

Student Inaug Address

Introduction

As some of you may know, I am a scientist and engineer
by training and background...

I must also confess I tend to be one of those
people who lives more in the future than in
the present or the past...

I can remember that...

in the 1960s I was working out at Los Alamos
on nuclear rocket engines designed to
power the first manned mission to Mars...

in the 1970s I was working in an exotic
area known as laser-induced thermonuclear
fusion in which we were attempting to use
super high powered lasers to compress
matter to the incredible densities and
temperatures found in the center of stars..
and create tiny thermonuclear explosions
in the laboratory, hence providing a
limitless source of power...

in the 1980s I refocused my efforts on
building an Engineering College which I
believed could trigger a major economic
resurgence in this state...and lead
efforts to build world-class programs in
robotics, microelectronics, artificial
intelligence, while building new bridges
between the University and the private
sector

In the late 1980s as a member of the
National Science Board, I have been
working very hard with Erich Bloch and
others to strengthen the science and
engineering base of this country...
with my particular focus on the development
of the scientists and engineers we will
need to keep our nation strong and

And, now, entering the 1990s, I find myself
looking once again to the future, facing
the challenge of helping to build a University
able to serve our state and our nation in
the 21st Century.

the model of a University for the 21st Century...

A Vision of the Future

It is important to realize that while you and your classmates
were born in the 20th Century, you will in fact spend the
majority of your lives in the 21st Century.

(You probably should also be aware that those of us on
the faculty are very much products of the 20th Century,
while this institution is, in reality, a product of the 19th Century!)

Hence it is very important that we look ahead for a moment
to speculate on what will be some of the key characteristics
of your future...and the manner in which this future should
come to bear on your education at Michigan.

- i) It will be a future in which our nation becomes a truly
multicultural society, with a cultural,
racial, and ethnic diversity that will be truly extraordinary
in the history of our civilization...
- ii) It will also be a future in which America will become "internationalized" ...
in which every one of our activities must be viewed from
the broader context of participation in the global community...

as America becomes a "world nation", with ethnic ties to every part of the globe...

iii) Finally, it will be a future in which we rapidly evolve from a resource- and labor-intensive society to a knowledge-intensive society...in which intellectual capital...educated people and their ideas...become the keys to our prosperity, security, and well-being.

Let's explore these themes for a moment to see how they might impact on your college education...

Theme 1: Diversity and Pluralism

America is changing rapidly...

By 2020, one of three Americans will be a person of color.

By 2000, one-third of college-age students will be from these groups

By 2000, 47% of our school children (K-12) will be Black or Hispanic

There seems little doubt that America of the 21st century will probably be the most pluralistic, multicultural nation on earth...and perhaps in history...

Note: It is important to realize here that 21st Century America will NOT be a mixing pot in which all cultures are homogenized into a uniform blend.

Rather, it will be pluralistic...composed of peoples of vastly different backgrounds, cultures, and beliefs...peoples who seek to retain their cultural roots...to maintain their differences.

Full participation of underrepresented minorities is not just a matter of equity and social justice.

It will be the key to the future strength and prosperity of American, since our country cannot afford to waste the human talent represented by its minority populations.

America cannot afford the loss of this human potential, cultural richness, and leadership.

If we do not create a nation that mobilizes the talents of all our citizens, we are destined for a diminished role in the global community and a social turmoil unequalled at any time in our history.

As both a reflection and leader of society at large, higher education has a special challenge and responsibility to develop effective models of multicultural, pluralistic communities.

We must strive to achieve new levels of understanding tolerance, and mutual fulfillment for peoples of diverse racial and cultural backgrounds.

On this campus many of you will encounter for the first time in your lives the remarkable diversity and richness of peoples of different races, cultures, religions, nationalities, and beliefs.

Many of these people will look different... many have different backgrounds... many have different beliefs...

Yet they, like you, bring characteristics of great value to our campus...talent, intelligence, ambition,... and the rich diversity of cultural beliefs and experience...

One of the most important things you must learn on this campus is to respect others for their differences...as well as their similarities.

Our challenge is not to make one group from many,

to blend together all cultures into a homogeneous mixture...but to build from many varying cultural, racial, and ethnic groups a truly multicultural community in which we share those common beliefs and values which bind us together.

All of us--faculty, staff, and students--must recognize that the challenge of diversity is our challenge and our responsibility, and until we recognize and accept this both as individuals and as members of the University community, we are unlikely to achieve our goals.

We can secure this future by setting aside confrontation and empty rhetoric, by seeking the understanding that comes from working side by side, by engaging in thoughtful dialogue, and by standing firm in our commitment to the creation of a pluralistic community on this campus.

My college generation of the 1960s was ignited by the spirit and leadership of Dr. Martin Luther King, Jr. in his effort to blaze a new path of opportunity for all peoples. Indeed, at my commencement in 1964, Dr. King received an honorary degree. Dr. King conveyed a sense of love and appreciation for one another, regardless of our differences. He taught us to replace confrontation with cooperation...to replace distrust with respect...to replace ignorance with understanding. He also taught us that we can only make progress toward his dream if we move forward together.

Theme 2. The Internationalization of America

Some signs...

Communications, travel, smaller world

Internationalization of commerce and industry...

Security and interdependence...

Nuclear weapons....

The "shrinking globe" phenomenon suggests that understanding cultures other than our own is necessary for good citizenship.

Some facts of life:

7-fold increase in international trade since 1970

Market for nearly all significant manufacturing industries has become world-wide

70% of goods we produce now must compete against merchandise from abroad

In slightly more than 5 years, US trade deficit has taken us from the world's largest creditor to its largest debtor nation.

Market for nearly all significant manufacturing industries has become worldwide

The fact is, a truly domestic US economy has ceased to exist.

Today, imports and exports represent about 10% of GNP...

70% of goods we produce compete directly with foreign goods.

> + **Jack Welch, CEO of GE, noted last November:**

"Within the next 2 to 3 years, at most, the most

important alliances will be forced in every significant global industry--medical, autos, defense, materials, and so on. Those who are

ow to recognize

head 3 - the emergence of these global alliances or to act in forming them will find themselves locked out of the game as we enter the 1990s."

American will no longer take its know-how and apply

it to low-cost natural resources from third-world countries, turn it into products, and then sell it back to them--as we do in a hierarchical economy. Rather, we'll be only one member in a global dynamic economy with tremendous network interdependency between countries.

US is no longer self-sufficient or self-sustaining. We are not immune to the shocks of the world society. We have never been more vulnerable.

US is the destination of about half the world's immigrants

Probably 10 million this decade alone...
One-third of annual population growth is immigration
Indeed, now that native fertility rates have stood since mid-1970s at 1.8 (below replacement level of 2.0), immigration promises to become the main determinant of future population variability

America is evolving into the first true "world nation",

shifting rapidly away from Eurocentricity into a society with strong ethnic ties to all parts of the globe--with a growing focus on the nations of the Pacific Rim.

This University is a truly international center of learning...

and it is important that you take advantage of this during your education...
whether through formal studies of other cultures
whether through studies at one of our overseas campuses
or simply by going out of your way to get to know students and faculty from other nations...

Theme 3. The Age of Knowledge

Looking back over history, one can identify certain abrupt changes, discontinuities, in the nature, the very fabric of our civilization...

The Renaissance, the Age of Reason, the Age of Discovery, the Industrial Revolution

There are many who content that our society is undergoing yet another such dramatic change...

As Erich Bloch, Director of the National Science Foundation puts it, we are entering a new age, an "Age of Knowledge"

The signs are all about us.

Our traditional industry economy is shifting to a new knowledge-based economy, just as our industrial economy evolved from an agrarian society at the turn of the century.

Industrial production is steadily switching away from material and labor intensive products and processes to knowledge intensive processes:

New ideas and concepts are exploding forth at ever increasing rates...

Concepts which have shaken apart the classical foundations of knowledge...
the theory of relativity
the uncertainty principle
the molecular foundations of life...
genetic engineering...

Radical critiques of fundamental premises, scholarship, and culture by feminists, minorities, and third world scholars.

Obscure, yet profound, new ways to approach knowledge such as Deconstructionism Knowledge Engineering

In many fields, the knowledge base is doubling every few years...

Furthermore, the typical college graduate of today will likely change careers several times during a lifetime...

It will be a future in which permanence and stability are less valued than flexibility and creativity... in which the only certainty will be the presence of continual change...

Hence a college education today will only serve as the stepping stone to a process of lifelong education... and the ability to adapt to...indeed, to manage change...will become the most valuable skill of all.

Response 1: The Need for a Liberal Education

These challenges suggest that the principal focus of an undergraduate education appropriate for the 21st Century will be the goal of liberal learning... that is, a liberal education as the preparation... the handling of knowledge, its selection for the determination of relevant issues, its employment to add value to our own immediate experience. This mastery of knowledge which is wisdom is the most intimate freedom obtainable.

The only avenue toward wisdom is by freedom in the presence of knowledge, the only avenue towards knowledge is by discipline in the acquirement of ordered facts."

We must take heed from T.S. Eliot's haunting passage:

"Where is the life we have lost in living?" "Where is the wisdom we have lost in knowledge?" "Where is the knowledge we have lost in information?"

We must not view undergraduate education at Michigan as simply aimed at extracting knowledge from the vast information characterizing our society.

Instead, our goal, indeed, the goal of any liberal education, is

head 3 - must be to help our students learn how to extract wisdom from knowledge -- and through that wisdom, prepare them to learn the art of life itself...

We must enable our undergraduates to find the wisdom in knowledge... and hence to find the life that is in living"

Response 1': A Complete Education

Note that the liberal arts include the natural and social sciences. Together the natural and social sciences and humanities are known as the liberal arts because of their potential to liberate the human intellect and the human spirit.

In American universities we do not insist on a

head 3 - balanced education for our students, and

although most humanists and many social scientists are literate, they are not numerate; they graduate without a reasonable background in science, a background

< - **that they will need to cope with and help with the increasing** technology of the modern world.

We really haven't appreciated impact of science and technology.

Examples of just the past few months:

- i) hole in the ozone layer over Antarctica
- ii) new supernova in the heavens
- iii) new high temperature superconductor
- iv) a new theory suggesting that all matter is composed of infinitesimal "superstrings" rather than point particles

Technological change is a permanent feature of our environment

Yet, at the same time public ignorance is extraordinary!

A recent NSF survey indicated that only 18% of those

head 4 - asked said they knew how a telephone works -- and only half of these gave the right answer.

head 3 + Yet more than half of those surveyed indicated they believed we were being visited by aliens from outer space!

Furthermore, the fundamental reason for this difficulty is

that education in science is highly vertical, where one

head 3 - subject is built upon knowledge of another, whereas

scholarship in the humanities is much less vertical;

head 3 - it is primarily extensive rather than intensive.. head 2 + Unlike

literature or social science, the highly vertical subjects

of science are very difficult to learn after college. Unless

one learns the language of science, mathematics, in

college, one is likely to remain scientifically illiterate

giving them up a gentle

slope to a more considerable level of learning. head 2 + The tragedy is not simply our poor showing relative to other nations.

Science, mathematics, and computer literacy will increasingly

become a requirement for almost all employment.

We are condemning an entire generation to a lifelong

estrangement from the very technology that will

inevitably overturn their lives.

Response 2: Values

Themes of the past

We hear voices of concern -- whether from the academy.

University!

For example, as some put it, spanning the range from Bloom to Bloom County...

Alan Bloom...

Condemns the cultural and ethical relativism of the 1960s (he sees it in American youth...

Their music

lifestyles, careerism

Laments lack of shared goals...

Loss of a secure religious foundation

Lack of familiarity with classical texts

Deficiency of moral education

"Our young people lack an understanding of their past and a

□ - **vision for the future; they live in an impoverished present.**

Our universities, entrusted with their education

, no longer
provide the knowledge of the great (tradition of philosophy
and literature that made students aware of the order of
the self-knowledge that has always been the
basis for serious humane learning."

Bennett: "Students deserve a university's real and sustained
attention to their intellectual and moral well-being."

There is almost a sense that our universities have
embraced a new type of philosophy of "literalism"
first articulated earlier this year by Opus Ó.

"You're born...
You live...
You go on a few diets...
You die."

But all too often I fear these voices also call for a return
to a style of education characterizing our past...

Of course, key in this debate is a suggestion that we
must move beyond focusing simply on intellectual
values in the education we provide...

Intellectual
The seeking of wisdom
Discipline of the mind
Respect for reasoned conclusions
Intellectual integrity
Freedom of inquiry

Character
Honesty
Integrity
Truthfulness
Nonviolence
Tolerance

Social
Compassion, Caring, Kindness
Tolerance and respect
Collegiality, civility, and community

It is these latter values that are so essential to Michigan
students because of the special role you will play in our
society.

Response 3: The Preparation for Leadership

As I noted earlier, you are an extraordinarily talented
group of individuals...

It is likely that regardless of what happens
during your college education, you will go on to
become leaders of our society.

Section 2 + Hence, we believe it important that you prepare for
this life of leadership now by taking advantage of
all that this University has to offer.

John Gardner suggests some of the key themes:

1. Your commitment to the fulfillment of human
possibilities.
The release of human potential is and must always be
a central value.
Serious and sustained attention to the special problems of
justice to historically deprived groups is essential.
2. Creating a sense of community
Shared values and goals are the chief resources leaders
can count on in motivating people--the task grows
difficult--eventually impossible--as shared values
disintegrate.
You should strive to participate in and experience a
sense of community on this campus.

3. Renewal

Leaders have to be capable of self renewal, (and, of helping in the renewal of the systems over which they preside.

Must learn to balance continuity and change.

4. Hope

Human beings are creatures who cheerfully act against the odds if they believe strongly enough, who reach for the unreachable stars and dream of impossible victories.

We must help young, potential leaders to value and to understand this side of our nature.

5. Discipline of the Mind

The central task of a university, a task which separates it from all other social institutions, is the creation of an environment where the quality of mind and of its performance is always the central concern.

The spirit most likely to develop leaders is a disciplined use of reason, enlivened by daring and the courage to experience, and tempered by respect for what we can learn from others.

6. Acceptance of Responsibility...

From the earliest moments in our long history, the UM has been known for a spirit of democracy and tolerance among its students and faculty.

Almost a century ago, Harpers Weekly noted: "The most striking feature of the University of Michigan is the broad and liberal spirit in which it does its work."

Student activism and involvement have always been an important part of the learning process at Michigan.

Yet, while it is of paramount importance that we protect the fundamental freedom of students and faculty to explore new ideas and concepts, to state their beliefs and values, no matter how far they may be from mainstream thought...

...it is also essential to recognize that without the

acceptance of responsibility, freedom is meaningless.

Indeed, true leadership consists not of simply protesting the existence of a problem...but rather consists of doing something positive about it.

Out against injustice. In a very real sense, I suppose, the acceptance of

responsibility along with freedom implies that one also accepts a commitment to move away from a negative stance of merely complaining or protesting

g...
and rather making a positive effort to address the
challenges before our society.

Response 4: The Michigan Initiatives - Head 2 + Goal:

To launch a series of initiatives designed to improve the

Head 4 - quality of undergraduate education at Michigan

Common thread: Grassroots involvement...

Each involves an effort to seek proposals...ideas and
participation in defining programs...from our faculty,
students, and staff to address the University's highest
priorities: in education, scholarship, and the
attainment
of a rich cultural and racial diversity in our
community.

We seek to invest resources in a way that will motivate
our most creative people to become involved and
committed.

Phase I:

+ 8. The Undergraduate Initiatives Funds

\$1 million per year to support innovative projects

Program will provide an ongoing source of support, up to
\$1 million per year, for a wide range of experiments

**Head 6 - designed to improve quality of undergraduate
education. Head 5 + Looking for good ideas...but prepared
to make base commitments from other sources to
support successful Head 6 - ventures.**

Categories of awards:

- i) promoting academic thinking and writing skills
- ii) Creating a new spirit of liberal learning
- iii) Promoting acceptance of pluralism and diversity
- Head 5 - iv) Promoting improved faculty-student interactions**

First awards:

- Development of new core curriculum in liberal arts
- F-S revision of sciences (math, chem, bio)
- Integration of arts into UG curriculum
 - Theatre, dance, electronic music
- Counseling and Pluralism
 - Career planning in liberal arts
 - Sensitivity training
- Head 5 + Student activities**
 - UG colloquium
 - Faculty "fellows" program in residence halls
 - Safewalk program
 - Alternative Career Center

TA training

2. School and College Initiatives

LS&A

- i) Collegiate Council
- ii) Associate Dean for Freshman/Sophomore Years
- iii) Special Assistant to the Dean

Engineering

- i) Commission on UG Engineering Education
- ii) Associate Dean for UG and Grad Instruction

Natural Resources

- i) Major curriculum revisions underway

Phase II:

1. Focusing of the Undergraduate Initiatives Fund
 - Will work directly with schools...not open solicitation
 - i) The unique nature of undergraduate education in

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environment

The Role of the Administration

Of course, we realize in an institution of such size, complexity, and tradition, those .h!a 4 - of us over in the blockhouse will have little capacity to define, redirect, or reorder the priorities of the University.

The articulation and achievement of any mission must be a communal effort. It will rest with

Error!

.heyd 4 - colleges; with students inside and outside their formal organizations; with professional and other staff throughout the University.

Hence, the role of the leadership of the University is simply to generate the debate...and then to provide resources for continuous experimentation.

The momentum of this University...of any great university...must flow up from the faculty...through the administration... from you...not to you!

.heyd 1 + What are we trying to do at Michigan?

Prepare you for a career?...

Are doctors, lawyers, engineers, investment bankers???

Well, we will do our best, but that is not our real mission...

These challenges suggest that the principal

< - **focus of an undergraduate education appropriate**

< - **for the 21st Century will be the goal of liberal learning...**

that is, a liberal education as the preparation for a lifetime of learning.

Emerson (1837 address at Harvard):

"Colleges ...have their indispensable office, -- to teach elements.

But they can only highly serve us when they aim (not to drill but to create; when they gather from far every ray of various genius to their hospitable halls, and by the concentrated fires, set the hearts of their youth on flame."

Tappan:

"Universities may, indeed, make learned men;

but their best commendation is given when it can be said of

: - them that furnishing the materials and appliances of

eaning

setting the examples in their (professors and graduates,
preaching the spirit of scholarship in all that pertains to them,
they inspire men, by the self-creative force of study and
thought, to make themselves both learned and wise. and thus
ready to put their hand to ever great c

d!od(work, whether
of scien, of religion` or of the state.