
VIRTUAL ADJACENCY AND THE MEANING OF “PLACE”*

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As I was putting my presentation together I was reminded of Winston Churchill, who was asked if he would address a group. Churchill agreed, adding:

If I can speak for four hours, I will be ready in twenty minutes. If I can only speak for twenty minutes, it's going to take me four hours. And if I can only speak for four minutes, there isn't enough time.

So my biggest challenge is to compress almost thirty years of thinking into a twenty-minute talk.

What I'm going to encourage you to do is focus on getting your imagination in focus. In order to do that, you have to think.

In fact, I was just outside having a cup of coffee, and I was chatting with someone, and I mentioned that when people ask me what I do, I say I think. He said, “Gee that's good, we need people to think, but thinking hurts my head.”

What I have always told my kids is, thinking is hard work. If you're not sweating when you're thinking, just like pumping iron, you're not really thinking. You're just repeating something you heard somebody else say, or you saw

* Introductory Comments transcribed from *The 2008 “YouTube” Election?: The Role and Influence of 21st-Century Media* Symposium held on March 13, 2008 at The Catholic University of America, Columbus School of Law, as edited by the author. Copyright © J.J. Hellman 2008.

[†] Dr. Hellman is a real estate developer and trend researcher known for his leadership in understanding how buildings, towns, and cities are being changed by computer and communication technologies. He invented the term “virtual adjacency®”—registered with the U.S. Patent and Trademark Office—to describe our increasingly Internet-driven world's changing work patterns, social structures, and living conditions. Telecommunications technology, he predicts, will change our world physically as well as culturally in the twenty-first century just as the railroads changed it in the nineteenth century and the automobile, air travel, telephones and television changed it again in the twentieth. Dr. Jay John Hellman holds five degrees from the Massachusetts Institute of Technology: Ph.D. (Quantitative Policy/Systems Analysis and Planning), M.S. Management (Sloan School of Management, incorporating research/education at Harvard Business School), and B.S., M.S., and E.E. degrees.

somewhere, or you read somewhere. So that's what I want to encourage—real thinking.

Now, the slide of the guitarist you are looking at here, which maybe looks a little bit like me, happens to be my son. What brought that up was yesterday's *Washington Post*. On page one of the business section was a picture of Lee Abrams, who is leaving or has left XM Radio to become chief creative officer for the Tribune Company. The *Post* quoted him as saying, "Over the past couple of years, I have been fascinated with the concept of news and information as being the new rock and roll. There had always been music, but rock and roll took it to a whole new level, broke the rules, wrote a whole new playbook."

The relevance of that quote to this picture of my son is that he's in Los Angeles right now. He went out there to make it in the music business, and he's good enough to be on stage in Madison Square Garden, which is his dream, but being good enough isn't good enough. You also have to be lucky. And to be lucky, you have to be in the right place at the right time. But you don't know in advance what the right place is and when the right time is. So what I've always told him is, you've got to be in a lot of places and keep your eyes open, so that when you're in the right place at the right time you recognize it.

Let me now explain how this relates to my subject today, which is Virtual Adjacency and the Meaning of Place, in the context of contemporary telecommunications technologies.

When I said a moment ago I wanted to encourage you to get your imagination in focus, I was referring to a favorite quote of mine, from Mark Twain. He advised us that our eyes cannot see properly if our imaginations are now in focus.

Many people today think they are seeing the telecommunications industries clearly, but they are not really doing this because although their eyes are perfectly clear, their imaginations are out of focus. This is because their imaginations are still attuned to outdated ideas about technology. Their philosophical concept of Place continues to be rooted in those outdated ideas.

There are two equally mistaken schools of thought about Place. One assumes that although new telecommunications technologies are transforming our society, our old reliance on Place remains unchanged. The other point of view goes to the opposite extreme and assumes that new technologies are making Place obsolete.

Neither of these two extremes is true. In the music business, for example, it is now possible not only to distribute, market and reproduce music in ways which were previously unthinkable, but it is also possible to build industry relationships and conclude major deals across vast distances. A little while ago my son took part in a movie music project which illustrates this. Though he was physically in Los Angeles he was able to create a musical product and en-

gage in professional dialogue with a movie producer elsewhere in the United States—all at enormous speed, since the project was very urgent. The parties were separated in space but in professional terms telecommunications technologies made them virtually adjacent.

On the other hand, the opportunity offered to my son to do this came about in the first place because of the reputation he has been building in Los Angeles.

So virtual adjacency should not be regarded as just the irrelevancy of distance. That would be an oversimplification of a much more subtle set of circumstances.

The complex form of virtual adjacency that new telecommunications technologies are creating means that face-to-face relationships are not less important but more important than ever. They have to be balanced with distance communication in appropriate ways.

Place is not becoming irrelevant. It is crucial. But how we handle it must now be intelligently conditioned by our adaptation to technological change.

Why am so interested in the concept of Place? Partly because I am a real estate developer. But that is not the whole story. Of my five degrees from MIT, three are in electrical engineering. So I don't think like a normal real estate practitioner. I am interested in how Place is being redefined by technology, not only for the purposes of real estate but in regard to our entire society.

You've all heard that the three most important things in real estate are *location, location, location*.

What most people don't realize is that location and how we define it and manage it is a key not only to real estate but to most and quite possibly all human pursuits.

Even fewer people realize that what determines our definition and response to location is our technology.

In introducing me, David Irwin mentioned I had anticipated the invention of the personal computer. When I did that, in the late seventies and early eighties, it was in relation my research on redefining our concept of location in this broader sense.

At that time I was evolving a new approach to the design of office buildings, which took into account the emergence of new information management and distribution technologies. This research eventually enabled me to get some of Washington DC's zoning laws changed.

The crux of this research was my finding that new information technologies affect the design of office buildings because they change the nature of Work itself.

Now, changing our concept of Work is as fundamental as changing our concept of Place. To many people it seems unreasonable to change our thinking about such fundamentals. But Ben Franklin said: "Progress is the work of un-

reasonable men.” What he meant is that reasonable men accept things the way they are. So anybody who says the way things are now isn’t right is usually regarded as being unreasonable. But every once in a while, some of those unreasonable men are right.

And sometimes being creatively unreasonable in this way requires us to admit the enormous newness of the forces that are changing our lives.

This admission can be very uncomfortable.

There was a class I took in my first semester of graduate school: “The Social Impact of Technology Change.” It was September of 1968—forty years ago.

A class with a title like that sounds like you’re going to sit around, talk, and shoot the breeze. That was in the department of electrical engineering at MIT. It was taught by Robert Fauno, the artificial intelligence pioneer who had run the MAC project—machine-aided cognition. And when he stood up in front of the class, he said: “I’ve never taught this before. I have no idea what I’m teaching. It just seems to me this is important stuff, and I don’t see anybody worrying about it.”

So as a group our class decided what to read and what to discuss, and we came up with a simple conclusion that can be summed up by saying that the evolution of technology has two very different impacts:

- It improves something we already do.
- It makes things possible that were not possible before the technology was invented, and this involves behavioral change.

When a new technology is introduced, most people judge it by how it improves something we’re already doing. It’s cheaper, it’s faster, it’s more reliable. That’s the trivial part, because you’re already doing that.

Social change, the harder part, comes from changing your behavior to adapt to the fact that the new technology makes things possible that were never possible before.

It took me fourteen years of applied research to predict three behavior-changing technological developments, namely:

- Computers will continue to get smaller, more powerful, cheaper.
- Video screens will get larger, thinner, higher resolution, cheaper.
- Communications networks will become high-bandwidth, cheaper.

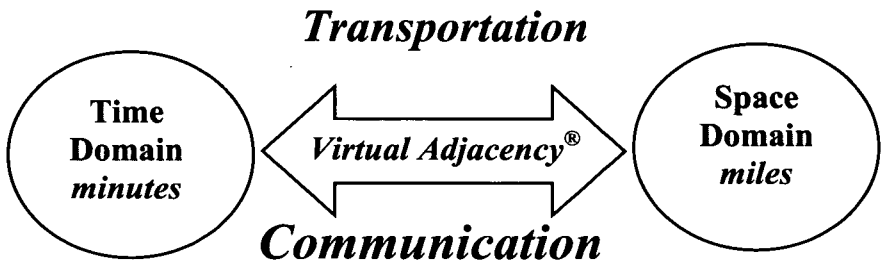
These three predictions all came true and are continuing to come true, and they resolve entirely around the concepts of Work and Place, and how these affect the kind of society now emerging in America and the world.

In this context they form the critical backdrop to everything you will be discussing at today's symposium.

The third prediction is one that very few people understand. Very few people know what broadband really is. Because the cable companies are trying to tell us that cable modems are broadband, and the telephone companies are trying to tell us that DSL is broadband. That is the sales text on broadband. But broadband is at least a thousand times more than that. It is much, much more than any hardware. It is a profoundly important social and psychological change which happens to be intimately linked with some of the major infrastructural features of our society, such as transportation.

Few people understand that transportation is actually a function of communication. This relationship is expressed in what I have called The Hellman Transform.

Figure 1: The Hellman Transform



If you ask somebody how far it is from where they live to where they work, they more often answer in minutes than in miles.

Well, those are two different dimensions.

Legal jurisdictions are of course defined in the space domain. They are lines on a map. Well, how relevant is a line on a map when human behavior is as much in the time domain as it is in the space domain?

The way I came up with the term "virtual adjacency", when I was thinking about how technologies would change behavior, is that I was asking myself the question "Why do I go to my office?". I realized that one of the reasons I went to my office was that my files were there. So, if I needed to get to my information, I needed to be physically adjacent to my files.

Now, if computers are going to get smaller, more powerful, and cheaper, where are your files moving? They are moving from paper in a drawer onto a server. And how do you access the server? By a network.

Let's say that server is in Australia, and now you sit at your computer connected to the network and you request the file. How long will it take for the file to appear on your screen? Less than one-tenth of one second. So in the time domain, Australia is virtually adjacent to us.

At this point in my presentation I have up on the screen a picture of an aircraft. But as you can see, there is no place for a pilot to sit. That is because this is a robotic precision-missile device intended not to bomb a large area such as a city, but to hit a highly specific target—a group of some top Al Qaeda people. Do you know where the pilot was for this missile attack? Nevada.

So you have a pilot conducting a precision attack on an individual human target on the other side of the world. That's virtual adjacency in space.

Now, I want to give you a little bit on numbers. The futurist George Gilder said that "fiber is to bandwidth as the integrated circuit is to transistors."

When I was in college studying electrical engineering, the transistor was pretty new. It was a solid-state little piece of metal with three wires, and it replaced vacuum tubes. Vacuum tubes were those electronics which almost looked like light bulbs. Those were great inventions at the time, but before the vacuum tube could function, you had to heat up the tubes. Computers used to use vacuum tubes for memory and switching. But you can imagine how much power it took to heat up the tubes. Then you needed air conditioning so they didn't get too hot. So computer rooms were built on raised floors with air conditioning underneath the machines to keep them cool. You can imagine how expensive this is.

Every transistor is a metal can with three wires. Up on the screen before you know is a chip that you put in a camera for flash memory. Now this particular chip happens to only be sixty-four megabytes. But you can buy this same chip today with eight gigabytes on it and it's physically the same size.

Do you know the sale price at Staples now for two gigabytes of space? \$14.99.

Let me give you an idea of how significant this is, and then remember that phrase I gave you that fiber is to bandwidth as integrated circuits are to transistors.

Who knows what a byte is? Eight bits. Why eight bits? Well, how do you know the difference between the capital D and the little d, or a little r and a capital R, we have symbols, and a period, or plus sign or a minus. In eight bits, you have 256 different numbers, two to the eighth power. And 256 numbers is enough to represent all the symbols we need to produce individual characters. So that's why a byte is eight bits. If you have two gigabytes, you have two bil-

lion bytes, or sixteen billion bits, which is the number of transistors on that chip, and since each transistor has three wire solder joints this makes the number of solder joints forty-eight billion.

It would take you 1,500 years to count to that number. Yet you can buy that chip for \$14.99.

By this reckoning, integrated circuits have virtually made transistors free.

This chart sets out the numbers. The first calculation is the number of seconds in a year, sixty seconds in a minute, sixty minutes in an hour, twenty-four hours, 365 days. There are 31,500,000 seconds in a year.

Chart 1: The numbers boggle the mind

| | |
|--|---|
| Number of seconds in one year | $60 * 60 * 24 * 365 = 31,536,000$ |
| Number of transistors on a 2GB chip | $2 \text{ billion} * 8 = 16 \text{ billion}$ |
| Number of solder joints on a 2 GB chip | $16 \text{ billion} * 3 = 48 \text{ billion}$ |
| 1,500 years to count to 48 billion | \$15 to purchase a 2GB chip |

This, then, is what fiber is doing to bandwidth.

We just don't have a legal system that knows yet how to deal with this kind of transformation.

If you ask why we have separate cable companies and telephone companies, and therefore separate, complex legal and regulatory structures, the answer is that because in the old technologies they were physically distinct networks, and they looked like they were different functions, different activities, and different services.

This is the conceptual baggage that handicaps our current legal system. It is our biggest impediment to making progress in getting to the future.

That is why the research company I co-founded with David Irwin was called CTN. This stood for “completing the network.”

We said: “Long-distance networks are fiber. The backbone of local networks is fiber. The last mile is copper. We're going to build edge access networks to make this last mile fiber, so you can complete the communications process without copper.”

That completion provides real bandwidth, and you can throw bandwidth at a problem the way you throw transistors at a problem now without thinking twice.

But there was another comment that David made which is very relevant to this. Imagine the fiber network we are building to connect people as the nervous system. Whereas in each human being the nervous system connects to the

cells, or at least all of the functional parts of a human being, fiber connects human beings. Each of us becomes a cell of a new, larger organism.

I have tried to indicate to you the philosophical and mathematical scope of the challenge with which new technology is presenting us. Now, let me take you to some of the public policy issues that relate to why virtual adjacency is important.

Consider the biggest problem facing our cities, which is surely poverty.

The wealthy parts of our cities are marvelous. They are magnificent to look at. They are wonderful to walk around. They are vibrant and alive. It is the poor parts of cities that are problem. What is the solution to poverty?

One word—and it's not Money. It's Education—which, among other things, is the ability to make money.

You've all heard the old Chinese proverb: if I give you a fish, you will eat one meal; if I teach you to fish, you eat for a lifetime.

Teaching is the key to wealth and social improvement.

And the new technologies are the most powerful teaching tools the world has ever seen.

We can today reinvent education in staggeringly powerful ways.

Now consider crime and recidivism. If the criminal justice system that we have today was designed by the private sector, the designers would have been sued for malpractice. When you are in jail, who do you have lunch with? You're networking with people who can't do you any good. You're being trained to become a better criminal.

We must use our new telecommunications technologies to re-engineer the criminal justice system by changing the concept of Place that this system uses. It is technologically today possible for the inmate of a prison to be exposed to role models who will change that inmate for the better.

Consider medical care. We don't have enough doctors in all the right places. Here, too, virtual adjacency can transform our society by enabling medical knowledge to be disseminated in vastly more effective and efficient ways.

From these issues to terrorism, social security and the redefinition of retirement, there is no major area of our lives that cannot be transformed for the better, almost unrecognizably, by virtual adjacency technologies.

There were two op-ed pieces in last week's *Washington Post* that really struck me. The first was written by John Nagl, a security expert.¹ This piece had to do with the fact that terrorism is an ideas problem, not a guns problem. Anyone who will strap explosives to their bodies and blow themselves up tells

¹ John A. Nagl, *We Can't Win These Wars on Our Own*, WASH. POST, Mar. 9, 2008, at B04 ("Insurgencies are ultimately inspired by ideas As such, the single most important step the United States could take toward victory is re-creating an information agency to discredit our enemies' narratives and amplify those of our allies.").

us that we are not dealing with issues of psychology more than issues of military hardware.

Not many of you remember growing up in the nuclear fright days. When I was a kid, there we were, with the Soviet Union and the US between us having enough bombs to blow up the world God knows how many times. The acronym for our defense strategy was M.A.D., Mutually Assured Destruction. You know what that strategy depends on? It depends on both parties being rational. But you don't have rationality with somebody who straps a bomb to themselves.

The second *Post* piece was by Linda Bilmes and Nobel Prizewinner Joseph Stiglitz. It said: "Already, the escalating cost of the wars has crowded out spending on virtually all other discretionary federal programs"²

These authors have recognized that our current security and military policies show that we are using the wrong tools. We are using military hardware to fight old-fashioned wars, whereas we should be using sophisticated telecommunications technologies to fight the wars of the twenty-first century, which are wars of ideas.

Stiglitz said: "We could have had a Marshall Plan to help desperately poor countries, winning the hearts and maybe the minds of Muslim nations now gripped by anti-Americanism."³

He also noted that in a world of millions of illiterate children we could have achieved literacy for all for less than the price of a month's combat.

Technology can change a society to an extent that seems incredible. Do you know what technology has most changed our buildings in recent times?

Air conditioning.

Look at the Pentagon. It's five long, narrow rectangles, one inside the other.

The Pentagon was built as these five long rectangles because we didn't then central air conditioning.

Now look at a picture of the new Reagan building on Washington D.C.'s 14th Street. Did you know the Reagan building is almost thirteen acres under one roof.

To me the Reagan building is a criminal building. It never should have been built like that. It is a throwback to the type of building that we designed when we did not have air conditioning—that is, to the design thinking of over half a century ago.

² Linda J. Bilmes & Joseph E. Stiglitz, *The Iraq War Will Cost Us \$3 Trillion, and Much More*, WASH. POST, Mar. 9, 2008, at B01.

³ *Id.* ("In a world with millions of illiterate children, we could have achieved literacy for all—for less than the price of a month's combat in Iraq. Closer to home, we could have funded countless schools to give children locked in the underclass a shot at decent lives. Or we could have tackled the massive problem of Social Security.")

But if we struggle so to catch up with air conditioning, imagine how much more we are going to struggle to keep pace with the effects of computer technology and new telecommunications on our building design, workplace design and social structure design.

Buildings in pre-computer days had to be built as enormous information processing factories based on paper and on-site manual labor—like an assembly line.

Computerization and telecommunications have done away with those needs, yet we continue to struggle with the intellectual baggage of the obsolete technologies.

I don't mean to disparage those who struggle intellectually with these effects. It took me ten years or more to realize these things, and I was specifically thinking about it.

This takes me back to what I said to you at the beginning, about thinking being very difficult—unexpectedly difficult.

You all know the expression “if you ask the wrong question, you're going to get the wrong answer”. Many intelligent people in our society are coming up with the wrong answers because they are asking the wrong questions, based on obsolete technological concepts.

For example, none of the authors I have mentioned have grasped that what we have been missing, in our efforts to solve the terrorism problem, is the fact that our new technologies have given us a power to wage peace which is for the first time as great as our power to wage war.

This fact has been outlined by today's keynote speaker in an article published by the Harvard International Review, *The Technologies of Peace*.⁴

The above article discusses how the US Peace Corps can and should be re-invented by new technology, to America's great benefit. It ties in well with a research dossier on the future of government that I compiled for Al Gore when he was Vice President some 12 years ago.

My dossier for Al Gore addressed three key points, all of which are critically related to all the concepts I have been outlining to you so far:

- Re-invent government for the computer era.
- Make the NII relevant & productive.
- Make concern for the environment a top government priority.

⁴ N.J. Slabbert, *The Technologies of Peace*, HARV. INT'L REV., May 2, 2007, <http://www.harvardir.org/articles/1336/1/>.

How many people know what the NII is? If it was relevant and productive I would have seen every single hand raised, right? NII was the flag Al Gore and Newt Gingrich were waving in the mid-90's. It stood for National Information Infrastructure.

Well if it was relevant and productive, it would be something you'd use every day and it was an integral part of your life. The reason it is not, is that efforts to make it so have been driven by pre-computer-age thinking.

Al Gore has, of course, gone on to identify himself with environmental issues, to his credit. But what he has not made clear to this day, in his speeches on this subject, is the connection between the environmental crisis and new telecommunications technologies.

Consider: re-inventing government technologically means changing work practices and thereby changing commuting patterns, and if you change commuting patterns that it is possibly the single biggest thing you could do to help the environment.

How much oil do we burn? How much carbon dioxide and nitrogen do we create commuting? I believe some twenty-five percent of the nitrogen pollution in the Chesapeake Bay comes from automobile exhaust.

My dossier for Al Gore was presented to the White House by Representative Steny Hoyer, who is now the House Majority Leader. In 1990 and 1992 Steny Hoyer and Representative Frank Wolfe got telecommunications technology-related language included in ISTEA, which is the huge transportation bill that the federal government passes every year. It stands for Integrated Surface Transportation Economy or Efficiency Act. I worked with Representatives Hoyer and Wolfe in drafting that language and getting it included. It provided for the first steps to be taken toward a technologically distributed government work force. They managed to get that in the transportation bill because if we get cars off the road in peak times—which we will do if we create a greatly distributed government work force—we'll significantly reduce congestion.

Now, Steny Hoyer and Al Gore know each other very well, so Steny wrote a transmittal letter for my dossier for Al Gore, pointing out the benefits to government and society if these ideas were implemented.⁵ Sadly, I never got a response from the Vice President. However, I did get invited to Brussels to lecture on the future of the city in the age of the computer, which shows that even when ideas are resilient, and when they don't take root in the intended place, they very often fly elsewhere.

⁵ “I am sure that you will find it very helpful as we look ahead to economically and environmentally efficient ways to reinvent government and I look forward to hearing your thoughts on it.” Letter from Rep. Steny Hoyer to Jay Hellman (July 25, 1996) (on file with author).

However, the conceptual obstacles in the way of the technological re-invention of our society persist.

This is illustrated afresh by the Department of the Homeland Security's plan to build yet another giant, Pentagon-style building as its headquarters in Anacostia, South-East Washington DC to follow the SEC's creation of a similar big building in downtown DC.

This is like the generals being ready to fight World War I when World War II broke out (which is exactly what happened in 1941). The *Washington Post* has run an op-ed piece about the DHS plan,⁶ and Representative Frank Wolfe has written about the need to embrace telework as workplace priority for disaster planning.⁷

All that I've said today may seem tangential to your subject today, which is the 2008 election, but it is in fact directly and urgently related to it. This is because this election will decide the governance of the most technologically determined four years in our nation's history. So what is most important to this election and to the thinking of its candidates is not so much any one technological medium, such as *YouTube*, but the whole spectrum of enormous technological change that *YouTube* represents. And this is not only practical change and physical change, but philosophical change—in fact, a philosophical revolution as big as any our nation has seen since its founding.

I leave you with a closing remark on government.

Government writes the rules, and the private sector is in the business of making money. Billionaire George Soros was on Charlie Rose's TV show a few years ago, and Soros had just done a deal that almost brought down the Bank of England, because George Soros plays in very big numbers. And Charlie Rose asked him: "Was it right what you did? Was there a morality to it?"

Soros was quiet for probably ten seconds, which seemed like an eternity, and he said something that floored me. He said "I followed the rules."

Now what that meant to me was that if you write bad rules, people will do bad things.

The difference between that thought and my philosophy is that when I see bad rules, I go about trying to change the rules. Which goes back to Ben Franklin and the unreasonable man. And the fact is that the rules that we have in place right now to regulate just about all areas of our society are bad, because they are geared to technologies of the past and do not, to virtually any signifi-

⁶ N.J. Slabbert, *Edifice Complex: The Wrong Way to House DHS*, WASH. POST, Dec. 2, 2007, at B08.

⁷ Press Release, Frank Wolf, Wolf Encourages Administration to Make Telework a Priority to Ensure Continuity of Operations in Case of Emergency (Sept. 16, 2005) ("[E]mbrace telework as a workplace priority for both the public and private sectors to improve continuity of operations in the event that a disaster—whether natural or man-made—strikes our country.").

cant degree, reflect the opportunity and power that new technologies have delivered into our hands to change our society for the better.

