

THE UNIVERSITY OF TEXAS AT AUSTIN
UNIVERSITY OF TEXAS LIBRARIES

THE RESEARCH LIBRARY IN THE 21st CENTURY
SYMPOSIUM

Austin, Texas

September 11, 2006

P R O C E E D I N G S

1
2 PRESIDENT POWERS: We had the idea of bringing
3 figures in research libraries and digital scholarship to
4 our campus to talk about these issues, and we succeeded.
5 And we succeeded because all of you are here today. We
6 have a truly, tremendous group.

7 I know you're very busy in your areas -- for
8 most of you or many of you -- on your campuses. I very
9 much appreciate the time that you've taken to be here.

10 Jim, I want to give a special welcome to you as
11 the, I think, the only president emeritus here. That has
12 a nice ring to it. Are you enjoying yourself?

13 Again, thank you all for being here. I hope
14 this conference is a tremendous benefit to you. We're
15 being a little bit selfish about it. We're facing these
16 issues on our campus. And we thought, what better way to
17 get advice than bring leaders from all around the country
18 on these issues.

19 And I want to say on behalf of myself and our
20 campus, we're very grateful for the help that you're going
21 to give us over this period of time, pointing us in the
22 right direction. And we have a challenge.

23 The challenge we all have is how we can best
24 leverage our investments, the investments we make in our
25 libraries and digital research, and to leverage those

1 investments to advance research and teaching and learning.

2 We simply can't recruit faculty in this day and age or
3 develop academic programs, and we could not have done it
4 on our campus -- and I know that's true on your
5 campuses -- without tremendous resources in our libraries
6 and collections. We're very proud here at UT. I think
7 we've done that.

8 At is turns out since 1963 -- this according to
9 the Association of Research Libraries -- on our campus
10 we've spent over \$650 million since 1963. And that
11 doesn't include the bricks and the mortar -- \$650 million.

12 That's a tremendous investment.

13 And I know on your campuses you've had similar
14 investments. We need to think carefully how to leverage
15 those investments -- and those investments as we go into
16 the future -- to make sure that we're using them in the
17 way that develops our faculty, develops our students,
18 develops our academic programs and our research.

19 We're very proud on our campus -- as I know you
20 are on your campuses -- of what we've done. Our
21 collections rank in the top dozen in America in terms of
22 volume count. They have tremendous richness and
23 uniqueness and diversity.

24 And we do find that these collections help us
25 attract the very best faculty and in many cases the very

1 best students. Let me just give two examples we're proud
2 of on our campus.

3 David Oshinsky is a faculty member in our
4 history department. He won the 2006 Pulitzer Prize in
5 history. J.M. Coetzee, an alumnus and a graduate of UT,
6 was the winner of the 2003 Nobel Prize in literature. And
7 they are examples of people who have been able to use our
8 collections, as a student in one case, as a faculty member
9 in another case, to advance that work and use these great
10 resources.

11 Coetzee wrote an essay entitled "How I learned
12 about America and Africa in Texas." And he wrote about
13 the time he had on this campus in the 1980s. And he said
14 this, "I'd had the run of a great library, where I
15 stumbled on books whose existence I might not otherwise
16 never had guessed."

17 Coetzee credits the UT library as a tremendous
18 resource of insight into history and culture and languages
19 of southwest Africa. He used our libraries. And as I
20 said, we're all proud of those libraries and those
21 collections.

22 And I hope while you're here on our campus
23 you'll have a chance to visit and see some of the richness
24 of our collections. I do hope you will be able to explore
25 them. We've had very acquisitive directors and great

1 leadership in our libraries.

2 Let me just give some examples of things we've
3 been able to acquire in the last few years alone. At the
4 Ransom Center we've acquired the Watergate papers of Bob
5 Woodward and Carl Bernstein, as well as the archives of
6 the film legend Bob De Niro, the renowned portrait
7 photographer Arnold Newman and the American icon, and
8 ironically iconoclast, Norman Mailer.

9 The Center for American History just received
10 17 tractor trailer trucks full of Exxon/Mobile historical
11 archives. And that goes back to the Standard Oil Trust in
12 the 1860's.

13 We've actually got the documents, the letters
14 that form the Standard Oil Trust, what a great bit of
15 reading -- and if you get a chance to see that -- of what
16 they had in mind and the thinking that went into forming
17 the Standard Oil Trust in that very early formative period
18 of our business and corporate life.

19 The Nettie Lee Benson Latin American Collection
20 is one of the leading collections and a collection of
21 record for an entire continent and indeed beyond an entire
22 continent.

23 And of course no cold war history or history of
24 the formative years of the civil rights movement would be
25 complete without consulting the richness of the Lyndon

1 Baines Johnson Presidential Library here on our campus. I
2 hope many of you, who have not had a chance to see that,
3 will have a chance to see that while you're here.

4 So we know what libraries and collections can
5 do. And there are similar stories on your campuses. For
6 those of you who come from campuses you know what great
7 collections and great libraries can do for an institution
8 of higher learning.

9 But we have challenges. What does the future
10 hold for great universities and great research
11 universities who face the challenges of advancing these
12 libraries into the 21st century?

13 Will we be able to respond to the increasing
14 and steadily rising cost of books and journals and
15 databases and the demands that our faculty and our
16 students put upon us?

17 Our scholarly and commercial publications here
18 at UT alone were increased by a cost of almost \$1 million
19 this year as we renew them for the calendar year. Digital
20 scholarship brings additional challenges and
21 opportunities.

22 How will our universities respond to make sure
23 that we're getting information and not just data? How
24 will we organize this information? How will we preserve
25 it and carry digital data across the millennia and make

1 sure that people in future generations can access it and
2 use it?

3 And all of our great university research
4 libraries face these issues together. So I hope this
5 symposium will help us better understand these issues and
6 understand the needs for scholarship in a digital age and
7 the paths that we should take.

8 And I hope you will emphasize that in your
9 discussions, the paths that we should all take on our
10 campuses as we move into the years ahead. So I look
11 forward to seeing how these discussions come out.

12 And again I want to thank you for being here,
13 being on our campus and especially giving us wisdom and
14 insight as to -- at least on our campus -- how we should
15 be confronting these issues as important and challenging
16 issues as we go ahead.

17 And I hope you'll take back to your campuses or
18 your firms or your organizations some wisdom as well. So
19 I do welcome you, and I hope you enjoy your time here.
20 It's now my great pleasure to introduce a dear friend of
21 mine and a -- for at least me -- 29-year colleague at the
22 Law School.

23 Roy, you've been there a great deal longer --
24 that's Roy Mersky, who has been a professor at the Law
25 School, a chair holder at our Law School, and Director of

1 Legal Research and our librarian for many more than 29
2 years.

3 And I do hope you'll get over and see the law
4 library. I was the Dean of the Law School for five and a
5 half years. I was on the faculty for 29 years. And it is
6 one of the truly premier law libraries in the country, a
7 wonderful rare books collection.

8 And like so many of our libraries and
9 institutions it owes it to great leadership over a long
10 period of time. And Roy, you've given us that leadership.

11 Thank you for what you've done, and welcome to the
12 conference.

13 Thank you very much.

14 ROY MERSKY: I'd just like to say something.
15 When we were organizing this conference I was told that I
16 was going to introduce the president. So I spent a week
17 preparing an introduction for Bill. And it's somewhat
18 ironic, he introduced me instead, and I'm going to
19 introduce another president.

20 I'll send you the introduction I wrote though.

21 I'm pleased to introduce to you Dr. James
22 Johnson Duderstadt, president emeritus and university
23 professor of science and engineering at the University of
24 Michigan. His auspicious academic career started on a
25 note of uncertainty.

1 During the late 1950s in the small town of
2 Carrolltown, Missouri, James Duderstadt played football on
3 his high school's team. One day a telegram arrived for
4 him, the first one he had ever received. It was from the
5 football coach at Yale, with an offer of admission.

6 He was unfamiliar with the school. He thought
7 it was in England, but he accepted. As a freshman at Yale
8 he considered football to be of paramount importance,
9 which led to poor grades. Resolving to improve
10 academically the following year, he chose to major in
11 electrical engineering and then regularly skipped football
12 practice to study.

13 That's kind of a no-no here at Texas.
14 Eventually he quit the team, much to the dismay of his
15 coaches, teammates and Yale football supporters. He went
16 on to win the Chester Harding Plimpton prize given to
17 Yale's top engineering senior and graduated summa cum
18 laude.

19 From Yale he also received a master's in
20 Engineering Science. His PhD is from the California
21 Institute of Technology. As an Atomic Energy Commission
22 post-doctoral fellow at Cal Tech, he developed nuclear-
23 powered rocket engines for a manned mission to Mars.

24 He then joined the University of Michigan's
25 Department of Nuclear Engineering. He served as dean of

1 the College of Engineering, as provost, vice president and
2 vice president for academic affairs.

3 Interviewed in 1988 as the final candidate for
4 the University of Michigan's presidency, he spoke in an
5 open meeting about the country's need for a new model for
6 research universities and stressed that Michigan should
7 take the initiative to develop that model.

8 By a vote of six to zero he was elected
9 president of the University of Michigan. He was
10 instrumental in establishing Michigan's Millennium
11 Project, a laboratory where new paradigms of learning
12 institutions can be designed, constructed and studied.

13 Its mission is to provide an environment in
14 which creative students and faculty can join with
15 colleagues far beyond the campus to develop and test new
16 paradigms for the academic community.

17 An analogue to corporate research and
18 development laboratories, it's an incubation center, where
19 new ideas concerning the fundamental missions of the
20 university teaching research service can be developed --
21 not simply a think tank, but a do tank, where ideas lead
22 to actual creation of working models or prototypes to
23 explore the possible future of the university.

24 In 2004 the research center was named after Dr.
25 Duderstadt and his wife Anne. Dr. Duderstadt's teachings

1 and research interests spanned a wide range of subjects in
2 science, mathematics and engineering, including work in
3 areas such as nuclear fusion reactors, thermonuclear
4 fusion, high-powered lasers, computer simulation, science
5 policy, higher education and information technology.

6 He has written numerous works including "A
7 University for the 21st Century," in which he said, "Not
8 only will social and technical change be a challenge to
9 the American university, it will be the watchword for the
10 years ahead.

11 "And with change will come unprecedented
12 opportunities for those universities with the vision, the
13 wisdom and the courage to lead in the 21st century." It's
14 my esteemed honor to introduce Dr. James Johnson
15 Duderstadt.

16 His vision inspires us to consider not whether
17 a higher education will be transformed, but rather how
18 those changes will take place and who will lead us in
19 effecting them. Dr. Duderstadt.

20 JIM DUDERSTADT: Thank you very much for those
21 kind remarks. I have to use Google myself, because my
22 memory has gone blank on many of those issues. It's great
23 to be back in Austin.

24 Unfortunately -- perhaps fortunately -- I was
25 unable to accept the invitation from one of your former

1 regents, Charles Miller, to attend the Saturday night
2 football game. But quite frankly I see enough of Ohio
3 State from year to year anyway that I don't need to see
4 them again.

5 For the past five years I've had the great
6 privilege of serving on the selection committee for the
7 Harrington Fellowship Program at the University of Texas.

8 Beyond the extraordinary quality of the
9 scholars that you've been able to recruit to Texas, either
10 as visitors or more permanently for your faculty, what
11 really impressed me in that effort was how every one of
12 those applications pointed to the great quality and
13 drawing power of your research libraries at the University
14 of Texas.

15 I think it provides a very strong evidence of
16 just how important these research libraries are for
17 universities and for attracting the kind of outstanding
18 scholars and teachers that we all aspire to. I faced a
19 bit of a quandary about how to approach this particular
20 set of discussions.

21 Since stepping down as president I no longer
22 can master the alphabet soup of the library business:
23 OCLC, ARL, RLG and so forth and so on. I read books;
24 sometimes I write them. But I'm a little bit off track.
25 But then it suddenly dawned on me that for the last ten

1 years I've worked and many ways lived in a library of the
2 future.

3 During the last couple of years of my
4 presidency we built this great big 250,000-square-foot
5 facility that we intentionally tried to design as a
6 library of the future. I got some very talented people,
7 stayed out of their way and let them pursue their vision.

8 It does have books in it -- about a million
9 books. But they're in the sub-basements and high-density
10 shelving, and I doubt if they're used very much. It has
11 about 1,000 workstations, a sound stage, recording
12 studios, design studios, a very large pipe and Internet2.

13 And it's so popular to students that we have to
14 operate it seven by 24, 365 days a year. It's the only
15 building on our campus, other than our university
16 hospitals, that's open all the time. It houses the
17 servers for the J-STOR Project and another project that
18 I'll tell you a little bit about, Project Sakai.

19 It also has a Starbucks -- actually not a
20 Starbucks; we have our own coffee shop that I think is
21 better. But that's very important in libraries of the
22 future. So in a sense I've experienced firsthand over the
23 last decade being stashed away, out of sight, out of mind
24 by my university, what these are like.

25 But rather than present homespun stories of

1 what it's like to live in one of these places, I thought
2 I'd move through a sequence of different perspectives that
3 draw on much more recent activities, first at the level of
4 the National Academies.

5 As some of you know, for the last five years
6 I've chaired a series of studies by the National
7 Academies, trying to understand the impact of information
8 technology on the future of the research university.

9 In fact we had one of our sessions here a
10 couple of years ago in this very building, in which The
11 University of Texas hosted university presidents and
12 executive officers from a number of other institutions for
13 one of these discussions.

14 Next I'd like to move to the federal
15 government, to the National Science Foundation, where the
16 buzzword these days is cyberinfrastructure. I currently
17 chair the Advisory Committee on Cyberinfrastructure for
18 the National Science Foundation.

19 And it also provides input to the President's
20 Council of Advisors on Science and Technology. So that
21 will have something to say about this. Higher education -
22 - I know you're all waiting with bated breath to find out
23 what the Spellings Commission report says, as it's
24 released formally next week.

25 Although if you go to the website for Inside

1 Higher Education you can find it, because the report is
2 considered a public document. As a commissioner on this
3 commission charged by one of Texas's own, Margaret
4 Spellings, Secretary of Education, I'd like to point out
5 some of the implications it may have for research
6 libraries.

7 I can't help but move to Michigan for just a
8 moment. I'll say a few words about Google, but I'm more
9 of a user than involved in the intricacies.

10 But then I'm going to link it to some other
11 things: the Sakai Project, the OpenCourseWare initiative
12 at MIT, the open learning initiative and a series of other
13 activities that may be building the scaffolding for what
14 Chuck Vest at MIT calls the metauniversity, that may be
15 more effective in responding to the changing educational
16 needs of this country and indeed the world.

17 The key themes. The first one is obvious. The
18 technology which is driving much of this change is indeed
19 a disruptive technology for the university. And in many
20 ways the library's become the poster child for these
21 changes.

22 Second, cyberinfrastructure -- that strange
23 word that means hardware, software, people, organizations,
24 policies that roll all the technology together -- is
25 actually beginning to build learning environments and

1 scholarly environments that are not only ubiquitous and
2 interactive, they are functionally complete. That carries
3 a certain implication.

4 The open paradigm, open source, open content,
5 open learning, open institutions, and of course open
6 libraries -- another one of those themes. Universal
7 access to knowledge and learning, and then finally whence
8 and whether the university and the library itself.

9 The National Academy studies. Over the last
10 several years -- actually throughout the late 1990's and
11 the early part of the new century, there was a growing
12 concern about what this fairly rapid evolution of
13 information and communication technologies was doing to
14 different parts of the intellectual infrastructure of the
15 United States.

16 The National Academies had a very clear
17 interest in that. And of particular interest was its
18 impact on research universities.

19 There was a sense that, although the technology
20 would present many challenges and opportunities, many of
21 the significant issues were neither well understood, or,
22 in many cases even recognized by leaders of our
23 universities or those constituencies who support and
24 benefit from them.

25 So they decided to launch a project in two

1 phases to explore this in somewhat more detail.

2 The first phase -- the acronym ITFRU,
3 Information Technology and the Future of the Research
4 University -- really involved a group of people that were
5 people immersed in the technology, the chief technology
6 officers of companies like IBM, Xerox and so forth, as
7 well as university leaders and people in public policy.

8 The first phase was to identify what might
9 happen over the next decade or two and then move from that
10 to looking at implications. That first phase surprised us
11 a bit, because looking out as far as we could see into the
12 future, we saw no signs that the exponential increase of
13 power in this technology -- the so-called Moore's Law --
14 would slow down.

15 In fact all the signs seemed to suggest it was
16 accelerating. The term was riding the exponential -- that
17 is, that part of the technology -- whether it's processing
18 power, bandwidth, storage, whatever -- which was
19 increasing the most rapid was changing the nature of
20 technology and how it affected society.

21 In thinking far ahead we saw the evolution from
22 giga to tera, and now, as Texas is well aware with its
23 recent success, the petascale initiative of ten to the
24 15th operations per second, or storage or whatever. And
25 in fact people are now beginning to talk about exaflop

1 machines, ten to the 18th. That'd be about a hundred times
2 faster than the brain is capable of processing.

3 Of more interest perhaps to the research
4 library community is data storage. Today's current
5 generation of desktop machines -- the machine on my desk
6 has a terabyte worth of memory, and that's expanding
7 rapidly.

8 One of the members of our group, Stu Feldman,
9 who was one of the senior technical officers of IBM at the
10 time, got the presidents' attention at an AAU meeting by
11 asking them how they would approach the construction of
12 new libraries if he could offer them a device the size of
13 a football that would contain the Library of Congress.

14 And he guaranteed he would be able to do that
15 within a decade. Most university presidents understand
16 how big a football is, you understand. They might not
17 understand the iPod, but the football they understand.
18 More to the point, as I'm sure you're aware, the entire
19 holdings of all academic research libraries is about one
20 to two petabytes.

21 And that's the iPod of about a decade from now.

22 And if you really want to go to the extreme, Hal Varian,
23 who many of you know at Berkeley, estimates the total
24 number of words spoken in the history of humanity at five
25 exabytes.

1 That's an extrapolation of memory perhaps two
2 to three decades into the future. How do we ship this
3 about? Well, a couple of weeks ago Internet2 announced it
4 was combining with the Department of Energy's Science Net
5 to build terabit-per-second networks. Larry Faulkner, as
6 you may know, is the chair of the governing board for
7 Internet2 and has played a very significant role in that.

8 But bringing it back down with WiMAX, we'll get
9 70 megabits per second over five- to ten-mile distances.
10 So it really will be ubiquitous.

11 So, first finding: the technology is moving as
12 fast as it has over the last several decades, and may in
13 fact accelerate. Second finding: the impact of IT on the
14 university is likely to be profound, rapid and disruptive.

15 That's a phrase that comes from again one of
16 Texas's former faculty members and leaders, Marianne Fox.

17 It will change teaching, research service organizations,
18 academic structure, faculty culture, financing management
19 and so forth.

20 Now, we all know that if change is gradual,
21 institutions can adapt. But this disruptive technology
22 term really goes back to Clayton Christianson's book, The
23 Innovator's Dilemma, in which it suggests that in rapidly
24 changing technologies, they may look at first inadequate
25 to displace existing technology, but they explosively

1 later displace traditional applications, because they
2 enable new ways of doing things.

3 Third finding indicated that, although
4 information technology would present many complex
5 challenges and opportunities to universities, creating
6 considerable uncertainty -- procrastination and inaction,
7 which of course are decisions in and of themselves, are
8 perhaps the most dangerous course of all to take.

9 So that moved us into the second part of this,
10 which was to create a forum involving: the leadership of
11 research universities across the country through AAU, the
12 presidents, its companion organization for provosts, and
13 then a series of workshops, which we call executive
14 leadership core workshops, where we would bring together
15 four to five institutions that would commit to a day-and-
16 a-half -- president, provost, head of the libraries, CIO,
17 deans, chief financial officer -- kind of sit around the
18 table, and in a structured dialogue with the blinds pulled
19 down, compared their very candid assessment and their
20 strategies.

21 We hosted a number of these around the country
22 and involved about 25 institutions in this. And as I
23 said, one of these was at The University of Texas. One of
24 the things that came out of these time after time after
25 time was the degree at which people were looking at the

1 research library -- as I said early, the poster child --
2 as the harbinger of the kind of changes that would occur.

3 And to give you a sense of this, let me relate
4 to you a discussion that we had, not in Austin, but rather
5 at Chapel Hill, and you can guess the institutions. The
6 question that was asked was, how many of the presidents
7 around the table were currently planning to build more
8 libraries.

9 Of course all the hands went up. Well, what
10 are you going to put in them? Are you going to put books
11 in them? Well, no, we're going to put books off campus in
12 high-density storage, retrievable facilities. Well, what
13 are you going to put in your libraries?

14 And after a little bit of discussion it turned
15 out the only common denominator was a Starbucks. All of
16 the libraries would have a coffee shop. And that's
17 because the libraries of the future that they were
18 building were seen as community centers, where students
19 and faculty came to study and to learn, but where books
20 were largely absent.

21 In a sense the library was becoming a people
22 place that provided the tools, the services, the expertise
23 to support learning and scholarship, but along with that,
24 an environment for social interaction. So it raised the
25 obvious question of what is the university library in the

1 digital age.

2 Is it built around stacks or around Starbucks?

3 Is it a repository of knowledge? Or is it a student
4 union for learning? And in fact we concluded that maybe
5 we weren't talking about libraries at all. Maybe it was
6 the kind of physical spaces that universities would
7 require for learning communities.

8 In fact one of our participants suggested that,
9 if today the common element of every library is a
10 Starbucks, perhaps with massive digitization and
11 distribution of library holdings, soon every Starbucks
12 will have a library.

13 That is, indeed you can take your coffee cup
14 and either your iPod or your WiMAX connectivity and access
15 the knowledge of the world through the internet. But
16 beyond that it was also clear that the library itself has
17 become the most important observation post for
18 understanding how students really learn these days, and
19 how faculty utilized knowledge.

20 In fact if the core competency of the
21 university is the capacity to build collaborative spaces,
22 then the changing nature of the library itself may be the
23 paradigm for the changing nature of the university.

24 Second subject: National Science Foundation.

25 My next-door neighbor and the only other

1 faculty member that has an office in this big library of
2 the future is Dan Atkins, who many of you know was the
3 founder of our School of Information.

4 But beyond that he chaired a very important
5 blue-ribbon study several years ago for the National
6 Science Foundation on the nature of information
7 technology, which utilized this term, cyberinfrastructure.

8 The concern was that we were approaching an
9 inflection point in which the potential of this technology
10 was going to transform how scholarship and learning
11 occurred, particularly in the sciences.

12 Well, the conclusion of the report that they
13 came out with I think is quite important. And let me
14 quote, "A new age has dawned in scientific and engineering
15 research, pushed by continuing progress in computing,
16 information and communication technology and pulled by the
17 expanding complexity, scope and scale of today's
18 challenges.

19 "The capacity of this technology has crossed
20 thresholds that now make possible a comprehensive
21 cyberinfrastructure on which to build new types of
22 scientific knowledge environments and pursue research and
23 learning in new ways and with an increased efficacy.

24 "The emerging vision is to use
25 cyberinfrastructure to build more ubiquitous,

1 comprehensive digital environments that become interactive
2 and functionally complete for research communities in
3 terms of people, data, information, tools and
4 instruments."

5 Stress the terms again: comprehensive,
6 functionally complete, ubiquitous. Now, they pointed out
7 that as with most of technology evolutions the real impact
8 occurs not through the technology change, but through
9 human behavior and organizational change.

10 And therefore they stressed that the National
11 Science Foundation efforts in the future should look at
12 all of these components as they try to build the
13 appropriate environments for scholarship and for learning.

14 Well, of course no good deed goes unpunished.

15 And in return for leading this very successful
16 panel, Dan Atkins this last spring was named the first
17 director of the Office of Cyberinfrastructure at the
18 National Science Foundation, where he, among other things,
19 leads efforts such as the petascale initiative.

20 I in turn -- in part because of Dan and in part
21 because of another Michigander, Arden Bement, who's the
22 director of the Foundation -- was asked to chair the
23 advisory committee for this. Now, we've only had one
24 meeting.

25 But that meeting, I think, suggests that this

1 will have a profound implication for libraries, because
2 one of the most difficult aspects of this is the explosion
3 in the amount of knowledge being generated by scientific
4 activities, by scholarship on campuses and so forth.

5 And the belief is increasingly that creating
6 and managing the new types of archival and support
7 material will really be the responsibility of institutions
8 themselves. In a sense we should not expect national
9 repositories for this kind of petabyte-scale information;
10 but rather universities, either on their own or through
11 consortia, will have to develop these. And these will be
12 a component of what you might call the library of the
13 future.

14 Third topic: the National Commission on the
15 Future of Higher Education in America. That was launched
16 by Secretary of Education Margaret Spellings almost
17 exactly a year ago. Although the final report will not be
18 presented to her until, I think, it's next week, since the
19 report itself is now in the public domain, let me make a
20 couple of comments about it, and then highlight a couple
21 of things.

22 It's kind of a good news-bad news story. The
23 good news I suppose is best reflected by that pithy little
24 paragraph in the Economist a year ago. "There's no
25 shortage of things to marvel at in America's higher

1 education system, from its robustness in the face of
2 external shocks to its overall excellence. However, what
3 particularly stands out is the system's flexibility and
4 its sheer diversity. It is all too easy to mock American
5 academia, but it's easy to lose sight of the real story,
6 that America has the best system of higher education in
7 the world."

8 The bad news is this isn't good enough -- not
9 nearly good enough. "Despite these achievements" -- here
10 and now I'm quoting from the report -- "the Commission
11 believes U.S. higher education needs to improve in
12 dramatic ways.

13 "Our year-long examination of the challenges
14 facing higher education in America has brought us to the
15 uneasy conclusion that the sector's past attainments have
16 led our nation to unwarranted complacency about its
17 future.

18 "What we've learned over the last year makes it
19 clear that American higher education has become what in
20 the business world would be called a mature industry,
21 increasingly risk adverse, at times self-satisfied and
22 unduly expensive, and has yet to successfully confront the
23 impact of globalization, rapidly evolving technologies, an
24 increasingly diverse and aging population, and an evolving
25 marketplace, characterized by new needs and new

1 paradigms."

2 Now, there's a lot of fine detail with a lot of
3 devils throughout the report, because in part it was
4 written by consultants that had very little to do with the
5 commissioners. But the commissioners themselves did,
6 essentially through revolution, take control of the
7 process and converged unanimously on six major
8 recommendations.

9 I'll summarize them very briefly, and then I'll
10 connect them back to the issue here. The six are: to
11 remove barriers to access and success; every student in
12 the nation should have the opportunity to pursue post-
13 secondary education; to restructure financial aid -- the
14 entire student financial aid system, federal, state and
15 institution, is simply not doing the job, because it's
16 channeling dollars to those students who don't need help
17 at the expense of those who do.

18 Transparency, accountability and public
19 purpose -- and you should thank Regent Miller for this --
20 to urge the creation of a robust culture of accountability
21 and transparency throughout higher education.

22 Investing in innovation both on the part of
23 institutions and on the part of the government. Lifelong
24 learning, recommending the development of a national
25 strategy for lifelong learning.

1 And finally, responding to the needs of a
2 global knowledge economy -- and there we put in a
3 recommendation which kind of gets behind the existing
4 National Academy efforts -- it goes under the acronym of
5 Rising Above the Gathering Storm or the American
6 competitiveness initiative.

7 The key themes here for the purpose of this
8 discussion, I believe, are the following. That every
9 student in the nation should have the opportunity to
10 pursue post-secondary education, number one.

11 And number two, every American should have the
12 opportunity for whatever post-secondary education they
13 need, aspire to, merit in an increasingly competitive,
14 global knowledge-driven society, throughout their lives.

15 Put another way, I think one of the themes in
16 this is to take the final step in America's sequence of
17 steps over the last two centuries to expand educational
18 opportunity -- from the Land Grant Act to universal
19 secondary education to the GI Bill, to the Equal
20 Opportunity Acts -- and provide all Americans with
21 universal access to lifelong learning as essentially a
22 civil right appropriate for a knowledge society.

23 A very bold vision, a very challenging goal.
24 How do you achieve it? Well, it's not in that report. So
25 let me go on and provide some other --

1 Now back to Michigan. Several things going on
2 at Michigan and at other institutions around the country,
3 including The University of Texas, I think, may point the
4 way to how this particular challenge might be faced.

5 One of them clearly is the Google print library
6 project. I'll just briefly summarize it, because many of
7 you know and have actually read the Michigan contracts in
8 much more detail than I have. But five institutions in
9 December 2004 announced an agreement with Google to
10 digitize a substantial part of their book collections --
11 Michigan, Stanford, Harvard, Oxford and the New York
12 Public Library.

13 Last month the G5 became G6 with the addition
14 of the University of California. At Michigan we committed
15 to digitizing our entire book collection -- about 7.8
16 million volumes. Now, the fact that Larry Page was an
17 undergraduate engineering student at Michigan during the
18 1980's I assure you had everything to do with this
19 project.

20 He had been bouncing this off of us for a
21 couple of years. We thought first, that's a crazy idea.
22 Then we said, we'll, I don't know. We were involved in
23 the J-STOR Project sponsored by the Mellon Foundation. So
24 that gave us a good head start.

25 The original thought was that it would take a

1 decade. That estimate is now down to about six years.
2 And Google is moving up the learning curve very, very
3 fast. So it may happen much sooner. Digitized materials
4 from the collection came online in June.

5 And in fact through its own copy, Michigan
6 receives as part of the deal, called MBooks, it's now
7 beginning to actually download full-text copies of books
8 that are in the public domain, no longer under copyright.

9 I went through this -- I might add -- because I
10 had a 30-year-old textbook that still is under copyright,
11 that the publisher wanted me to do an update on. Since it
12 had been put together before the days of word processors I
13 didn't know what to do about it.

14 So I said to the librarians, Could you go ahead
15 and hurry up and digitize that part. And sure enough,
16 there it is scanned by Google. Anyhow our provost, Paul
17 Courant, at the time, who was very instrumental along with
18 our associate library director John Price Wilkins, put it
19 this way.

20 "Our purpose is to extend the realm of ideas in
21 the broad service of society." Part of this was the
22 concern that most of our vast collection, as in the vast
23 collection of your research libraries, are orphan works --
24 works that can no longer be easily identified in terms of
25 copyright ownership.

1 In our case on the order of about 80 to 85
2 percent. And therefore in the kind of world in which
3 people -- students and scholars -- approach searching for
4 information digitally -- Google, Wikipedia, whatever
5 students use these days -- they were likely to kind of
6 pass out of sight.

7 So part of it was simply to provide access to
8 these materials. But I will tell you that our provost
9 believes that part of the reason as well was to Michigan
10 to take head-on the grand challenge to digital access that
11 is copyright.

12 Now, that is nothing new for my institution. I
13 ended up as a named defendant in the case that made it
14 before the Supreme Court in 2003 over affirmative action.

15 University of Texas with the Hopwood case also faced some
16 of that challenge.

17 I can look at other examples: NSF Net in the
18 1980s which led in part to the internet; Sakai, which may
19 also end up in court -- as we'll see in a moment --
20 challenging the intellectual property claims of monopolies
21 such as Blackboard.

22 So we're used to going to court about things
23 and getting sued. So maybe we will on this one as well.
24 Fortunately I'm not at the helm on something like this.
25 Courant believed very strongly in pushing this. As he put

1 it, the world of Google is really emblematic of something
2 very important.

3 And that's the world of ubiquitous, indexed
4 digit content. Google's arrangements with Michigan and
5 other libraries essentially are going to teach us how we
6 have to live in that world, that will encompass both
7 material that started as print, as well as material that
8 was or will be born digitally.

9 It's quite a challenge obviously. I'll come
10 back and make a couple of comments about it in just a
11 moment.

12 The Sakai Project, again yet another one of
13 these open sources projects -- in this case a consortia of
14 universities and corporations: IBM, Apple, Cisco,
15 Unisys -- that is building the open source to support
16 learning and scholarship, with some efforts to move that
17 up to the enterprise level -- more broader activities
18 involving universities -- and perhaps down to the desktop
19 level for scholars.

20 That one actually is right above me in the
21 building I live in. And they in fact right now are in the
22 process of developing yet another tool which will support
23 yet one-third of these open initiatives, which is the
24 OpenCourseWare initiative, initially promoted through MIT.

25 As some of you may be aware, several years ago

1 when asked, the MIT faculty decided that their commercial
2 or proprietary rights over the digital assets behind their
3 instruction was more valuable in the public domain than it
4 was to them personally.

5 And therefore with the help of the Mellon and
6 Hewlett Foundations they have put roughly 2,000 of their
7 courses, the background material, into the public domain.

8 As Chuck Vest notes this is not a distance-learning
9 method effort, but rather a web-base publishing venture.

10 But it's one that's now being used by millions
11 of students around the world. And increasingly it's being
12 a model that's followed by a number of institutions in the
13 United States and abroad.

14 Coming back again to Sakai, that's the reason
15 why -- since most universities won't have the \$20 million
16 that you get from the Hewlett Foundation and the Mellon
17 Foundation -- we have to provide cost effective ways that
18 they can capture those materials and make them available
19 to the world.

20 All of this together with other open
21 initiatives -- the Open Learning Initiative at Carnegie-
22 Mellon, the Open Knowledge Initiative which was a
23 precursor to this -- even long-standing efforts such as
24 the open university philosophy of the British Open
25 University, which removes the traditional barriers and

1 constraints on admission and enrollment -- all of it is
2 coming together to create what Chuck Vest likes to call
3 the metauniversity.

4 Open source, open content, open learning and
5 other open technologies raise the possibility of
6 developing a scaffolding on which one would build truly
7 global universities.

8 After all when you look at the need for higher
9 education at the global level, the huge scale of it, the
10 great diversity of cultural, political, economic context,
11 the financial issues and so forth, suggest that the old
12 paradigms of campus-based learning just are not going to
13 be sufficient.

14 In fact the metauniversity -- again as Vest
15 puts it -- a transcendent, accessible, empowering,
16 dynamic, communal-constructed framework of open materials
17 and platforms on which much of the higher education
18 worldwide can be constructed or enhanced -- is in fact
19 taking advantage of the great strength of
20 cyberinfrastructure to distribute knowledge and learning
21 opportunities and to do it to the world.

22 But -- which takes me to the next part -- to
23 achieve this vision it's going to have to overcome not
24 only some formidable obstacles in terms of existing mind-
25 set, but also some very powerful monopolies. Let me give

1 you a case in point.

2 Two weeks ago -- actually a couple of weeks
3 after the Spellings Commission had approved the end of a
4 very difficult process to construct a final report, which
5 we felt we could sign off on -- and 18 of the 19
6 commissioners signed off on it with the understanding that
7 nothing will be changed -- late one Friday night we got a
8 message from one of the commissioners that apparently read
9 the report once again in great detail, or perhaps had
10 someone from her organization read it once again in great
11 detail, and found that she could no longer accept some of
12 the language in the report.

13 The language was this: "The Commission
14 encourages the creation of incentives to promote the
15 development of open source and open content projects at
16 universities and colleges across the United States,
17 enabling the open sharing of educational materials from a
18 variety of institutions, disciplines and educational
19 perspectives.

20 "Such a portal could stimulate innovation and
21 serve as a leading resource for teaching and learning.
22 New initiatives such as OpenCourseWare, the Open Learning
23 Initiative, the Sakai Project and the Google book
24 project -- uh oh, trouble there -- hold out the potential
25 for providing universal access to both general knowledge

1 and to higher education."

2 Well, we did have significant representation
3 from industry on this among the commissioners. This was a
4 company in Seattle that has a little bit of difficulty
5 with a couple of sensitive words in this: open source and
6 the name of another company.

7 And so after a wild weekend of email
8 negotiation we were finally able to get the Commission to
9 agree on compromise language. And again I quote -- and
10 this is what's in the report -- "The Commission encourages
11 the creation of incentives to promote the development of
12 information technology-based, collaborative tools and
13 capabilities at universities and colleges across the
14 United States, enabling access, interaction and sharing of
15 educational materials from a variety of institutions,
16 disciplines and educational perspectives.

17 "Both commercial development and new
18 collaborative paradigms, such as open source, open content
19 and open learning, will be important in building the next
20 generation of learning environments for the knowledge
21 economy."

22 So we kind of take out the names of specific
23 programs. But open, open, open is in there because we
24 feel that may be the quickest route to the future of
25 higher education, at least on the global level. That was

1 the one that was approved unanimously by the group.

2 Well, this takes us into almost the metaphysics
3 of the issue of ownership. Here I would remind you of
4 that great quote from John Perry Barlow in Wired magazine
5 many years ago.

6 "The enigma is this. If our intellectual
7 property can be infinitely reproduced and instantaneously
8 distributed all over the planet without cost, without our
9 knowledge and without its even leaving our possession, how
10 can we protect it?

11 "How are we going to get paid for the work we
12 do with our minds? And if we can't get paid, what will
13 assure the continued creation of distribution of such
14 work?" Or even better Thomas Jefferson. "Ideas should
15 freely spread from one to another over the globe for the
16 moral and mutual instruction of man and improvement of his
17 conditions. This seems to have been particularly and
18 benevolently designed by nature, when she made them like
19 fire, expansible over all space without lessening their
20 density at any point, and like air in which we breathe,
21 move and have our physical being incapable of confinement
22 or exclusive appropriation."

23 It seems like a clash between the irresistible
24 force of the open knowledge movement against the immovable
25 object of intellectual property ownership. But another

1 quote from Kevin Kelly, also from Wired, who writes very
2 provocatively this time in spring's New York Times.

3 "The courts may haggle forever as this complex
4 issue works its way through the top. In the end it won't
5 matter. Technology will resolve the discontinuity first.

6 The Chinese scanning factories, which operate under their
7 own looser intellectual property assumptions, will keep
8 churning out digital books.

9 "As scanning technology becomes faster, better
10 and cheaper fans may do what they did to music and simply
11 digitize their own libraries. But it will adapt
12 eventually. The reign of the copy is no match for the
13 bias of technology. All new works will be born digital.
14 And they'll flow into the universal libraries you might
15 add more works to the long story." And of course Kelly's
16 concept here is the age-old quest for universal access to
17 all human learning.

18 The Library of Alexandria, which for a very
19 brief time he points out, had between 30 to 70 percent of
20 all books in existence, disappeared, obviously. But
21 perhaps with massive digitization we're beginning to
22 actually approach that possibility once again.

23 WorldCat suggests there are 32 million books in
24 the world. And the analysis of the G5 suggested that the
25 unique volumes that could potentially be digitized from

1 those libraries amounted to about one-third of the world
2 collection. And to that of course is now added the
3 University of California. As Kelly said, if we can
4 provide all of the works of humankind to all of the people
5 of the world, it will be an achievement remembered for all
6 time, like putting a man on the moon.

7 Well, what is the future of the library? Maybe
8 the future of the library is not simply that of the
9 university but of civilization itself. The key here is
10 not providing open access to the digital records of all of
11 the works of humankind. But rather it's the linking
12 together of a substantial part of the world's population
13 with limitless access to knowledge and learning
14 opportunities that's enabled by this rapidly evolving
15 cyberinfrastructure, again increasing 100 to 1,000-fold
16 every decade, decade after decade after decade.

17 I think that if you go to the cinema you'll see
18 any number of science fiction movies that point out the
19 horrors of artificial intelligence, the possibility that
20 even the Terminator will become governor of the State of
21 California.

22 But in reality what we're talking about here is
23 not artificial intelligence, but a new form of collective
24 intelligence, in which billions of people are interacting
25 in a very direct and robust way with access to the

1 knowledge of humankind, unconstrained by today's
2 monopolies on knowledge or learning opportunities.

3 And maybe this is the most exciting vision for
4 the future of the library and perhaps for the university
5 itself, because no longer constrained by space, time or
6 monopoly, but rather unleashed by cyberinfrastructure,
7 perhaps this is the new kind of a global learning
8 community that will evolve over the course of the next
9 several decades.

10 Well, enough said. I can make some further
11 comments about the future of the university. But I think
12 it's probably better to open it up for discussion, because
13 I probably provoked a number of you with these comments.
14 So let me stop right now and answer questions if I may.

15 VOICE: [inaudible] role of the library --

16 JIM DUDERSTADT: I think what you'll see is
17 that clearly the responsibility to collect unique
18 materials will define and characterize certain research
19 libraries. And that gives them their uniqueness. And as
20 I mentioned at the outset, that's what attracts very
21 unusual scholars to campuses.

22 On the other hand, the broader knowledge will
23 be a collective knowledge and increasingly will not be
24 viewed at a particular place. But rather will be in the
25 ether maintained by a collection of institutions. How

1 those collections come together -- obviously it'll involve
2 the commercial sector to some degree, whether Google is
3 the glue that pulls it together, whether it's through
4 federal activities.

5 To build the petabyte per week kinds of
6 repositories that the large hadron colliders are going to
7 require from Geneva as it comes online is something that
8 the federal government is going to have to figure out how
9 to do in order to support high energy physics.

10 So it may come in part from the federal
11 government, and it may come from institutions themselves.

12 So I think the thing is to just aggregate those very
13 unique materials -- our papyrus collection at Michigan for
14 example or the kinds of things you have -- from that
15 roughly one-third and growing fraction of the world's
16 collected wisdom in books, and then adding to that other
17 kinds of multimedia materials that I think will have to be
18 a shared resource.

19 And institutions in the way that they cooperate
20 today and make major investments will have to continue to
21 do that in the future. And that requires some kind of
22 collective agreement.

23 VOICE: [inaudible] language -- describing.

24 JIM DUDERSTADT: Well, good. You mean we did
25 something right. We're probably going to take as much

1 heat for the Spellings report as you folks will take for
2 losing to Ohio State on Saturday night.

3 VOICE: [inaudible] is there anything you could
4 tell us?

5 JIM DUDERSTADT: There are 19 commissioners on
6 the Spellings Commission. And five of them were kind of
7 out of higher ed: David Ward, Chuck Vest from MIT, Bob
8 Zemsky from Penn, myself and Charlene Nunley from a large
9 community college in Maryland.

10 So we were kind of the higher ed mafia that
11 were horrified at the release of the first draft of the
12 report that was done entirely by consultants, did our best
13 to keep it from ever seeing the light of day -- which of
14 course it did -- and then went through a series of efforts
15 to patch it up.

16 We had enormous help from people like Sara
17 Martinez Tucker, who will actually have to implement much
18 of this as the new undersecretary-designate of education
19 and many others. But in part it was to recognize that it
20 was a very, very diverse commission.

21 They saw things in many different ways. Now,
22 what we didn't want to happen is for the report to be so
23 hostile -- which of course the first draft was -- that
24 those of us from higher education would have to repudiate
25 it and either write a minority report or simply refuse to

1 sign it.

2 David Ward was with us as we moved -- I mean
3 there was a tremendous amount of writing and rewriting and
4 negotiation over every bit and piece of it. And there's
5 still a lot in it we don't like. But nevertheless we felt
6 we could support the recommendations, as did David Ward,
7 president of the American Council of Education.

8 In the end however, some of the language in it
9 that we tried to get changed, we really couldn't get
10 changed, because of the time scale. I think if we'd had a
11 little bit more time, we might have gotten it changed.
12 David was sufficiently uncomfortable, as were the
13 organizations that essentially he reports to through ACE,
14 that he decided it was best not to sign.

15 In retrospect I tend to agree with that as
16 being a wise decision, because it sends out the signal
17 that while the 100,000-foot part of the report is
18 something we can support, there are a lot of details there
19 that we do not support.

20 And therefore it should not be portrayed as
21 something that has unanimous consent. And that allows us
22 then to challenge some of those parts. In all candor it's
23 not a very well written report. Usually things written by
24 committee are not.

25 The summary of the report was not written by

1 the Commission. But the findings and the recommendations
2 were written by the commissioners themselves. They took
3 control of that process.

4 As to what will happen, again since the federal
5 government really provides only about 20-25 percent of the
6 support of higher education in this country, their
7 leverage is pretty limited, and particularly with a
8 Congress that has to approve anything.

9 So I'm not sure that you're going to see them
10 having great influence over it. It's our hope that the
11 principal response to it will come from higher education
12 itself, because the two themes in it that drove everything
13 were first the themes of social justice, the fact that
14 there's a significant fraction of the American
15 population -- particularly those in the lower two economic
16 quartiles -- that are simply not being served by the way
17 higher education is currently structured and is approached
18 in this country.

19 And second, that more broadly the challenges of
20 the global knowledge economy -- Friedman's flat earth --
21 are very compelling and will require a very significant
22 change to meet the changing needs of the nation. And that
23 was the second major theme that drove this.

24 So I'm hoping that if we can keep it at the
25 100,000-foot level through higher education itself, that

1 we can get some significant things accomplished.

2 Just nuking the federal financial aid system
3 would be positive -- right -- if we could restructure
4 everything in terms of Pell Grants and so forth and get
5 the dollars to people with need, rather than subsidizing
6 the wealthy, which the commercial lending -- I'll be
7 provocative -- which it does right now.

8 But nevertheless we'll see more as people
9 become more aware of it. There will be rollout over the
10 next two or three months, with the Secretary carrying much
11 of the load. And we'll see what the Secretary's decided
12 to push during the last two years of the Bush
13 administration.

14 And those of us on the Commission are already
15 being lined up to appear before a number of groups. If
16 you hear from 19 different commissioners, you will hear 19
17 different perspectives of what really is said and what's
18 missing.

19 VOICE: [inaudible] career -- individual
20 faculty? Where the rubber meets the road, so to speak.

21 JIM DUDERSTADT: There are several aspects in
22 it. Let me say the Spellings Commission, and then I'll go
23 back to the library of the future. The Spellings
24 Commission -- what probably got the faculty members'
25 attention most earliest was the suggestion that maybe this

1 would be a No Child Left Behind -- kind of a combination
2 of a Nation at Risk and No Child Left Behind, brought to
3 you by a prominent Texan who led those in the State of
4 Texas.

5 And in fact at one point those consultants even
6 floated a particular testing device, which is this
7 collegiate learning assessment tool. That was strongly
8 opposed by most of the commissioners.

9 But what remains in it is a challenge to
10 faculty, that is their obligation to clearly define in a
11 public way the objectives of their educational program,
12 and then to devise a way to provide evidence, publicly
13 once again, of how they are doing and meeting those
14 objectives, but leaving that up to the faculty to
15 determine.

16 Now, that's not really that unique. There are
17 a couple of the regional accreditation groups that already
18 have language like that. They put it in two or three
19 years ago. And they are holding faculty's feet to the
20 fire of those institutions undergoing accreditation review
21 right now.

22 I led one of those for UC Santa Cruz. And I
23 must say the faculty response to that was very, very
24 encouraging, very sophisticated and very important I think
25 for the future of that institution. So in any event I

1 think to the degree that the faculty's challenged, this is
2 their responsibility. It's not something for the
3 government to tell them what to do. But it's something
4 they have to do. That could be constructive.

5 Back to the library of the future and so forth,
6 you know one of the strange things is that we look at this
7 as a revolution in higher education. But most of the
8 university hasn't changed very much over the last -- I
9 mean the academic programs are the same way as they've
10 always been. We finance it the same way. We organize our
11 degree programs. But what has changed is the day-to-day
12 work of the faculty.

13 I mean, how many times do faculty visit the
14 library any more? The first thing they do is they go to a
15 search engine -- sometimes they go to Wikipedia for that
16 matter -- to get some guidance and move beyond that. They
17 no longer talk to the person across the hall.

18 They're in almost instantaneous interaction
19 with people all around the world. So the life of the
20 faculty member is changing enormously. And from our
21 experiences in visiting a number of campuses, the same is
22 true with the students.

23 This is the plug-and-play generation. They are
24 always on, always connected, forming their own learning
25 groups, much more active in defining their learning

1 environments and much more reluctant to accept the kind of
2 passive learning that all too often the lecturer and our
3 curriculum seeks on their part.

4 So things are changing on the part of faculty
5 and students very, very dramatically right now and very
6 fast. It's only a question of time before the
7 institutions themselves change. Let me kind of conclude
8 by going back to again one of these experiences.

9 We had two round-table sessions, two days each,
10 of the AAU presidents and the AAU provosts. Actually to
11 get the presidents in the right mood, we had Lou Gerstner,
12 former CEO of IBM, to come in and talk a little bit about
13 how IBM was a company that was just about to fall apart
14 when he came in as CEO, in large part because although
15 they developed the technology, they didn't take it
16 seriously themselves.

17 And he suggested that maybe universities were
18 doing the same. Well, the best way to have a meeting of
19 presidents is to let them do the talking. Then they'll
20 listen to themselves. They don't respond very well if you
21 talk to them.

22 But I think there was some constructive
23 activities that came out of that. But the interesting
24 ones were the provosts. We were actually able to get onto
25 the table in the provost discussions -- we had about 50

1 provosts there -- the ultimate question of whether the
2 research university would even exist -- at least in terms
3 that we could understand it -- a generation from now.

4 Presidents would never touch that. But
5 provosts were at least willing to touch it. The comment
6 that came up at that point, actually from Susan Lohmann
7 who's a professor at UCLA, that if you look at that period
8 from the Civil War to a generation afterwards in this
9 country, higher education changed in almost every way that
10 it could, from the kind of British boarding school models
11 of the colonial colleges to the great land grant
12 universities, faculty empowerment with academic freedom,
13 from institutions of several hundred to several thousand
14 students, the research mission, the service mission and so
15 forth.

16 Everything that could change changed. It all
17 changed in a generation. Most of the provosts believe
18 that higher education is entering a similar period of
19 change, in which the university as we understand it -- and
20 that's kind of the research university -- will be so
21 totally different a generation from now, that we probably
22 won't even be able to recognize it or describe it in the
23 terms we use today.

24 I thought that was very provocative. Maybe
25 that's because provosts see institutions in a much more

1 hands-on way and kind of sense some of these changes that
2 are occurring at the grassroots level. At the front of
3 that change will be the research library.

4 It's not only going to be the poster child of
5 the thing we look at. But it could well be the
6 organization that is driving much of the change. What an
7 exciting time to be in this business. Right? Thank you.

8 [TWENTY MINUTE BREAK]

9 DON CARLETON: It's my privilege and delight to
10 introduce our next speaker, Clifford Lynch, who is going
11 to give us his thoughts on the impact of digital
12 scholarship on research libraries and archives.

13 It's hard to imagine any attempt to conduct a
14 serious discussion about the research library or archive
15 in the 21st century without having Clifford Lynch play a
16 leading role in that discussion.

17 Since 1997 Dr. Lynch has been the director of
18 the Coalition for Networked Information or CNI as many of
19 you know, which is jointly sponsored by the Association of
20 Research Libraries and EDUCAUSE. CNI includes
21 approximately 200 member organizations concerned with the
22 use of information technology and networked information to
23 enhance scholarship and intellectual productivity.

24 Prior to joining CNI Clifford Lynch worked for
25 18 years in the office of the president of the University

1 of California, the last ten as director of library
2 automation. Dr. Lynch continues to serve as an adjunct
3 professor at UC Berkeley's School of Information
4 Management and Systems.

5 Clifford Lynch is a past president of the
6 American Society for Information Science and a fellow of
7 the American Association for the Advancement of Science
8 and the National Information Standards Organization. He
9 currently serves on the National Digital Preservation
10 Strategy Advisory Board of the Library of Congress.

11 And he was a member of the National Research
12 Council group that published The Digital Dilemma:
13 Intellectual Property in the Information Infrastructure
14 and Broadband: Bringing Home the Bits. He now serves on
15 the National Research Council's Committee on Digital
16 Archiving.

17 Clifford Lynch is much published in a variety
18 of media. In fact it would take me the rest of the
19 afternoon to list Dr. Lynch's publications, not to mention
20 his lectures, some of which are on podcasts. Happily for
21 us however, we do not have to hear Dr. Lynch on our iPods,
22 because we have him here in the flesh.

23 Please join me in welcoming Clifford Lynch.

24 CLIFFORD LYNCH: Podcasts. I never thought
25 about actually the need to enumerate those -- a new worry.

1 Something we can all worry about now is bibliographies of
2 podcasts. It's a pleasure to be here.

3 It's always a pleasure to follow Jim, who I
4 think has done an incredible job of laying out this
5 enormous, complicated landscape that we're operating
6 within. And I think that backdrop is going to be very
7 helpful to my comments.

8 I want to talk a bit this afternoon about the
9 futures of the research library. And I use that word,
10 futures, plural, very deliberately.

11 I think that we may see a world ten, 20 years
12 from now where there is considerably greater diversity
13 among our research libraries, as a result of deliberate
14 policy choices that the leadership of those research
15 libraries and the universities in which they're embedded
16 make in the next, let's say, about five years.

17 That's my suspicion. And I don't want to
18 necessarily argue that one specific future is always the
19 right future, and everybody not choosing that is making a
20 dreadful mistake, but rather to illuminate some of those
21 choices, and leave it to all of us to talk about the pros
22 and cons of those choices.

23 Now, before going any further, I want to first
24 constrain my comments a little bit. I'm going to talk
25 about the future of research libraries and specifically

1 research libraries that are embedded within research
2 universities. There are, to be sure, research libraries
3 that are not embedded within research universities. And
4 we indeed have at least one of those represented here.
5 Those institutions I think face some somewhat different
6 challenges, although certainly some common challenges and
7 opportunities as well. But I think that there are some
8 very specific questions there, which I'm not going to try
9 and cover.

10 Secondly, I'm going to deal with research
11 libraries and not academic libraries broadly. I think
12 that the gap between most research libraries and most
13 academic libraries or most libraries in higher education
14 institutions -- and let us just remember there are a whole
15 lot more higher education institutions in this country
16 than there are research universities. Those academic
17 libraries are going to change in dramatic and sometimes, I
18 think, in almost unrecognizable ways rather quickly. When
19 you start thinking about what a library embedded in, say,
20 a community college going to look like in another five or
21 ten years.

22 I think that the answers there get very, very
23 different than the kinds of things that we think about
24 with the future of research libraries. And I'm again
25 going to leave those off the table.

1 I do want to sort of note the question of the
2 future and the purpose of the research university itself,
3 which was well framed in the earlier remarks, and to say
4 that what happens there is obviously going to be a factor
5 here.

6 But it's one that again I want to leave largely
7 out of scope in my remarks. Will there be as many
8 research universities in the next generation as there are
9 today? I'm not sure.

10 It does seem very clear that, when we look at
11 the sort of much broader system of higher education and
12 how that connects to the system of K through 12 education
13 in this country, that there are some things there that are
14 pretty acutely stressed and that -- at least from my
15 rather ignorant view -- there's liable to be some changes
16 here over the next decade.

17 But changes or not, I think that we will
18 continue to see a core of institutions that are
19 recognizable as research universities, and within them we
20 will continue to see great research libraries.

21 My last environmental caveat -- and this is one
22 that again I think was touched on, but I just want to
23 underscore -- there some questions that are starting to be
24 framed both in the United States and elsewhere,
25 particularly to my knowledge in parts of Europe, about

1 what really is the purpose of the research university.

2 Clearly there's consensus that one of the
3 purposes is to create knowledge. Another is to pass that
4 knowledge on through teaching. There's I think a more
5 debatable issue about how much its mission encompasses the
6 dissemination of knowledge, particularly the broad
7 dissemination of knowledge to the public.

8 How much, for example, one can think of things
9 that have historically been publishing, largely outside
10 the purview of the university, as moving into core
11 missions of the university. And I do hear that debate
12 starting to surface in various areas.

13 The resolution of that debate -- and again I
14 would expect that it will not be resolved uniformly, but
15 rather the different research universities will make
16 different choices -- is I think going to be a factor in
17 shaping the future of research libraries at those
18 universities.

19 And I'll have a little more to say about that
20 shortly. So let me move on, and let me connect this
21 question of the future of the research library with
22 questions of what I believe the program calls digital
23 scholarship or some such.

24 The fundamental point is that changes in
25 scholarly practice writ large -- and that includes changes

1 not just in the practices of doing research, but indeed of
2 teaching and learning as well in higher education -- are
3 going to shape the future of the research library.

4 Talking about "how will the research library
5 evolve" as if it has a sort of an intrinsic right to exist
6 and an ongoing destiny, I think is really misleading.
7 That destiny is, I think, going to be absolutely shaped by
8 these environmental changes.

9 Paul Courant, who is I guess starting to emerge
10 as a presence at this meeting, even though he's not here,
11 has made the statement a number of times that there's no
12 scholarship without scholarly communication. And I think
13 that that's an important observation.

14 It's clear that the changes in scholarly
15 practice are profoundly intertwined with changes in
16 scholarly communication. And there again this brings in
17 the question of roles of libraries.

18 I think that one absolutely critical point to
19 underscore is that the gap between scholarly communication
20 and -- if you'll permit me the term -- traditional
21 scholarly publishing is growing ever wider.

22 With the broad landscape of scholarly
23 communication dwarfing the much more narrow confines of
24 the province of traditional scholarly publishing, that gap
25 is going to become of profound and growing interest I

1 think to the future of the research library.

2 I also want to underscore the theme of
3 convergence here. I think when we speak of the future of
4 the research library in the setting we're talking about,
5 we're equally focused, and it's equally important to think
6 about the future of the entire portfolio of cultural
7 memory organizations within our institutions.

8 That means not just the libraries, not just the
9 archives, but also the museums, and beyond the museums
10 some of the museum-like collections that are embedded in
11 departments. It also means trying to sort out and
12 understand the roles of some things that have emerged in
13 the last half century, that have certain kinds of cultural
14 memory behaviors, but don't fit comfortably in here.

15 A leading example that I can think of is public
16 broadcasting, which often is sitting on enormous, often
17 almost completely unexplored archives of key scholarly
18 source material. Those need to go into the question as
19 well.

20 So when we think about what the future of the
21 research library is in our institutions, I think it's
22 critical that we think about that in the broader context
23 of the institutional strategy for all of its content
24 management organizations, all of its organizations for
25 dealing with the management of scholarly evidence and of

1 the results of scholarship.

2 I think looking at individual bits of that in
3 isolation is increasingly painful, particularly as it
4 becomes a little bit more difficult every year to
5 confidently say what ultimately distinguishes one of these
6 institutions from another.

7 Okay. With all that setting and groundwork
8 let's talk just a little bit about what's going on with
9 scholarly practice. We heard a discussion already about
10 cyberinfrastructure or e-Science as they prefer to call it
11 in most of the rest of the world perhaps a little bit more
12 clearly.

13 I don't really think I have to trot out all of
14 the poster children of e-Science for you, all of the new
15 particle accelerators and space telescopes and other
16 national-scale or international-scale facilities.

17 I think that it is worth reminding you though
18 that in so many fields of science, this has permeated not
19 just the, you know, the sort of hero marquee projects, but
20 in fact the work of the vast majority of scientists
21 working on the scale of, you know, individuals labs,
22 modest-sized research groups.

23 If you look at the current scholarly practices
24 in molecular biology, in chemistry, in engineering, in
25 astronomy, you'll find that more and more and more there

1 is an adoption, an infusion of information technology into
2 the day-to-day working practices of those scholars.

3 And beyond that there is an increasing move to
4 build up community databases of information out of those
5 tools. Think of things like the various molecular biology
6 databases. Think of things like the national virtual
7 observatories that are currently being federated in
8 astronomy.

9 Yes, you can still find, you know, the scholar
10 in the sciences whose involvement with information
11 technology is primarily searching literature databases and
12 cranking up the word processor and trading electronic mail
13 and using the web browser to look at things.

14 But I think that that cadre in most of the
15 sciences is diminishing. Furthermore I think it's
16 important to underscore that, at least my sense is,
17 broadly across the sciences the move to e-Science has been
18 accepted on a disciplinary basis.

19 It is not controversial to be using these
20 tools. It is expected that you'll use these tools when
21 appropriate, and that these are good tools for doing good
22 science and advancing scholarship.

23 If we look though across the rest of our
24 research universities, beyond the sciences and
25 engineering, I believe that you will also find a rapidly

1 growing use and reliance upon the tools of information
2 technology, of cyberinfrastructure, of massive data
3 resources to advance work in the humanities and the
4 qualitative, rather than quantitative, social sciences as
5 well.

6 We heard earlier about the Atkins report, which
7 at least in the United States is sort of the touchstone
8 for articulating that vision of how information
9 technology, advanced networks, high-performance computing,
10 shared observational and experimental apparatus and data
11 management to accompany all this is transfiguring
12 scientific research.

13 What wasn't mentioned earlier -- and I would
14 also direct to your attention -- is a study that was done
15 under the auspices of the American Council of Learned
16 Societies with funding from the Andrew Mellon Foundation
17 and which was chaired by John Unsworth, and which has put
18 its final draft report now up on the net.

19 This Commission -- and I should, in the
20 interest of disclosure, mention that I did serve as an
21 advisor to it -- took a pretty broad look at what's going
22 on in the humanities and the social sciences in terms of
23 information technology.

24 And I think that the picture that the
25 Commission came away with, is that these kinds of

1 scholarly practices are starting to make a major
2 difference there as well.

3 They are not as uniformly accepted. They are
4 not as uniformly distributed. But indeed if you want to
5 identify marquee projects -- not necessarily marquee
6 projects in the sense of having a marquee price tag that
7 would impress the National Science Foundation, but in
8 terms of the kind of scholarly creativity that they
9 demonstrate -- you can find good examples of this,
10 startling, impressive examples of this in the humanities.

11 And indeed we have several people here who have
12 been pioneers in developing exactly those kinds of
13 examples, modeling cities, buildings, societies, analyzing
14 cultural objects using information technology tools.
15 There's a tremendous amount that's going on there.

16 So I think that one of the many messages of
17 that report is that we should not think of these changes
18 of scholarly practice as limited to the sciences and
19 engineering. Indeed they are happening in medical area.
20 They are happening in humanities. They are happening in
21 the social sciences. You can even find fascinating bits
22 of them starting to turn up in other places, the
23 performing arts for example, where they are starting to
24 have some impact. I would not overlook also the fact
25 that, even in the humanities, even in the social sciences,

1 there's new floods of data turning up.

2 This is not just about dealing with old
3 material in new ways. It's not about, we can do a
4 spectrographic analysis of the Mona Lisa and now
5 understand how that painting happened in ways that we
6 couldn't before, or try and digitally restore it to the
7 way it probably looked when it was painted.

8 Just think about things like this. If you
9 wanted to do a biography of Alexander Hamilton's years in
10 office, this is a pretty manageable thing. It's not
11 insane to think of a scholar actually over the course of a
12 career familiarizing him or herself with most, if not all,
13 of the source documents, assuming they can get into the
14 right archives and see them. The scale is a human scale.

15 When you start thinking about someone who wants
16 to write a history of Bob Rubin's role in the Clinton
17 administration -- to take kind of a parallel thing -- the
18 volume of evidence is unthinkable.

19 The notion that some human being can actually
20 look at all of this becomes more and more tenuous. We
21 start thinking about having to have automated tools in
22 order to simply deal with the flood of evidence. This by
23 the way I'll just note is not limited to people trying to
24 understand history in academic settings.

25 I would invite you to have a look at the way

1 that text-mining technologies and database technologies
2 and information-retrieval technologies have found an
3 enormously profitable niche in things like large-scale
4 inter-corporate litigation.

5 When something like Enron decides to have a
6 meltdown, and you go in and take possession of all of the
7 computer files of an organization that size, this is a
8 very formidable problem to sift through.

9 And we're starting to see technologies show up
10 there, which I think are going to show up increasingly in
11 many of the social sciences, as the flood of evidence --
12 those 17 tractor trailers full of stuff -- start showing
13 up in digital form.

14 Okay. So those are a few of the things that
15 are starting to change the way scholarship is practiced.
16 I'll just mention two other things that are also having an
17 effect in here. It's not just about what scholars do.
18 It's also related to how they interact with their own
19 scholarly record.

20 We're starting to see labs, research groups,
21 even individuals wanting to amass significant personal
22 literature collections or to do so at a lab level, to link
23 that up to public databases, to private database, to do
24 computation on it.

25 All of a sudden the literature is permeating

1 into the laboratory. It's permeating into all of the
2 places where scholars work in ways that it couldn't
3 before, and really becoming much more of a sort of an
4 interactive loop, I think.

5 It's no longer sort of, read the literature, go
6 research, write, go back to step one. The whole matter
7 has become much more iterative. And there's some
8 complicated things that are showing up as a consequence of
9 this.

10 Here's one good example. I think just about
11 everybody here knows all about the shift that has taken
12 place in libraries from purchase to site license,
13 particularly for the journal literature, over the past two
14 decades.

15 Now, what this typically does is basically sets
16 up arrangements where the library licenses and pays for
17 some community to have access. And that community is
18 typically defined by language that says something like,
19 the faculty, students and staff of The University of Texas
20 and -- parenthetically since it's a public institution --
21 other people who are incidentally physically present on
22 their premises.

23 You can probably negotiate something like that
24 in. Well, okay, that's great. There's been a technical
25 challenge which we are mostly finished fighting our way

1 through to make sure that members of the licensed
2 institution have access to this content, wherever they may
3 be, whether they're physically on campus, whether they're
4 at home, whether they're out at a research facility,
5 whether on sabbatical at some other university.

6 Well, now we have the emergence of what's being
7 called in some circles virtual organizations as part of
8 the whole move to e-Science, cyberinfrastructure,
9 e-Research.

10 Virtual organizations are basically nothing
11 more at their crudest level than a group of scholars that
12 come together to work on a specific problem, to interact
13 with a specific set of data and instrumentation, that may
14 have been drawn from an array of different institutions --
15 sort of standing institutions -- scattered all over the
16 globe.

17 So you may have a team of particle physicists
18 or astronomers or whatever forming a virtual organization.

19 Yet their access to the literature is tied up with their
20 source affiliations. So all of a sudden you have this
21 conflict between building collaboration environments for
22 these folks and being able to uniformly import the
23 literature you want as part of that collaboration
24 environment.

25 These are some of the kinds of complexities

1 that are starting to show up -- these needs to compute,
2 these needs to support virtual organizations -- as we look
3 at our ongoing relationship between the scholar and the
4 literature of his or her field.

5 We're also seeing the production of scholarly
6 works that go far, far beyond traditional articles,
7 traditional printed monographs -- that represent
8 databases, that represent simulations, that represent
9 complex mixtures of software and data and analysis.

10 Right now I think that we're in an environment
11 in most disciplines where people do both. Very few
12 scholars have completely forsaken the sort of traditional
13 article or traditional monograph, depending on their
14 discipline, for these new kinds of vehicles.

15 But these new kinds of vehicles are becoming
16 increasingly important. Even in areas where things like
17 the journal article are still absolutely essential stock
18 in trade for scholarly communication, those articles are
19 being supplemented and interlinked in many, many fields by
20 complex data sets or databases, often managed on a
21 community basis.

22 Often that data is augmented by complex or
23 specialized software that's necessary in order to
24 understand, manipulate and work with the data. So even in
25 fields where that traditional journal article remains

1 paramount, there is an ever-growing amount of
2 supplementary material that's equally important.

3 And there are, by the way, fascinating things
4 going on these areas. I don't have time in this
5 conversation to do more than just sort of sample a couple
6 of trends. But I think it is worth it at least sampling
7 into a couple of trends.

8 There's always been a notion in science in
9 particular about reproducibility. The idea is if you
10 write up the results of an experiment, someone else who is
11 sufficiently well motivated and has the appropriate
12 laboratory equipment, should be able to reproduce it.

13 And in fact there's been a large gap between
14 theory and practices in many cases, because the article
15 summarizing the results often is very light in research
16 methods and things like that. There's a lot of interest
17 in making reproducibility easier.

18 And part of the notion there is, can you come
19 up with more raw data that can be reanalyzed as part of a
20 form of reproducibility. So you make the raw data
21 available under sort of norms of scholarship in a field,
22 so that someone else can work with it.

23 Can you even somehow structure not just the
24 data, but things like the experimental setup in some
25 representation? There's very interesting research work

1 going on in this. There are people who are trying to
2 codify theorem proving and things like that, so that you
3 can basically import an article and rerun the analysis,
4 rerun the steps of the proof.

5 I think rerunning the analysis is probably more
6 plausible in terms of having real impact in the near term
7 than rerunning the proof. But there clearly is this kind
8 of thinking about reproducibility. In the humanities, of
9 course, things get even more interesting, because in the
10 humanities it's less about reproducibility than citing
11 sources.

12 But you could cite some really obscure sources
13 in the humanities, sources that would require trips across
14 the ocean, special pleading with curators, to get into see
15 things. Maybe you could get it; maybe you couldn't. Now,
16 it starts to become possible to make the evidence -- or at
17 least digital versions of the evidence -- an integral part
18 of your piece.

19 We may increasingly see norms for archival-
20 based research calling for digitizing the relevant pieces
21 of the archive if they're not digitized and connecting
22 them up to the article in some ways.

23 Finally in this area -- just to mention one
24 more trend that I think is of critical importance -- we
25 are seeing in various disciplines a sort of a revisitation

1 of the norms about data sharing, the expectations about
2 when you share data and why and who can take credit for it
3 and under what circumstances.

4 And obviously these are very different
5 conversations with very different outcomes from discipline
6 to discipline. But I think that by and large -- and
7 institutional review boards notwithstanding in certain
8 areas -- the tendency is towards greater sharing.

9 I'd also point out that the funding agencies
10 that underwrite a good deal of the research that goes
11 on -- and I don't just mean government agencies here, but
12 also private agencies, private foundations -- are starting
13 to take a much stronger interest in the data component of
14 research that they fund, and how that data is going to be
15 shared.

16 I've been intrigued, for example, to see that
17 certain private foundations that fund work in the
18 management and cure of specific diseases are now requiring
19 researchers that they fund to share data with other
20 researchers in advance of publication.

21 They're basically saying that our primary goal
22 is to accelerate the progress of research in this area,
23 not to accelerate the prestige of the researchers that
24 we're funding. And I think that those kinds of pressures
25 are going to continue to put focus on these questions of

1 data sharing.

2 So data, I think, is becoming an increasingly
3 critical part of the scholarly record. Now, how does this
4 connect up to libraries? Well, let's just point at a
5 couple of specific developments. First and most obviously
6 the question of data, which was mentioned earlier -- who's
7 going to take responsibility for it?

8 Where does that fit institutionally, given that
9 data is of growing importance as evidence, as
10 documentation and as direct scholarly communication?
11 Who's going to manage it? I think that more and more it's
12 being suggested that libraries are going to carry at least
13 a very significant part of this burden.

14 And it's worth understanding at least a couple
15 of sub-pieces of this. Jim talked about some of the
16 cyberinfrastructure vision of data management. And I'd
17 urge you to read the relevant documents from the National
18 Science Foundation and elsewhere.

19 But they're being very cagey about how much
20 funding they're going to put into this and about how much
21 investment we're going to see. Really this issue is not
22 just for the NSF. It's for all of the federal funding
23 agencies.

24 How much investment we're going to see in
25 national-scale data management strategies. We have some

1 tradition of this in place in areas around the life
2 sciences already, because of the ongoing investment of the
3 National Institutes of Health, in the National Center for
4 Biotechnology Information, within the National Library of
5 Medicine.

6 That served as sort of a de facto national
7 focal point for the management of a good deal of genomic
8 and related information. We have some similar kinds of
9 things in planetary data from NASA. NSF in fact --
10 although it doesn't always like to admit it -- does have a
11 considerable history of funding a certain collection of
12 community information resources in the fields.

13 It funds things like the protein databank. But
14 the need is enormously larger than what's in place. And
15 an open question right now is, how much of that is going
16 to be done on a national disciplinary basis. How much of
17 it is going to be done on an institutional basis?

18 How much of it is going to be done through
19 various kinds of intermediate or alternative approaches,
20 for example consortia of universities, things perhaps
21 modeled after something like ICPSR in the social sciences.

22 We have a few examples of that.

23 It's clear there are some beneficial economies
24 of scale in terms of the ability to afford to construct
25 specialized access and management tools in individual

1 disciplines. For those who would like the government to
2 undertake a lot more of this on a central basis, it's
3 interesting to notice that we are seeing models of that
4 elsewhere.

5 The UK has done that for a long time through
6 its data centers, which it set up in the mid-'90s in
7 various disciplinary areas -- things like the arts and
8 humanities data center, the environmental sciences data
9 center.

10 I just recently saw some announcements of an
11 EU-wide attempt to build up a network of repositories to
12 deal with some of this. I'll just make a couple of final
13 points about data and about the role of data here and the
14 role of libraries in dealing with this.

15 First one -- and this is an observation which I
16 think I also owe to Paul Courant. If you look across our
17 research universities, across the range of disciplines
18 represented there, it's important to remember that a very
19 significant number of faculty really don't get grants.

20 Or at least they don't get big grants. They
21 might get grants that buy out their teaching for a
22 semester or two to work on a book or to go abroad to
23 lecture. But they're not big sort of systems grants to
24 sequence a species genome or something like that, into
25 which you can build data curation and people, and out of

1 which you can take overhead to move to the library.

2 A lot of that research, as far as I can tell,
3 falls to the university, because it's the university's
4 faculty, and the university underwrites it, and they are
5 really the only agency there to do it. It's also worth
6 being aware, in the broader university context, that I
7 think funding agencies are becoming increasingly conscious
8 of the value that research data represents.

9 They are starting to worry about -- as good
10 funders, as responsible funders, as responsible allocators
11 of public money or foundation money -- how do we ensure
12 that this data gets appropriately preserved and shared.
13 Both in the short-term, how do we ensure that it's being
14 backed up and secured well, so that if there is a natural
15 disaster we don't lose 15 years of scientific work.
16 And in the longer term, how do we assure it gets archived.

17 You're starting to see funding agencies require
18 data management and dissemination and preservation plans
19 as part of the grants. And I believe you will
20 increasingly see this considered as a factor in deciding
21 who does and who doesn't get grants in an increasingly
22 competitive environment.

23 And the story that a lot of these researchers
24 are going to tell, with the encouragement of their
25 department chairs, their deans, the vice president of

1 research. They say, Well, if we have to make a case for
2 this, we'll say the university and specifically the
3 library will do this. They'll take care of this on an
4 ongoing basis when we're done. We'll just deposit it
5 there.

6 So there's liable to be not just a need, but
7 perhaps also a growing mandate to deal with this. Okay.
8 A couple of other comments in this area before I try and
9 bring the threads together.

10 I think there's a real question of credibility
11 for libraries, particularly when we think about scientific
12 data. If you look at the ACLS report that I discussed
13 earlier, the notion the libraries represent the
14 laboratories of humanities, that they are an essential and
15 central part of cyberinfrastructure for a future vision of
16 the humanities, is widely accepted.

17 Great respect for libraries within the
18 humanities. When you look in the sciences things become
19 much more ambivalent. Certainly libraries still continue
20 to expend massive segments of their budget licensing
21 access to scientific journals and making them available.

22 Although I think that despite the best efforts
23 of libraries, working scientists in our universities are
24 still remarkably uninformed about just how big that
25 investment is. Graduate students are even more clueless.

1 They find them through Google. They think they're all
2 free. Life is wonderful.

3 Beyond this sort of writing checks for the
4 scientific literature, many of our research libraries have
5 not had very deep interaction with a lot of their
6 scientists over the last decades.

7 There is a real potential challenge when we
8 start thinking about an enormous role in data management
9 and data curation and data stewardship in the scientific
10 areas in establishing the kind of relationships and the
11 kind of credibility that will be necessary to bring that
12 off.

13 And I think it's important really to sort of
14 address that very clearly up front, because I think it
15 ties into some of the questions I raised at the very
16 beginning of my talk about the futures of libraries.

17 I think one future that some libraries may
18 elect to take is to very much back away from the demands
19 of particularly scientific data, and to build largely upon
20 the alliance with the humanities in dealing with data
21 kinds of things, to really continue to restrict their
22 engagement with the sciences in licensing literature.

23 I think that we will see alternative methods
24 for supporting scientists who are at institutions, who are
25 in that position. I think that's a very strategic

1 question with a very high price tag though that libraries
2 need to consider.

3 It's not just data. Another piece of the
4 relationship between libraries and scholarship deals with
5 dissemination, particularly of these things that don't fit
6 into the traditional paradigms of monographs, of journal
7 articles.

8 I think that -- and I'm sure there are people
9 here who will disagree with me -- university presses
10 particularly have not by and large been aggressive in
11 moving into the digital area.

12 They have, largely when they have translated
13 things so they're really using the digital environment for
14 distribution rather than getting into the support of
15 authoring of things that are intrinsically digital -- very
16 much by the way, the same pathway that journal publishers
17 followed when they moved to the digital world.

18 There are a lot of reasons for that. Some of
19 the reasons have to do with a lack of availability of
20 venture capital of various kinds, either grants or
21 funding. Some of it has to do with other priorities. But
22 leave that as it may.

23 What we've seen as a partial response to that
24 is many libraries now getting involved often in deep ways
25 with individual departments in things that look a lot like

1 reinventing publishing in the digital world. That's going
2 to be a very crucial role, it looks to me, for libraries.

3 And it's a role that also implies preservation
4 in ways that are very different than the kind of
5 preservation that we had in the print world. In the print
6 world publishers were not responsible for preservation.
7 Publishers disseminated.

8 Libraries acquired and preserved. In this new
9 digital world you may have a phenomenon that's very much
10 you as a research library collaborating in the
11 construction and dissemination of this thing.

12 You bear a moral responsibility for either
13 preserving it or deciding that it's not worth preserving
14 at some point -- very, very different situation -- with
15 much more pressure perhaps on individual libraries making
16 choices and the entire scholarly community living by the
17 results of those choices.

18 So let me try and tie this together now into a
19 few looks at the roles of libraries and a couple of other
20 things that are liable to change. The first thing that I
21 think needs to be said is, the massive digitization
22 programs that are under way, among the Google Six
23 notwithstanding, change in research libraries is going to
24 be somewhat incremental.

25 They are stewards of enormous physical

1 collections. And those enormous physical collections
2 aren't going to go away. Some of them may move into low-
3 access storage. Some of them may be merged in various
4 ways with those of other institutions to reduce the amount
5 of redundancy in the physical holdings.

6 Massive digitization will open up access to
7 things in ways that were just unimaginable only a few
8 years ago. But change in here is going to be somewhat
9 gradual. It's just the nature of the beast. We're not
10 going to get rid of a lot of the old really
11 instantaneously.

12 Indeed perhaps the biggest challenge here is
13 that for every voice advocating and demanding investment
14 in something new, there's still one advocating and
15 demanding continued investment in something that you're
16 already doing.

17 There are very few things I think today that
18 research libraries do that don't have a constituency
19 within their institutions. So there's a really large
20 reallocation challenge here. It's not a question of, we
21 just stop A and start B.

22 Let's talk just a tiny bit about the sort of
23 four functions that are typically attributed to a research
24 library: collecting, organizing, providing access and
25 archiving.

1 Clearly in the organization area things are
2 changing. Things are changing in two different ways that
3 push us in opposite directions. At the same time we are
4 digitizing and we are using in scholarship a tremendous
5 amount more unique material. Images for example have
6 become much more of a first-class object in a much broader
7 array of teaching and scholarship over the last, let's
8 say, 20 years than they had in the past.

9 Most of this is relatively unique material
10 right now in the sense that we haven't yet built up sort
11 of canons and replicated it in various ways. Although I
12 think you can argue that systems like ARTstor are making
13 the first tiny steps towards that.

14 These are very hard to deal with because we
15 really don't know how to teach machines to describe and
16 organize images very well yet. So we face very
17 challenging organizational problems in this area.

18 When we look at collecting it's clear that the
19 sort of traditional published materials -- while they will
20 continue to be important -- are likely to be a smaller
21 part of the collecting universe. Let me just say a quick
22 word or two about those traditional published materials.

23 You can divide those at least in a sort of a
24 vague way -- and just bear with me; I'm going to be vague
25 here, but I think the point is real -- into materials

1 where the primary audience is the scholarly community, and
2 materials where the primary audience is not the scholarly
3 community, but they are important to the scholarly
4 community, as evidence that can drive scholarly inquiry
5 and analysis.

6 Now, the materials inside the scholarly
7 community, we are working out pretty effectively
8 acquisitions and archiving and things like that. Yes.
9 There's still more work to do. But we can point to a lot
10 of progress in the area over the past decade -- progress
11 both with commercial and non-commercial players in that
12 field.

13 One of the reasons we can do that is because
14 there's a common set of values and interests around that
15 scholarly material. And that includes the values around
16 access, archiving, preservation, maintenance of integrity.

17 When you look at that vast assortment of
18 material which is not targeted for higher ed, but which
19 higher ed is interested in as evidence -- popular film,
20 television, radio, newspapers, popular books and
21 magazines, all of the tracings of popular culture and
22 discourse -- we have an enormous problem.

23 The commitment to ensure archiving scholarly
24 access and use of that is not there in our society.
25 Indeed one of the great challenges that the research

1 library community faces, I believe, is making the case to
2 the society that we've got to clear a path to be able to
3 do that.

4 And that's implicit in these discussions around
5 orphan works. It's implicit in many other policy
6 discussions. But that is a central policy problem. If
7 you want to see just how bad that can get, I invite you to
8 have a talk with your film and media studies folks.

9 They're probably one of the most severely
10 challenged academic fields right now because of the
11 difficulties they face in getting access to the source
12 material they need and being able to weave it into their
13 work.

14 Beyond the published literature, clearly we are
15 going to see libraries taking more and more stewardship
16 responsibility for all of these other parts of scholarly
17 communication and evidence that I've been describing --
18 the data sets, the new genre works.

19 These will have very different financial
20 properties. They will have the property, for example,
21 that in many cases they are very inexpensive to acquire,
22 unlike published materials. But they are very expensive
23 to maintain, to provide continuing access to, to preserve.

24 The whole economics of how you allocate
25 resource between acquisition and preservation or ongoing

1 access is liable to shift in this world. And I think we
2 can already see evidence of it. I cannot resist a very
3 quick anecdote here.

4 In some discussions over the past few years I
5 have had conversations where I've talked with people
6 about: Well, what happens to the next generation of
7 special collections; that today, you know, you can often
8 find a donor that will help you acquire, for example, a
9 set of personal papers that come onto the market; and that
10 usually the primary issue there is getting the money to
11 acquire it. Sometimes there's a secondary issue about
12 finding some money to organize it or to stabilize some of
13 it. But the big problem is usually the acquisition.

14 Tomorrow you may be able to get many people to
15 say, Sure, take my disks. The problem will be how to
16 handle it going forward. And what you may wind up doing
17 is seeking donors who will essentially endow a collection,
18 that somebody is being kind enough to give you. But you
19 need an endowment to keep it alive.

20 I actually saw a company -- and I have to thank
21 Neal Beagrie from the UK for the pointer to this last week
22 called Arkhold. They are advertising a service to the
23 consumer now, where you can purchase an endowed website.

24 So you can pass it on to your children, you
25 know, those precious memories and things like that. And

1 they've worked out the interest rate and the cash flow and
2 things like that. You'll be interested to know that
3 they're figuring at a 4 percent return the price tag on an
4 eternal website is \$2,500 a gigabyte. Fascinating.

5 So this kind of issue is starting to move into
6 the consumer consciousness as well. But I think that
7 there's a powerful message there. Okay. So those are a
8 couple of the points about how these functions may
9 rebalance.

10 I want to say one word, too, about providing
11 access and preservation. And that's that I think that
12 there's a growing imperative -- and perhaps this is a
13 particularly appropriate thing to say on September 11 --
14 to reconsider a bit what we mean by good stewardship.

15 When we think in our museums, our archives, to
16 some extent our libraries, of unique works and unique
17 collections, I'm not sure that good stewardship is just
18 about better theft protection and environmental control
19 anymore.

20 I think we need to be honest about how far we
21 have come with digital capture technologies, digital
22 imagining of two and three-dimensional objects. We're at
23 the point now where we can produce, if we want to, good
24 enough replicas for most scholarly purposes.

25 I would not say all. I'm not sure we'll ever

1 be able to say all, at least not until we get to the real
2 Star Trek kind of technology, but a very, very large
3 percentage. Now, this is starting to emerge, for example,
4 in the museum community as a serious question.

5 If you are a museum holding a collection of
6 public domain works, what really constitutes good
7 stewardship here? I think you can make a compelling
8 argument that one answer to that is you make high quality,
9 digital replicas of this material available very broadly.

10 That is one way to ensure, not just access, but
11 survival of that material in the face of all kinds of
12 inevitable catastrophes. I think that this is also
13 starting to come into the mix.

14 I was very struck -- when I was at the
15 University of Michigan early this year they held a
16 symposium about the implications of mass digitization.
17 Mary Sue Coleman got up, and she gave a talk which in part
18 I believe reprised some of the remarks she made to the
19 American Association of Publishers, where she pointed out
20 that one of the results of this digitizing program was
21 that for the first time they had a real disaster recovery
22 and business continuity alternative starting to emerge for
23 their library collections.

24 I think we need to recognize that these kinds
25 of issues are on the table. So those are a few thoughts

1 about how the mix of these long-standing functions, which
2 I don't expect to change -- organizing, collecting,
3 providing access and preserving -- are likely to be
4 rebalanced and reinterpreted.

5 I think it's important not to lose sight of
6 course of the points that Jim made about library as place,
7 about library as a place that is sort of a social
8 interaction crossroads across the many disciplines
9 represented at our campus.

10 These elements are coming on as well. But I've
11 chosen in my remarks here to focus more on the collection
12 side. I would just underscore that the question really in
13 my mind shouldn't be just, What's the future of the
14 research library in the 21st century university.

15 It should be, In the 21st century research
16 university what are our collective strategies for
17 organizing, collecting, providing access and preserving
18 the evidence, the output, the communication of
19 scholarship.

20 That's really, I believe, the way to frame the
21 question. I think as soon as we do, it points us at the
22 need for a coherent, systematic, institutional strategy
23 that encompasses not just our libraries, but all of the
24 cultural and scholarly memory activities that are based on
25 our campuses. Thanks.

1 And I would be pleased of some comments.

2 VOICE: [inaudible]

3 CLIFFORD LYNCH: Yes. Let me repeat that,
4 because I see a few people trying to hear. Perhaps that's
5 something we should keep in mind as we have our
6 discussions going forward as well, is talk loud. The
7 issue is -- I talked a lot about things on an
8 institutional level.

9 What about libraries collectively? How do they
10 come into play here? It seems to me that we are moving
11 into a world where libraries are going to need to act more
12 collectively. Many people over the years have commented
13 on this sort of strange mixture of cooperation and
14 competition that characterizes relationships between our
15 major universities.

16 They, to a very great extent, share common
17 values and objectives. But they also in some cases
18 compete vigorously against each other for talent and for
19 prestige in various areas. I think that libraries, you
20 know, have always picked up on some of that as well.

21 They collaborate. But they also are protective
22 of their resources and of their relative positions. The
23 quality of the libraries reflects on the quality of the
24 university as a whole in an important way. It seems to me
25 that in this digital world what we're going to find

1 inevitably is that many kinds of collections are going to
2 become more uniformly accessible.

3 The notion that you cannot attract someone
4 because of the depths of your special collections may get
5 shakier, because you've got those special collections
6 digitized, and in fact they're being used by scholars
7 around the world.

8 I think that that's going to be a tough thing
9 to get over. But we're just going to have to move past
10 it. I think that really the requirements of scholarship
11 demand it in the same way that I think that some of the
12 discussion earlier is pointing to rethinking a number of
13 things about higher education and how we do it.

14 It's clear to me that for many kinds of data we
15 will be in much better shape if we work together than if
16 we work individually. It's just too hard to work at this
17 individually. It's too expensive. We haven't got the
18 scale.

19 It seems to me that we end up in a world where
20 inevitably we're going to have to learn to trust each
21 other as institutions in more critical ways than we do
22 today perhaps, and in less geographical ways.

23 I mean right now you see a history of
24 cooperation that's often rooted in geography -- regional
25 storage centers, reciprocal borrowing privileges, things

1 like that -- that mostly make sense on a geographic basis.
2 We're going to, I suspect, see alliances show up in some
3 cases on strength of academic programs in specific areas,
4 rather than geographic proximity.

5 You know a few schools with premier interests
6 and capabilities and discipline acts coming together to
7 deal with some of the data management issues around it.

8 So it that's one thing you'll see. The other thing -- and
9 I think you can already point to the work that ARL and
10 other library organizations, but especially ARL have done
11 in speaking out on some of the public policy issues that
12 are crucial to libraries.

13 I think that collectively research libraries
14 are going to some extent live or die by their ability to
15 make the case on a public policy basis around some of
16 these intellectual property issues. They've got to
17 continue to work collectively through organizations like
18 ARL to do that.

19 VOICE: [inaudible]

20 CLIFFORD LYNCH: That's a very complicated
21 question that probably to some extent goes way beyond my
22 competence to answer very well. Maybe I'll just say one
23 or two things that come to mind as little bits of this.

24 It seems that in the sciences at least we are
25 certainly seeing lots of work going on to operate on a

1 coordinated, international basis, both in the developed
2 world and, where relevant, into the developing world. You
3 certainly see that in many of the data management
4 strategies in environmental studies, meteorology, earth
5 sciences.

6 They're federating the national virtual
7 observatories into an international system. Certainly the
8 interchange agreements in Genomex have been in place for a
9 long time. So within the sciences there's always been
10 some attempt -- not always but certainly in the last 40
11 years there's been some attempt to think systematically.

12 It tends, I think, to be more of a federation
13 kind of a thing than a truly multinational that people
14 contribute to. There probably needs to be more of that
15 kind of conversation in the humanities than I'm aware is
16 taking place, although I may have simply exposed my
17 massive ignorance in that comment.

18 But I'm not aware of the same kinds of
19 organizations as bring together scientific data management
20 groups across most of the humanities. It would seem that
21 there would be interesting prospects for libraries in
22 other countries, both developing and developed, to
23 contribute in very different ways to area studies and
24 language studies and things like that.

25 If you've got, you know, the national library

1 of Sweden collecting everything in Swedish that was ever
2 done in a very systematic way, and they can figure out how
3 to make it available, it's not clear how much of that you
4 really need to replicate, if they have got expertise to
5 bring to bear on that that we may never have here in the
6 States.

7 At the same time there's a lot of tricky issues
8 about not wanting to leave the worldwide cultural records
9 at the mercy of individual, political and social entities.

10 I don't know how to square some of those. I think there
11 are a lot of good questions to be asked there.

12 I do want to circle back and just make one
13 comment on one of the sort of framing statements you made.

14 I think that while collections may become somewhat more
15 homogeneous, that the service portfolio and the expertise
16 portfolio that is held by individual research libraries --
17 and here I am talking mostly in the States -- may become a
18 more distinguishing feature.

19 It's not just the collections -- be they at
20 your home institution or anywhere else among the
21 collective research enterprise -- rather it's how capably
22 you can help scholars to navigate and work with that
23 entire constellation of resources.

24 VOICE: Could you talk a little bit about the
25 issues relating to the collection and archiving of net

1 content as a [indiscernible], whether it be correspondence
2 or email, publications of net documents, selection of
3 websites. We all agree that these are pretty ephemeral
4 and pretty dynamic --

5 Could you talk about that in the context of the
6 role of research libraries?

7 CLIFFORD LYNCH: Yes. Happy to. The question
8 was about the archiving of web content and the role of
9 research libraries doing it. I think that first off this
10 is going to be an essential part of understanding many,
11 many aspects of our culture, society and activities going
12 forward.

13 And we absolutely have to collect and preserve
14 it -- just a no-brainer. I think that we want to
15 replicate this record fairly broadly, because it is
16 subject to lots of kinds of attack.

17 I think at the same time there is a good deal
18 of leverage in research libraries coming together to use a
19 relatively limited -- and I don't want to say, one -- but
20 a relatively limited set of collections tools and
21 capabilities, so that everybody's not out there trolling
22 the entire web every week, but rather we siphon it up.

23 I'm not a big fan of technical monocultures of
24 any kind. Maybe we have two or three distinct breeds of
25 siphoning tool. Then we do those passes and interchange

1 the results among our repositories and libraries. So I
2 think that's really important.

3 Obviously, sort of adding on to the baseline of
4 that, there are more detailed, more refined and more in-
5 depth studies that you want to do to support specific
6 scholarly disciplines or research groups. At one level I
7 would say the really good news about dealing with the web
8 and archiving the sort of surface web is that it's pretty
9 cheap, and it's pretty automated.

10 If you look at the operating budget of the
11 Internet Archive relative to the operating budget of the
12 major research libraries of the United States, it's a
13 pretty good trade, considering the significance of that
14 content.

15 I think that we get into much more problematic
16 areas, when we start talking about deep web material,
17 which we really haven't dealt with very much -- databases
18 and things. We really, I think, underestimate how much
19 stuff is in there in the databases that we used to pick up
20 in ephemera of various kinds that no longer is produced in
21 ephemera.

22 So I think a focused look at that is necessary.

23 I also think that dealing with things that are not
24 exactly part of the public web, but that represent
25 institutional records that are on a web inside an

1 institution or even personal records, is going to become
2 critically important.

3 I mean, going back to the 17 trailers there,
4 I'm aware of very few efforts to do that in current
5 corporations where everything they do is increasingly
6 represented in a digital way.

7 VOICE: I hope that libraries will get involved
8 in -- catalog, and I hope we'll talk more about that
9 tomorrow.

10 CLIFFORD LYNCH: We're just about out of time.
11 I'll take maybe one more question or comment, if we have
12 one. It looks like people are ready for a break. Thanks
13 again.

14 DON CARLETON: Well, I'd like to thank James
15 Duderstadt and Clifford Lynch, both our speakers today for
16 fine presentations. Thank you.

17 (Whereupon the symposium was recessed, to
18 reconvene on September 12, 2006.)