



**Silicon Valley Culture:
One-Dimensional 'Faustian Bargain' or
Multi-Faceted Forerunner of Global
Society?**

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If the only tool you have is a hammer, every problem is a nail.
-- Abraham Maslow

Every society determines reality, truth, beauty, and values in accordance with its own worldview and its unique historic path. A common view among casual observers of Silicon Valley is that its extreme technology emersion can lead to a one-dimensional perspective of the world and its problems. According to San Jose State anthropologist, Jan English-Lueck,

“The notion that a culture can be identified with its economic specialization – and the technology associated with it – is a very old and widespread idea. Of course, the worldviews held by individuals or by groups are very influential in determining behavior, as well as in determining motivations, attitudes and actions. Working with technology, thinking about technology, and producing technology change the way Silicon Valley people construct reality by giving them new metaphors” (English-Lueck 66).

As such, critics of Silicon Valley note that, while it is clear that technology¹ has the power to enhance lives, it is not always as clear to the developers and consumers of high technology products that the same beneficial technology might also lead to an oversimplified public discourse of social problems, a loss of richness in human interactions, and a sense of personal alienation. As the literary character Faust sold his soul to the devil for the riches of today, one must ask if Silicon Valley, as a harbinger of future capitalistic global society, provides a glimpse of the risks to a healthy multifaceted society. In such a technology-intense society, does the singular focus on technology and rational thinking crowd out or devalue the emotional, intuitive, creative, and spiritual aspects of civilization? Does Silicon Valley's worldview take into consideration the untidy emotional factors inherent in the social 'ends' that justify the technological 'means?' Do the citizens of Silicon Valley practice a one-dimensional worldview that shuns rich social interaction, or do they use technology to create a new form of futuristic culture, complete with the arts, literature, and passion for community?

¹ The origin of the word *technology* gives valuable insight into its meaning. It is derived from the Greek words, *techne* and *logos*. The former means art or craft and the latter signifies discourse or organized words. The practice of technology frequently is that of an art or craft, as distinguished from science, which is precise and is based upon established theoretical considerations. Even though we do not normally think of technology as consisting of written or spoken words, as implied by *logos*, it does involve the systematic organization of processes, techniques and goals. While science is the study of the nature around us and subsequent development of scientific 'laws,' technology is the practical application of those laws, in sometimes non-rigorous ways, toward the achievement of some material purpose (Dorf 1).

This paper summarizes our findings regarding the myths and realities of maintaining socially balanced perspectives in a land of technology saturation.²

Silicon Valley Culture: Fact & Fiction

In Silicon Valley, people transfer engineering and entrepreneurial approaches to their understanding of the social world, such that efficiency, utility, instrumentality, and economic rationality become the philosophical underpinnings of the Silicon Valley worldview³ (English-Lueck 74-77). She notes that, "In Silicon Valley, people view the daily conflicts of life as 'social engineering problems' that can be 'solved' if given thoughtful and systematic appraisal" (English-Lueck 76). So, one wonders to what degree and in what manner is Maslow's adage -- "If the only tool you have is a hammer, every problem is a nail" -- relevant or irrelevant in the social discourse of Silicon Valley?¹ Robert, an African-American CEO of a startup, strongly disagreed with the premise, "This is a terribly mistaken concept. It's a very complex environment. There has been a chance for wealth, not a chase for technology. The focus may be on technology, but there is not an over reliance on it to solve social problems." Grant, a transplanted New Yorker human resources director, agreed, "There is a tendency for people to take that approach, but if you scratch the surface, they are getting by with more than computers. There's more there than meets the eye. People are more than one-dimensional. They are not stereotypical. It's wrong to make that assumption." Steve, a senior marketing executive of established and start-up companies took the opposite view, "I think it is profoundly real. Every aspect of my life has been associated with work – dating, social life, etc. What we have here is a recreated company town on a different scale." David, a senior marketing executive originally from Yugoslavia, took the middle view, "Being in technology, we are believers here. However, technology cannot solve all problems but it can be a facilitator and it can make it easier to solve."

However, Silicon Valley provides certain challenges to one seeking to keep a reasonable balance between work and home life, technology and the arts, that seem unique in comparison to other places. Robert remarked that, "It has a frenetic pace. The environment you live and work in can't be separated." According to David, "It's a big challenge. The Valley is the most competitive place on the planet. It's the top of the world. Highly competent people push you. You work hard, keep in touch; it takes time. There's very little time for anything." Grant noted that, "You are expected to be at work or on call all the time. Real or imagined, the pace is required. The arts organizations have to fight to get on the agenda. The Tech Museum can thrive, but the ballet and symphony cannot." Alternatively, Steve commented that, "I don't think they are unique. You have to balance hours of work, family, and contributions to social programs."

Technology has both helped and inhibited the community dialogue. Robert observed that email has changed communications, "We are more connected, but we have less face time." Grant agreed, "Email and instant messaging are tremendous benefits, but it's a problem when people hide behind it rather than being physically present. It's a mixed bag because I've seen a mentoring project done exclusively over emails. This can be beneficial, in that the kids might not have otherwise had access to these mentors at all, but it's limiting; you are present with part of your being." Likewise, David commented, "Technology can help or be counterproductive. People seem more comfortable with technology than face-to-face. Real-time direct interactions create new ideas and exchanges of ideas. For example, when the only way to reach people is by email, we lose a lot by taking the path of least resistance." Steve agreed, "Net, it's a huge help: mobile phones let me have more conversations, but the PC has created a segment that is isolated."

² The high-tech industrial base in Silicon Valley is based on such industries as aerospace, defense, semiconductors, computers, software development, telecommunications, and biotechnology (English-Lueck 82).

³ English-Lueck draws an analogy to other cultures and worldviews. Devout Christian fundamentalists frame the happenings of the world as functions of 'good' and 'evil,' and during China's Cultural Revolution, every action was viewed as a political event – even choosing a bride from the proletariat.

The Humanizing Role of the Arts

In a place that's so focused on technology, what is the role of the arts, social interactions, and community groups? John Kreidler, Executive Director of Cultural Initiatives Silicon Valley, believes that, "It's no different than anywhere else. The arts' function is the same as anywhere else." Robert agrees, "It's similar to any other place. It enhances the quality of life, creativity, and relaxation. People in technology are so stressed, they could use the outlet." Grant echoes the sentiment, "Given the extreme focus on technology in Silicon Valley, the softer areas are even more critical." "The arts are for basic entertainment and diversion," noted Steve. David put it bluntly, "The arts keep us sane. It's intense, focused, and concentrated. We can become obsessed with our work. R&R time doesn't help. It's difficult to unwind. The arts let me escape."

Aristotle reminded us that art finishes the job when nature leaves something undone. In essence, he argued that there is a place for both non-rational approaches and rational ones. This is an important lesson for a society that depends heavily on science and technology. However, according to Audience Insight's research for Cultural Initiatives, while 80% of Silicon Valley residents value their personal artistic activities, only 55% of them believe that it is a good place to pursue their interests. Less than half of all residents surveyed give public art efforts a good rating. While 51% of the 361 residents surveyed gave the region a good rating as a place to attend live performances and visit museums, and 80% of residents attended a live arts performance in the last year, they are infrequent patrons, with 80% attending an event no more than twice in the year. This is reflected in the statistic that shows Silicon Valley as having only 5.99 venue seats per 1000 residents, compared to 12.23 in San Francisco, 10.62 in San Antonio, 8.91 in Oakland, 8.25 in Denver, and 7.71 in Seattle. In addition, Silicon Valley may not be adequately producing the next generation of artists. For example, the availability of local arts education falls well below the national average (music 45% vs. 90%, visual arts 50% vs. 90%, dance 12% vs. 20%, theatre 16% vs. 18%).

Utilitarian Value Applied to the Arts

While Kreidler is bullish on the arts, noting, "The arts are intrinsically valuable; they are among the ends of life," he understands the unique way in which the arts must be positioned to civic leaders and patrons, "but, I don't say that much in Silicon Valley." Kreidler cautions, "You can't make an intrinsic argument for art here. People want tangible analysis and numbers. The great number of people in leadership positions here are focused on the practical; one might say that the area is usually driven by practicalities." The argument he usually makes among business and civic leaders is that the arts:

- Build trusting and caring communities; communities of tolerance,
- Attract creative people from all walks of life, which help build a vibrant economy, and
- Are a crucial ingredient of a well-balanced education.

In spite of its wealth, local donations to the arts (2.8%) are less than half the national average (6.4%). In Silicon Valley individual contributions are much less significant (35%) than the national average (61%), but corporate, foundation, and government contributions exceed the national average. Kreidler explained how Cultural Initiatives has experienced funding for the arts, beyond the impact of the obvious economic downturn. He noted,

"It's not different from other 'new wealth' places. San Francisco is 'old wealth.'

The formal arts community [in Silicon Valley] has always been small. For example, all of the South Bay arts budgets are less than that of the San Francisco Opera. People go to San Francisco for the high arts. There is a great symbiosis between San Jose and San Francisco – Silicon Valley is the business engine and San Francisco is the center of the traditional arts."

"Silicon Valley is average America, but individual giving is below average," according to Kreidler. The size of individual donations and grants are small -- only 9.6% of arts groups have received a 'leadership level' gift of more than \$100,000. This has been a criticism of Silicon Valley for at least two decades. For example, in 1984, Silicon Valley firms lagged behind Pittsburgh, Akron, and Newark by donating only 0.75% of their pretax profits to charities and the arts,

compared to the national average of 1.1% (Rogers 179). “Since the ‘70s, schools have cut back on the arts. The population is less educated in the arts, so there is very little appreciation. People have become consumers of arts,” notes Kreidler. David reminds us of the high cost of living in Silicon Valley and the many alternatives for personal giving, “ In addition to the weak economy, taxation is high in California, so there’s not much left. A lot of my donations go to help people back home because of the extreme situation in my country (Croatia). I’ve taken responsibility for a family there.” According to Kreidler, “The city of San Jose is a major contributor to the arts. Unfortunately, the corporate giving level, with the exception of Applied Materials and Cisco, is bad.” Cultural Initiatives’ 2002 study indicates that Silicon Valley corporations gave 21% vs. 12% nationally; local foundations donated 23% vs. 14% nationally; and local government grants amounted to 21% vs. 13% nationally. The foundations, such as the Hewlett Foundation, are still big contributors. While the Packard Foundation still donates to the arts, it has closed down its arts organization.

But counting the donations to the major arts organizations can be misleading in Silicon Valley. “The arts scene here is probably not as visible on the surface,” says Kreidler. Since the late 1970s, pop art showed up in many publications, such as AMD’s (Advanced Micro Devices) annual report (Rogers 182). Back in 1983 Verbatim established a \$100,000 fund for the San Francisco Museum of Modern Art to purchase paintings (Rogers 182). The Sunnyvale Community Center was the first to recognize the cultural by-products of the microelectronics industry and highlighted this avant-garde movement in a 1981 show saluting Silicon Valley (Rogers 182). Today, Kreidler notes, “There are many poetry slams, art classes, and more computer-influenced art forms here. Amateur participatory arts are very alive and well in Silicon Valley, especially in immigrant communities.” Key findings by Dr. Pia Moriarty show that 61% of Santa Clara County’s population is made up of foreign-born immigrants and their children. These immigrants come from 177 of the 194 nations in the world. Over 40% speak a foreign language at home.

Immigrants are more active in the participatory arts, which are more concerned about production than about consumption, and more concerned about transmission of culture than developing individual expertise. The style of participatory arts is open entry/open exits, rather than elite gate keeping. According to Moriarty, immigrants use the arts to reclaim their cultural identity so they can attain membership in the new society as whole persons. In addition, the participatory arts are the immigrants’ strongest tools for connecting with the mainstream community. Civic engagement through participatory arts include:⁴

- The Vietnamese American Center
- Vietnamese Cultural Heritage Foundation at Kelly Park
- Vietnamese Folk Arts Institute
- Cambodian American Resource Agency (CARA)
- Naatak Indo-American Theater Co.
- Kurdish Cultural Celebration
- Contemporary Asian Theater Scene
- Firebird Youth Chinese Orchestra
- Obon Festival in Japantown
- Payvand School at DeAnza Community College
- Diwali Festival at the Hindu Temple
- Ethiopian Community Services
- Kwanzaa at the Triton Museum
- Calligraphy of Thought
- Eid ul Fitr Muslim Celebration
- Teatro Corazon at Sacred Heart Parish
- San Jose Cinco de Mayo Celebration
- Movimiento de Arte y Cultura Latinoamericana

⁴ **Immigrant Participatory Arts: An Insight into Community-Building in Silicon Valley.** Conducted by Pia Moriarty, Ph.D. from September 2002 – February 2003. Published June 2003.

Social service agencies, movie theaters, libraries, parades, and street festivals serve as venues for these activities. "So, in a way, I'm not surprised that the San Jose Symphony went out of business. The age and race demographics of the South Bay vs. the symphony patrons (who's average age was 68) showed us that the supply was there, but the demand was going down," notes Kreidler.

Arts and civic organizations have had to modify services to fit the needs and interests of Silicon Valley. Robert mentioned that a big issue is the proximity to San Francisco. "People spend money in San Francisco, but San Francisco people don't go south. So, people in Silicon Valley have to spread the wealth. They need fewer, but more high-quality arts. Also, private, community, and Stanford arts give people in Silicon Valley many options," notes Robert. David made an interesting analogy to the lifestyle, "You know, people here like a relaxed, casual, outdoors setting, like Villa Montalvo. You can even have a glass of wine with the concert. It's what this place likes. There's also tremendous variety, not just jazz or country. It's different than buying a subscription to the San Francisco Symphony where it's the same style of music and you have to get dressed up to go there." Steve tied it to the work-life balance, "They need to cater to Silicon Valley families. For example, the San Francisco Ballet has a very liberal exchange policy for people with very busy lives and open rehearsals for stay-at-home moms." Steve also commented on the type of entertainment that works best, "People attracted to Silicon Valley are highly motivated. Passive entertainment doesn't work. We are so multidimensional that it's hard to keep our attention."

Kreidler comments on how Cultural Initiatives has had to adjust to the demands of the Silicon Valley lifestyle.

"This place works harder than other places. We need the basic tools, we are active ourselves, and appreciate others who are world class. Because we believe that giving people the tools and experiences in the arts creates demand, not just supply. So, we have focused on grants to schools that impact 60,000 students. Our Creative Education program provides grants to everyday schools (not magnet schools) and onsite assistance to teachers."

In addition, in order to speak to Silicon Valley in its own vernacular, Cultural Initiatives has developed a software program – *The Great Cities Simulator* – that demonstrates the positive impact the arts can have on the quality of life and the ability for businesses to recruit talent.

Volunteerism and Public Policy Participation

Due largely to Silicon Valley, we are in the midst of an economy that defines success by the ownership and control of information and the tools that access and exploit abstract representations of knowledge. Our economy requires identification numbers, credit records, medical, dental, educational, criminal, and family records to be stored, matched, updated, and archived by computers.ⁱⁱ We live in a world where our 2003 is not as totalitarian as George Orwell's 1984, but every electronic signature, fingerprint, or transaction record we leave is a non-transitory record that is more easily monitored, more cheaply searched, transparent to the person being searched, and can lead to the erosion of personal privacy (Lessig 7-12). Likewise, government initiatives to use data mining techniques to profile terrorists, corporate monitoring of employees' computer use, and Internet commerce sites routinely capturing and selling personal preference information are merely a few of the similarities between America in 2003 and Orwell's Oceania of 1984. We live in a culture that is quickly moving toward a paperless and faceless society. However, the faceless or non-human contact of our Information Age only enhances our vulnerability. As we dash into the electronic society, with written records and receipts fading into the "inaccuracy of individual memories," as Orwell's Party would state it, the reality of our transactions, our lives, and the lives of others become flexible. From the bureaucracy's perspective, our reality exists at its discretion. In addition, **New York Times** reporter Jeffrey Rosen's interview of Oracle executives indicated a profound lack of ownership of 'policy issues,' such as the balance between personal privacy and security. As Tim Hoehst, a senior vice president of Oracle, is quoted as stating, "At Oracle, we leave that to our customers to decide.

We become a little stymied when we start talking about the ‘should wese’ and ‘whys’ and the ‘hows,’ because it’s not our expertise” (Rosen 5-6).

Since technology is the use of scientific knowledge toward a defined set of goals, it always has social implications. The public is increasingly concerned that the benefits of scientific knowledge are being outweighed by our inability to control the negative consequences. The layperson’s remembrance of history is that if anyone is to be adversely impacted by a new technology, it is generally the poor, the powerless, and those of color.

Do scientists and engineers have a responsibility to society, and if so, what is that responsibility and how does it play out in Silicon Valley?ⁱⁱⁱ As Steve observed, “It is common for execs here to not be involved in community activities, unlike what would be expected of executives of older traditional companies.” However, since humanity’s needs, wants, and desires are realized through technology, it seems that there is at least verbal support among the scientific community to encourage active roles by scientists and engineers in the decision-making processes of new technology implementation. Certainly it is no longer adequate for scientists to lock themselves in their laboratories and blindly search for ‘neutral’ facts. Science ethicists Skillen, Bronowski, Harrison, and Yellin all show a common thread that has been running through the technology community for decades -- the argument of the supposed neutrality of scientists and engineers is no longer an acceptable shield behind which technologists can hide. Given that technologists must get directly involved in technology policy issues, it is timely and proper that a renewal of professional ethics and a recommitment to community discourse by Silicon Valley technologists is in order. However, Grant echoed the work-life balance issues when it comes to volunteering for civic and social service organizations, “To attract me, they have to do more and better marketing because they are competing for time. Non-profit and social organizations have had to be flexible with time commitments and hours to attract supporters. Schedules are a crapshoot. If you are going to volunteer, you have to set limits.”

Conclusion

This survey underscores the need for a reconciliation of the technology community with the emotional, artistic, and religious schools of thought in a manner that recognizes that they are not inconsistent with each other. One begins to see a glimpse of this when one goes beyond the perspective of casual external observation and looks closely at the manner in which Silicon Valley is using its multicultural technological worldview to redefine ‘culture’ and ‘arts’ according to new metrics. Silicon Valley’s citizens believe they have a rich social and arts scene, but admit that it cannot be judged by the European classical arts definitions. In Silicon Valley, the arts are local, participatory, influenced by global diversity, and frequently use the medium of technology. Venues are decentralized, small, community-based, and informal. Individual financial donations are small, often intangible, but are large in aggregate impact. The range of arts options available is broad, the quality is high (as defined by Silicon Valley’s standards), but the visibility is low. The fact that these metrics are different than the classical arts of ‘old money’ cities does not negate their existence or significance in the lives of the people of Silicon Valley.

The citizens of Silicon Valley themselves accept a major portion of the responsibility to establish a work-home, technology-arts balance that works for them and works in aggregate for the overall Silicon Valley community. In spite of intense workloads, long commutes,⁵ and an extreme focus on technology, the people we interviewed found ways to force the balancing act. Robert, who was influenced in the early days at HP, saw role modeling by Bill Hewlett and Dave Packard who were actively involved in the community. So he got involved in United Way. “These perspectives let you be a more effective executive,” says Robert. Grant noted, “It might be easier for me because I’m an HR guy that happens to be in technology, not the other way around. I keep balanced through a variety of things: the spiritual realm, Eastern philosophy, Buddhism, Sangha (congregation), meditation, and I make sure to make the time for lunch (not many do). My wife and I attend lots of movies, an occasional play, and small parties. I run three times a

⁵ Every 10 minutes of commuting time cuts all forms of civic engagements by 10%. The average one-way Silicon Valley commute is 26 minutes, but most experience much longer commutes, such as the 1-hour San Francisco commute and the 2+ hour Central Valley commute (Moriarty 40).

week and eat healthy.” David goes to Villa Montalvo (outdoor concerts at a mountain winery), a comedy club, the Museum of Modern Art, and concerts at Shoreline Amphitheater. A patron of the classical arts, Steve and his wife are regulars at the San Francisco Ballet. “I exercise and I’m involved in community organizations, such as the YMCA of the Mid Peninsula, where I am a volunteer and Board member,” says Steve.

Silicon Valley’s cultural institutions also have a definite role of importance in balancing the technocratic worldview. In such a complex world, perhaps there is a role for art to help with nature’s ‘unconcealment,’ as Heidegger would state it (Heidegger 2:649-701). Understanding the history, belief systems, ethics, shared assumptions found in the literature of a people, economic shifts, political context, class/race struggles, and the critical adoption rate or “tipping point” associated with major scientific discoveries and their related technological uses, will allow engineers to develop an approach to technology assessment that is balanced with a humanist worldview.^{iv} This art form can be inherently superior to the sterile analysis of trends because it will take into consideration the untidy emotional and cultural factors inherent in the ‘ends’ that justify the technological ‘means.’ In the process, Silicon Valley will be able to minimize the separation between technology and ethics, culture and tools. It may even be able to usher in a new age of complementary thinking styles based on harmony between science and religion, tangible and intangible, fact and faith, optimism and fate. In this sense, Silicon Valley’s unique balancing act may be a harbinger of what post-industrial society has in store for the world.

APPENDIX --- Research Methodology

The approach used in this survey is (1) an augmentation of secondary research based on in-person interviews⁶ conducted for Cultural Initiatives Silicon Valley, with (2) an in-person interview of John Kreidler, Executive Director of Cultural Initiatives,⁷ plus (3) discussions with long-time Silicon Valley leaders who seem to have mastered the technical-humanitarian balance. For Cultural Initiatives, and the arts organizations it represents, we asked how they experience the client base and how have they adapted traditional cultural services to the specific demands of a technology-saturated populace. How would delivery of these services be different if they were in Sacramento, Cincinnati, Charlotte, or Philadelphia? With the significant upswings and downturns of the Silicon Valley economy, we asked how they solicit funding from a population obsessed with rationalization and results. There are also many long-time Silicon Valley entrepreneurs, computer scientists, corporate executives, human resource managers, marketing executives, university professors, and grassroots political activists that have also navigated the balance of artistic enlightenment and community commitment while fully participating in and leading the Silicon Valley charge. Many of them are from other parts of the United States, while others migrated to the U.S. from Europe, Asia, South America, and Africa. Their perspectives are fascinating because, not only have they voluntarily moved to Silicon Valley and been successful in business or academia, but they also have managed to maintain a cultural identity of nationality and ethnic group. Given the short timeframe and scope of this project, this study interviewed:^v

- Grant, a transplanted New Yorker, white male, human resources director and Buddhist with a bumper sticker that reads “Live Simply,”⁸
- Robert, a retired African-American senior executive of a major computer company and now recharged CEO of a startup, who loves fine wines, music, politics, social networks, and his tennis court on Maui,⁹
- David, a white male marketing executive from Yugoslavia, veteran of many product launches and keeper of Orthodox Christian traditions, former connoisseur of great scotch and fine cigars, and facilitator of an extended social network of Croatian expatriates and American-born friends,¹⁰
- Steve, a white male marketing executive of established and start-up companies, Ivy-league educated, Santa Barbara raised, family man, avid outdoorsman, and connoisseur of theater, ballet, and opera.¹¹

To these distinguished people we asked how they experience the challenge of maintaining balance in Silicon Valley? Given that they have all come from elsewhere, to what degree and in what manner does being in Silicon Valley make cultural balancing unique?

⁶ **Creative Community Index: Measuring Progress Toward a Vibrant Silicon Valley.** Conducted by Audience Insight of Fairfield, Connecticut in 2001-2002. Published June 2002.

⁷ Held on 7/8/03, 4PM PDT, in-person interview in his office in San Jose

⁸ Phone interview on 7/10/03 at 5:30PM PDT

⁹ Phone interview on 7/11/03 at 7:30AM PDT

¹⁰ Phone interview on 7/9/03 at 3PM PDT

¹¹ Phone interview on 7/11/03 at 1PM PDT

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End Notes

ⁱ To the external observer, Silicon Valley seems to have a habit of reducing causes and cures to pure mechanistic explanations that are contrary to broader human experience. Silicon Valley's assignment of an omnipotent role to science, of solving all problems and clarifying all things, and of deifying nature while secularizing religion can lead science to what Robert Fischer refers to as, "...like other ideologies, [science] tends to be systematic, authoritarian, and to be held tenaciously" (Fischer 68). Science and technology cannot ever hope to realistically answer the big questions facing humanity. Being based upon observation and testing, science is at an impasse when it comes to things that cannot be observed, measured, tested, and predicted. However, when we turn to the world of the intangibles, technology and science face definite limitations. Social problems transcend mathematical description and involve emotions that cannot be touched, measured, or manipulated successfully. Worse still, technical solutions often only address changes in technique that might relieve the symptoms, but do not demand changes in human values or morality, which ultimately affect many underlying causes (Meadows 155-159). Theological questions transcend our three physical dimensions of space and our one dimension of time. What exists beyond those dimensions can only be entertained as speculation or believed through blind faith. Science is a search for truth and truth is limited to the facts of nature that are there for observation via our senses. As a result, technology cannot emulate human feelings and science cannot define God.

ⁱⁱ Dependency upon databanks is not an indictment of those sources, per se. However, the ultimate threat to privacy and distortions of reality revolve around the use of our files by agencies to judge our creditworthiness, our insurability, our employability, educatability, and our desirability as neighbors or tenants. This creates an enormous potential risk to the privacy and accuracy of our personal records in databanks, nationwide. Even more disturbing, Accenture and HNC Software are building a profiling system designed to analyze airline passenger living arrangements, travel patterns, real estate history, demographics, financial, and other personal information to prepare a threat index that can be compared to a terrorist profile (Rosen 2-3). However, through maliciousness or accident we may become a perceived threat or at least an undesirable. The losers suffer either profound dislocations, an increasing economic gap with its subsequent competitive disadvantages, or at best they become the employees or servants of the new ruling class. Silicon Valley is an extreme version of this.

Over forty years ago, George Orwell, wrote a scathing attack on the tendency of modern societies to erode privacy in his prophetic novel, **Nineteen Eighty-Four**. His totalitarian world of Oceania drew a striking resemblance to his world of 1948 and our world of 2003. In Oceania, individual ignorance was strength. Today in America, citizens leave the decisions up to the politicians and experts who "have better data." The prevailing aristocracy of Oceania is not one of "old money" or family ties, rather, as in America today, it is one made up of global corporations, technocrats, trade associations, money managers, and media conglomerates. In his interview with the billionaire chairman of Oracle, Larry Ellison, New York Times reporter Jeffrey Rosen noted, "As Ellison spoke, it occurred to me that he was proposing to reconstruct America's national security strategy along the lines of Oracle's business model," one of consolidating hundreds of separate databases into a single database on the Internet (Rosen 7). Oceania's "The Party" complacently used surveillance techniques like the omnipresent telescreens that watch every waking, sleeping, and even excreting action. In the post-9/11 America, video surveillance is commonplace (Lessig 8). ID badges can track one's movements in buildings (Rosen 4). ADT's GPS system can track humans the way Lojack tracks cars (Saphir, New York Times, Letter to the Editor, 3/16/2000). Every web site that is visited and every email that is sent or received can be monitored (Guernsey 1-3). To 'The Party,' reality is not external. "Not in the individual mind, which can make mistakes, and in any case soon perishes; only in the mind of 'The Party,' which is collective and immortal," as the interrogator O'Brien insists.

ⁱⁱⁱ This debate around the role of scientists and engineers as ethical social agents has been around for ages. Nearly fifty years ago, Bronowski reinforced the basic argument that scientists have a responsibility to humanity. Bronowski stated that the dilemma of today (1956) is not that human values could not control a mechanical science. It was the opposite: "The scientific spirit is more human than the machinery of governments." He saw scientists as belonging to a community that fosters free critical thinking and tolerance – just the characteristics needed by our troubled society. Bronowski argued that science is a human activity and is practiced by "very human" scientists. Although he believed that the facts produced by science are neutral, science as a human activity is not neutral. With this established, he advocated a role for scientists as educators of the public on the positives and negatives of new discoveries. Bronowski shunned the idea of scientists as governors and plead for an adoption of the scientific ethic by world leaders (Bronowski 71).

The late Dr. Bronowski eloquently and logically argued his points. He showed us that scientists are as fully human as artists and, as such, they display a full range of creative genius. Being human, however, means that scientists can no more shirk their responsibility to improve our lot than politicians. His argument, that scientists have a crucial responsibility (for which they are uniquely trained) to make the public fully aware of the implications of their work, should serve to bring the 'overly tunnel-visioned' researcher back into the realm of political activist and citizen. According to Bronowski, no longer do scientists have a right to hide behind the veil of scientific neutrality. They must participate in decision making as full partners with the public.

Twenty years ago, Mount Holyoke College Professor Anna J. Harrison presented an interesting case for the expert scientific consultant and against the expert scientific witness in technology decision-making. The, then, president

of the American Association for the Advancement of Science, Harrison contended that the integrity of scientists was called into question when an individual accepts the role of witness for a contending party. When this happens the role of that individual necessarily becomes that of marshalling scientific knowledge to support the position of a contending party. She viewed scientific experts as, by definition, biased and therefore advocated a restriction of their role to that of consultant.

This consultant role was consistent with Harrison's belief that, since technology necessarily involved a negative impact regardless of its positive impact, should be governed by an enlightened public. She stated:

"My experience has been that, in endeavouring to communicate relevant scientific knowledge to individuals who have limited backgrounds in science, these individuals can comprehend the information very quickly if they understand the nature of scientific knowledge" (Harrison 123).

From this perspective, Harrison saw the role of scientists as educators of the public and as consultants to special interest groups. In a fashion similar to Bronowski's argument, Professor Harrison once again stressed the importance of scientists coming out of their labs to participate in the decision-making processes of technical innovation by helping the public decide on socially appropriate courses of action.

In 1984, Joel Yellin, then Senior Research Scientist at the Massachusetts Institute of Technology, proposed a system of expert advisors who would help create a deeper emphasis on the principle of public participation in technological decisions. Yellin saw the growing use of experts in government agencies and the delegation of public responsibility to these agency experts as being a serious threat to representative government. In an argument similar to his contemporary, Anna Harrison, Yellin conceded that administrators of agencies such as the Environmental Protection Agency (EPA) have far broader responsibilities than initially envisioned by politicians. They are called upon to assure worker health and safety, to protect and improve air and water quality, and to guarantee the safety of complex engineering systems. They also must predict the long-term consequences of major industrial and government decisions which, increasingly involve technological innovation that results in social changes which surpass the capacity of the general public to absorb these changes, not to mention understand all aspects of the technology. Yellin conceded the necessity for technical experts but warned of the dangers of the professional technocrat (Yellin 126).

His solution placed the scientist on a representative advisory board formed by the public with competence and the public interest as its chief operating rules. With Yellin, we saw yet another argument for responsible scientists participating in technical decisions rather than merely allowing the stated neutrality of science to cause an abandonment of this responsibility to professional bureaucrats.

^{iv} Since phenomena outside of the physical realm of experience are, by definition, foreign to science and native to religion and art, one's feeling, intuition, and connectedness can certainly assist in answering complex questions. Art and religion can tell society where to look for solutions to social problems, and science and engineering can help society determine how the process occurred (or should occur). Science's focus on the physical realm of cause, effect, and cure, plus its values of truth, objectivity, dissent, independence, respect, and supranationality might help humanity solve many of the most pressing social problems. Art and religion, focusing on the non-physical realm, might help society refine universal meaning, personal morals, interpersonal relationships, and societal value. When technologists start appreciating artists and listening to theologians and mystics, and this latter group starts, not only listening, but also understanding and practicing science, society may be its way to viewing these ultimate questions in a holistic fashion.

^v Originally, the researcher sought to benefit from the insights of a larger, more diverse group of interviewees. However, of the 10 interview requests, half either did not respond in time for the survey or were not available. For completeness, they are described here. *Names have been changed for anonymity.*

- Li, a Chinese-American political activist who also consults with CEOs of major computer companies on organizational design,
- Grant, a transplanted New Yorker, white male human resources director, and Buddhist with a bumper sticker that reads "Live Simply,"
- Robert, a retired, African-American, senior executive of a major computer company and now recharged CEO of a startup, who loves fine wines, music, politics, social networks, and his tennis court on Maui,
- Robert, a white male, 30-year college professor that has tried to drill generations of engineering students with ethical thinking and humanistic decision-making,
- Jean-Philippe, a Belgian white male, marketing consultant for Silicon Valley companies, who splits his time between work in the San Jose area, family in the quaintness of Mill Valley in Marin County, and his extended family in Belgium,
- David, a white male native of Yugoslavia, marketing executive, veteran of many product launches, keeper of Orthodox Christian traditions, former connoisseur of great scotch and fine cigars, and one with an extended social network of Croatian expatriates and American-born friends,
- Steve, a white male, experienced marketing executive of established and start-up companies, Ivy-league educated, Santa Barbara raised, family man, avid outdoorsman, and connoisseur of theater, ballet, and opera,
- Barbara, a white woman, dean of a graduate liberal arts program at a major university in the heart of Silicon Valley, who has to recruit and retain humanities majors from the adult population of a technology saturated marketplace,
- Chuck, a white male computer scientists and inventor of key components of the Internet, former MIT professor, entrepreneur, and connoisseur of fine wines.