative experience and exploration of the landscape at a time when everything (on the landform surface of the Earth) has already been explored and modeled. It emphasizes not the disembodiment of datascapes from their referents, but their intimate connection and productive capability.

Conclusion

I have outlined three modes of practice, database politics, data visualization, and database formalism (the latter contra disembodiment) in which contemporary database practice can be interpreted. The later formalist tendency, in which database is conceived as virtual context for implementing a data co-operative mediation of the world, perhaps most interestingly overlaps in the final analysis with the database politics. Though largely apolitical at first glance, the formalist interpretative mode of database art practice is
similar to that of database politics in that the goal of both is to realign the power of database to distribute the real, albeit for different reasons, as opposed to data visualization's dominant (but perhaps not universal) desire to better understand data. Though formalist practice may not self-consciously attempt to intercede in pan-capitalist distribution of power, data formalism and artistic data mining practices do conceive of agency returning back to the hands (or for C5 the feet) of the people who interact with such systems, although perhaps in a perverse way by tactically ceding a certain level of arbitrary control to the database applications themselves. But as long these are at least neutral with regards to power, and hopefully designed and performed by autonomous users of the systems in non-coercive ways, there are advantages to be found - perhaps even political ones.

For one, formalist database practice is in alignment conceptually with the ubiquity of database in our culture, perhaps encouraging individuals to develop related expertise for apolitical ends (recreation, hobbies) that produce ecologies of knowledge that become useful when political conditions become too onerous for the majority of people. Formalist practice could be aware that discovering the possibilities and building novel alternatives (especially when done so by communities instead of for them), might be just as effective as directly resisting the distributed, nomadic power of systems of mass subjugation. But as long these are at least neutral with regards to power, and hopefully designed and performed by autonomous users of the systems in non-coercive ways, there are advantages to be found - perhaps even political ones.

Interpretively, there is perhaps a fourth mode of practice that it may be argued that I have ignored. The only other mode of database practice that is perhaps not necessarily some derivation founded in database politics, data visualization, or a database formalist practice is seemingly a multimedia practice that assembles and processes a 'database' of multimedia materials, mixing or remixing them into some other media forms such as web video, animation, real time video processing, music, etc. The multimedia assumption insists that the core of digital media art practice is manifest as pixels on a screen, or some other output such as speakers, or as interaction at an interface that produces some kind of visceral or otherwise magically mediated experience. The mediation is viewed as ultimately flowing from the identity of "the artist" of course, who is assumed to produce some kind of political awareness or aesthetic/cultural experience in the minds of the audience. Often, this kind of very traditional orientation toward art practice does not consider the elements in the database as data with their own ontology, and suppresses data's identity into being mere media elements or samples to be processed, remixed, and assembled by the artist in an expressive configuration of individual artistic style and message. Media tools such as digital video editing and multimedia authoring platforms are commonly employed, and often these are used pretty much the way that their designers (large corporations) intended them to be used. There is no reason to think that such software applications can not be used in other ways (in fact, there are many
delightful examples on runme.org), but in practice such conceptual repurposings are all too rare. When they do happen, they seem to transcend multimedia and map to conceptual art practices (often termed "software art"), and I suspect that my categorical distinctions regarding database practices would support these. But I am veering dangerously toward making an evaluation of multimedia practices here. That is not my goal, so this is a good place to conclude.

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This essay is dedicated to the memory of Eric Gray, who is responsible more than any other for helping me establish my interest in computing as a young person. In 1981, Eric showed me a war dialer he had written in BASIC on a TRS-80 computer, along with
custom hardware enabling his tape drive remote control output to perform pulse dialing on the plain old phone network, which he was using (while his parents were away, of course) to war dial for local modem connections to hack into. I was hooked. And the hours of playing "Adventure" did not hurt either. On behalf of your family and friends, we love and miss you Eric.

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Indigenous and Ethnic Articulations of New Media

Abstract: This paper extends a lineage of research that reveals appropriative possibilities by which indigenous and ethnic communities have appropriated media technologies to serve their own cultural, political, and social visions. This paper focuses on networked and database-driven "new" media and information systems, and the possibilities and potentialities these hold within cultural scenarios. A case is presented that has focused on Native communities within the United States. Through this presentation, I present a methodology, process, and analysis of the means by which information systems can enable culturally and community-focused goals.

The isolating and stratifying impacts of new media are widely discussed when pertaining to indigenous and ethnic communities. Emerging from these critiques is the term "digital divide" [www.digitaldividenetwork.org, NTIA(1999 and 2000)], and maintains two meanings. First, it can apply to the notion of ownership. This indicates that existing ethnically-correlated stratifications would only be accentuated by those who own, operate, and control the roles of new information systems. Secondly, a number of writers have flatly assumed that new technologies inherently create ethnic biases. These critiques lie not so much in problems fundamentally with the technological system itself, but rather how it is used to reinforce structures of power, and therefore stratify.

However, in parallel to these critiques, a number of relevant initiatives and studies have pointed to the empowering potentials held by internet-based technologies toward ethnic and indigenous communities. This includes literature that uncovers how communities can utilize the internet to exchange information, preserve histories, generate diasporic identities, and share resources that can enable collective political and social causes to be realized. This paper focuses on the empowering potential held by the use of (a) servers and networks, and (b) databases within information systems. The possibilities these hold to enable fragmented and underprivileged communities is discussed in the context of my fieldwork with 19 Native American reservations based in San Diego County (California, United States).

New Media and Community

A number of social scientists have questioned the potential held by information systems toward forming and sustaining community. At the forefront, Paul Virilio has denounced new media technologies, and the means by which they "virtualize" the physicalized understanding of landscape, geography, and culture. His concern is that through new media there is an overemphasis on "real-time" versus 'real space' or 'real life'.

The specific negative aspect of these information superhighways is precisely this loss of orientation regarding alterity (the other), this disturbance in the relationship with the other and with the world. . .Up to now, history has taken place within local times, local frames, regions and nations. But now, globalization and virtualization are inaugurating a global time that prefigures a new form of tyranny [Virilio (1995, p.1)].

When community is no longer understood in geographical terms, fears and critiques have arisen [Sassen(1999), Oldenburg(1989)]. Robert Putnam points to the loss of geographically-localized communities as factors that accompany the emergence of network media [Putnam(2000)]. Public spaces, local cafes, and bowling alleys – all places of meeting in traditional Western civic society, are largely obsolete social
spaces today. Putnam argues that Western societies (focusing on American societies) have become disconnected from the traditional means by which people receive social affirmation. These have included family and friends, recreational leagues, political parties, and religious institutions. Heightened intra-community interaction generates greater social capital, loosely defined as the cohesion of a community in providing resources for itself. Putnam finds a decline in civic, religious, and political participation across American society, and argues these losses in social capital are linked to lower educational performance, higher crime rates, and other negative phenomena[Putnam(2000)].

How do new media technologies affect this dynamic? Putnam argues that this is still an unanswered question. It seems clear that the context of technology usage would be important to clarifying this issue. Social network theorists, for example, have discovered that “social” uses of information systems can positively impact community formation and sustenance, through the sharing of information resources and creation of common spaces for socializing and communication [Wellman and Gulia (1999)].

**Culture and Community - Visual Media**
The prevailing discussion has been limited to a passive understanding of new media, as a set of technologies that are imposed upon the public, rather than as a tool that can be utilized to achieve locally and culturally specific visions. The understanding of media and technologies as emerging from a central source and vision has led to the assumption that they have in turn projected values that derive from the “culture industries” and reify power dynamics between the owners and consumers of the technology (Horkheimer and Adorno (1976)). By recognizing the possibilities for technologies to serve specific community aims, new media can instead be understood as a catalyst for new interpretations and alternative paradigms (Hall(1973)).

Faye Ginsburg, an anthropologist from New York University, has detailed a number of efforts by which media technologies have empowered ethnic and indigenous communities [Ginsburg(2002)]. “Screen Memories” discusses the means by which the Inuit people of the Arctic re-create oral traditions through the media of film and video. This has been done without an intrusive intervention, and merely by making tools available that can address pressing needs. While re-telling stories involves their being reshaped, as discussed by Ong [Ong(1988)] and others [Goody and Watt(1968), Lord(1960)], preservation is a process that requires adaptation to competing demands and an altered cultural and political context. For example, Ginsburg discusses the means by which Inuit filmmakers have created films as a response to dominant objectified representations.

Rather than destroying Inuit cultures as some predicted would happen, these technologies of representation – beginning with the satellite television transmission to Inuit communities of their own small-scale video productions – have played a dynamic and even revitalizing role for Inuit and other First Nations people, as a self-conscious means of cultural preservation and production and a form of political mobilization... (The benefit of new media) is apparent not only in the narrative constructions of Inuit history on their own terms, but in integrating it with Canadian modernity, embodied in the flow of television [Ginsburg(2002, p. 41-42)].

Ginsburg’s example reveals how film and video technologies have allowed community members to create and disseminate their reflections on present day
realities and future visions. This example demonstrates the importance of re-purposing the Frankfurt School critique of culture industries within a model of appropriation that place those traditionally disadvantaged into the position of creator and broadcaster. This is a step further than the process of traditional appropriation and reception studies [Hall(1973), Morley(1992)], wherein the fan [Jenkins(1992)] or receiver re-tells or re-creates an already once released narrative. Instead, the content and utilization of the technology are placed in the hands of the community.

Terrence Turner’s work with the Kayapo people of central Brazil extends Ginsburg’s analyses by overtly studying the impact of community-created media on cultural, educational, and political efforts [Turner(1992)]. The purposes of his research involved initiating a video-creating process to advance and develop various political and cultural community agendas. Introducing the technology of video camera to the Kayapo translated into an involvement and documentation of the negative effects of governmental hydroelectric dam schemes. The video documentation was brought back to the people by the appointed video creators and informed the different tribes of the impending danger. The Kayapo discovered that using their video cameras allowed them to interview and question Brazilian bureaucrats and politicians with a level of legitimacy that the government official would have to answer. Ultimately, this work translated into an international exposure for the community, as they were able to demonstrate their land rights issues on an international stage that could supersede even the Brazilian national government.

Turner argues that while media scholars have worked in the domain of ethnographic film with an end purpose in mind, few reflect on the possible effects of an objectifying medium such as film’s impact on the social and cultural consciousness of the people involved. The question of who owns and controls the films that are created may seem unimportant, but this often has a significant effect on the community itself. With the Kayapo, the different roles occupied in the video making process had an impact on their relative abilities to advance within the tribal government.

From the moment they acquired video cameras of their own, the Kayapo have made a point of making video records of their major political confrontations with the national society, as well as more exotic encounters such as their two recent tours to Quebec to support the Cree Indians in their resistance to a giant hydroelectric dam scheme that would have flooded their land. They have also employed video to document internal political events such as meetings of leaders from different communities to settle disputes or the foundation of new communities. . . The Kayapo do not regard video documentation merely as passive recording or reflection of existing facts, but rather as helping to establish the facts it records. It has, in other words, a performative function.[Turner(1992, p.11)]

Essentially, the aspects of video that are often criticized – its exhibition and framing of the subject – are what the Kayapo have exploited to achieve their own aims. Over a series of successful political struggles from 1970-1982, the Kayapo have recovered land the size of Scotland as well as entered the international stage to champion causes of sustainable development and indigenous rights.

Turner’s example is extended in the work of Eric Michaels, focused on the Warlpiri Aborigines of Western Central Australia [Michaels(1994)]. Michaels provides a pathbreaking illustration of the use of television as a localized information source that transforms issues of economy and power structures within the community. His
example extends the approach of Turner and others by focusing toward infrastructures as technologies that maintain local and culturally specific control. These technological solutions involved the creation of a low-frequency, low-power community transmitter that would allow community members to select from a variety of locally produced programs. The process generated an expansion of topics covered through these video programs, and correspondingly, shifts within social organizations of the community to accommodate the television feed. Fascinatingly, Michaels observes a seamless transition between the oral traditions and electronic media.

There is no necessary translation from orality to electronics; we are instead seeing an experimental phase involving the insertion of the camera into the social organization of events [Michaels(1994, p.65)]

Therefore, cultural control has been placed around the creation, transmission, and dissemination of visual media for the Warlpiri. Similar to Turner, this work maps to important issues of self-determination within the community, not only in terms of content created, but also with decisions made as to external satellite-derived feeds of national or international programming. These levels of control reveal the potential by which local populations can generate self-sustaining indigenous media that can live independently of the researcher’s presence.

The above examples demonstrated means by which technologies are appropriated by indigenous groups to achieve community-focused cultural, political, educational, and social objectives. These technologies emerge from ethnographic research that is community-focused. Yet the impact and discussion of these projects must not be considered solely within the case-study or domains of the fieldwork, but in a larger play with national and international notions that define the concept of “indigenous”, through media, politics, and other conduits. These are critical social and cultural issues that emerge through the culture-media examples and propositions I articulate in this paper. Hartley and McKee encapsulate these discussions as the “indigenous public sphere”.

It follows that we believe the ‘indigenous public sphere’ stands as a model for other developments in late modern culture. . .in the developed Western world as a whole. New notions of citizenship have arisen that stress culture, identity, and voluntary belonging over previous definitions. . . Media are primary and central institutions of politics and of idea-formation; they are the locus of the public sphere [Hartley and Mckee(2000, p.4)]

The precedents I have discussed are limited to the visual broadcast media of film, video, and television infrastructures. But what do “new” interactive, web-based, network and database-driven digital media hold in the indigenous and ethnic realm? Efforts of media cultural studies scholars must center on the novel possibilities held via “new” media that were unavailable in video, television, and film precedents. I point to two features that both hold great relevance in the convergence of cultural studies and new media: (1) client-server architectures (networks), and (2) databases (classification and object preservation).

**Feature One: Bridging Space - Diaspora, -Scapes, and Networked Media**
Traditionally, community has been conceived of around the bounds of geographical neighborhood and cultural background. However, in an epoch of globalization characterized by flows that connect individuals and objects across distance and via technological mediation, implications toward community must be re-conceived. Arjun Appadurai’s essay “Disjuncture and Difference in the Global Cultural Economy” [Appadurai(1998)] focuses on the cultural implications of the global flows of information and capital. Via these flows, community may be imagined and impacted [Anderson(1990)], and through the digital networks that enable interaction across distance, national and local politics are shaped. Traditional ethnic and local notions of community are deterritorialized via Appadurai’s description of “ethnoscapes”, one dimension of transnational cultural flow.

Appadurai’s explains that culture and community have shifted from the local to the –scape. He points to the struggle by the Sikh immigrants (in the West) to further the cause of an independent homeland (Khalistan) within India, although the population is only connected via the mediascape of a set of internet technologies.

These landscapes thus, are the building blocks of what, extending Benedict Anderson, I would like to call ‘imagined worlds’, that is, the multiple worlds which are constituted by the historically situated imaginations of persons and groups spread around the globe [Appadurai(1998, p.27)].

Community is therefore ‘imagined’, mediated through the imageries of the “mediascape”, ideologies of the “ideoscape”, and ever-shifting demographics of ethnicity (“ethnoscape”) and information. As ethnicity and its study becomes a multi-sited discipline, new media, due to its networked client-server abilities, holds potential as a means to connect distributed ethnic populations across geographical distance.

This invokes the concept of diaspora, the minority expatriate communities that originate from a homeland but have migrated to new host country [Safran(1991)]. The identity of diaspora is often framed relative to the dual relationships held with the ancestral homeland as well as the new host country. In an era of global cultural flow, the diaspora issue grows in importance. With advances in networked technologies, diaspora now maintain social and political ties that are transnational, including fellow communities in other host countries and homeland. Can the internet allow an identity to be imagined that is transnational in nature? [Morley and Robins(1995)].

A number of notable studies have focused in on the impact new media holds on diasporic identity formation, cultural expression, politics, and so on. Mitra’s research on Indian immigrants and their uses of newsgroups [Mitra(1997)] presents dual results: (1) National identity is imagined simply via the transnational membership in the virtual space, and (2) National identity is fragmented via the fractured disagreements and ongoing dialogues that result via a newsgroup that is atemporal and therefore without an end. Additionally, the original understanding of migration as a strong break from the homeland has been reversed by the recognition that networked media has enabled migrants to maintain ties to the originating country [Mitra(1997), Castles and Davidson(2000)]. Homelands serve as means of cultural identification for these communities and create an imagined sense of one-ness, according to scholars of transnational migration [Anderson(1991), Ginsburg et. al(2000)].
The next feature impacted via the convergence of diaspora and new media is that of mobilization. Kwok [Kwok(1999)] has described how the internet can enable ethnic communities to globally react, communicate, share resources, and mobilize in reaction to global events. Marginalized discourses can be published without having to enter into the traditional top-down editorial processes that Adorno and Horkheimer are so critical of. It therefore introduces the possibility of resistance that is inherent in every relationship of power [Foucault(1983)]. Diaspora can introduce web sites to present marginalized perspectives but can also create electronic systems to present their culture and ideas to visitors and virtual tourists [Srinivasan(2004), Chan(2005), Miller and Slater (2000), Kwok(1999), Ho, Babeer, and Khondker(2002)]. Nationalism can be promoted from afar via these diaspora through the creation of sites that assert rights to territorial states [Bakker(2001)]. One example of this is the means by which Uyghur (region in Western China) activists and non-govermental agencies [Gladney(2003), Kanat(2005)] have utilized the internet to link to one another, receive international financial and other support, and popularize their political/cultural causes by presenting their distinct cultural histories in opposition to mainland China. These new media connections have played an important role in reinvigorating Uyghur identity amongst dispersed groups while creating a new diasporic, transnational identity that is relatively independent of the “East Turkestan” homeland. The Uyghur example complements the work of Tekwani on the Tamil diaspora in Sri Lanka [Tekwani(2003)]. Tekwani argues that digital networks complement the social, political, and economic networks that have always sustained inter-diasporic relationships, and that the internet is particularly useful to diaspora because of the power of immediacy it offers to share resources in light of spatial dispersion. This networked feature has presented the Tamil diaspora of Sri Lanka with the possibility to promote their cause yet also militantly organize resistances to the national government.

A final example is provided in Jon Anderson’s study on electronic mediation across the “cybernauts” of the Arab Diaspora [Anderson(1995)]. Anderson has researched how the Middle East’s overseas immigrants are finding each other via the Internet and forming communities that are decentralized and non-hierarchical in contrast to the traditional at-home social organizations. The connections these cybernauts have include a bricolage of different media components.

What emerges in all of these venues is what I have called a creolized discourse [Anderson(1995)] that mixes bits of wire service news, transcriptions of sermons, intense debate about home-country issues, stories of expatriate life and notices of cultural events, sources of food and of cheap flights home, and even matrimonials. [Anderson(1997)]

Anderson has identified that new worlds and spaces of interaction are created that integrate Iraqis without being as fundamentally tied to the homeland itself. In that regard, this example differs slightly from the Uyghur or Khalistan examples. The Middle East has become public according to Anderson and its public visibility starts and ends via these new media technologies. In the Middle East itself, barriers of access has limited those online to elites. Therefore, the egalitarian facets of the virtual space are not shared as uniformly within the homeland.

In addition to the diaspora example, indigenous communities have also appropriated new media to activate their own cultural, political, economic and other causes. A wide variety of indigenous web-sites are now in existence, some created by non-governmental organizations, and others created by communities themselves (see
Native Americans, the subject of this paper’s study, are at the forefront of this movement, having organized a vast variety of sites that either represent a tribal nation, an archive, a political movement, or an economic institution. Native American leaders have used the internet to generate support from within and outside their nations, to exchange and share resources, to coordinate cultural activism through pow-wows, etc., and so on. With the recent opening of the Smithsonian’s National Museum of the American Indian, many activists and leaders have joined forces via this common institutional affiliation.

The point across both the indigenous and diasporic examples is clear: the networked nature of new media technologies enables sharing, identity formation, communication, and publicization to occur nearly instantaneously without being bound by the realities of physical distance. However, the danger remains of a new digital colonization of these internet sites:

- **Clearly, the Internet provides indigenous peoples powerful new means of self-representation, but as its use expands and intensifies, so does the “overseeing gaze” of encapsulating polities and transnational corporations. This given, the current relief form from visual imperialism afforded to indigenous peoples by the web may be phantasmagoric and the “visual performative” alone will not overturn their subaltern positions in the political arena** [Prins(2002), p.72]

As Harald Prins aptly points out, it is critical for communities to work to develop media that cannot be incorporated or absorbed by the imperialistic influences he identifies. By implication, the challenge is clear: Communities must push to develop new media and information systems that are not just exhibitions or aggregations of content, but also are built around locally and culturally specific representations and paradigms.

**Feature Two: Databases, Ontologies, and Cultural Discourses**

With this challenge, I introduce the second highlighted feature new media offers to ethnic and indigenous communities, that of databases and ontologies. New media can extend the powers of video by also preserving and classifying the creations of the community within an information architecture, or ontology, which can be representative of the community’s priorities or a specific cultural discourse [Srinivasan and Huang(2005)]. This provides the potential to answer Prins’s charge and engage communities to not only be the creators but also architects of their media and information systems. Creating spaces that are based around the community’s own representations and discourse may enable media to truly serve the community’s specific priorities, rather than presenting a space that is incommensurable with a culture’s traditions and own categorizations of knowledge. It may allow an “indigenous” approach toward development to result [Srinivasan(2006)].

The institutional approach toward approaching this issue of databases and representation is present in digital archives and library research. Archival research has expanded to consider electronic records [Gilliland-Swetland(2005)], focusing on the ability to store, classify, and interpret provenance through database annotations. A number of international organizations have emerged to develop classification schemes for cultural heritage material that is preserved in a database and served globally. These efforts have converged with new platforms and mark-up languages
developed by Computer Scientists, with a first breakthrough as XML. Each effort has had to consider the question of ontology, or the architecture of the knowledge repository, and its relevance to the material being circulated. In global cultural heritage databases, the ontology is expressed by the different standards that are articulated for particular cultural domains. As an example, the European Union’s Dublin Core (http://dublincore.org/) project maintains a set of particular standards that drive the architecture of its database systems. It is notable that it maintains three major priorities: (a) Developing metadata standards for discovery across domains, (b) Defining frameworks for the interoperation of metadata sets, and (c) Facilitating the development of community- or disciplinary-specific metadata sets that are consistent with items 1 and 2.

Therefore, the goals of bridging knowledge *across* domains is key to the development of the standards by which cultural knowledge is indexed and annotated within Dublin Core’s media systems. It adheres similarly to certain models that have begun to introduce themselves into the literature on digital libraries and digital museums. For example, the ABC model, described by Hunter and Lagoze [Hunter and Lagoze(2001)], classifies objects as entities that maintain temporality, actuality, and abstraction as their three layers of categorical data. Temporality is a reference to events, precedences, and sequences. Actuality is a layer that refers to anything that can be physically detected, whether it be a view, smell, or touch. Finally, abstraction is related to concepts and only references a concept when it is articulated or acted upon.

What is clear when one begins to analyze these metadata models is that they are built around a system of logic that follows traditional notions of rationality. The assumption in Hunter and Lagoze’s work that a concept only can instantiate when it is articulated publicly imposes a number of assumptions around the contextualization and notion of the cultural object and how it is perceived. These are systems that do not seem to primarily be concerned with the community or specific cultural group’s authorship, epistemology, or ontology.

**Presenting a Community-focused Approach**

The projects and models presented concern themselves with both the networked and database-classification aspects of new media, but in both cases I have presented examples that have yet to truly engage the possibilities to enable communities to author, classify, and own their media and information systems.

My research has focused toward ethnography that drives the development, design, and deployment of a new media system of new media. The communities with which I have worked have understood my approach as non-traditional and anti-imperialist, and instead a collaborator seeking to develop new media that is owned and designed by ethnic and indigenous communities.

The case presented to demonstrate this approach is Tribal PEACE (Preserving Education and Cultural Expression), a web-based information system created with 19 Native American reservations of San Diego (California) county as part of my doctoral dissertation work between the years 2003-2005 [Srinivasan(2005)].

**Tribal Peace**

The reservations of San Diego County derive from the once contiguous and connected nations of Kumeyaay, Luiseno, Cupeno, and Cahuilla. These nations
tended to maintain contact with one another but largely existed as separate communities based on blood lines. However, historical dynamics and the creation of the reservation system have fragmented and disconnected these peoples from one another and a collective cultural history. Indeed, today, native languages, songs, and rituals remain largely lost across the reservations.

The goal of this research was to study the impact of a community-designed and created media system on resolving disconnections that the reservations face. One is a disconnection from cultural memory, as just explained. The second goal is spatially-focused and based around employing the networked power of new media to re-connect the fragmented reservations of the region. It is notable, however, that this re-connection would not establish a community that once existed. Indeed, given that each of the nations were separate entities and communities, the re-connection would establish an “imagined community” around the shared media system.

The physical dispersion of the reservations is conveyed in the above map. Not only is this dispersion expressed in terms of the distance between reservations, but also in
the lack of access to major highways and freeways of the area. While the density of population increases significantly as the map approaches the San Diego city in the Southwest region of the map, placement in areas of relative isolation has left the Native reservations at a significant disadvantage in terms of transportation infrastructure. Disconnection is thus accentuated by the inadequacy of transport infrastructure and a disadvantageous landscape for many of the reservations within San Diego County. Even on the individual reservations, land title is not contiguous. This has created the so-called “checker-board” pattern on the scale of a single reservation where to reach one point of the reservation to another, one must pass through non-reservation land. This lack of contiguity and boundedness generates the fragmentation on the micro-scale. Indeed, natives often allege that the fertile land on their reservations is given to non-natives and farming cooperatives. As an example, here is a GIS-generated map of the San Pasqual reservation:

Figure 2: The checker-boarded layout of the San Pasqual reservation (source: SanGIS)

I was invited to work with the leaders of these 19 reservations through an organization known as the SCTCA (Southern California Tribal Chairmen’s Association). The SCTCA had received a massive technology grant from Hewlett-Packard that provided up to 5 million dollars worth of digital network infrastructure, earmarked for wireless internet towers, computers, projectors, video cameras, and so on [http://www.hp.com/e-inclusion/en/project/tribal1.html]. This infrastructure would be based around the goals of rekindling ancient networks of kinship amongst the reservations that had been destroyed over time. In essence, the grant would provide a “Tribal Digital Village” (TDV). Of course the provision of this internet access
and technology would not guarantee a “village”, but instead provide the opportunities all communication infrastructures offer. Therefore, I was invited to develop a media environment that could serve as a space of exchange and preservation across the 19 reservations. This project, it was decided, would be called Tribal Peace. My first meeting with the community leaders (via the SCTCA) was in December, 2003. At this point, interest was expressed in collaborating on a project that could build on the TDV infrastructure. It was not until February of 2004, however, that I was able to secure permission from the SCTCA’s Education and Culture Committee, at a meeting taken place on the Barona reservation. The committee consists of cultural representatives from each of the 19 reservations and makes collective decisions to collaborate with outside researchers. At this meeting, approximately 50 members were present, and after presenting and answering questions on previous research [Srinivasan(2004), Srinivasan(2002)], permission was granted to begin the project. Active ethnography began at this time, and Shonta Chaloux, a leader from the San Pasqual reservation, was given the role of serving as the project leader on behalf of the SCTCA. Shonta’s role was to publicize the project across the reservations, and engage community members to participate in developing their own media pieces to submit and share with others across the reservations. A number of pieces had already been created through previous SCTCA programs, and ancestral songs, images, and languages had been digitized. Reservation members had already begun utilizing the technologies to digitize and document traditions, language and songs. Moreover, stories reflecting contemporary issues and realities had begun to be created through the use of the video cameras available at the different reservation “resource centers”. Ultimately, I had spent close to six months intermittently (November, 2003 – April, 2004) on the reservations before Tribal Peace went “live”.

As I spent much of the next 18 months (11/03 – 5/05) on the reservations, my goal became to develop bonds with as diverse a group of tribal elders, leaders, and institutions across all the reservations as much as possible. This would allow the project to interact with diverse networks and power structures across the reservations rather than inherently serve as a tool of those already in deeper connection with the SCTCA. Additionally, I worked to gain the blessings of tribal leaders and icons already serving as threads of connection across the communities, such as medicine people, tribal chairmen, cultural leaders, and so on. It was understood that the system must be embedded within the sociocultural context and respect the threads and networks it maintains, rather than existing as a negation of this.

Reservation members had already begun utilizing the technologies to digitize and document traditions, language and songs. Moreover, on a very basic level stories reflecting contemporary issues and realities had begun to be created, primarily through the use of the video cameras that were present at the different reservation “resource centers”. Ultimately, I had spent close to six months intermittently (November, 2003 – April, 2004) on the reservations before Tribal Peace went “live”.

By April of 2004, Shonta and I had assembled a committee of 20 individuals spanning 15 of 19 reservations to serve as the overseers and leaders of the project. This committee membership was open to any who wished to join, and its membership to this day remains fluid. The committee meets bi-monthly to discuss how the system could continue to empower reservation members to continue to bridge space and connect with one another around shared information and priorities.
It consists of members from different reservations and has attracted individuals to participate who have normally not been strongly tied to existing cultural initiatives.

With the initial April meeting, the committee gathered to view the 75 media pieces submitted for the system. They discussed the appropriateness of showing pieces to all members of the community, the importance of being sure information would be community intellectual property, and possibilities to deploy content into educational and cultural initiatives that were ongoing across the reservations. This meeting served as the first opportunity for community members to design the Tribal Peace system, and the means by which it could be built around culturally-specific representations and priorities. The process of eliciting a collective ontology amongst tribal members was challenging and involved the primary leadership of Shonta (where I was present as largely an observer and to answer any clarifying questions). Committee members viewed the different media pieces, paused videos at different times, and free-listed topics that were considered important by consensus. After completing discussion about all 75 pieces, the list was finalized with some topics removed and others added. The committee then created a structure to represent the interrelationships between these topics, engaging in dialogues regarding which topics were more related to others within the world of the reservations. They expressed the need to be able to re-visit the ontology diagram at any time and modify the structure as they see fit. They also stressed the importance of enabling submitters to continually adapt the annotations they choose to provide to their submissions. With these steps finalized, the following initial ontology was created:
This ontology represents the community’s overall structure of priorities and issues. As further content is added to the system and issues change, the ontology shall adapt based on the committee’s reflections and redesign. The continual adaptation of ontologies therefore corresponds to events that may occur on the reservations over time, such as natural disasters (which have made their way more prominently into the created content and ontology nodes) or political movements toward sovereignty. The adaptation also adheres to the growth of the system across the reservations. As community members become more engaged by submitting new content, joining the project committee, and commenting on each other’s content, the ontology shall adapt accordingly. The infusion of educators, medicine people, and political leaders into project involvement over time has therefore impacted system content and ontology structure. Over time, therefore, the system has begun to accommodate the voices of educators and the voices of cultural leaders who have begun to see the system as a powerful tool in their daily purposes. For example, the oral traditions of bird-singing, prayer, and native languages, can be easily digitized and disseminated across the reservations for archival and educational purposes. There has thus been a
natural linkage between these oral and cultural histories and the visual performativity of the new media system [Ong(1990)].
The ontology is a discretely re-designed representation of the convergence between the system’s databases and community’s cultural articulations. It provides a mechanism for community members to annotate and re-annotate their submissions with a set of collective topics. System visitors can browse through content based on these ontology topics and in turn the collective cultural discourse. It reveals a means by which new media can be organized with a responsiveness to differences of ethnicity and culture, traced even to the very languages spoken [Whorf (1940)].

As Tribal Peace was intended to be a web-based project accessible across the reservations, engaging the project committee in the process of visually designing and leading the outreach process was important. A key aspect of this was to determine a metaphor that could drive Tribal Peace and energize the native reservation members around a collective cultural theme. With this goal different concepts were discussed, and ultimately the theme of re-birth and revitalization emerged. It was important for the community to work with a metaphor that was present within their natural environment yet also embody the theme of re-birth. We explored different images, such as fire, ocean, animals, and so on, but the metaphor that resonated strongest according to Shonta was the tree. The Manzanita tree in particular can be found across the landscape of the region, and emerges in local cultural mythologies across the reservations. It was a natural choice to utilize this, a real tree with symbolic importance, as the project interface. The submissions by community members therefore appear on the branches of the Manzanita tree.
Exploiting a cross-reservation internet infrastructure, Tribal Peace attempts to connect a displaced and fragmented community around shared information. While this is not focused around the global scale of diaspora, the networked character and potentials are similar. As a bottom-up project, submissions are created and owned by individuals across the reservations. The project emerges from the ethnographic process and via the leadership of community members across lateralized structures of power. Therefore, the project committee does not just feature tribal chairmen, but also members of casinos, educators, and so on.

However, to truly enable the community to serve as the articulator and owner of a media system, the issue of databases must be re-encountered, and within a manner that moves away from the top-down, formal logic-type models described earlier via the Dublin Core and other examples. In essence, creating a mapping between the cultural priorities and the database representations of content is the system unlocks the question of ontology, and whose ontology drives the system. The challenge here is of mapping a cultural discourse to an organization of databases, a question which I have been concerned with in previous and ongoing research [Srinivasan(2005), Srinivasan and Huang(2005), Srinivasan(2006)]. I have observed that this elicitation must be humanistic, ethnographic, and truly in the hands of community members.
How they wish to map and conceive of their own cultural priorities, temporalities, and spatialities, must be their own choice and not placed into a pre-decided template. The creation of emergent databases [Turnbull(2004)] would then be a technical challenge that would follow from the cultural mapping process.

I discuss further details of my time on these reservations in other publications [Srinivasan(2006)], but wish to point out that the ethnographic process of engaging the community, presenting my research and personae, and ultimately receiving the embrace that manifested itself into a digital media system, is a key element of this research [Srinivasan(2005)]. This has involved the understanding that the development of the information system accompanies and progresses reflexively based on the ethnographic process [Hammersley(1992)]. The time spent with medicine people, political leaders (chairmen), educational representatives, and business owners all manifested itself into the development of Tribal Peace. I believe that conceiving the creation of the media system as rooted within the ethnographic process enables Tribal Peace to serve as a useful contrast to the systems and theories articulated earlier in this paper. Indeed, in the spirit of Turner and Michaels, Tribal Peace is a project that has focused on deploying and designing media that has emerged out of the navigation of the social and cultural geography of the native reservations. This has occurred through the social deployment of the project, self-representation through story creation and video-making, and via the ontologies and database representations of the community’s aggregated content.

System Impact and Evaluations
How has Tribal Peace impacted the social, educational, political developments across the communities? And how can this impact be understood within the context of 8 months of system usage wherein data was gathered? (Tribal Peace debuted in April, 2004 and evaluations are gathered from January, 2005).

I have found a strong connection between usage patterns and particular months that featured concentrated ethnography and relationship-building between myself and reservation members. I have found that the presence and active outreach within the tribal social geography has had a statistically significant impact on any dimensions of system usage. These metrics include number of stories viewed, diversity of queries and stories, number of comments left, and number of user sessions. The quantitative data have shown a gradual growth in system usage as a function of time but ultimately a strong correlation with the ethnographic period. The question this result raises is at what time scale a system like Tribal Peace can be truly evaluated. If self-sustainability is to be reached, it would entail a significantly lower correlation with the time spent by the ethnographer. Therefore, the quantitative data paints a clear lesson that can be captured through words, that a technology’s ability to impact a community is subject to accompanying social and cultural processes.

The impact of the system, however, cannot solely be considered in terms of this quantitative data. Given that data was collected within an incubatory period, much of Tribal Peace’s benefits lie in its potential to engage community infrastructures (such as schools, political and cultural institutions, etc.) in the long term. I have observed periodic use of the system in the on-reservation secondary schools, particularly during Native Culture, History, and Politics sections. Additionally, the system has been used in occasional meetings to allow political leaders to access the variety of voices of their peoples. Finally, the system has been advocated by other outside institutions and individuals who maintain strong relationship with the tribes. This includes faculty from UC San Diego’s Department of Ethnic Studies, and directors
from San Diego’s Museum of Man and the Smithsonian’s National Museum of the American Indian.

**Looking to Future Convergences**

The Tribal Peace example is intended to demonstrate the potential of developing new media systems for communities that utilize digital networks and culturally-authored databases. This research acknowledges that new media systems and video technologies can elicit and shape cultural ontologies that in turn impact the potential for communities to preserve, share information, and develop collective infrastructures. Two important issues continue to stand out:

1. **Globalization of the Tribal Peace method:** How would the localized process described briefly in the context of Tribal Peace apply when working with multiple diaspora across different global spaces? Will the bridging efforts of Tribal Peace with 19 dispersed, but semi-local reservations, apply across such great distances?

2. **Eliciting truly culturally-articulated ontologies:** The ontology diagram demonstrated in Figure 7 was created by the project committee, but is it truly representative and indicative of the basic conceptions by which these native nations represent and classify the world? Researchers have revealed, for example, that aboriginal notions of history, time, and geography are incommensurable with Western rationalistic knowledge systems. How could such an ethno-media project as Tribal Peace function within this setting? This is the enquiry of current ongoing research [Boast, Bravo, and Srinivasan(2006)].

As future research continues to explore these questions, the barriers between cultural difference and information/media technology will continue to erode and in turn a continued trajectory of ethno-media research will uncover new empowering potential uses of technology within the ethnic and indigenous realm.

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Digital Divide Network – www.digitaldividenetwork.org


Weaving Spatial, Digital and Ethnographic Processes in Community-driven Media Design

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Chapter 1: Public Spaces of Today and Yore, Media, and its Impacts on Community

The public space, understood as the environment designed for interaction, exchange of resources, is fundamental to the formation and sustenance of the community. The interaction and dialogue between individuals within the space is described as the public sphere. In this section, I will use the term “public sphere” to describe the process of this interaction, and public space to describe the environment within which it occurs. My assumptions within this section are that the successful public sphere or space involves dialogue, and therefore posit that the power of the public space is socially evaluated and constructed. This will have implications on my methodologies of evaluating the success of Tribal Peace as an environment that can foster community.

Unsurprisingly, across the fields of social sciences and design, there has been a considerable amount of theorizing and analysis of the elements critical to a successful public space. I begin this chapter by introducing some notable ideas of public space, and then shift to a discussion of globalization and the information-age and its implications on public space, sociability, and community.

1.1 Classical Theories of Public Space and their critiques

Jurgen Habermas, with his "Preliminary Demarcation of a Type of Bourgeois Public Sphere", promotes a type of “deliberative democracy” as his ideal for the public sphere, where the informed would engage in a rational and critical dialogue and come to a consensus. Habermas’s analysis of an effective public sphere was based on his analysis of the Enlightenment and its revolutions (French and American). He refers to the apex of the bourgeois society in his writings, appearing from the 1700s onward, and envisions dialogue within an environment that was neither private nor state-controlled. This would involve an open discussion of all issues related to the general interest and public welfare, and would be accomplished through a logical dialogue that would ultimately generate consensus. While public dialogue had historically been based around an open, rational consensus, it had been appropriated in Habermas’s era, by a

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1 Deutsche (1999)
2 Habermas (1962)
system of elites, each seeking his or her own good, a “welfare state capitalism and mass democracy”. Thus, an oversaturation of media had compromised rational dialogue. A citizen was no longer an active participant in an open dialogue, but was instead subject to the distortions of media, functioning as a cultural opiate. His analysis had revealed clear transitions from an era of democratic revolutions in which citizens were able to assert and organize against authorities to an increasingly media-dominated setting that the Frankfurt School so vehemently attempted to criticize. He thus calls for a renewed democratization of public institutions, and a return to the power of open and rational communicative interaction.

Hannah Arendt’s views on the public spheres are often referred to as “agonistic”. This is built on the civic, republican tradition of antiquity, in which the viva activa is divorced from the private life\(^3\). Society for Arendt is situated between the household, private life, and the state, or active life. The growth of the society sphere entails a shift from political action to a behavior that fits within pre-defined social roles. An understanding of the historical shifts from active to passive, private to public, are key to a re-injection of the public sphere. The agonistic public space was a competitive space where heroism and political greatness would emerge and assert themselves. This was the Greek agora or Roman forum, where the collective heroism from competition would supersede the frailties of the individual lives. However, Arendt, claims there has been a rupture from this history to today’s “associational spaces”, where cooperation, not competitiveness is the norm. Thus, the new public spaces are nomadic, not just restricted to the town hall, but to any environment in which action is taken in concert\(^4\). It is critical to understand the associational space within this lens because the constituency of who and who is not involved as a citizen or decision-maker has only continued to broaden as a function of time and “democratic” revolutions. It is within these spheres that knowledge and experience are imparted and decisions are reached.

The two models I have presented emanate from a classical perspective that considers modernity in contrast to a history that begins with the Greek

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\(^3\) Arendt (1958)
\(^4\) Benhabib (1992)
democratic civilization. In other words, public space began and in Arendt’s case reached its apex within the first traces of Western democracy. Interestingly, Habermas in particular and Arendt to some extent, both dismiss the private in lieu of the public personae. This raises questions of how decisions can be made without an infusion of personal wills and opinions, and moreover what kinds of decisions could be made without a deep level of diversity. As Nancy Fraser and others have argued in compelling critiques of Habermas, the public must necessarily must embrace its individual differences rather than dismiss them to truly formulate a common identity. Habermas’s public is largely white, male, and upper class, and thus he fails to examine other nonliberal, non-bourgeois, competing public spheres that exist in tandem, and therefore inappropriate as a description of contemporary society.

A multiplicity of publics is preferable to a single public sphere both in stratified societies and egalitarian societies. . . a tenable conception of the public sphere must countenance not the exclusion, but the inclusion, of interests and issues that bourgeois, masculinist ideology labels “private” and treats as inadmissible.

A further compelling critique of Habermas is articulated by Craig Calhoun, who argues that in keeping with the tradition of the doomsayers of the Frankfurt School, Habermas may have overestimated the degeneration of the media-saturated mid 20th century. His treatment of the Enlightenment era neglects a number of social scandals, crimes, and injustices, and in contrast his discussion of his own era neglects the possibilities to generate alternative media approaches toward democracy. In general, much like Fraser, Calhoun critiques Habermas’s lack of a pluralized analysis of his “public”. Social variance across themes as nationalism, religion, youth, and gender, have a significant amount to contribute to the possibilities of a meaningful public sphere, and thereby negate the binary public-private dichotomy.

It seems to me a loss simply to say that there are many public spheres, however, for that will leave us groping for a new term to describe the communicative relationships among them. It might be productive to think of the public sphere as involving a field of discursive connections.

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5 Fraser (1992)
6 Ibid (5), p. 137
7 Calhoun (1992)
8 Ibid (7), p. 37
Thus, an understanding of hegemony, social movements, and the nature of the diversity of individuals entering the public sphere would provide a much deeper insight into an understanding or promotion of a certain ideal.

To conclude this section, I point to other often recognized aspects of successful public spaces:

Multiplicity of Publics: As many have argued, those within the public must embrace their differences rather than dismiss them. The tribal power structure can be described as largely hierarchical, as I describe in Chapter 2, with a chairman who maintains ultimate political power over the direction of his or her tribe, and several commissions underneath to investigate issues of gaming, education, culture, etc. In terms of inter-tribal communication, these committees and the chairmen tend to dominate. However, there is no strong dialogue social categories and tribes within this setting. In otherwise, communication tends to be topical and within a social strata, rather than across multiplied publics.

Landmarks: The public space is identified by its landmarks. These are the environment around the space, elements within the space of differing colors, shapes, and labels. This refers also to the idea of symbology: there are persevering and powerful images that can be associated with the most powerful public spaces. These are images that can invoke an emotional, and in some cases, religious sentiment. The Palaver tree, sounds and smells of bazaars, sloped, alley-fed Campo of Siena, or incredible monuments of the Forum, all serve as examples. Thus, in the design of public spaces, it is critical to conceive of mechanisms that can allow it to be situated and distinct as a place. It brings to light a number of questions: What are appropriate landmarks to embed within the environment? Should these landmarks be derived from the nature of the community? information about its members? activity within the community?

Serendipitous and Dynamic Interactions: One of the beauties of the public space is the process of discovery and communication that could be made possible by its members. The idealized public space allows for dynamic interactions, which could not predicted or forecast and for communities to be formed based around their interlocking histories and shared narratives. Difference and similarities are all
articulated within the public space and as Arendt has argued, the private and public can collapse into the community that is being formed. Instead, of the individualized viva contemplative, the viva active takes precedence as the new exalted state. The successful public space allows for the associations between individuals to take place, potentially creating a community that can discuss and debate, and emerge as a political being. Thus, the successful public space can impose a friction and communicative discourse on a previously dissociated set of individuals.

Identity: In the virtual space, the identities of different members encounter complications. No longer are the sensory elements which physical proximity make possible, adding a level of mystery to the identity of members. The idealized public space, as conceptualized classically by Arendt and/or Habermas, encourages the development of a community identity while putting aside the private identities of different individuals. However, even though the individual in the public space can still maintain some level of privacy, their mere physical presence unlocks many mysteries about their identity which could potentially trigger communication and mutual understanding. The recognition of multiple publics can begin to take shape under such a model and a type of deliberative democracy, where dialogue and communication integrates the private and public lives of individuals and serves as a critical precursor to a successful public space.

Monumentality and the Everyday: I believe one of the most important aspects of creating, and fostering community lies in how its public identifies with itself as a larger unit. I describe this concept as the community’s “social fabric”. The “fabric” is what weaves the community together, and can manifest itself both in the physical form of the building or square, or through psychological and emotional constructs such as song, story, or shared values.

In the physical world, the monument is often identified as embodying the understanding of composition, history, and shared goals for a physical community. Communities tend to identify with spatial elements such as churches, memorials, and parks when they tell the stories of their collective selves. In all of these examples, the common history, interests, and stories that integrate a social group are symbolized in the monument, often referred to as a symbol of
collective memory. Architects such as Aldo Rossi have been celebrated for the monuments to collective memory they create, physical manifestations of a that which a community shares⁹.

1.2 Public Space and Ethnic Variance

As this dissertation is focused on the creation of a digital space for a community that maintains a specific ethnic and cultural set of traditions, I believe it to be useful to present a metaphor that has generated an effective public space in Northwestern Africa.

The Palaver Tree of Senegal and Western Africa:

A provider of shade and comfort to villagers mainly within the Senegal region of Western Africa, the Palaver tree has taken on a strong meaning to village communities within this part of the world. It very much is an embodiment of the “public” within this context.

A key socio-political institution of pre-colonial Africa, the palaver is an assembly where a variety of issues are freely debated and important decisions concerning the community are taken. Its purpose is to resolve latent and overt conflicts in certain highly specific situations. The participants usually gather under a “palaver tree” where everyone has the right to speak and air their grievances or those of their group. A complainant may opt to be represented by a griot (a poet, storyteller and traditional singer), or some other spokesman.¹⁰

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⁹ Moneo (1976)
¹⁰ Sopova (1999), p. 1
A massive tree that provides needed shade, the Palaver Tree has served as a public space within a variety of villages mostly in Northwestern Africa throughout history. A valuable place for shade and comfort, villagers would meet under the Palaver tree, settle disputes, make plans for the entire village, and engage in religious and ceremonial activities. The processes of communication were centered around this tree, and culture was imparted traditionally through the telling of stories. The Western African tradition, much like many others throughout the world, is an oral one, and the existence of the Palaver tree was integral to the preservation of this oral tradition across generations\textsuperscript{11}. This was done through a variety of performances, a precursor and analogue to the Greek system of theater. The role of performance has been central to African cultures,

\textsuperscript{11} Pratt (1987)
and for generations, Africans have been communicating through these media. The group traditionally takes preference over the individual in the village environments, and therefore the performance, which attempts to articulate a shared group history and culture, becomes the act which the Palaver tree gives space to.

Beneath the palaver tree misunderstandings were resolved and critical community issues were discussed under the direction of the village elders. Villagers explained points of view and together, through group consensus, reached a final decision. But the palaver tree stood for more than group decisions and problem solving: it was the place of festivals, the harvest celebrations and where the traveling storyteller would set his camp up in the evening to spin the tales of a place & time far off and free from the worries of rural farming. (Land, 1992)

Figure 2: Under the Palaver tree, festivities and rituals flourish

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12 Land (1992), p. 10
Figure 3: Central Palaver tree and its radial paths out into the village

It is notable in Figure 3 that the tree is placed at the center of the village, and that all paths are radial and move from the tree to the periphery of the village. As all paths lead to the Palaver tree, so too does community gravitate around the village center and its holy tree.

The Palaver tree was therefore a key institution of pre-colonial Africa but has been rarely recognized either within the colonial era or today’s postcolonial environment. Indeed, only Mali today recognizes the palaver as a legitimate form of public assembly. However, the role of this tree as a metaphor that inspired political and social engagement as well as cultural communication is undeniable.
and timeless. These realities have manifested themselves within the oral mythological cultures of the region.

Across the metaphor of the Palaver tree, a clear image emerges of a simple artifact or articulated form that can be associated with community, narratives, and the power of assembly. Story and public space are deeply intertwined. Not only do these spaces foster the exchange and creation of narratives, but in many times they themselves enter into the collective mythological and cultural lore to be passed onto future generations. Interestingly, many such spaces are notable for actually serving as physical teller and repositories for stories. The inscriptions of the hieroglyphs detailing the monuments of ancient Egypt are but one example of this point.

Other incarnations of the same metaphor hold. The Greek agora, Roman forum, and Islamic Bazaar have are all referenced within the Urban Western City Square. Common across all of these cases are the definition of a bounded place where exchange of all types can occur. Examples such as these have helped me formulate my design work as I search for the appropriate spatial form for the Native American communities with which I have been working.

### 1.3 Space as a Mediated Concept

In this section, I connect these preliminary understandings of public spaces with the story of contemporary social dynamics. An unprecedented movement of information, populations, and therefore ideas, has generated new theories of understanding space, and the role of the city and public space. Pundits have begun to recognize the emergence of new spaces, that reflect an epoch of juxtaposition, between the far and near, and before and after. Descriptions of space have begun to recognize their locations and positions within larger topographies.

The space in which we live...is also, in itself, a heterogeneous space. In other words, we do not live in a kind of void, in side of which we could place individuals and things...One could describe, via the cluster of relations that allows them to be defined\(^\text{13}\).

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\(^{13}\) Foucault(1967)
Michel Foucault invokes the term heterotopias of deviation to describe the types of spaces that have dominated contemporary society. A heterotopia is a space that cannot be summarily defined or captured (such as a utopia), but instead a space of deviation, difference, and reference. Dynamics such as colonization, population and cultural dispersal, and technology-aided information revolutions have generated spaces that are without a situated place of belonging. As an example, take the introduction of the mental hospitals of modernity. These were spaces that did not exist previously within a utopian system that failed to give space to deviance, and instead incorporated difference within the singular institution. However, deviance and difference have become recognized as norms, spaces have emerged accordingly.

The mantras of flows, grids, and networks have emerged in the literature to describe the nature of the environments of today. Together, they all point to the idea that an understanding of placement is inextricably linked to a set of relationships. Cardinality, topography, relative distances – these become the terms by which space is operationalized rather than completely localized measurements. While the Greek agora could be understood by its shape, total area, and program, today’s public spaces tend to primarily consider patterns of circulation, position within the city, and other dominantly relational concepts.

The discourse has thus shifted into one of classification, placement and a focus on systems of relationships and networks. Understandings of a concept, work of art, or achievement in science are intimately linked with an awareness of the process of mediation surrounding them. Bruno Latour has written extensively about the development of technoscience, and its irrational attachment to processes of standardization\(^{14}\). Geoff Bowker and Susan Leigh Star characterize the process of standardization as maintaining four major characteristics\(^{15}\).

(1) Ubiquity: Classification Schemes saturating the worlds in which we live.
(2) Materially textured: Standards are not just numerical but have a material force in the world, and their ubiquity ensures their power.
(3) Past as indeterminate: The creation of standards are often arbitrary

\(^{14}\) Latour (1996)
\(^{15}\) Bowker and Star (1999)
(4) Politics of classifying and standardizing

For Latour, the study of mediation is critical as the model of understanding the connected nature of ideas and disciplines. However, in the process, it has re-represented the mind and world, and presented fundamental opportunities for disciplines that were previously considered distinct and oppositional to inform one another. He speaks specifically about sciences and the arts:

When science was obsessed by what happened in the Mind or what was the case in the World, the distance with arts, especially the visual arts, was at its maximum. But when science began to be seen as a mediating visual activity, then the visual arts offered a fabulous resource... a vast common ground was opened, and, in recent years, a flurry of studies have “vascularized” the connection between visualization in science and the visual arts.\(^{16}\)

Thus, understandings and analyses of public spaces have to reconcile the variety of mediations with which they are surrounded. These include patterns of circulations, points of time within the day, nature of demographic ever-changing constituencies, nature and patterns of interaction, etc. The public space has recombined into a position within a network deriving other members from the city and around the world. The public space can be understood as a data-producing and regulating system, and the designer becomes the mediator of this ever-complex and dynamic process. Indeed, these ideas have been embraced and understood in the design processes of such influential figures as William Whyte\(^ {17}\), in his data-driven analyses to understand what makes public spaces in New York successful, Christopher Alexander\(^ {18}\), who articulated a pattern language to describe architecture and urban form, and Kevin Lynch\(^ {19}\), in his operationalization of the mental and cognitive maps that mediate the experience of each individual as he or she interacts with the larger city and its sets of public spaces.

1.4 The Shifting Experience of the City

Given these analyses and dynamics, how has the experience of navigating and exploring the city changed? What has happened to community and are the goals of the public space as articulated by the theorists in section 1.2 still valid or

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\(^{16}\) Latour (1998), p. 422

\(^{17}\) Whyte (1988)

\(^{18}\) Alexander (1977)

\(^{19}\) Lynch (1985)
attainable? Note that I use the term city as a description of a space characterized by a dense population. My invocation of the city largely applies to other units of population (villages, smaller towns, etc.).

A number of writers have been sharp in their critiques of the pace in which information flows and dominates. At the forefront is Paul Virilio, who believes that the paradigm shift toward immediacy and instantaneity has created a significant disorientation with our physical realities. There is no globalization, he argues, only a virtualization, the introduction of the illusory that is a precursor to a new type of tyranny. The concern with Virilio is that an overemphasis on “real-time” has compromised ‘real space’ or ‘real life’.

The specific negative aspect of these information superhighways is precisely this loss of orientation regarding alterity (the other), this disturbance in the relationship with the other and with the world. . .Up to now, history has taken place within local times, local frames, regions and nations. But now, globalization and virtualization are inaugurating a global time that prefigures a new form of tyranny.\(^{20}\)

Disorientation from the other, the world, and only a connection to temporality creates a deep virtualization that ultimately negates democracy, which for Virilio is grounded within discussion, an awareness of the issues, the larger population. The invisibility of the information controller raises the clear idea that as multinational corporations continue to control the speed and volume of the information that disorients us, citizens move further away from the fundamentals of democracy, community, and humanity.

Jean Baudrillard invokes a similar scenario with a more descriptive and less scathing tone.\(^{21}\) The simulacra are based on image, imitation, and counterfeiting. They have come to populate society, and have been materialized by the machine and augmented by the information network. The ultimate simulacra is one that is hyperreal, and maintains total control. This is when reality is perceived as the simulacra, and the simulacra thus exerts the complete, disorienting control that Virilio fears. Baudrillard thus articulates a reality that is obfuscating, and

\(^{20}\) Virilio (1995)  
\(^{21}\) Baudrillard (1988)
therefore in many ways in opposition to the demystification that Latour advocates when he calls for renewed study of the systems of mediation that surround the previously “absolute” institutions of science and art.

Given these theoretical introductions, what is the experience these and other writers invoke of navigating the city? Latour and Emilie Hermant’s “Paris, Invisible City” is a poetic description of the disorientation that emerges when the city as a network is imposed on the consciousness of the citizen\textsuperscript{22}. It wanders through the city, in texts and images, and allows the ordinary objects of the real city to be comprehended rather than filtered out as a function of some top-down paradigm.

The initial point of view doesn’t count; all that counts is the movement of images. All the images are partial, of course; all the perspectives are equal. . . Let’s rather say that the visible is never in an isolated image or in something outside of images, but in the montage of images, a transform of images, a course wandering through different views, a progression, a formatting, a networking.\textsuperscript{23}

Latour appeals for an understanding of the city as a montage of the array of images it holds. Instead of grasping for a collective, macro-level understanding, the city can be experienced via the mediation of multiple images, viewpoints, and the interplay between these.

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22 http://www.ensmp.fr/~latour/virtual/paris/
23 Latour (1998), Paris – Invisible City
Figure 4: Entry Page and Proportioning Node within a Sociological Web Opera
Generally speaking, there is a duality of understanding associated with the city. On the one hand, there are macro-level associations with the city – its name, size, geography, latitude, etc. But deeper understandings of the city, its public spaces, its communities begin to reveal the networked nature of all these urban levels, as a node characterized by flows of information, people, and resources. Thus, the demystification Latour promotes is highly symmetrical to the disorientation that so many theorists fear.

The practices of the situationists, as proclaimed in Guy Debord’s “Society of the Spectacle”, voice the placelessness of the public space and the urban unit. The spectacle presents itself simultaneously as all of society, as part of society, and as instrument of unification. As a part of society it is specifically the sector which concentrates all gazing and all consciousness. Due to the very fact that this sector is separate, it is the common ground of the deceived gaze and of false consciousness, and the unification it achieves is nothing but an official language of generalized separation. The spectacle is not a collection of images, but a social relation among people, mediated by images.

Using the techniques of the playwright Brecht, the situationists would call attention to the ubiquitous spectacle through their practices. Walking through Paris with a map of London, they would remind Parisians that being Parisian and identifying it as a discrete place and comprehensible entity was nothing but the gaze that dulls and confuses deeper consciousness.

A textured approach of interacting with the city is articulated by Michel De Certeau in “The City in Everyday Life”. This bases an understanding of the public space as a function of the everyday, the rich interactions within the social and cultural world of the communities within the city. The act of walking becomes the language of the spatial world, and allows one to discover mechanisms to circumvent some of the power structures that Foucault and others point to. The city is not completely sealed to De Certeau. Instead, there are mechanisms to escape from the dangerous technologies of control I have written about earlier. It is the act of walking that liberates, and that enables the discovery of new spaces.

24 Debord (1967)
25 De Certeau (1984)
that connect the city and enable the citizen to grasp and be empowered within it. Resistance, therefore, for De Certeau, is not about ‘oppositional culture’ but about a deeper understanding of the pluralized powers within the city.

Between the symmetrical errors of archaistic nostalgia and frenetic overmodernization, room remains for microinventions, for the practice of reasoned differences, to resist with a sweet obstinance the contagion of conformism. . .Each of us has the power to seize power over one part of ourself26

Thus, an attendance to the practices of everyday life, enables the obscurity of social activity to be penetrated and understood, potentially realizing the goals of empowerment held within the utopia of public space.

1.5 The City, New Media, and Social Networks

However, what is clear amidst this discussion is that a combination of social, economic, and political trends have created an environment that has called for a new understanding of community that exceeds neighborhood. The individual has become a member of multiple social groups today, many of which need not be defined by local boundaries. While this phenomenon is not unprecedented, the level to which it has expanded is notable. The field of social networks has appropriately surfaced as a useful means of analysis of these new dynamics. Social networks measure the actor’s position in a network of connections, some of which may be interconnected themselves. The network metaphor has come to describe the new social condition of the individual who receives and provides resources from/to other distinct actors. Social networks are a useful contemporary methodology because they allow for the visualization and understanding of the complexity that characterizes the individual’s relationships with others. Enabling these new dynamics are new networked technologies, which serve as “mediators” of new social networks that are being consummated and upheld. There are characteristics of the digital network that are unprecedented: it allows for instantaneous exchanges and accesses of greater amounts of information than ever considered before, invoking the “Infinite Library of Babel” metaphor of Borges27, while also raising alarms among such theorists as Virilio.

26 Ibid (25), p. 213
27 Borges (1938)
Several layers of communications technology have thus inserted themselves onto the urban fabric, creating a new situation that calls into question how the role of the city (and more specifically its public spaces) is changing given these circumstances. It is this dynamic that Latour is focusing in his Paris, Invisible City. As new communication technologies have surfaced, the network phenomenon has continued to proliferate in the urban sphere. Notions have surfaced that describe the city as a set of carefully developed nodes that follow a set of patterns, and many have lamented the supposed fragmentation which they claim characterizes the postmodern city. Christine Boyer, for example, argues that “there is less reason to be sanguine about the liberating potential of the new technologies of mass communication, because electronic communication disrupts critical awareness.”

Saskia Sassen fleshes this assertion out in her “Electronic Space and Power” where she argues that electronic space is not just a mechanism of transmitting information, but also a vehicle in the distribution of the global social and economic power structure. The internet, therefore, is a space of contestation, and the relative power over networked infrastructures by the elites (global alliances and corporate power) have widened a digital divide, and appropriated a medium with democratic potential into a stratifying force.

Such criticism is laden with panic about the presence of new types of networks and based around the belief that these disrupt traditional communication within the city. What this analysis misses is the important point that the village unit has always been connected to a network of infrastructure, whether it was through a kingdom, traveling bard, or agricultural trade. The development of cities follows the metaphor of networks closely. This is not merely restricted to how the city adapts to new computer-based communication networks, but to other types of networks that have manifested themselves historically in urban life. Cities need to exploit networks to thrive, and urban innovation is often geared to resolve a discontinuity between the city as is and a new technology that has been introduced. Thus, the adaptation of the city is dependent on its exploitation of infrastructural networks that emerge. As people use a city for social or economic

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29 Sassen (1999)
exchanges, they are interacting with rich networks that have been laid down over many years.

Cities are the summation and densest expression of infrastructure, or more accurately a set of infrastructures sometimes working in harmony, sometimes with frustrating discord. . . The infrastructure is a reflection of our social and historical evolution. It is a symbol of what we are collectively, and its forms and functions sharpen our understanding of the similarities and differences among regions, groups, and cultures. . . Equally important and subject to change is the “software” for the physical infrastructure.

A number of scholars argue that the historical pattern is one of urban recombination. For example, the water well, a traditional agora within the village, was fragmented as the network of home plumbing manifested itself. The village was forced to recombine in this situation where the network of plumbing would be included with the urban infrastructure and new agoras for socialization could be re-discovered. The most contemporary new technologies, whether web-based or mobile, have had similar effects in producing a recombined city.

This latest layer will shift the functions and values of existing urban elements and radically remake their relationships. The resulting new urban tissues will be characterized by live/work dwellings, 24 hour neighborhoods, loose-knit, far-flung configurations of electronically mediated meeting places.

This imagery is certainly in stark contrast to the great American cities that Jane Jacobs writes about, with their sidewalks serving as the powerful collective public spaces for the neighborhood. However, the deeper insight comes from understanding the nature of the effects of these recombinations. In particular, the topic of community emerges - - Has community been compromised or damaged in our information technology-dominated era?

To approach this question, a definition is useful. What is the relevance of community and how do I define it? I define community as a set of individuals with a shared set of interests, values, or ideals. One’s community can be characterized as the group that shares these values with the interest of providing sociability, social support and social capital. The key aspect to community is one of a shared imagination around collective cultural, political, and social values.

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30 Herman and Ausubel (1988)
31 Mitchell (1999), p.7
32 Jacobs (1962)
Traditional notions of community limit its definition to the scale of neighborhood, which imposes the bounds of spatial proximity.

Communities are integral in the maintenance of an individual’s social capital, a term that describes an individual’s ability to access needed resources, whether they be material, physical, or emotional/psychological. Social capital has begun to flow to the individual from numerous sources, as he or she has become a member of multiple communities, and a significant amount of research has surfaced to show what are advantageous vs. disadvantageous configurations of the individual’s social networks that maximize this property.\(^{33}\)

Within this dissertation, I argue strongly for a definition of community that is more fluid and less limited than a social network-based measurement. I believe that community must be defined with a cognizance of the social and cultural context. As I explain in section 1.1, articulating community is dramatically different for a set of dispersed Native American reservations than it is within the broader context within which the term is currently being discussed.

The above definition of community does not preclude a community where resources are shared and support is offered without physical co-presence. Thus, stimulated by the emergence of new information and communication technologies, the term “virtual community” has begun to enter the literature. I define the virtual community as a space of association or interaction that is mediated by digital technology. In general, the discussions of how new media affects communities has been fraught with disagreement. Some pundits have argued that networked media is ill-suited for the expressive, emotional actions that are fundamental to the sustenance of community,\(^{34}\) while others have seen it as integrative and rich as a mechanism of connecting people\(^{35}\). My belief is that new media can strengthen already strong connections; open up new previously

\(^{33}\) Putnam (2000)  
\(^{34}\) Kraut (1998)  
\(^{35}\) Wellman(2001)  
\(^{36}\) Haythornwaite(2002)
“latent” connections\textsuperscript{37}, and make possible rich communities that only meet across the online space \textsuperscript{38}.

Only a few studies have examined the impact of Information and Communication Technologies (ICTs) on local neighborhoods, but there are a few relevant benchmarks in this research. Hampton et al.’s study of four Boston-area neighborhoods (E-neighbors) has shown that internet use can have both positive and negative effects on local communities depending on whether the how interactive the type of usage is (e.g.; chatting or emailing vs. watching videos)\textsuperscript{39}. Regardless, the finding that community does not have to be physically bounded does not mean that local communities are necessarily disenfranchised. In fact, several studies in underprivileged neighborhoods\textsuperscript{40} have demonstrated that ICTs can empower local neighborhoods to share assets, communicate about issues, and feel more of a sense of community. Finally, the now famous Netville study has shown that residents of a wired suburb can expand their social networks to include those that are in the neighborhood and far away\textsuperscript{41}.

The sociologist Robert Putnam has written a considerable amount about the impact that social bonds have on a number of life satisfaction indicators. He argues in his book, Bowling Alone, that American society has become disconnected from the traditional means by which people receive social affirmation. These have included family and friends, recreational leagues, political parties, and religious institutions. This allows Putnam to define the important concept of social capital:

Whereas physical capital refers to physical objects and human capital refers to properties of individuals, social capital refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them . . . A society of many virtuous but isolated individuals is not necessarily rich in social capital\textsuperscript{42}

The core idea of Putnam’s theory is that heightened intra-community interaction generates a greater social capital, and that any process that changes a community’s social network dynamics, affects its social capital.

\textsuperscript{37} Eveland & Bikson (1988)
\textsuperscript{38} Smith & Kollock (1999)
\textsuperscript{39} Hampton (2003)
\textsuperscript{40} Pinkett (2001), Shaw (1995)
\textsuperscript{41} Hampton & Wellman (2003)
\textsuperscript{42} Ibid(33), p. 19
Putnam finds a decline in civic, religious, and political participation across American society. This is dangerous because the loss of these connections indicates the loss of social capital, which Putnam argues is linked to significant problems that affect communities. Communities with less social capital have lower educational performance and higher crime rates, among other phenomena\textsuperscript{43}.

Putnam also expresses a relationship between lower social capital and an increase in television usage. However, the link between the telephone or a networked computer, and social capital is murky because these media are more interactive. Theorists have argued that social networks can be both created and supported by computer sources, through their sharing of information resources, and creation of common spaces that never existed previously where people can communicate\textsuperscript{44}. What is clear across the literature is that the city has been unmistakeably altered with the social, economic, and technological dynamics discussed. Having introduced material related to the urban and resource-related understandings of community, I shift my discussion to focus on cultural dynamics that have affected community.

1.6 Focusing on Community

I have defined community in this dissertation (in section 1.4) as the shared values, ideals, and beliefs shared amongst a group of individuals. Traditionally, community has been conceived of as neighborhood-based, as already discussed, as well as strongly tied to common cultural background. Arjun Appadurai’s essay “Disjuncture and Difference in the Global Cultural Economy”\textsuperscript{45} focuses on the cultural implications of the global flows of information and capital. These dynamics have created a deterritorialization of the traditional ethnic and local notion of community, instead introducing several “landscapes” of global cultural flow. These include:

\begin{itemize}
  \item \textsuperscript{43} Ibid(33)
  \item \textsuperscript{44} Wellman (1999)
  \item \textsuperscript{45} Appadurai (1989)
\end{itemize}
Ethnoscapes: Defined as the landscape of personal who constitute the shifting world we live in as international capital shifts (i.e; tourists, guestworkers, exiles, etc.)

Technoscapes: The global uneven configuration of technology, moving at high speeds across all boundaries, but in an uneven manner.

Mediascapes: Image-centered, narrative-based accounts of reality stimulating an imagined life, a description that invokes Latour and the Situationists’ poetics of the city.

Ideoscapes: Political imagery – terms that have emerged from the creation of new nation-states such as sovereignty, democracy, etc.

Appadurai’s argument is that culture and community have shifted from the traditional ethnic basis to a focus around those mediated by the various –scapes. He points to the struggle by the Sikh population worldwide to further the cause of an independent homeland (Khalistan) within India, although the population is only connected as a function of the mediascape of a common cultural ancestry and essentially disconnected from the details of the climate within the ‘homeland’ India.

These landscapes thus, are the building blocks of what, extending Benedict Anderson, I would like to call ‘imagined worlds’, that is, the multiple worlds which are constituted by the historically situated imaginations of persons and groups spread around the globe46. Appadurai’s insights reveal that ethnicity and locality can no longer be considered the fundamental or dominant precursors to community. Instead, community is ‘imagined’, mediated through the imageries of the mediascape, ideologies of the ideoscape, and ever-shifting demographics of ethnicity and information. I believe it is critical to shed further light on my discussion of community as “imagined”. My use of the term “imagined community” comes directly from Benedict Anderson, whom Appadurai himself references above. Anderson articulates a critical model of understanding community as formed around a constructed imagination47. His development of his central idea is largely based around the

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46 Appadurai (1989)
47 Anderson (1991), p. 6
analysis of the newly formed nation states of Southeast Asia from the late 19th
to early 20th centuries. Unlike the tenets of religion, nation, for Anderson is not
grounded in a strong philosophical, intellectual, or mythological tradition. Thus,
the creation of “nation” in this era necessitated imagination – constructing a
tradition, developing institutions that could legitimate the new nation as an
independent sustainable entity. The nation is imagined because “the members of
even the smallest nation never know most of their fellow-members, meet them,
or even hear of them, yet in the minds of each lives the image of their
communion. . .Gellner makes a comparable point when he rules that ‘Nationalism
is not the awakening of nations to self-consciousness: it invents nations where
they do not exist.’

I believe that Anderson’s postcolonial analyses can be very suitably applied to the
context of my research. It would be impossible for every tribal individual within
San Diego county to know or meet every other, particularly because of the
significant infrastructural dynamics of fragmentation I point to in the next
chapter. However, for community to be generated and sustained, a common
imagery and sense of collectivity is integral. Anderson explains through his
discussion of nation-state formation that media served as a key generative
factor:
What, in a positive sense, made the new communities imaginable was a half
fortuitous, but explosive, interaction between a system of production and
productive relations (capitalism), a technology of communications, and the
fatality of human linguistic diversity.

In the specific example of the new French democracy, Anderson explains that
solidarities were visualized through general themes, ideals in a largely ad hoc
manner. Print media in this case produced the faith in the brotherhood,
fraternity, and belief in common ideals of the nation. This was accomplished
without the philosophical and developmental discourse that is integral to religion
for example. The potential to reach, and instill belief in the nation is only
extended with the introduction of communications technology. Thus, media and

48 Ibid (47), p. 30
49 Ibid (47), p. 43
the creation of such institutions as the museum, census, or map were critical in
the imagination of community.

These analyses are appropriate for my focus on the fragmentations that
characterize the tribes of San Diego county. I am interested in the effect of
applying Anderson’s analyses as a basis for my work with the web, a medium
that is more instantaneous and “two-way” than broadcast-driven television and
radio. Can the web provide a means for imagining community that further
catalyzes the developments Anderson points to? And can this work within the
environment of fragmentation that characterizes the Native American
reservations of San Diego County?

I recognize that this is different than other definitions of community, particularly
those emanating from the urbanist and social network-driven paradigms. The
urbanist paradigm assumes that community is fundamentally based on physical
density, and that the urban environment and its concentrated public spaces
engender the neighborhoods that are critical to developing community. The
social-network approach, however, is focused on sources of support, arguing that
the community is the summation of all other actors that provide support to the
given individual. Given this, it is very rare that two individuals would belong to
the identical community – only in the case that two social networks were exactly
the same. I believe that this is an appropriate definition when the scale of
analysis is more global and variant. However, because of the domain of my
research is tightly bounded to reservations within the San Diego County, it is
appropriate to focus community on the history, connected issues, and shared
future goals rather than more individually variant criteria. As the nation state was
imagined around ad-hoc, politically adjudicated borders, I imagine community
around the checker-boarded tribal geography and reservation borders.

Given this goal, it is appropriate that I utilize an imagery-based definition of
community throughout this dissertation. I argue, particularly in Chapter 2, that
the disconnection and separation of the tribes of San Diego county, make a more
individual-individual network-based definition of community less applicable than a
definition that focuses on exposure to shared values, histories, ideologies, and
imageries.
Therefore I re-invoke my definition of community as the exposure to and belief in a shared set of interests, values, or ideals. I operationalize and evaluate the merits of my work relative to this definition by studying the relative effects of Tribal Peace on specific aspects of these shared interests, values, and ideals. This is done through both explicit and latent analyses. The latent analyses involves studying the ways in which the usage of the Tribal Peace system has changed as a function of time and connecting this to my definition of community. In contrast, the explicit analyses involve traditional social-science approaches of survey, interview, and participant observation as a process of reflexive ethnography, one which acknowledges the researcher and his or her role. With the guidance of tribal leaders, I have evaluated the level of familiarity and comfort with different aspects of community before, during, and after the deployment of tribal peace. My criteria, experimental deployment, and analyses will be described in detail in Chapter 6 and Chapter 7.

I end this chapter with a few words on the importance of acknowledging the social and cultural context within which this dissertation is embedded. The research I write about in this dissertation involves a collision of systems, cultures, and perspectives between the most advanced technical and scientific approaches toward information representation within a web-based technology and the history, infrastructure, landscape, and cultural bases of the indigenous peoples of Southern California. The two are not fundamentally inconsistent, but what has become clear from my research is that the power of technology-mediated community is deeply related to how it is designed for the socioeconomic aspects of the peoples with whom I have worked. As Anderson has made clear, new media and institutions have had a radical impact on their constituent communities, but I argue that these impacts would not be felt if the basis for imagining community was not deployed in a harmony with the existing geography. Designing a digital environment in this research cannot be restricted to the language of computer science, virtual reality, or virtual communities. Instead, it must be about ways in which media can advance existing trajectories and intervene to catalyze a nascent discourse.
Thus, I end Chapter 1 with my research question: How can new media be designed to generate place and community within an environment of spatial and temporal fragmentation? I investigate the thesis that to be successful it must merge with the (1) ontologies of the community and (2) its existing networks of sharing and recommendation amongst members.
Fluid Ontologies for Digital Museums

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Abstract

With the advent and accessibility of the Internet, artistic and indigenous communities are beginning to realize how digital technologies can be used as a means for documenting and preserving their histories and cultures. However, it is not yet clear what knowledge architectures are most appropriate for creating a digital museum in order to facilitate an effective collection, organization, conservation and experience of cultural and artistic heritage. In this paper, we discuss the concept of „fluid ontologies,“ a novel, dynamic structure for organizing and browsing knowledge in a digital museum. Fluid ontologies are flexible knowledge structures that evolve and adapt to communities’ interest based on contextual information articulated by human contributors, curators and viewers, as well as artificial bots that are able to track interaction histories and infer relationships among knowledge pieces and preferences of viewers. Fluid ontologies allow for a tighter coupling between communities’ interests and the browsing structure of a digital museum. We present the key ideas behind the use of fluid ontologies within the context of digital museum design, and discuss these characteristics in three concrete examples: (1) Village Voice, an online agora that ties together the narratives created by a group of Somali refugees using an iteration of community-designed ontologies, (2) Eventspace, a node-based collaborative archive for design activities, and (3) Kumeyaay Diaspora, an online digital museum that uses proactive agents to tie distributed Kumeyaay reservations together in their quest to achieve greater political sovereignty.

Keywords

Ontologies, Metaviews, Dynamic Data Structure, Digital Museum, Online Exhibits, Cultural Heritage, Knowledge Representation, Information Visualization
1 Introduction

One of the key challenges in creating a digital museum is the design of its underlying architecture\(^1\). What should a museum collect and how should it organize cultural heritage? This is a problem that digital museums have in common with digital libraries, and much of the recent research efforts in both fields have focused on datamodels and meta-models for structuring digital information\(^2\). Indeed, there is a proliferation of powerful museum archives that are now more available than ever via the web. Projects such as the Ellis Island Archive\(^3\), or Experience Music\(^4\) have surfaced to tie past and present across a wide variety of individuals whether they be immigrants or musicians. Concurrently, there is a significant amount of research being done in fields of knowledge representation and ontologies. These span deeply formal models of describing the world and the relationships between its attributes. For example, CYC, developed by the Cycorp corporation, is one of the largest knowledge representation databases. Its goal is to construct the foundations of basic common sense to relate all the pieces of knowledge within the system. This involves a massive mélange of terms, rules, and relationships\(^5\). Another relevant project is the Open Mind Common Sense project\(^6\) which is an attempt to provide computers the millions of pieces of ordinary knowledge that humans know as “common sense.” Marvin Minsky, in Society of Mind, defines common sense as “actually more complex than many of the intellectual accomplishments that attract more attention . . . because the mental skills we call "expertise" often engage large amounts of knowledge but usually employ only a few types of representations. In contrast, common sense involves many kinds of representations and thus requires a larger range of different skills\(^7\).

While these two poles of projects are both fascinating, we find a growing rift between the advances of AI-driven knowledge representation modeling and the increased digital presence of museums. Thus, we believe that there lies great potential in a synthesis between these two. In this vein, only a few projects have surfaced as useful benchmarks for our discussion. For example, The Dublin Core metadata project\(^8\) has attempted on a large scale to create a new interoperable set of standards to tie distributed content together by worldwide creators. The
successes of this group are truly admirable, and serve as a first solution in the quest to create cross-referenceable, deeper repositories of knowledge. Another interesting example is a prototype system developed by Hunter and Newmarch to extend metadata models on top of the Dublin Core successes to audiovisual content present within the State Library of Queensland, Australia. The organization of digital museum collections was discussed in Hong, Hsiang and Chen’s XSL-based Multi-Presentation Content Management System (XMP-CMS). This approach would enable curators to effectively create exhibitions of different presentation styles, with an understanding of how to select a variety of different pieces by treating them as communicative objects. Indeed, other standards such as IBM’s Digital Library, and the W3C’s Resource Description Framework exist to effectively integrate heterogenous content.

The approach presented in this paper offers a shift from these research efforts in that instead of focusing on the development and definition of clear but fixed standards for structuring information, the main motivation for this research has been in liquifying such structures and designing „fluid ontologies,“ i.e., processes for letting knowledge structures emerge from the interaction with the very communities that is using the digital museum. We believe that an ontology that is truly adaptive and reflective of the priorities and hierarchies of the participant (museum visitor, curator, or contributor) can serve as the key architecture behind making the digital museum experience truly powerful.

In the remainder of this paper we describe the key ideas behind fluid ontologies, show how these ideas are realized in sample online cultural heritage and artistic community projects, and discuss their implications for the future design of digital museums.

2 Key Ideas

One of the most important characteristics of fluid ontologies is that they are not predefined but emergent (and adaptive) structures for knowledge representation. There are four key ideas that form the basis for fluid ontologies. Although these ideas can be seen as independently and empirically testable hypotheses, they are
treated here as general design premises. They are listed and briefly described below. In the next section, we describe concrete projects that use them.

(1) Involvement of content creators. The ontology can become richer if the content creator is directly involved in its definition. By letting the creator or collector of content participate in the definition of the knowledge structure and indicating where his or her piece of knowledge fits in, we gain additional insight about the context for the new content and how the pieces relate to each other. Individual pieces of knowledge no longer stand alone in this model but instead are interrelated in the collective fabric of the entire exhibit.

(2) Sharing metaviews. The browsing and learning experience can be significantly enriched if the views each participant creates of the available knowledge and the way the participant makes sense, browses and rearranges the knowledge are made explicit visually and can be accessed by others.

(3) Adaptiveness. Ontologies that adapt and are continually redesigned in time can be more useful than static ontologies. How people make sense of the world often evolves over time as a function of what they experience.

(4) Bots and Personalization. The use of artificial bots and proactive agents that track and analyze interaction histories can effectively help adapt and fine-tune the dynamic evolution of ontologies. By integrating and learning from interaction histories, we can dynamically generate ontologies that correspond to the different viewers’ profiles and preferences and anticipate expectations and interests.

3 A First Example: Village Voice

To illustrate the ideas of fluid ontologies described above, we provide in this and the two next sections examples of how these ideas have been applied in real projects for the collection, preservation and exhibition of cultural heritage. The first project is Village Voice, a dynamic, expanding archive of community-submitted narratives developed as part of Srinivasan’s M.S research at the MIT Media Laboratory. This project was designed, developed, and evaluated within a Somali refugee community based in the Boston metropolitan area.
3.1 The Village Voice Ontology

Village Voice serves as a useful first example of „fluid ontology“ because it is structured to represent its content based on the manners in which content creators (community members) articulate their own cultural realities. It builds upon the growing movement in community publishing and storytelling. A number of studies have demonstrated that empowering communities to create their own stories stimulates a process of reflection, which in turn facilitates the sharing of values, knowledge, structure and dreams. However, it also builds on the concurrent technical movement in knowledge representation and ontology-focused research. Village Voice then is the intersection of how to apply the power of a fluid ontology to a set of community-created narratives.

In the case of Village Voice, ontology can be seen as a conceptual map where the links between individual pieces of knowledge are delineated. An assumption researchers in this field make is that knowledge is without meaning unless it is contextualized. The specific nodes in the structure need to be understood along with the links that tie them together. Roger Schank explains that through ontology, we make sense of the world. Information that we encounter is understood through our own internal “data structures”, which he calls scripts. In contrast, to these ambitious projects that attempt to map universal knowledge, the Concept Maps approach involves the creation of diagrams that can represent specific concepts and their interconnectedness.

The idea of creating formal, relational links between concepts was an inspiration to Village Voice. Instead of basing community contributions and their interrelations around ad-hoc indices, Village Voice would allow the community member or other user to interact with material based on how the community itself articulates the relationships within its different pieces. When continuously populated with their stories, ontology becomes a dynamic structure that is used by members to model the evolution of their community. As the focus of the study was to test whether a community-created model could be a strong foundation for the design of such a multimedia narrative system, Srinivasan sought out the Somali refugee community in the Boston area, a population of approximately 3000 to 5000. Refugees today are victims of a civil war that has torn apart these
families and decimated a once thriving culture. This community has dramatically expanded over the last five years due to the civil war in Somalia. According to community members, there is a desire to archive their experiences as they face new challenges in the United States. They wish to find a means to tell stories to their community, as well as to incoming refugees and others outside of the community. Traditionally, story has been orally transmitted in Somali culture, so the use of a medium that records and retells story is new to them.

Thus, a set of video stories was created by a variety of community members. Very few instructions were given about the pieces except that they should be focused on issues relevant to their collective community. The goal was to use these stories to stimulate the design of a set of representations, or a fluid ontology, that could illustrate the intersecting issues of the community and could be altered and modified as the community’s priorities evolved.

As the community would meet over several sessions the role of the fluid ontology became clearer. Each session began with an explanation in Somali to remind participants about the purpose of the project. The movies were then shown on the VHS tape, and participants were encouraged to pause, stop, or repeat the video at any time. They were instructed to do this whenever they felt an issue that was relevant for their community was revealed in a story. During the pauses, the community would discuss the videos they were watching and craft a part of the ontology diagram on the white board in the front of the classroom. During these discussions, the community would come to a consensus on whether an issue that had come up should be included in the ontology. For example, one story was set at a Somali youth party. It showed teenage men and women dancing together dancing to hip hop music. The idea of a youth dance party without Somali music was disagreeable to some of the participants because of its disrespect to the Islamic taboo of pre-marital relationships, while most of the youth at the meeting argued that one could have a pre-marital relationship without being disrespectful to Muslim culture. During this discussion, the participants decided that issues of religious tradition, sexuality, and generational differences were relevant to the ontology. These topics were then added to the ontology and linked to each other on the white board. The drawn structure changed multiple
times in the process, as the community members reflected further on the issues that united them. The initial community ontology appears as follows:

![Somali community ontology](image)

**Figure 1** – Somali community ontology

It is important to note that this was merely a first iteration within the process of creating a set of fluid ontologies to anchor the content that began to populate Village Voice over time. However, as we assert in Section 2, Village Voice represents several attributes within our characterization of fluid ontologies. Its explicit focus toward author/community articulated knowledge design enables the contributor to be involved in the exhibit design to an unprecedented level. Additionally, the potential to share meta views during this process of iterative ontology design is made possible through the process and technology discussed. Finally, it is important to state that within this project the community of authors is given the ability to continually redesign and update the collective ontology. As priorities and goals are changed, the collection of narratives are empowered to change their relative meanings. This creates a level of fluidity where the exhibition can be responsive to the iteratively updated knowledge architecture.

### 3.4. Prototype Technology

To integrate the content submitted and fluid ontology, a simple web portal was created:
Village Voice is entered via a “search” page. This page is organized hierarchically, according to the tree-based design of the fluid ontology. The user can select multiple nodes from the ontology tree that he or she is interested in watching stories about.
This leads to the main browsing interface, designed to illuminate complex interrelationships between different topics visually. The browsing page is designed to give the user a wide range of information about the different video stories by displaying each story’s thumbnails, while conveying their relationships to each other. Each thumbnail can be selected, so that it can be streamed in an adjacent frame, or so that audio responses from other community members can be listened to. As seen in the image below, the thumbnails are illuminated to varying levels. This is reflective of how closely each thumbnail corresponds to the terms the user decided to search on in the search page. A brighter illumination indicates a closer match with the search query.

### 3.5. Evaluation

To assess whether the fluid ontology serves as a more attractive design for the visitors and contributors of the digital exhibition, a simple experiment was designed. Over a week, approximately 100 community members were asked to each browse the ontology-focused Village Voice and a control keyword version that would only organize stories based on the words most often stated within them. Before using either version, the subject would log in to the system with an anonymous name allowing the ability to monitor the sequences of stories the subject browsed, how long he or she stayed logged on, and how many stories were played.

This data shows the mean and standard deviation values across the subjects of the number of stories browsed, number of stories played, and time online for the keyword (KW) and Village Voice (VV) versions. The values for time online are expressed in terms of seconds.

<table>
<thead>
<tr>
<th></th>
<th>Mean value</th>
<th>standard of deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>KW time online</td>
<td>263</td>
<td>205.36</td>
</tr>
<tr>
<td>VV time online</td>
<td>967</td>
<td>891.39</td>
</tr>
<tr>
<td>KW # clips browsed</td>
<td>2</td>
<td>0.697</td>
</tr>
<tr>
<td>VV # clips browsed</td>
<td>7</td>
<td>2.719</td>
</tr>
<tr>
<td>KW # clips played</td>
<td>1</td>
<td>0.433</td>
</tr>
<tr>
<td>VV # clips played</td>
<td>3</td>
<td>0.788</td>
</tr>
</tbody>
</table>

Table 1 – Mean and Standard of Deviation values of Village Voice versus control

This data shows a higher engagement for subjects across-the-board with the fluid ontology version of Village Voice. It appears that fluid ontologies inspire a
greater engagement with the digital exhibit. This example thus begins to confirm our assertions that fluid ontologies can serve as an empowering mechanism for the creators and visitors of the digital museum.

4 Example Two: Eventspace

Where Village Voice explored the idea of a community driven ontology that is designed and redesigned based on consensus, our next example, Eventspace, explores the ideas of fluid ontologies within the context of a bottom-up online exhibit. In this example, a multiplicity of ontologies co-exist in parallel that are created in a decentralized fashion. The objective of using fluid ontologies in this fashion is to collect and exhibit not only the evolving artifacts created by the community of artists but also their processes of creation and perspectives. We want to enable individual artists to do three things:

1. place their contributions in the larger context of a digital museum, i.e., precisely situate where their own contributions fit in
2. structure the "larger context" of the online exhibits from their own perspectives and in their own voice, i.e. create and communicate their "metaviews" of the existing artifacts to others, and
3. use those views to stimulate collaboration on art works, i.e., based on an increased understanding of where each contributing artist is coming from, encourage joint projects.

4.1. System Overview

System Architecture. Eventspace evolved in two stages. The first version was written and refined between 1995-2002 using open-source software at the Swiss Federal Institute of Technology: MySQL, Apache Server, PHP and HTML. This version is described in [Spicer and Huang 2001] 18. The second version, currently under development at Harvard Design School, Center for Design Informatics, uses a Flash frontend, Actionscript/Coldfusion, and Oracle database. It currently exists in a prototype form and has been tested in two academic experiments.

Functionalities. Eventspace features several functionalities that empower members of the online community to post digital artifacts in an open online exhibit visible to all participants. Each submission, or node consists of a particular
set of required elements, as specified by the community leader or curator. For example, a digital arts exhibit might define a node as a combination of a graphic file (image, 3D model, animation), url, and text description. The database automatically records for each node submitted its author, the time of submission, and whether it was an original ‘creation’ or a continuation of a previous node.

Figure 4. A single submission, or node, showing a) on the left, previous nodes on which this node has been built; b) the comments on this node; and c) on the right, later nodes which built on the ideas or files implicit in this node.

Eventspace has built-in uploading mechanisms that enable participants to contribute on-going exhibits in one of three ways: by posting submissions (nodes), building on the nodes of others, or commenting on the submitted work. This system builds on the understanding that each participant brings different skills to the exhibit: some are best at producing original ideas (creators), others at building on the ideas of others (advancers), while still others are most skilled in critiquing the work submitted (reviewers). Every node retains a record of a) all the previous nodes from which it is derived; b) all the comments made concerning that particular node; and c) all the later nodes that built on ideas or files contained in the current node.
Default Ontologies. What emerges from such a structure is a chronology of the emerging online exhibition: a visualization of the “genealogy of ideas”. This genealogy is a graphic representation that clearly identifies a network of individual submissions leading to the final collectively authored exhibit. Eventspace encourages interaction and collaboration among participants. It must be noted that such collaboration also contains an element of Darwinian competition: when artists can easily view and compare all the ideas (nodes) proposed by their peers there will be a process of natural selection as participants choose which ideas to build on and which to neglect. Eventspace adds to any online exhibit the ability at any stage in the creation process to make completely transparent the authors who have contributed to a given submission and the ideas which have been most influential in shaping the outcome of the collaborative project. There are three basic representations of the nodes that participants can choose as defaults: organized by time (chronological genealogy of ideas), by people (who contributed what), and by keywords (as specified by contributors).

Metaviews. In addition to the default ontology with its three default views, Eventspace provides each participant with the ability to dynamically construct an overview of the existing nodes, or what we call „metaview“ of the existing body of knowledge and share those views with the community. The tools are based on the database driven architecture of the online exhibit, and allows participants to rapidly script (using Actionscript) metaview templates for organizing and viewing the nodes.

4.2 Sample Application

Our first and most fully developed application of these ideas is in the context of two class projects at Harvard Design School and the Department for Visual Arts that we use to test our ideas of fluid ontologies.

Background. We chose the academic context as a testbed because of its accessibility, controllability and because making work in progress explicit and learning from one’s peers have traditionally played a significant role in the education of artists and design professionals. Artistic and design knowledge is tacit by nature and difficult to make explicit: it cannot be lectured in a classroom.
and is best taught through hands-on experience, trial and error, and peer-to-peer interaction. The physical space of the artist’s or designer’s atelier was specifically designed to meet these pedagogical challenge of teaching. Its open studio space fosters the constant exchange of ideas around student works in progress that is an essential aspect of the arts studio experience. Eventspace in this context encourages peer-to-peer interaction by engaging participants in collective projects that demand the combined resources of several students working as a group. These groups can be assigned by the instructor, or they can be formed by the students as the need arises for collaboration on a particular task.

Figure 5. Sample metaview by one of the participants: Visualization of the available knowledge node as a three-dimensional city-like visual structure. Each „building block“ represents a knowledge entry. On mouse click the content is shown in the right window, together with related nodes.

In our test cases, we used Eventspace in the following three ways that we introduced gradually as the semester progressed.

(1) First, we introduced Eventspace as a collective curation tool. Participants were asked to post nodes containing interesting art works that related to the subject of the class, and post them as nodes on the online exhibit.

(2) Second, we used Eventspace as a online conversation tool to stimulate discussions around the nodes posted. Here participants assumed different
roles, that of creators, advancers and reviewers, as mentioned above. Creators would continue to post new nodes that may contain their own arts projects, advancers would take an existing posted node and develop it further, and reviewers would critically comment on an existing node.

(3) And finally, third, we introduced the metaview idea. Each participant would create a metaview of how they viewed the nodes and nodal relationships. Such metaviews could be „snapshots“ of the current exhibit, static views that show how individuals view the current set of nodes in one particular moment in time, or „dynamic filters“: templates for structuring and organizing changing current and future nodes.

4.3 Discussion

As of this writing, the described application has been in use for 4 months. Compared to the Village Voice application, the main difference here is the interpretation of fluid ontologies in terms of metaviews. By providing the capability to fluidly create ontologies, different knowledge representational structures – the metaviews that are created by individuals in the community and reflect their views and perspectives on the existing set of knowledge in an evolving digital museum – are made explicit and become shareable meta-knowledge that accompany the original artifacts. Participants thus have multiple ontologies at their disposition that they can interchange to browse the online exhibit, including three default views provided by Eventspace: chronological, by authors, by keyword, and the 20-25 metaviews created by participants. The following diagram illustrates the overall architecture of the Eventspace as deployed test cases:
5 Example Three: The Kumeyaay Diaspora

Our final example is an investigation of how fluid ontologies can allow the digital museum to serve as a tool for political empowerment. While the previous two examples have studied fluid ontologies in terms of a set of iterations or metaviews, the Kumeyaay Diaspora is a study of how the approach of a proactive agent can arm individuals across reservations with novel and useful information collected in a large digital museum archive. This ongoing project involves the Kumeyaay Native American reservations distributed across Southern California and Northern Baja California (Mexico). Waves of Spanish, Mexican, and finally American conquerors have had a strong effect on a number of tribes within the San Diego region of Southern California. Notable amongst these is the Kumeyaay, a tribe that has now been dissolved and dispersed across the region. The reservation systems of the 19th and 20th centuries have magnified these dynamics, forcing a resettlement of these groups away from their traditional coastal lifestyle into the desert approximately 100 miles to the east. Specifically, the situation is now that the Kumeyaay tribes have largely fragmented, and maintain little infrastructure from which re-organization could be made possible.
In an effort to assist these communities and with a Hewlett-Packard grant, the Tribal Digital Village project was begun. This project has attempted to study whether the provision of basic satellite-generated internet facilities could enable individuals across tribes to receive the informational benefits the internet makes possible while also creating a digital museum that could empower the Kumeyaay to organize and communicate regarding their ongoing quest for a greater level of political sovereignty. This digital museum is continuing to receive Kumeyaay-authored content, the only restriction around which is that it is reflective of the Kumeyaay quest toward sovereignty. This can involve for example, a look into the day-to-day life of a certain tribe member. However, it can also be considered a documentation of an ancient tribal practice, such as the return to the sea pilgrimage. What is important is that different topics and issues that are important to the tribe are integrated into the collection process. Additionally, it is important that content is being created by a cross-section of community members across traditional social boundaries such as age and gender.
However, despite the growing presence of this digital museum there exists no architecture or mechanism to narrate this large aggregation of content into an experience that can empower different museum visitors and Kumeyaay individuals to receive meaningful exposures to content that can allow them to connect to others around the important struggle toward sovereignty around which a number of these dispersed reservations identify. This presents a situation which calls for an application of a fluid ontology that can serve as an architecture to present a meaningful experience to the visitors of the digital museum.

Traditional digital archives are merely repositories, but not necessarily active information generators. Therefore in this context, because the Kumeyaay are envisioning the web portal as an active resource in their fight for sovereignty, the archive must be much more proactive and connection-brokering. The approach being studied in this example involves the use of fluid ontologies in the form of proactive agents that can mediate, and disseminate knowledge more powerfully across the visitors that access the digital museum. Specifically, the focus is on an intelligent agent or bot capable of mapping the evolving interests of a given tribal individual to a meaningful and previously unseen set of content that can be presented to him or her. This approach has been touched on briefly in Section 2 above in our discussion of how the approach of fluid ontologies make possible digital museums that can learn from interaction histories, and dynamically generate ontologies that correspond to the different viewers’ profiles and preferences while also anticipating expectations and interests.

We define an agent as a technological entity that attempts to accomplish a task for a user based on an understanding of the user, the content of the task, and the environment in which it is situated (other agents, the information being expressed, etc.). This utilization of agents departs from the traditional research trajectory where the agent is only designed as a representation of an individual within a usually economic, numerical context. Instead, we are interested in how the agent can actually create a connection between a given community member and aspects of the quest for sovereignty that may appeal to him or her, therefore creating a structure around which the struggle for sovereignty can be structured, discussed, and disseminated. There are several notable examples we have focused the
creation of the proactive agent around. These include Oren et al’s Guides project, which was a landmark approach that allowed students of American History to view an event from the dynamically generated perspective of multiple authors. Similarly, we are interested in enabling museum visitors to access multiple evolving approaches toward sovereignty that can be dynamically selected and created from the growing contents of the digital museum. We intend to incorporate this technique with the important successes found in social information filtering algorithms that can expose the museum visitor to new information that he or she may not have previously viewed but could still benefit from. The fluid ontology that characterizes the Kumeyaay Diaspora museum allow us to study whether the personalized and adaptive approach toward supplying a visitor with important cultural information that can reveal a powerfully inclusive portrait of this set of distributed reservations.

**6 Benefits and Potential Problems**

We have briefly described three applications of the fluid ontologies in completed and ongoing projects. Across the three examples the following observations can be made with regards to the perceived benefits of using fluid ontologies:

a. for the visitor:
   - personalized content and ability to see content that have not yet been exposed to but would find truly rewarding (bot)
   - ability to access content and paths through content based on the articulation of the community itself; content through its own eyes (village voice and eventspace)
   - new visitor-driven approach toward information visualization (eventspace)
   - ability to be exposed to the community of creators and other visitors through the bot's ability to proactively identify connections with others

b. for the creator/community of creators:
   - to influence the ability of where your contribution to the exhibition fits within the overall structure
   - ability as a community of creators to create an exhibit, not just content but the way the content is represented as an architecture, empowering
potentials as village voice evaluations have shown (for a community of creators)

On the other hand, we see the following potential problems associated with the use of fluid ontologies:

- the ontology is not truly fluid in the sense that it is a set of discrete steps rather than a truly continuous process like what a bot makes possible
- bot without human touch that the iterative ontology has (village voice)
- how the ontology is arrived at is an imprecise process

7 Conclusions

In this paper, we have presented key ideas and sample applications related to fluid ontologies. We have shown how the careful design of the degree of “fluidity” of an ontology can provide a basis for powerful digital museum architectures. We believe that systems that use fluid ontologies, like the ones presented, illustrate important – and not yet widely recognized – possibilities for creating, organizing, preserving and exhibiting cultural and artistic knowledge. The power of the fluid ontology approach appears to be partly due to the fact that it does not emphasize the building of intelligent, a priori standardized knowledge structures, but instead focuses on creating processes and providing tools to gradually support the sense-making processes of humans when they are confronted with cultural and artistic heritage.

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http://www.dublincore.org/projects/


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On narrative, abstract and location
A few words on location-based data in art

If we produce a work of art that is based on data acquired from a locative device such as GPS, Bluetooth or WiFi the fact that it tells a story of some sort, is a given. It's inherent. To produce the data, the device would have to physically move from point A to B to C etc.. So if I show someone the following and explain that it's a tracklog, downloaded from a GPS device, the fact that it describes a story is unavoidable:

| Trackpoint | N67 53.037 E12 59.075 | 6/21/2004 1:42:58 PM | 76 ft | 94 ft | 00:00:03 |
| Trackpoint | N67 53.047 E12 59.102 | 6/21/2004 1:43:01 PM | 75 ft | 84 ft | 00:00:03 |
| Trackpoint | N67 53.055 E12 59.324 | 6/21/2004 1:43:18 PM | 76 ft | 510 ft | 00:00:17 |
| Trackpoint | N67 53.052 E12 59.489 | 6/21/2004 1:43:29 PM | 81 ft | 378 ft | 00:00:11 |
| Trackpoint | N67 53.048 E12 59.515 | 6/21/2004 1:43:31 PM | 82 ft | 65 ft | 00:00:02 |
| Trackpoint | N67 53.024 E12 59.599 | 6/21/2004 1:43:40 PM | 84 ft | 245 ft | 00:00:09 |
| Trackpoint | N67 53.035 E12 59.777 | 6/21/2004 1:43:55 PM | 76 ft | 108 ft | 00:00:04 |
| Trackpoint | N67 53.092 E12 59.871 | 6/21/2004 1:44:09 PM | 59 ft | 302 ft | 00:00:10 |
| Trackpoint | N67 53.114 E12 59.878 | 6/21/2004 1:44:13 PM | 56 ft | 136 ft | 00:00:04 |
| Trackpoint | N67 53.156 E12 59.870 | 6/21/2004 1:44:21 PM | 67 ft | 259 ft | 00:00:08 |
| Trackpoint | N67 53.174 E12 59.886 | 6/21/2004 1:44:26 PM | 70 ft | 114 ft | 00:00:05 |
| Trackpoint | N67 53.198 E12 59.920 | 6/21/2004 1:44:41 PM | 71 ft | 166 ft | 00:00:15 |
| Trackpoint | N67 53.209 E12 59.945 | 6/21/2004 1:44:58 PM | 64 ft | 87 ft | 00:00:17 |
| Trackpoint | N67 53.212 E12 59.978 | 6/21/2004 1:45:14 PM | 59 ft | 77 ft | 00:00:16 |
| Trackpoint | N67 53.211 E12 59.982 | 6/21/2004 1:47:02 PM | 81 ft | 10 ft | 00:01:48 |
| Trackpoint | N67 53.212 E13 00.002 | 6/21/2004 1:48:00 PM | 68 ft | 106 ft | 00:00:58 |
| Trackpoint | N67 53.212 E13 00.031 | 6/21/2004 1:48:08 PM | 68 ft | 8 ft | 00:00:01 |
| Trackpoint | N67 53.212 E13 00.035 | 6/21/2004 1:48:01 PM | 70 ft | 10 ft | 00:00:02 |
| Trackpoint | N67 53.244 E13 00.103 | 6/21/2004 1:48:24 PM | 82 ft | 253 ft | 00:00:21 |
| Trackpoint | N67 53.258 E13 00.107 | 6/21/2004 1:48:29 PM | 79 ft | 84 ft | 00:00:05 |
| Trackpoint | N67 53.300 E13 00.108 | 6/21/2004 1:48:42 PM | 76 ft | 252 ft | 00:00:13 |
| Trackpoint | N67 53.309 E13 00.131 | 6/21/2004 1:48:46 PM | 76 ft | 76 ft | 00:00:04 |
| Trackpoint | N67 53.304 E13 00.195 | 6/21/2004 1:48:53 PM | 54 ft | 150 ft | 00:00:07 |
| Trackpoint | N67 53.347 E13 00.249 | 6/21/2004 1:48:58 PM | 51 ft | 181 ft | 00:00:05 |
| Trackpoint | N67 53.322 E13 00.292 | 6/21/2004 1:49:05 PM | 49 ft | 169 ft | 00:00:07 |
| Trackpoint | N67 53.330 E13 00.307 | 6/21/2004 1:49:07 PM | 49 ft | 56 ft | 00:00:02 |
| Trackpoint | N67 53.337 E13 00.353 | 6/21/2004 1:49:11 PM | 51 ft | 114 ft | 00:00:04 |
| Trackpoint | N67 53.336 E13 00.404 | 6/21/2004 1:49:15 PM | 51 ft | 118 ft | 00:00:04 |
| Trackpoint | N67 53.327 E13 00.439 | 6/21/2004 1:49:18 PM | 49 ft | 97 ft | 00:00:03 |
| Trackpoint | N67 53.303 E13 00.487 | 6/21/2004 1:49:24 PM | 56 ft | 181 ft | 00:00:06 |
| Trackpoint | N67 53.302 E13 00.527 | 6/21/2004 1:49:28 PM | 56 ft | 92 ft | 00:00:04 |

But what is not obvious, is what that story is. If I do some research, I might be able to figure out where it is, what direction the device was moving in and how long the trip took. However, this tells me nothing about what actually happened during the trip. It tells me nothing about the people involved or their feelings, surroundings or how they may have interacted with their location. In that sense, this information is quite abstract. If I don't do any research, it becomes even more abstract. Yet, if I'm made aware of the fact that this is a GPS tracklog, I know that there must be some form of narrative regardless of whether or not I'm actually able to read any of it. This is one of the most
important aspects of locative media as an art medium. Regardless of how we choose to present it, it's always a record of a sequence of events. A story.

**sto·ry** (stôr, stôr)  
*n. pl. sto·ries*  
1. An account or recital of an event or a series of events, either true or fictitious, as:
   
a. An account or report regarding the facts of an event or group of events: *The witness changed her story under questioning.*

And the reason that this is important is that we can choose to present the data in a variety of different ways. We can use it to control the pitch of a simple beep, we can use it to control bezier curves on a simple line or we can use it to control the color of a 200 x 200 pixel square but it still contains the original account even though it's not immediately obvious. So our story is still there and by learning to read the presentation method chosen, the audience can begin to formulate their own ideas concerning what that story is. This is what turns this medium into an exciting platform for researching what I choose to call Abstract Narrative. A form of narrative that provides an audience with a means for creating their own story. The work is able to provide a timeline and clues regarding location and in fact, as much or little information as the artist chooses to provide but it's up to the audience to fill in the blanks and create the actual events within the story. It's not a test. There is no wrong or right story. The audience gets to experience the work on their own terms. The artist's focus is on the presentation. The visual or audible aspects. He is free to focus on the aesthetics without regarding whether or not the “meaning” is coming through. The work doesn't have to contain any meaning except in the audiences own interpretation of the work. However, unlike the ideology behind abstract painting, the idea is not simply to invoke an emotional response. The idea is to invoke an “understanding” of the events involved by formulating relationships between events. Regardless of whether that “understanding” is factual or not. It becomes the viewers own personal understanding of the events and is to be respected as “factual” to that viewer.
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Pall Thayer
2004
http://www.this.is/pallit
Landscape data and complex adaptive system Earth
Holism in complexity and network science
Geri Wittig

Landscape and its data can be viewed as interrelated components in the complex adaptive system, Earth. The Earth viewed from a holistic vantage point suggests a Gain sensibility, but I would suggest not in Lovelock's Gain sense as an organism, but rather in Margulis's sense as an ecosystem. An autonomous system, as proposed in Varela's interpretation of Gaia, with operational closure, that is a fully self-referential network that specifies its own identity and also specifies its response to emergent factors and events. A complex coadaptive network, coevolving in interaction with a wide range of networked systems, including information technology networks and the data that they generate. Data from emerging GIS developments, like all other data networks will play a role in the ongoing evolution of the complex adaptive system, Earth.

Why Gaia
Gaia is a dicey word. A word, that in scientific discourse, seems to have fallen a bit by the wayside. There is much up for debate concerning the Gaia hypothesis, particularly the notion that the biota manipulates its environment for the purpose of creating biologically favorable conditions for itself. However the one premise that is largely accepted - the biota has a substantial influence over certain aspects of the abiotic world - points to the holistic orientation of the Gaia hypothesis and it is this holistic orientation that I think is the Gaia hypothesis' major contribution to scientific discourse.

Dr. James Lovelock, a British chemist specializing in atmospheric sciences, was a recognized scientist in his field in the 1960's when NASA and the Jet Propulsion Laboratory (JPL) asked him to participate in their project teams relating to the scientific search for the evidence of life on Mars. Lovelock predicted the absence of life on Mars based on analysis of the Martian atmosphere and its state of being in a chemically dead equilibrium. Noting that the Earth's atmosphere on the other hand is in a chemical state described as being far from equilibrium, Lovelock began to speculate about what was happening on the Earth which enabled the maintenance of the unlikely balance of atmospheric gases that make up the Earth's atmosphere. In explanation, Lovelock began to formulate his hypothesis that the planet had been transfigured and transformed by a self-evolving and self-regulating system. In 1973, with American microbiologist Lynn Margulis, Lovelock formally proposed the idea of Gaia as a control system.

Lovelock's tendency toward the poetic seems to have contributed to the cooption of the Gaia hypothesis by many far outside the scientific realm, who are attracted to its holistic orientation. Margulis who is in disagreement with Lovelock in
his premise that the Earth is an organism, states: "Lovelock's position is to let the people believe that Earth is an organism, because if they think it is just a pile of rocks they kick it, ignore it, and mistreat it. If they think Earth is an organism, they'll tend to treat it with respect." (1) Lovelock's positioning for political aims might be considered unfortunate, because it's this holism, often misinterpreted in animistic terms, that is the paradigmatic contribution of Gaia. The premise of an interrelation between the biota and environment moves away from the one directional Darwinist notion of life adapting to environment, toward a holism that is also a primary factor in the fields of complexity and network science that were beginning to emerge during this same timeframe.

At the edge of chaos - the rise of complexity theory in evolutionary biology

William Thompson, the Director of the Lindisfarne Association, an interdisciplinary networking think tank, organized an international conference held in Perugia, Italy in 1988 called Gaia 2: Emergence, the New Science of Becoming. This conference brought together not only Lovelock and Margulis, but scientists like Varela, who brought to the conference an expansion of the discourse into the realms of the emerging fields of complexity and networks. As Thompson noted, "we are moving from lines of descent to patterns of reflexive self-reference or emergent patterns of circularity in the metadynamics of the system." (2) Someone who was not at the conference, but who could have contributed much to that discourse is Stuart Kauffman, a biologist who became deeply involved in the debates about complexity that were taking place at, what was during this same time period of the late 1980's, the recently founded Santa Fe Institute. The domain of complexity lies between order and disorder, or, as was coined by complexity scientist Chris Langton, "at the edge of chaos." Kauffman persuaded by the premise that life takes shape between too much and too little order endeavored into an examination of the precise dynamics of emergence.

As biologists such as Kauffman, who interprets the evolutionary process in terms of self-organizing systems, began to use complexity theory, there was a reaction from the neo-Darwinians such as Dawkins, who extends the theory of evolution to the level of genes. Dawkins maintains "A body is the genes' way of preserving genes unaltered." (3) For Dawkins what matters is the survival of the part rather than the whole. For neo-Darwinians the focus is on the elements that make up the whole: the whole is the sum of its parts and the whole can be reduced to its essential elements without substantial loss. In response to the reductive excesses of neo-Darwinism, Kauffman argues for a combining of neo-Darwinism with an increasingly refined theory of complex self-organized adaptive systems: "the revolution in complex systems dynamics is now making it possible to hope that complex, self-organized systems, including those investigated by evolutionary biology, can be more closely linked to physics and chemistry without reductionism or vitalism." (4)

The underlying premise of Kauffman's view is that the emergence of order is spontaneous, but not random. In the
early 1960's biologists Jacques Monod and Francois Jacob had discovered feedback mechanisms that function in a binary mode similar to computers are what regulate genes. Kauffman who saw this insight as pointing to a new research approach, was focused at the time on the problem of determining how the immense numbers of genes in the genome (approximately 100,000) could produce the comparatively speaking, very small number of different cell types necessary for life (250). With the potential activity states of the genes comprising the genome being $10^{30,000}$, Kauffman thought the chances of natural selection producing this small number of specifically required genes to be extremely improbable, if not impossible. Thinking of Monod's and Jacob's discovery of the feedback mechanisms by which genes switch on and off, he thought it possible to model genetic activity with Boolean networks. Kauffman speculated that the parallel distributed processes of Boolean networks could approximate genetic activity. In his research he found that Boolean networks, made up of a multiplicity of interconnected nodes, display the characteristics of emergent self-organizing systems. Kauffman found that when random inputs are applied to these networks, they tend to settle into regular patterns known as "state cycles" which serve as attractors in the system. Within certain parameters, Boolean networks produce emerging webs of self-sustaining patterns. Kauffman describes these webs within networks as "order for free."

Kauffman concludes that the principle of order for free provides an approach toward the explanation for the origin life as well as its development, arguing that life emerges in "autocatalytic sets". Autocatalytic sets possess the property whereby each member's formation is catalyzed by one or more members, so that its own high concentration is maintained. The set is collectively autocatalytic by virtue of reflexive catalysis among its members. In explaining the loops of autocatalytic sets, Kauffman points to Kant's understanding of the organism in relation to the concept of inner teleology:

"Immanuel Kant, writing more than two centuries ago, saw organisms as wholes. The whole existed by means of the parts; the part existed because of and in order to sustain the whole. This holism has been stripped of a natural role in biology, replaced by the image of the genome as the central directing agency that commands the molecular dance. Yet an autocatalytic set of molecules is perhaps the simplest image we can have of Kant's holism. Catalytic closure ensures that the whole exists by means of the parts, and they are present both of and in order to sustain the whole. Autocatalytic sets exhibit the emergent property of holism."(5)

Coevolution and fitness landscapes
The genome, Kauffman contends, is a complex adaptive system composed of "networks of genes and their products interacting with one another in enormous webs of regulatory circuitry."(6) Complex systems being adaptive, their evolution tends to be coevolution. When systems and networks adapt to systems and networks that are adapting to them, change is reciprocally related.

Developments, at both the individual and species level, take
place in webs within networks that are transforming by adapting to each other. This process of coadaptation creates a dynamic of coordination between the parts and the whole within a system, establishing the type of niches similar to those found in an ecological system that form fitness landscapes, which Kauffman postulates are non-random. This non-randomness Kauffman argues is "critical to the evolutionary assembly of complex organisms. We will find reasons to believe that it is not natural selection alone that shapes the biosphere. Evolution requires landscapes that are not random. The deepest source of such landscapes may be the kind of principles of self-organization that we seek. Here is one part of the marriage of self-organization and selection."(7)

Kauffman's argument that fitness landscapes are non-random comes out of his work on Boolean networks. Fitness landscapes of an individual or network develop in parallel with other fitness landscapes. These landscapes can be thought of as nodes in a web of landscapes that determine the parameters for each other: enabling the network to establish the conditions for development. The ecology of the whole network is transformed by a change in one niche or landscape. Kauffman argues that coadapting networks evolve to the verge of a self-organized threshold where minor changes in one landscape trigger a rush of changes that move out through the entire network. Because of the complexity of the web of landscapes, possibilities are limited within a given network. Networks of fitness landscapes are inclined to settle into rhythms with cyclic patterns, functioning like attractors in dynamical systems. Functioning along a perimeter of divergence that is in constant flux, networks self-organize in somewhat stable patterns until another phase transition occurs. A bifurcation occurs resulting in the emergence of a new morphological type that remains relatively stable for a time, and then suddenly mutates or vanishes. Because this process is unpredictable by nature, it doesn't necessarily mean it is directionless. Instead of thinking of this process as teleological, self-organizing systems can be understood as following a teleonomic progression; a line of development that moves toward increasing complexity.

**Landscape and its data**

What of the other landscapes - the material ones made of such things as dirt, rocks, and dust? Here we come full circle to the premise of the Gaia hypothesis that is widely agreed upon - the biota has a substantial influence over certain aspects of the abiotic world - and as argued in Kauffman's coadapting networks, vice versa. I would speculate further that both the data networks generated in relation to both the biotic and abiotic realms are also implicated in these coadapting networks.

It's interesting to note that in the field of physical geography, which is self-admittedly probably one of the most empirically oriented of the sciences, there is some discussion emerging concerning the use of complexity science in physical geography research approaches. The fields of biogeography and landscape ecology are the areas most oriented toward the applicability of complexity theory in research methodology. In his article, "Considering Complexity", biogeographer George
Malanson suggests the science of complexity as a possible approach to the conflict that has emerged in physical geography between reductionism and holism, especially since the introduction of General Systems Theory, the scientific effort to identify structural, behavioral and developmental features common to particular classes of living organisms.

Malanson describes the "strong trend toward reductionism in physical geography over the past three decades..." which has lead to researchers tendency to "...simplify our research questions to conform to mathematically tractable domains..."(8) A primary argument of the paper is that most of the research in physical geography is related to place. Because "...the location of a place can be characterized by its spatial properties..." and "space can produce complexity in simple processes..."(9) there are nonlinearities created in geography associated with scale. Malanson views this as a prime area for applicability of methodologies of complexity theory. He describes a key area for applications of complexity in biogeography as the analysis of ecotones (vegetation boundaries where plants are presumed to be near the edge of their physiological tolerance) related to the edge of a phase change, through the use of computer-simulation modeling developed out of GIS or remote-sensing technologies.

With the increasing use of GIS technologies in a wide variety of fields, including art, the data networks generated will disseminate into the expanding networks of information technology. I speculate these GIS generated data networks have the potential to act as bifurcations and coadaptive systems in relation to the landscape and the overall complex adaptive system earth.

C5 Landscape Projects Field Mediation
UTM 10 589631E 4145735N (in the vicinity of Alviso, CA)
January 12, 2003

Notes


6. Ibid., 99.
7. Ibid., 166.


9. Ibid., 748.

**Bibliography**


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Will There Be Condominiums in Data Space?

Bill Viola


Introduction by Noah Wardrip-Fruin

Video artists, and particularly interactive video artists, have developed approaches that can help us think about new media more broadly. For example, in the 1960s, when video seemed to be only lesser film for many people (less both in cost and value), artists began to explore the distinctive features of the video medium. They have continued their explorations as the technologies involved—cameras, editing systems, image synthesis equipment, screens and projectors—have evolved. Hans-Peter Schwarz notes, in his "MediaVisions" essay, that the early results began to call into question the sacrosanct status of montage, which had been central to film from the time of Eisenstein and Podovkin, in a manner even more fundamental than what experimental film had accomplished up to that time. Part of this was through exploration of immediacy—examples of which include Nam June Paik's immediately-screened video of the Pope's visit (15), Les Levine's self-surveillance installations at Software (17), and video environments in which artists presented images of the audience itself using different sorts of displacements in time and space: with a few second's delay, in a narrow corridor, while traversing a maze. Though television production had used the technologies of video for some time, artists' video reconfigured public and industrial conceptions of the video image—via means ranging from site-specific installations to the "music video" form.

Bill Viola has been one of the highest-profile of video artists, allowing him to create, in recent years, what some have called "70 millimeter" video art—work in which video's lower cost is not a primary attraction for the artist, and the traditionally rough production values of video art are not present. However, what has remained consistent from Viola's grittier early work to his massive late-1990s retrospective at the Whitney Museum is a poetic approach to exploring the video medium. As Michael Rush wrote in his New Media in Late 20th Century Art, "Bill Viola's work, perhaps more than any other, represents the tendency toward the lyrical in art" (140).

This view of Viola's work is perhaps instructive when considering the essay reprinted here—for example, during his discussion of the MIT Media Lab's famous Aspen Movie-Map. The project was brilliant, but limited by the fact that it was structured around a video hardware hack (as discussed in Andrew Lippman's paper from SIGGRAPH 1980) which was mapped onto a navigation system meant to be as familiar as possible, so as to bring something already imagined to life. It remained for artists to seek, instead, surprise, and to create defamiliarizing forms of interaction that would allow the technology to be envisioned anew, instead of as a step toward making real what we already expected The work of Lynn Hershman (44) and Grahame Weinbren includes important artist-led explorations of interactive techniques and structures that, as Viola discusses, go beyond the basic branching flowchart, a structure that had been applied to narrative two decades before by Raymond Queneau (12).

Hershman and Weinbren's work, as well as Viola's own, relates to the Aspen project or commercial interactive video as poetry relates to an instruction manual or brochure. An instruction manual that makes us consider language anew is usually a failure—such a document must be transparent in order to be effective. Of course, the creation of effective structures for such manuals is a formidable challenge, and such documents are essential. But few would wish to live in a culture in which our ability to understand and use language was limited to what is evoked by such documents.

-NWF
Will there be Condominiums in Data Space?

Possibly the most startling thing about our individual existence is that it is continuous. It is an unbroken thread—we have been living this same moment ever since we were conceived. It is memory, and to some extent sleep, that gives us the impression of a life of discrete parts; periods, or sections, of certain times or "highlights:" Hollywood movies and the media, of course, reinforce this perception.

If things are perceived as discrete parts or elements, they can be rearranged. Gaps become most interesting as places of shadow, open to projection. Memory can be regarded as a filter (as are the five senses)—it is a device implanted for our survival. The curse of the mnemonist is the flood of images that are constantly replaying in his brain. He may be able to demonstrate extraordinary feats of recall, but the rest of the banal and the mundane is playing back in there too, endlessly. The result can be lack of sleep, psychosis, and even willful death, driving some to seek professional psychiatric help (and thus become history on the pages of medical journals and books).[1] This reincarnates one of the curses of early video art—"record everything," the saturation-bombing approach to life which made so many early video shows so boring and impossible to sit through. Life without editing, it seems, is just not that interesting.

It is only very recently that the ability to forget has become a prized skill. In the age of "information overload," we have reached a critical mass that has accelerated the perfection of recording technologies, an evolution that leads back to ancient times. Artificial memory systems have been around for centuries. The early Greeks had their walks through temple,[2] and successive cultures have refined and developed so-called "mnemo-technics"—Thomas Aquinas described an elaborate memory scheme of projecting images and ideas on places (fig. 31.2); in 1482 Jacobus Publicius wrote of using the spheres of the universe as a memory system (fig. 31.2); Giulio Camillo created a "Memory Theater" in Italy in the early 1500s; and Giordano Bruno diagrammed his system of artificial memory in his work Shadows, published in 1582. Frances Yates describes this entire remarkable area in her brilliant book The Art of Memory (University of Chicago Press, 1966).

When I was in Japan in 1981, I visited a festival of the dead at one of the most sacred places in the country, Osorezan Mountain. There I saw blind female shamen called itako calling back the spirits of the dead for inquiring relatives, a centuries-old practice. Until that time I had felt that the large Japanese electronics companies were way ahead in the development of communications technology. After witnessing the itako, however, I realized they were way behind. Right in their own backyard were people who, without the aid of wires or hardware of any sort, have been for ages regularly communicating through time and space with ancestors long gone. An interesting place at the temple site (which was perched in the surreal landscape of an extinct volcanic crater) was a special walk for the visiting pilgrims to take along a prescribed trail: The way led from the temple through a volcanic wasteland of rockpiles and smoking fissures to the shores of a crater lake. It was called "the walk through Hell" The path through the landscape and the points along it all had special significance. The itako, to call up the dead, took this "walk through Hell" in their minds, bringing the spirits in along the familiar path, and when they were through, sent them back the same way.

The interesting thing about idea spaces and memory systems is that they presuppose the existence of some sort of place, either real or graphic, which has its own structure and architecture. There is always a whole space, which already exists in its entirety, onto which ideas and images can be mapped, using only that portion of the space needed.
In addition to the familiar model of pre-recorded time unfolding along a linear path (as evidenced by many things from our writing system to the thread of magnetic tape playing in a videotape recorder), there is another parallel to be linked with modern technology. “Data space” is a term we hear in connection with computers. Information must be entered into a computer’s memory to create a set of parameters, defining some sort of ground, or field, where future calculations and binary events will occur. In three-dimensional computer graphics, this field exists as an imaginary but real chunk of space, a conceptual geometry, theoretically infinite, within which various forms may be created, manipulated, extended, and destroyed. The graphics display screen becomes an impossibly third point of view looking in on this space (we often call it “our mind’s eye”), which can be moved about in this space from any angle at will. The effect is that the space must exist in the computer first, so that there is a reference system within which to locate the various coordinates of points and lines called into being by the operator. In our brain, constantly flickering pulses of neuron firings create a steady-state field onto which disturbances and perturbations are registered as percepts and thought forms. This is the notion that something is already there before we and, starting at the top of the page, we can see the end before we actually get there.

When I edited a tape with the computer, for the first time in my life I saw that my video piece had a “score,” a structure, a pattern that could be written out on paper. We view video and film in the present tense; we “see” one frame at a time passing before us in this moment. We don’t see what was before it and what is after it—we only see the narrow slice of “now.” Later, when the lights come on, it’s gone. The pattern does exist, of course, but only in our memory. The history of events has been recorded since the beginning of history, since what we call history is not the event in time, i.e., historical “records.” With what we call history is the notion of events in time. We have graphic writing systems; with music we have the score. They are both symbolic coded systems for the recording and later playback of information events in time. Poetry always had a level that video or film cannot approach (at least not yet); the existence of the words on paper (how the poem looks, how the words are placed on the page, the spacing, etc.). The whole poem is there before us, and, starting at the top of the page, we can see the end before we actually get there.

When I had my first experience with computer videote editing in 1976, one demand this new way of working impressed upon me has remained significant. It is the idea of holism. I saw then that my piece was actually finished and in existence long before it was executed on the VTRs. Digital computers and software technologies are holistic; they think in terms of whole structures. Word processors allow one to write our correct, and rearrange the whole letter before typing it. Data space is fluid and temporal, but not for real—those are born and become fixed in time. Chiseling in stone may be the ultimate hard copy.
realities. If you want to make a jigsaw puzzle, you must first start with the whole image, and then cut it up. The observer, working backwards into the system, has the point of view that he or she is building things up, putting it together piece by piece. The prophet Mohamed has said, "All knowledge is but a single point—it is the ignorant who have multiplied it."

The Whole Is the Sum of Its Parts

A friend of mine is an ethnomusicologist who spent several years studying the gamelan music of Central Java. He was trained in Western music in the States, and spent many years working on his own compositions and performing with other musicians. One of the most frustrating things about his studies in Java, he told me, was trying to work on specific parts of songs with the gamelan musicians. Once they were at a rehearsal, and after running through a piece, he asked them to play only a section from the middle so that he could make sure he got all the notes right. This proved to be an impossible request. After a lot of hemming and hawing, excuses, and several false starts, he realized that the group just could not do it. They insisted on playing the entire piece over again, from beginning to end. In Java, the music was learned by rote, from many years of observation and imitation, not from written notation. The idea of taking a small part out of context, or playing just a few bars, simply did not exist. The music was learned and conceived as a whole in the minds of the musicians.

Giulio Paolini, the contemporary Italian artist, made a little-known but far-reaching videotape in the mid-seventies. It was his first and only tape. Working at an experimental video studio in Florence in the cradle of Western art, he, like many other European artists who visited the art/tapes/22 studio, had his first encounter with video. Instead of simply re-translating into video what he had already been doing before, as most other artists had done, Paolini intuitively recognized the great power underlying the recording media. He took the slides of all his work, most of the pieces he had ever made, and recorded them one at a time on each frame of video. Playing back this tape, the viewer sees 15 years of Paolini's art, his life's work, go by in less than a minute. Poof! It's gone.

It is slowly becoming dear that structuralism, currently out of fashion in the fashion-conscious, ever shifting spotlight of the art world, must be reconsidered. It is vital. However, this new structuralism is not the same as the often over-intellectualized, didactic, structuralism-for-structuralism's-sake that took center stage in the art scene over a decade ago (most visibly through the work of experimental filmmakers). In retrospect, however, the core ideas being expressed then certainly remain important, and perhaps could only have emerged in the way they did given that particular place and moment in cultural time. Furthermore, the anti-content messages that have been espoused in various fields of art in the twentieth century also continue to merit attention. We have all been made aware that, since the Renaissance, Western eyes have been drawn to the visual, to the surface appearance of the world. "Realism" came to mean how something appeared to the eye alone. Looking at the Gothic art before it, along with Asian and so-called Primitive or Tribal Art, it is dear that something fundamental is missing. However, from our viewpoint today, it is also dear that pure structuralism alone is no answer either.

Decadent art is simply an art which is no longer felt or energized, but merely denotes, in which there exists no longer any real correspondence between the formal and pictorial elements, its meaning, as it were, negated by the weakness or incongruity of the pictorial element; but it is often ... far less conventional than are the primitive or classic stages of the same sequence. True art, pure art, never enters into competition with the unattainable perfection of the world. [3]

-A.K. Coomaraswamy

Structure, or form, has always been the basis of the original pictorial art of both Europe and the East, but the Middle Ages were the last time when both Europe and Asia met on common artistic ground.

In Western art, the picture is generally conceived as seen in a frame or through a window, and so brought towards the spectator; but the Oriental image really exists only in our mind and heart and thence is projected or reflected into space.
The Indian, or Far Eastern icon, carved or painted, is neither a memory image nor an idealization, but a visual symbolism, ideal in the mathematical sense. Where European art naturally depicts a moment of time, an arrested action, or an effect of light, Oriental art represents a continuous condition. In traditional European terms, we should express this by saying that modern European art endeavors to represent things as they are in themselves, Asiatic and Christian art to represent things more nearly as they are in God, or nearer their source.

-A.K. Coomaraswamy

The idea of art as a kind of diagram has for the most part not made it down from the Middle Ages into modern European consciousness. The Renaissance was the turning point, and the subsequent history of Western art can be viewed as the progressive distancing of the arts away from the sacred and towards the profane. The original structural aspect of art, and the idea of a "data space" was preserved through the Renaissance, however, in the continued relation between the image and architecture. Painting became an architectural, spatial form, which the viewer experienced by physically walking through it. The older concept of an idea and an image architecture, a memory "place" like the mnemonic temples of the Greeks, is carried through in the great European cathedrals and palaces, as is the relation between memory, spatial movement, and the storage (recording) of ideas.

Something extraordinary is occurring today, in the 1980s, which ties together all these threads. The computer is merging with video. The potential offspring of this marriage is only beginning to be realized. Leaping directly into the farther future for a moment, we can see the seeds of what some have described as the ultimate recording technology: total spatial storage, with the viewer wandering through some three-dimensional, possibly life-sized field of prerecorded or simulated scenes and events evolving in time. At present, the interactive video discs currently on the market have already begun to address some of these possibilities. Making a program for interactive video disc involves the ordering and structuring (i.e., editing) of much more information than will actually be seen by an individual when he or she sits down to play the program. All possible pathways, or branches, that a viewer ("participant" is a better word) may take through the material must already exist at some place on the disc. Entire prerecorded sections of video may never be encountered by a given observer.

Soon, the way we approach making films and videotapes will drastically change. The notion of a "master" edit and "original" footage will disappear. Editing will become the writing of a software program that will tell the computer how to arrange (i.e., shot order, cuts, dissolves, wipes, etc.) the information on the disc, playing it back in the specified sequence in real time or allowing the viewer to intervene. Nothing needs to be physically "cut" or re-recorded at all. Playback speed, the cardinal 30 frames a second, will become intelligently variable and thus malleable, becoming, as in electronic music practice, merely one fundamental frequency among many which can be modulated, shifted up or down, superimposed, or interrupted according to the parameters of electronic wave theory. Different sections can be assigned to play back at specific speeds or reversed; and individual frames can be held still on the screen for predetermined durations. Other sections can be repeated over and over. Different priorities rule how and in what order one lays material down on the "master" (disc). New talents and skills are needed in making programs—this is not editing as we know it. It was Nikola Tesla, the original uncredited inventor of the radio, who called it "transmission of intelligence." He saw something there that others didn't. After all these years, video is finally getting "intelligence," the eye is being reattached to the brain. As with everything else, however, we will find that the limitations emerging lie more with the abilities and imaginations of the producers and users, rather than in the tools themselves.

As in the figure/ground shifts described in Gestalt psychology, we are in the process of a shift away from the temporal, piece-by-piece approach of constructing a program (symbolized by the camera and its monocular, narrow, tunnel-of-vision, single point of view), and towards a spatial, total-field approach of carving out potentially multiple programs (symbolized by the computer and its holistic software models, data spaces, and infinite points of view). We are proceeding from models of the eye and ear to models of
thought processes and conceptual structures in the brain. "Conceptual Art" will take on a new meaning.

As we take the first steps into data space, we discover that there have been many previous occupants, Artists have been there before. Giulio Camillo's Memory Theater (which he actually constructed in wood, calling it a "constructed body and soul") is one example. Dante's *Divine Comedy* is another. Fascinating relationships between ancient and modern technologies become evident. A simple example can be found in the Indian Tantric doctrine of the three traditional expressions of the deity: the anthropomorphic, or visual, image; the yantra, or geometric "energy" diagram (fig. 31.3); and the mantra, or sonic representation through chanting and music. It is interesting to note that these are all considered to be equal—simply outward expressions of the same underlying thing. In form, this is not unlike the nature of electronic systems: the same electronic signal can be an image if fed into a video monitor, an energy diagram if fed into an oscilloscope, and a sequence of sounds if fed into an audio system.

Today, there are visual diagrams of data structures already being used to describe the patterns of information on the computer video disc. The most common one is called "branching," a term borrowed from computer science (fig. 31.4). In this system, the viewer proceeds from top to bottom in time, and may either play the disc uninterrupted (arrow), or stop at predetermined branching points along the way and go off into related material at other areas on the disc for further study (like a form of "visual footnoting") Examples of this system go something like—in a program on the desert, the viewer can stop at a point where plants are mentioned, and branch off to more detailed material on the various flora of the valley floor, etc. Although it is clear how this can enhance our current educational system, freeing students from boring and incompetent teachers so they can proceed at their own pace through information which now contains movement, dynamic action, and sound in addition to written words, artists know that there must be more out there than this. Even though the technology is interactive, this is still the same old linear logic system in a new bottle.

As a start, we can propose new diagrams, such as the "matrix" structure (fig. 31.4). This would be a non-linear array of information. The viewer could enter at any point, move in any direction, at any speed, pop in and out at any place. All directions are equal. Viewing becomes exploring a territory, traveling through a data space. Of course, it would not be the obviously literal one like the Aspen project.[4] We are moving into idea space here, into the world of thoughts and images as they exist in the brain, not on some city planner's drawing board. With the integration of images and video into the domain of computer logic, we are beginning the task of mapping the conceptual structures of our brain onto the technology. After the first TV camera with VTR gave us an eye connected to a gross form of non-selective memory, we are now at the next evolutionary step—the area of intelligent perception and thought structures, albeit artificial.

Finally, we can envision other diagrams/models emerging as artists go deeper into the psychological and neurological depths in search of expressions for various thought processes and manifestations of consciousness. Eventually, certain forms of neurosis, so long the creative fuel of the tormented artist in the West, may be mapped into the computer disc. We may end up with the "schizo" or "spaghetti" model, in which not only are all directions equal, but all are not equal (fig. 31.4). Everything is irrelevant and significant at the same time. Viewers may become lost in this structure and never find their way out.
Worlds are waiting to be explored. It is to be hoped that artists will be given their share of access to experiment with this exciting new technology. I recently had a glimpse of some of the possibilities for art when I met a designer who had first encountered computers while working at a large French fashion design firm in New York. There, the graphics artist worked at computer terminals. With a light-pen, he could draw various designs, working with functions of computer memory and data manipulation. Furthermore, his terminal was linked to a large databank of fabric designs and images from around the world and throughout history. After completing a sketch, for example, he could call up a seventeenth-century Japanese kimono design, look at it or superimpose it with his own idea. Then he could call up a turn-of-the-century European dress pattern, combine that with his design or integrate it with the kimono, all the while storing the various stages in memory. When all of this was completed and the final design chosen, he could then tie into other offices in Europe and the Orient right on the same screen. Designers could compare notes, get availability data on his fabric from the mills (i.e., where is the best silk, who has stock, what is the order time, etc.). All phases of his work could occur on the same screen as digital information. He could travel in space (Europe, the Far East), as well as in time (art history), all in an instant and available either as written text or visual images.

Despite the anti-technology attitudes which still persist (some, it should be added, for very good reasons), the present generation of artists, filmmakers, and video-makers currently in school, and their instructors, who continue to ignore computer and video technology, will in the near future find that they have bypassed the primary medium, not only of their own fields, but of the entire culture as well. It is imperative that creative artists have a hand in the developments currently underway. Computer video discs are being marketed as a great new tool in training and education. At this moment, there are creative people experimenting with the technology, ensuring that innovative and unique applications will emerge; but for now, many of the examples return to the boring domain of linear logic in the school classroom. The Aspen city map project is perhaps one of the more interesting examples of new program formats. We are at the beginning, but even so, for the artist, standard educational logic structures are just not that interesting. Artists have been to different parts of the brain, and know quite well that things don't always work like they told you in school.

It is of paramount importance now, as we watch the same education system that brought us through school (and the same communications system that gave us the wonderful world of commercial TV and AM radio) being mapped onto these new technologies, that we go back and take a deeper look at some of the older systems described in these pages. Artists not shackled to the fad and fashion treadmill of the art world, especially the art world of the past few years, will begin to see the new meaning that art history is taking on. As I have begun to outline in this article, the relation between the image and architecture (as in Renaissance art), the structuralism of sacred art (Oriental, Early Christian, and Tribal art, with their mandalas, diagrams, icons, and other symbolic representations, including song, dance, poetry), and artificial memory systems (the first recording technologies from the time of the Greeks through the Middle Ages), are all areas that require further investigation.

As we continue to do our dance with technology, some of us more willingly than others, the importance of turning back towards ourselves, the prime mover of this technology, grows greater than the importance of any LSI circuit. The sacred art of the past has unified form, function, and aesthetics around this single ultimate aim. Today, development of self must precede development of the technology or we will go nowhere—there will be condominiums in data space (it has already begun with cable TV). Applications of tools are only reflections of the users—chopsticks may be a simple eating utensil or a weapon, depending on who uses them.
The Porcupine and the Car

Late one night while driving down a narrow mountain highway, I came across a large porcupine crossing the road up ahead. Fortunately, I spotted him in time to bring the car to a stop a short distance from where he was standing. I watched him in the bright headlights, standing motionless, petrified at this "dose encounter of the third kind." Then, after a few silent moments, he started to do a strange thing. Staying in his place, he began to move around in a circle, emitting a raspy hissing sound, with the quills rising up off his body. He didn't run away. I realized that this dance was actually a move of self-defence. I cut the car headlights to normal beams, but he still continued to move around even more furiously, casting weird shadows on the trees behind. Finally, to avoid giving him a heart attack, and to get home, I cut the lights completely and turned off the engine. I watched him in the dim moonlight as he stopped his dance and moved off the road. Later, while driving off, I realized that he was probably walking proudly away, gloating over how he really gave it to that big blinding noisy thing that rushed toward him out of the night from sure he was filled with confidence, so pleased with himself that he had won, his porcupine world-view grossly inflated as he headed home in the darkness.

Notes


2. The Greeks perfected a system of memory that used the mental imprinting of any objects or key points to be remembered onto specific locations along a pathway previously memorized from an actual temple. To recall the points in their proper order, one simply had to take the walk through the temple in one's mind, observing the contents left at each location along the way.


4. A landmark interactive laserdisc project by MIT Media Lab, in the late 1970s, that mapped the city of Aspen, street by street, with moving cameras so that the viewer could take a "ride" through the city, going anywhere at will—one of the first visual-mapping database moving-image projects related to data space ideas and today's virtual reality technology.
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