# The MIT Faculty Newsletter

**Vol. IV No. 5** **March 1992**

On Governance

## Reflections and Comparisons

**David Thorburn**

When I joined the MIT Literature Faculty in 1976 after a decade at Yale, it seemed to me at first that the distance between my old institution and my new one was much greater than could be measured by the 135 miles between New Haven and Cambridge.

Most of the differences turned out to be matters of emphasis and style: the architecture was different, to be sure; science and engineering were at the very center of the culture of the Institute as they had not been at Yale; I taught far fewer literature majors. But the students were just as intelligent as those I'd taught before (and they almost certainly worked harder!), and the institution's commitment to excellence in teaching and research was at least as powerful and defining.

In one respect, though, my sense of the difference between the two institutions has enlarged rather than diminished over the years. The faculty's role in the governance of MIT is less decisive, less clearly defined by tradition and by regulation than at Yale (and, it is my impression, than at many other private

*(Continued on Page 4)*

## A Short History of *Politically Correct*

**Ruth Perry**

The phrase *politically correct* has been so ready to hand lately for journalists and news commentators, that a brief backward glance at its actual usage might be of interest. Like a recurring refrain in a song, or an incantatory line in a poem, its meaning changes as its context changes.

The phrase seems first to have gained currency in the U.S. in the mid-to-late 60's within the Black Power movement and the New Left. Dissatisfaction with the alienated values of the 50's generated a number of idealistic movements in that era, most of which were newly organized, whistling in the dark, trying to get their bearings, reaching for common terms to name the "white-supremacist," "sexist," "militaristic," "plastic," "corporate," "mechanistic," "alienated" society they wanted to change. Feminists of various stripes, Black Panthers, activists against the Vietnam War, civil rights workers, Black Muslims and pan-Africanists, hippies, and counter-cultural pacifists—all of these groups were evolving their own agendas, their own internal dynamics, and their own political

*(Continued on Page 8)*

Editorial

## A New Deal

***Each of us feels the good days speed and depart, and they're lost to us and counted against us.***

**— Martial,** *Epigrammeta*

We thought we had a deal. We, and the other research universities, would educate the technical elite of the country and work on technical problems of paramount interest to industry and the national defense. In return, the nation would provide the funds and freedom necessary for us to choose our own agenda, determine our own working conditions, and admit the best students without concern for their ability to pay.

The deal was not explicit. We never made any promises and the rewards were never spelled out. The necessary funds were provided via many channels

**A Letter From The Provost — Page 15**

in an apparently uncoordinated fashion. The system worked well for both sides for a long time, but it depended upon mutual good will and a sophisticated understanding of very complex systems.

*(Continued on Page 3)*



Printed On Recycled Paper

# MIT Faculty Newsletter

## Editorial Board

**B. L. Averbach**
(Materials Science & Engineering)
**Stephan L. Chorover**
(Brain & Cognitive Sciences)
**Nazli Choucri**
(Political Science)
**Catherine V. Chvany**
(Foreign Languages & Literatures)
**Ernst G. Frankel**
(Ocean Engineering)
***Jean E. Jackson**
(Anthropology/Archaeology)
**Gordon Kaufman**
(Management Science & Statistics)
**Daniel S. Kemp**
(Chemistry)
**Jonathan King**
(Biology)
**Vera Kistiakowsky**
(Physics)
**Stephen J. Lippard**
(Chemistry)
***Lawrence M. Lidsky**
(Nuclear Engineering)
**Fred Moavenzadeh**
(Civil Engineering)
**Merritt Roe Smith**
(Science, Technology, & Society)
***David Thorburn**
(Literature)
**Leon Trilling**
(Aeronautics & Astronautics)
**Robert V. Whitman**
(Civil Engineering)
***Editorial Committee for this issue.**

**David Lewis**
Managing Editor

**Address:** MIT Faculty Newsletter, MIT Bldg. 38-160
Cambridge, MA 02139; (617) 253-7303.
**E-Mail:** FNL@ZEISS.MIT.EDU
**FAX:** 617-253-0458

**Subscriptions:** $15/year On-Campus
$20/year Off-Campus


## Contents



## Authors

**John G. King** is Professor of Physics.
**Paul Penfield, Jr.** is Professor of Electrical Engineering and Computer Science.
**Ruth Perry** is Professor of Literature.
**Stephen Tapscott** is Professor of Literature.
**David Thorburn** is Professor of Literature.
**J. Kim Vandiver** is Professor of Ocean Engineering; Faculty Chair.
**Patrick H. Winston** is Professor of Computer Science.

## Editorial

# A New Deal

*(Continued from Page 1)*

More important than anything was the need for good will on both sides, an understanding of the other parties' agenda, and an unspoken *quid pro quo.*

The delicate balance was maintained by a complex, highly interconnected bureaucracy that shielded academic structure from the fluctuations of electoral politics. This system has broken down. Our supporters are no longer able to act as a buffer between us and the more public arenas of government. The funding agencies have lost the ability to commit funds without "objective justification" and there is little chance of being able to coordinate a number of agencies to achieve important but unstated national goals. Trust has been replaced by suspicion, and we have been charged with succumbing to the exaggerated self-interest and self-importance that has infected other portions of our society. And we provided evidence that we have erred — perhaps not as much as other groups, but enough.

We were asked to justify our anomalous position in society and account for the support that had been given to us. We responded with arrogance. No contract, no matter how cunningly couched in legalisms, can survive if the parties are suspicious and argumentative. Clearly the complex multipartite arrangement that had evolved to nurture the research universities had no chance at all. There is no good will and no deal.

The time has come — it has been forced upon us — to forge a new deal. We must determine what we wish to do, determine what support we will need, and justify it to those whom we expect to pay the bills. If we can't make a convincing argument, then we will learn more about the art of compromise than we would like to know. There is a great deal of interaction, argument, and mutual education to come. Both sides were at fault and both sides must come to the table looking for a solution. If there is no new deal, it will be bad for our nation and it will be bad for us. The research universities must take the first step. The government and the society it represents are not ready. As the most visible of the research universities, it is our duty to begin the process.

The task is daunting — we will face internal dissension and external suspicion. The problem is difficult intellectually and socially. How are we to begin? Who will grasp the nettle?

This is a job for the faculty. We represent the gamut of interests and it is we who have interacted with the corporations, foundations, and government agencies that have funded our work. It is we who are responsible for the survival of academia, and we who are most sensitive to the forces that threaten its survival. We call upon the faculty chair to begin the process.

**Editorial Committee**

**Faculty Meeting**
**April 15, 1992**
**Tentative Agenda**

Motion(s) to revise the Rules of the Faculty pertaining to membership, speaking privileges, and membership on faculty committees
— Professor Vandiver

Report of the Committee on Nominations
— Professor Gyftopoulos

Report of the Edgerton Award Committee
— Professor Oppenheim

Report from the Committee on Academic Responsibility
— Professor Widnall

Student academic responsibility
— Professor Kiang,
Chairman of the
Committee on Discipline

Update on MIT's program to combat sexual harassment
— Professor Keyser

On Governance

# Reflections and Comparisons

*(Thorburn, from Page 1)*

universities). Far more than at institutions of similar academic standing, the administration drives our institutional agenda, establishes educational guidelines, articulates MIT's public and communal identity.

These arrangements are surely an expression of MIT's unique traditions and organizational history, not to be easily dismissed or underestimated. The tradition of individualistic, entrepreneurial researchers, generating their own funding and expecting to be left alone in their laboratories, has been a vast practical and intellectual success at MIT. In such circumstances, it would seem, teachers and researchers, intent on their own work, have on the whole preferred to leave institutional tasks and decisions in the hands of administrators and their appointees. This MIT commitment to individual initiative is reflected even in our unusual geography, in a campus whose physical layout accommodates labs and research facilities some of which have only an ancillary connection to the Institute's teaching mission.

But there are costs in such arrangements as well as advantages. In prosperous times the costs may be minimal, but in periods of institutional stress, of increasing competition for scarce resources, the costs may be very serious, impairing or undermining a sense of shared responsibility across faculties, schools and laboratories; inciting selfish and protective tendencies as against an awareness of the common good.

I still recall with a mixture of respect and impatience the vigorous, extended debates we regularly endured at meetings of the Yale College faculty concerning curricular minutiae that would never be brought before the faculty at MIT. There was something excessive, perhaps even trivial in the spectacle of the entire faculty of the College debating the syllabus of a proposed new course — not a major curricular change but merely the introduction of a single new subject in an already established departmental curriculum. But, as I've come increasingly to understand after the fact, there was something inspiring about this spectacle as well.

**Professors of chemistry and physics disputed passionately with professors of history over the introduction of subjects far removed from their own specialties, and matters of policy ranging from admissions standards to grading practices to major questions of institutional structure and direction were routinely debated and decided at faculty meetings.**

Professors of chemistry and physics disputed passionately with professors of history over the introduction of subjects far removed from their own specialties, and matters of policy ranging from admissions standards to grading practices to major questions of institutional structure and direction were routinely debated and decided at faculty meetings.

Several features of Yale's administrative structure reinforced the sense that faculty were responsible not only — not even primarily — for their own individual welfare but for that of the larger community. The dean of the faculty, not an administrative officer, presided at faculty meetings, and the agenda for such meetings was established by a steering committee composed of three senior and three junior faculty members with no ties to the administration and no other administrative responsibilities. Departmental chairs and deans were appointed on a rotating basis, and it was generally assumed that faculty in such posts were serving largely as a duty to their colleagues and would return to teaching and research after a limited tenure as administrators.

The president and his administration were active, at times dominant forces in setting agendas or proposing policy, of course. But the faculty itself often initiated discussion of major questions and always functioned in an independent, quasi-parliamentary role. In general, the governance model was less corporate or top-down than consensual and parliamentary, and the faculty was understood to have a continuing role in establishing and defining the institution's essential priorities.

I don't mean to imply that MIT is devoid of such communal and collegial tendencies. On the contrary, this *Newsletter* is a powerful expression of exactly such energies; and I have heard many colleagues speak about MIT (sometimes at our own faculty meetings!) in ways that underwrite a notion of faculty governance similar to what I've been describing. Nor would I propose that an institution so different from Yale in its history and intellectual orientation as MIT adopt strategies or practices that are alien to it.

But I do want to suggest that the Institute would greatly profit if we could find ways to encourage the faculty to discover and give voice to its own identity as a community of teachers and scholars, distinct from the administration and enabled by a sense of collective responsibility for all students, for colleagues in other disciplines and for the institution as a whole.

## From The Faculty Chair

# Excitement and Reward in the Freshman Year

J. Kim Vandiver

Many faculty, staff, and students have expressed discontent with the freshman year experience. In this article I describe my perception of the most important problems, identify some of the causes, and offer a few possible solutions.

### The Problems

A small fraction of freshmen are quite happy and perform exceedingly well. Another small group (1% to 2%) do abysmally the first term, largely because of the emotional baggage they have brought with them. These students probably don't belong here at this time in their lives. This leaves a large middle class, who midway through the year have learned to grind out problem sets but do not find excitement in the experience. The result is a general malaise and a lack of enthusiasm — quite a change from when they first arrived on campus.

### The Causes

After arriving on campus, the freshmen take a writing test on which roughly one-third perform marginally and one- third fail. They then take a math diagnostic exam which is also disappointing for roughly one-third of the students. By mid-terms, 90% of the students have come to the realization that, for the first time in their academic lives, they are not in the top 10%. By terms' end, many are questioning whether they made the right choice in coming to MIT.

I happen to believe that both the writing and mathematics diagnostic exams are useful instruments which contribute to a better education. Nonetheless, in the short term these tests, coupled with a poor performance on mid-terms, may contribute to the erosion of confidence that many students experience during the first term. I believe that a loss of self-esteem is very difficult for students to regain and contributes unnecessarily to poor performance in subsequent years.

An important point is that today's freshmen arrive with a great variety of preparation and experience, caused in part by the decline of American secondary education. In my opinion the typical high school preparation of students is more abstract and lacking in experience than in decades past. This is in part because mathematics is generally less expensive to teach than science, and computers have become much more accessible than laboratory experiences. I have frequently heard the observation that incoming students have had the appropriate mathematics subjects in high school, but often have difficulty in applying or remembering them. Colleagues also express the belief that many students have a lack of feel for the natural world, and therefore lack intuition that is so helpful in solving, for example, problems in freshman physics.

Another problem is in the lack of opportunities during the freshman year that provide the kind of thrill and satisfaction that students expected to find in science and engineering at MIT. We have gone to great lengths over the years to protect the freshman year from the encroachment of departmental programs. This has the consequence of leaving the freshman year rather empty of subjects which satisfy the desires of freshmen who arrive on campus expecting to be turned on by the MIT science and engineering candy store. One piece of evidence is that students vote with their feet and sign up (often over their advisor's objections) for subjects which satisfy this desire. They are eager to take subjects like 2.70 (Introduction to Design) or 6.001 (Structure and Interpretation of Computer Programs). The argument that they take these to get them under the pass/no record umbrella seems erroneous when you consider the degree to which the students engage these subjects, often at the risk of performing poorly in required subjects.

**In my opinion the typical high school preparation of students is more abstract and lacking in experience than in decades past. This is in part because mathematics is generally less expensive to teach than science, and computers have become much more accessible than laboratory experiences.**

### Possible solutions

A partial solution is to diversify the teaching of the core science subjects to better match the needs of the incoming students. Important steps are being taken to accomplish this. Freshman programs

*(Continued on Next Page)*

## Excitement and Reward in the Freshman Year

*(Vandiver, from preceding Page)*

such as Concourse, ESG, and ISP offer alternative pedagogical styles to about 15% of the freshman class. Innovations in the teaching of mathematics, chemistry, and physics subjects have appeared over the past few years, including the efforts by Prof. Dan Kemp in chemistry, and the 8.01X and 8.02X subjects in physics. Another example is 8.01L, an extended version of 8.01, which would extend through fall term into IAP. The mathematics diagnostic exam appears to have helped students to make better informed subject selections, which, one hopes, will lead to better performance.

**We have gone to great lengths over the years to protect the freshman year from the encroachment of departmental programs. This has the consequence of leaving the freshman year rather empty of subjects which satisfy the desires of freshmen who arrive on campus expecting to be turned on by the MIT science and engineering candy store.**

In addition to innovations in the core science subjects, we need to make available freshman subjects and experiences which are rewarding and perceived as valuable or empowering. 2.70 and 6.001 have these characteristics, but are not appropriate for most freshmen. Two other examples come to mind, which were intended specifically for freshmen and were very successful for the students who took them.

The first was a freshman seminar subject offered by "Doc" Edgerton. In 1972 I was the teaching assistant in the Strobe Lab and was given an up close opportunity to observe Doc's "Let's try it and see" style of teaching. The subject required that the students learn a considerable amount about high-speed photographic techniques and apply them in a friendly laboratory setting. Doc's charisma was certainly part of the allure of the subject, but so was the fact that the class was fun and rewarding. One could learn rather quickly the wizardry behind stopping bullets and other fascinating things. A version of that subject exists today, and many more students wish to enroll than can be accommodated.

The second example was a nine-unit subject entitled Chemistry Demystified. It was conceived by three undergraduate tutors at ESG, the Experimental Study Group, a self-selected program for 50 to 60 freshman each year. The tutors asserted that as freshmen they had been excluded from UROP projects in chemistry and biology, largely because they had no laboratory experience. They set out to design and teach a first-term laboratory subject in chemistry, exclusively for freshmen, so as to overcome this lack of laboratory know-how. This was the beginning of what was to become known as "brown bag chemistry experiments."

The ESG kitchen and common room were taken over weekly by the first group of seven students who took the subject. It was a great success, often enjoyed by the entire ESG community. Discovering the amazing mechanical properties of a giant mixing bowl filled with a mixture of corn starch and water is still very fresh in my mind. What happens when you smash your fist into such a pot of glue? In addition to a weekly experiment, conducted by all the students, each had to complete a term project. At the end of the term the students' oral reports revealed an unexpectedly high level of sophistication and proficiency. With the upper class tutors as their guides, the students had discovered and used some quite sophisticated experimental tools in the laboratories of the Department of Chemistry. The reports also revealed the very high level of enthusiasm that the students had sustained throughout the term. The students learned how to use the system and had fun doing it.

A broad choice of experiences such as Doc's seminar and Chemistry Demystified are an important element of what is missing in the freshman year. Both of these examples have the common qualities of tangible experiences, which are fun, rewarding, and empowering. Experience-based education is fun and need not be entirely laboratory-based. Take a few minutes and read Paul Penfield's article in this issue [Page 11]. He and I would like to promote more opportunities for freshmen in the tradition of Doc's seminar in high-speed photography.

# MIT's Newest Doctoral Program

***Newsletter* Staff**

In its fourth year, the newest doctoral program at MIT has established an enviable record of success. Started in the fall of 1987 by a consortium of faculty in History, the Program in Anthropology/Archaeology, and the Program in Science, Technology, and Society, the new doctoral program is focused on "understanding and evaluating science and technology in historical, socio-cultural, and policy perspectives." With 18 graduate students currently enrolled, and four more expected to be admitted this spring, MIT's program is now competing "nose-to-nose" with older and more established programs in the field.

The intellectual focus of the new doctoral program is on the rapidly expanding field known as "science and technology studies." Observes STS Director Kenneth Keniston, "We find that the simplest way to explain our field to undergraduates at MIT is to point out that while most MIT students **do** science and technology, the STS program aims at helping them **understand** what they are doing." One major area of the field is the history of science and technology, with particular emphasis given at MIT to the history of the last two hundred years. Another major area is the burgeoning field known as "social studies of science and technology," which applies the methods of sociology, anthropology, political science, and other social science disciplines to understanding the contemporary role and status of science and engineering in a modern world. Finally, science and technology policy studies aim at investigating what should be done for, about, and with science and technology in a policy-oriented context.

Because of the growing importance and visibility of science and technology in the modern world, science and technology studies are booming at institutions in America and abroad. Harvard historian of science Gerald Holton estimates a growth rate of ten percent a year as measured by the emergence of new programs and the granting of doctorates in the field. In recent years, new programs have emerged or are being planned at a number of major institutions such as Cornell, RPI, University of California at San Diego, University of Minnesota, Stanford, and Georgia Tech. Other departments that traditionally focus on premodern history of science are increasingly emphasizing modern science and technology, and incorporating into historical studies concepts derived from the social sciences. Currently there are more than 250 programs, departments, consortia, and interdisciplinary committees in American universities and colleges that work in this broad area.

The MIT doctoral program grew out of discussions initiated by the Program in Science, Technology, and Society, founded at MIT in 1977. "MIT, probably the strongest single university in science and engineering in the world, is an obvious place for a strong doctoral program in science and technology studies," says Keniston. "The objects of our studies are all around us, and we benefit from conversations and criticisms from our colleagues in science and engineering."

From its inception, the program has drawn exceptionally able students. The number of applicants has steadily increased since the program's founding, from 17 the first year to more than 60 last year. "We believe we now have more applicants than any other program in our field in the country," says Director of Graduate Studies Merritt Roe Smith of STS, "and we have been fortunate that since the beginning more than eighty percent of the students to whom we have offered admission have accepted our offers and come to MIT."

**The intellectual focus of the new doctoral program is on the rapidly expanding field known as "science and technology studies." Observes STS Director Kenneth Keniston, "We find that the simplest way to explain our field to undergraduates at MIT is to point out that while most MIT students do science and technology, the STS program aims at helping them understand what**

"Last year," Smith noted, "the program's offers of admission were accepted by all five of the top ranked students." Moreover, students in the program have won fellowships from NSF, the Mellon Foundation, and the MacArthur Foundation; others have won competitive MIT awards like the Ida Green Fellowship and the John A. Lyons Fellowship; still others are supported by STS research grants from the Mellon, MacArthur, and Rockefeller Foundations, and the Smithsonian Institute.

The new doctoral program is governed by a steering committee that includes Professor Merritt Roe Smith, Director of Graduate Studies, and Professor Sherry Turkle, STS, as well as the heads of the three participating faculties (Professor Jean Jackson, Anthropology/Archaeology; Professor Kenneth Keniston; Professor Peter Perdue, History Faculty).

## A Short History of *Politically Correct*

*(Perry, from Page 1)*

identities. Officially suspicious of the older generation (Question authority! Don't trust anyone over 30!) these groups saw themselves as discontinuous with past movements: fresh, new, and visionary. In this context, the phrase *politically correct* meant as many different things as the people who used it. Usually marked with quotation marks or italics, it expressed a combination of distrust for party lines of any kind and a simultaneous commitment to whichever dimension of social change that person was working for. Used ironically, satirically, interrogatively, the phrase focused and expressed all the uncertainties about dogmatism and preachiness that these new movements were questioning, including the pieties of the Old Left as well as corporate America and the government.

It probably came into our political vocabulary through translations of Mao Tse-tung's writings, especially in "the little red book" as it was known, *Quotations from Chairman Mao Tse-tung*. Mao used the word "correct" a lot (or rather his translators used it), as in "correct" ideas or "incorrect" ideas. [Mao did not, of course, invent the concept of "correct" ideas. As far back as 1935, Joseph Wood Krutch, in an article "On Academic Freedom" in *The Nation* (April 17, 1935), noted that leftists were beginning to sound more like conservatives in believing that "'correct' opinions," as opposed to debate and conflicting ideas, should be taught in school.] "The only way to settle questions of an ideological nature or controversial issues among the people," wrote Mao — the only way to determine what is *politically correct* — "is by the democratic method, the method of discussion, of criticism, of persuasion and education, and not by the method of coercion or repression." Let a thousand flowers bloom, he advised. In other words, the Maoist position in the little red book was that correct thinking—thinking that would help the new socialist state survive—could be achieved by free speech, contention, and mutual criticism. These three conditions of thought and speech were assumed to entail one another rather than to inhibit one another.

**Although the mainstream press is obviously trying to reconstruct the phrase on a Stalinist "party line" model, there is little evidence of such usage by the Old Left, while there is a great deal of evidence that within the New Left it was frequently used with a double consciousness.**

Whatever we may now think about the sincerity of Mao's message, at the time many took his words at face value. These modern Chinese political apothegms were doubly influential for being read and discussed by two different constituencies in this country: the largely white middle class New Left and a variety of Black political communities. The earliest memories of the term *politically correct* that I have been able to elicit for this historical investigation are the memories of Black friends who remember guilt-tripping others or being guilt-tripped themselves about their dedication to the Black Power movement. To be politically incorrect in the late 60's as a Black person was to be an Uncle Tom, a non-revolutionary, or a sloppy person — a hippie, for instance. Women who stood up to their Black brothers as feminists rather than staying within traditional nurturing female roles were also incorrect.

The first published use of the actual phrase that I have found is in an essay by writer and film-maker Toni Cade (not, as yet, Bambara), "On the Issue of Roles," in the anthology she edited in 1970, *The Black Woman*. She tells about confronting gender prejudice in a class of Black students by reading aloud an anti-feminist paper in which all the references to men and women had been changed to "us" and "them," thus disguising its sexism as racism. "And sure enough everyone reacted to phrases like 'I don't believe in the double standard, but' or 'They're trying to take over' and agreed it was the usual racist shit." When the uproar died down after she revealed her stategem, the point remained, as she put it: "racism and chauvinism are anti-people. And a man cannot be politically correct and a chauvinist too."

When I asked her about this early usage during her recent visit to our campus, she told me another anecdote. The next year, 1971, when she described herself in a biographical note as raising her daughter "to be a correct little sister," people she respected, in particular the poet Audre Lorde, criticized her for the implication that there was a single standard of "correctness" for all time. Lorde urged that each generation has its own context, its own agenda, its own changing political needs.

Almost from the start, then, there was dispute over what *politically correct* thinking was and over its uncritical use as a rhetorical brickbat. The dispute raged among feminists, in the so-called "Sex Wars" — debates about the cultural meaning of pornography and whether or not one could define a*politically correct*

*(Continued on Next Page)*

## A Short History of *Politically Correct*

*(Perry, from preceding page)*

female sexuality.

No doubt, there were some like the young Toni Cade, who used the phrase straight up, without irony or self mockery. But almost as soon as anyone did use it that way, it was picked up and parodied by others, skeptics or individualists worried about dogmatism and sloganeering.

**The attack on the *politically correct* in the universities is an attack on the theory and practice of affirmative action—also a legacy of the 60's and 70's—and of policies oriented to increasing the diversity of students as well as**

The phrase *politically correct* has always been double-edged. No sooner was it invoked as a genuine standard for sociopolitical practice—so that we might live as if the revolution had already happened—than it was mocked as purist, ideologically rigid, and authoritarian. This is corroborated by Maurice Isserman's memory about the phrase in the early 70's, in a recent article in *Tikkun* [Vol. 6, No. 5, July/August 1991]. "It was always used in a tone mocking the pieties of our own insular political counterculture," he writes, "as in 'We **could** stop at McDonald's down the road if you're hungry,' or 'we **could** spend good money to get the television fixed,' etc. — 'but it wouldn't be politically correct.'"

Although the mainstream press is obviously trying to reconstruct the phrase on a Stalinist "party line" model, there is little evidence of such usage by the Old Left, while there is a great deal of evidence that within the New Left it was frequently used with a double consciousness. That the phrase has survived with these self-mocking, ironized meanings is testimony to the self-critical dimension of New Left politics, and to its suspiciousness of all orthodoxy.

Why then, has the phrase suddenly been emblazoned on the pages of *Time* and *Newsweek*? Why have Bush and his administration taken up the cause to discredit, and indeed to silence certain voices in the academic world by labeling them with this old, long since dismantled and ironized cliche?

The attack on the *politically correct* in the universities is an attack on the theory and practice of affirmative action—also a legacy of the 60's and 70's—and of policies oriented to increasing the diversity of students as well as educational materials. Aside from the simple goal of social justice, the cultural, or as some like to say, ideological, aspect of this practice of recruiting women and minority students and faculty to academic institutions has been to reconsider our sense of whose culture is worth studying and knowing: whose history, whose literature, whose customs, whose attitudes, whose self-definitions. This investigation has caused no little excitement in departments of history, literature, psychology, sociology — and even a number of business schools. It has even been asked how disciplines in science and engineering developed as they have developed because white middle-class men constructed them.

Certainly some part of the animus against the *politically correct* has been generated by particular battles waged on these fronts. I would feel better about the campaign to expose the *politically correct* if the campaigners were willing to challenge openly the justice of affirmative action or the intellectual value of attention to societies and traditions other than the Anglo-American, instead of impugning the motives of those advocating such cultural adjustments.

For the stakes are still what they were before 1968, when Martin Luther King was alive and many inside the university and outside it believed that they could change the course of history through the redistribution of power, knowledge, and resources. The appropriation of the New Left's in-joke, its phrase of ironic self-criticism, by Bush and by the popular press, pretending to expose some narrow-minded doctrinaire position, is ludicrous in the face of the worsening economic and political position of women, African-Americans, and other minorities in this country. The findings of MIT economist Paul Krugman, as reported in the March 5 *New York Times*, show that the richest 1% of our population have reaped most of the economic benefits of the decade —60% of all increases in after-tax income for the years 1977-1989 went to those with incomes over $310,000.

Without rehearsing the depressing statistics about unemployment, salary scales, mortality, education levels and the like, let me end by stating that insofar as the accusation of *political correctness* restrains or embarrasses anyone inclined to point out these appalling inequalities, the phrase is now being deployed to do just what its new critics pretend to deplore — that is, to forestall any discussion of the real issues and to silence any but official voices with their own version of the *politically correct.*

# Camera-In-The-Classroom Mixed Results and Images

Stephen Tapscott

Several years ago I was wondering about the power relations in my seminars with upper-level students. For my introductory (lecture) subjects in literature (not at MIT), the hierarchical, vertical pattern of the relation between knowledge and power seemed adequate: the professor lectures, the students listen, take notes, and reproduce the paradigmatic knowledge with minor integrative adjustments, in an exam. I had been having some trouble, however, understanding my relation to a group of students in a different structure, one in which I was asking them to take interpretative risks, and then judging them according to the accuracy of those moves. Imminent judgement seemed to compromise their ability to make the leaps with confidence. This situation seemed the more problematic the more I recognized it occurring among some of the minority students and some of the women students in my classes, more than among white male students.

A colleague with connections to the Danforth Foundation, at that time seriously invested in improving undergraduate education, offered to visit a class to tape-record, and later visually to record, the classroom interactions. I agreed, acting more from a sense of loyalty to the faculty member whose grant involved such procedures than from any faith I had in such technological interventions.

In class, I explained the visit, somewhat euphemistically, a week in advance. On the day of the taping, the students arrived brushed, shaven and clean; I should have been suspicious from the start. During the class session they were helpful, pleasant, energetically compliant, polite to one another. The camera whirred; the class was a nightmare of docility. The very qualities for which I had valued these students—independence, a willingness to ask difficult questions, a resistance to easy answers, even the denotative nature of the silences from the students I was concerned about—melted. I realized that the students had presumed that I was to be judged, somehow, as a result of this "performance"—and that they were trying to be "good students" in order to protect me. In some Heisenbergian way, their eagerness to "help" had falsified the object of study—the classroom interaction. Pure observation was apparently impossible, at first, because of the intrusion of the observing apparatus and because of the mediation of the students' self-consciousness about being filmed. I must admit that even recognizing this impulse among my students changed my relation to the seminar — but still we persevered with the video equipment. It took several visits until the students settled (or un-settled) back into their usual classroom selves. After several visits the image the camera recorded was one I recognized, at least insofar as it reproduced exchanges like those of our usual class conversations.

I still didn't know what to do with these images, however, and spent several weeks puzzling over them. Eventually I badgered a college psychologist to help me to "read" the text of the film in such a way as to understand some of the systemic messages my classroom demeanor was delivering. In the event, what the theorist had to show me was information I was already half-consciously looking for — for instance, about (male?) power-based behavior in the classroom; about the need for the teacher to set discussion questions in such a way as to invite thoughtful responses from both young men whose linguistic patterns were often based in competition and in challenges to authority and from young women whose linguistic patterns were often based in collaboration in negotiation.

These insights weren't news to me as a writer and a reader, but they were new to me as a teacher, experientially; I apparently needed to restructure some of the ways in which I asked questions, for instance, in order to invite collaboration from students who (for personal reasons, or gender-based reasons, or cultural reasons) were not contentious in speech patterns; I needed to find ways to make a seminar less an occasion for enthusiastic attitudinizing by the self-confident student and more a field of on-going possibilities for the reticent student, whose discoveries might or might not take place during the class hour. I had not realized in what ways even the forms of my own body-postures—leaning forward with enthusiasm at the interruptive blurt of insight from certain voluble students—might have the effect of inhibiting more thoughtful students, or those less inclined to challenge the traditional vertical relation of knowledge to classroom-power. In time, these changes in the method of teaching (moving away from the "null-hypothesis" system of proving intellectual claims) influenced also my sense of what materials are appropriate and necessary to teach, especially in literary and cultural-studies seminars; having been videotaped was obviously only one of many such influences.

In important ways these insights should have been available to me without the intervention of the camera. Further, these insights were responses to questions I brought to the encounter with the camera-in-the-classroom; in that sense the questions asked determined the answers provided, because I was predisposed to learn particularly those answers. I did learn from the experience, but I would do it again only (l) if I had a clear sense of what pedagogical questions I needed to have answered, (2) if I could depend on having more than one visit for filming, to avoid the Heisenbergian problem, and (3) if I were absolutely certain that the people offering the mechanical service were also offering the theoretical and pedagogical and psychological services of helping me to interpret the information that the objectifying camera records. ♣

# Freshmen at MIT: "Look Ma, No Hands (On)"

**Paul Penfield, Jr.**

When I was in high school in the 1940's, I was what would be called today an electronics hacker. I built crystal sets and tape recorders, wired a phone in my bedroom, and built a hi-fi before you could buy them. I even bought an old car and rebuilt the engine. Somehow I have to believe that these experiences helped prepare me for what I do today.

This year I read freshman application folders. Not a single folder I read mentioned any particular hands-on experience of this sort, except for one person who was a gardener. The closest thing these days seems to be working on a computer, but there you deal with human-made abstractions, not with the "real thing."

**There is great value in working with your hands on real, tangible objects. Most of us need to root abstract concepts in direct experience. But nowadays electronics projects all involve packaged integrated circuits, and if you've looked under the hood of your car recently, you know why automobile engine hacking is no longer possible. Where can our students pick up this valuable**

There is great value in working with your hands on real, tangible objects. Most of us need to root abstract concepts in direct experience. But nowadays electronics projects all involve packaged integrated circuits, and if you've looked under the hood of your car recently, you know why automobile engine hacking is no longer possible. Where can our students pick up this valuable experience?

From time to time there have been places at MIT with such opportunities. The MIT Hobby Shop serves a useful role, particularly for woodworking projects. The Department of Materials Science and Engineering runs glass-blowing and blacksmithing labs. At various times such activities as the Tech Model Railroad Club have helped. Some first-year programs such as ESG and ISP have also had heavy hands-on experience.

Perhaps the premier example of an MIT faculty member with this attitude was Harold E. “Doc” Edgerton. Right up until his death two years ago, Doc was deeply involved in the running of the Strobe Lab. Students who wandered in were put to work on a variety of projects, including preparing and testing instruments for some of Doc's famous expeditions. Doc's easy-going, straight-to-the-point style, emphasizing doing rather than theorizing, appealed to many and made him an outstanding educator. Today the Strobe Lab, under Charlie Miller, continues to offer this type of experience with stroboscopic light.

But Doc's influence on MIT was, I believe, more than his particular technology. Technologies come and go. What was appropriate for university research decades ago may not be so today. Doc’s real strength was timeless: his style.

Surely there must be faculty at MIT today who appreciate and carry on this style. Who are they? We need them. Today's freshmen have not had the same kind of hands-on experience many of us had decades ago. As the practice of engineering and the frontiers of science have advanced, layers of abstraction have been added. Many of these layers have migrated down into the undergraduate curriculum, displacing the very hands-on material our students need more and more.

The freshman year is probably the right time for this kind of activity. In later years, students are absorbed in studying their major subjects, and it is unlikely that most departments would consider hands-on experience to be as important as the fundamentals of their own discipline.

What should we do? Should we have a heavy laboratory component in, say, 8.01 and 8.02? Should a set of experiences be made available and strongly promoted during IAP? Should we establish a facility similar to the Hobby Shop that emphasizes other crafts? I don't know. But I do know that many of our students are not getting the best education they could because they lack the "physical feel" needed to appreciate modern science and engineering. And I know we should do something about it.

What is holding us back? I am convinced that what is really missing is a small group of faculty who think that doing this would be the most exciting way of spending the next few years of their lives. If such a group came up with some good ideas, I believe that money could be found to support them. I also think that space could be found to house the activity, and the necessary curricular approvals could be obtained. In other words, lack of money and lack of space are not problems. The problem is lack of faculty interest and enthusiasm.

Got some ideas? Kim Vandiver and I would like to hear them. Applications are available in his office. First come, first served, the line forms at the rear.✤

## On Teaching

# Reviving An Innovation
# Part Two: Concentrated Study

John G. King

Edwin Land, inventor of Polaroid, the product, and founder of Polaroid, the company, had many connections with MIT and MIT people. In his speech "Generation of Greatness," given at the ninth Arthur Dehon Little Memorial lecture in May 1957, he described the kind of education that he would have liked to have had, and, since he had been talking to MIT students for two weeks beforehand, the kind of education he sensed they wanted.

Among other comments, Land made three proposals. First, that there be "ushers" — one for each group of 20, 10 freshmen and 10 sophomores. The usher would be "a scholar who has a warm feeling for teaching, has succeeded enough in his field so that he is emerging from the fast-flowing part of the stream of his career, past the exciting rocks and chasms of his earlier years, and entering onto the pleasant, broad part of the river where he can relax a bit." So the usher advises about reading, courses, professors, lectures, and starts the student on a personal project.

Second, Land proposed that each student should undertake a personal project, a piece of original research. This clearly can't be at the forefront of an established field where long apprenticeship is required, but would be an exploration of some interesting and likely arcane topic where the process of research can be experienced. As Land says (with the unconscious sexism of the times) "A contemporary man who has not participated in actual work in science is, in my opinion, not a modern man. I believe that this experience in science should come early in the life of all of our pupils."

Last, he proposed that inspired lectures full of fresh insights should be preserved on film in an extensive and accessible library. "With the movie we can capture the excitement, as well as the substance of the best lectures. The lecturer...can devote himself to what he is excited about this year; to the new discovery,... to a fresh statement about an extensive new area."

This talk, extreme as it may have been, asserted the need in university education for freedom, for exploration of the unknown, and for the fostering of individual talent, in some contrast to other needs which we at MIT satisfy admirably; the structured study of what is known, and often the mastery of the "hidden curriculum" of how most efficiently to juggle multiple commitments one way or another.

In the last issue of this *Newsletter* (Vol. IV, No. 4) I offered two innovative teaching techniques that I have found useful and feel could be successfully implemented at MIT. The first, Corridor Lab, was described in detail. I would now like to go into greater depth concerning the second, Concentrated Study (COS), another way of getting at the problem of freshman anomie, or how to find "ushers."

Concentrated Study is a way for one teacher to present a single subject in twenty working days to twenty students who have no other academic commitment. There is experimental work and lecture/seminar in the morning, and hour-long discussions between the teacher and pairs of students in the afternoon. There is homework, a test, and a final. The students are made aware of the powerful value of unbroken time and get to see the subject and the mind of the teacher up close; the teacher gets to work very hard and very closely with our super students and then has two months free of the fragmented MWF teaching schedule.

Concentrated Study is a way for one teacher to present a single subject in twenty working days to twenty students who have no other academic commitment. There is experimental work and lecture/seminar in the morning, and hour-long discussions between the teacher and pairs of students in the afternoon. There is homework, a test, and a final.

This is an OK short description, and since I don't have time or space to give a full account of my experiences with COS, which are certainly the richest and most complex and intense teaching experiences I've ever had, I'll simply explain how and where it was done, what we know about it, and what might be done.

On June 3, 1968, after a long period of convincing the Committee on Educational Policy that this educational

*(Continued on Next Page)*

## Reviving An Innovation: Concentrated Study

*(King, from preceding page)*

experiment should be tried, and with support from the Physics Department, 20 first-year student volunteers assembled in 4-317 to take 8.03TS, Vibrations and Waves in COS. From 9:00 until 10:30 they worked in partnerships of two, beginning by learning to use a cathode ray oscilloscope. After a break (free Coca Cola) we sat around a table and talked until noon.

At first I lectured, but after a few days there started to be more general discussion of the material being studied. Since we met daily, topics not fully explored in one session could be taken up the next time, and since the students had no other subject, they thought about 8.03 in the time between meetings. In this first trial, two-thirds of the students lived in Random Hall, and we learned that prolonged discussions about the subject went on until late in the evening.

Starting at 1:00 each afternoon, I had four one-hour interviews with four different partnerships of two students each. We talked about the weather, their homes, their interests, homework, science, careers, etc. We wrote in our squared-paper spiral notebooks, and were seated in such a way that each could see what was written in a free and open way.

This routine was varied by two morning lectures by visitors, and by two field trips, to the Cambridge Electron Accelerator and to the Haystack Observatory. On the last day there was a small celebration; I was even presented with a plaque!

I tried COS at MIT two more times: 8.04 in February, 1970; 8.03 in September, 1971 (18.03 and 2.00 were also offered in COS that fall). Margaret MacVicar taught 8.02 in COS in 1972. I also traveled to Rust College in Holly Springs, Mississippi, with a van-load of apparatus during IAP of 1974 and 1975 to teach a version of 8.01. The close contact with students there, with far poorer preparation than MIT students, taught me a lot about the need for careful explanation of fundamentals often taken for granted.

I found all these COS experiences stimulating, as did the great majority of the students. True, we only "covered" about three-fourths of the material, but the COS students (a representative group in terms of choice of course and ability as measured by GPA) did about as many problems and did about as well on the test and exam as their colleagues in the regular subject.

And what about COS at MIT now? I believe the numbers can't be changed much: 20 students, 10 partnerships, 20 working days, an introductory subject with contrasting but complementary parts (e.g., theory and practice), one hour interviews with two students at a time; each of these numerical choices has an important influence on the whole operation. Notice also that besides instruction of the head and hands, the heart is also instructed through epic tales of scientific heroes and villains wrestling with nature and each other. Many students crave the kind of attention they could get in COS (and UROP, and seminars) but many want a contractual relationship: I pay, pass the tests, you give the degree, I get a job — nothing wrong with that. Likewise some faculty enjoy close contact with smart young people, whereas others only want an ax-grinding relationship.

I believe that MIT should try to make the COS experience available to those wishing it, but it is hard to envision how to start such a program. I quote some suggestions from M.R. Parlett's "Concentrated Study in Retrospect," an unpublished report based on his observations and experience of COS subjects. "(1) The system [COS] needs to be explained and publicized. (2) As with the launching of UROP, administrative encouragement and ingenuity would be called for to find ways of organizing such courses, since they run counter to the prevailing scheduling assumptions and administrative mechanisms, and can easily be dismissed as 'impractical' regardless of the likely educational merits. (3) Realistic incentives would need to be offered for interested and suitable faculty to make the effort that doing anything for the first time requires."

Nowadays, a great deal of class time could be better spent by students studying on their own or in small groups. They would need some pacing scheme, possibly with interactive computers. Contact would then come through relatively infrequent, inspired demonstration lectures, through e-mail, and through the opportunities for close intellectual association (over a long enough time to overcome the barriers of diffidence and age) that are provided by COS and other innovative teaching schemes to provide some approximation of the ushers envisaged by Edwin Land so long ago. ✥

### Please Write

The *MIT Faculty Newsletter* welcomes articles on any subject of interest to the MIT community.

Send your submissions to ***MIT Faculty Newsletter,* 38-160;** or by FAX at **617-253-0458;** or by E-Mail to **FNL@ ZEISS.MIT.EDU.**

# Lecturing Heuristics

**Patrick H. Winston**

A handful of heuristics makes it possible to improve lectures, make better presentations, and survive oral exams. This is a list of my favorites.

**Preliminary Planning**

Get a feel for what is coming. Find out how many people there will be and how much they know. Find out who has talked before if you are part of a series. Look at the hall. Arrange for a room that will be comfortably crowded. Near-empty rooms suggest unexpectedly and embarrassingly low attendance. Those who are there will think that those who are not are having more fun.

Realize that the nature of an audience changes with its size. With fewer than 20 people, discussion is possible. With more than 50, a performance is expected, and an audience can turn vicious if it does not get one. Start your career teaching to small classes.

Realize further that your mood may be determined by only a few people. A smiling nodder will make you feel good, and you will do better. People reading newspapers will make you feel bad, and you will do worse. Do not permit people to do things that make you feel bad.

Schedule the talk for 11 a.m. Most people are awake by then and few have gone back to sleep. Just after lunch is the worst time to talk — a few people are bound to go to sleep no matter what, thus depressing you. Late afternoon is also bad since some people will be running out of gas and others will be itchy to get off to some squash game or something. Never speak after dinner unless your talk is strictly joke and astonishment oriented.

Realize that a lecture has these parts: the menu, the hors d'oeuvre, the entree, the dessert.

**The Menu**

It is hard to get a lecture started and stopped smoothly. In starting, the problem is to attract attention and get people quiet. If you just start talking, your first words will be lost, annoyingly. Start by writing a few words of outline on the board. This both gets things started and provides an outline to refer to during the rest of the talk.

Never start with a joke. People are looking for their pencils and getting accustomed to your voice. Jokes always seem to do poorly in the first few minutes.

**Look at the hall. Arrange for a room that will be comfortably crowded. Near-empty rooms suggest unexpectedly and embarrassingly low attendance. Those who are there will think that those who**

**The Hors D'oeuvre**

Present a carrot immediately and be excited by it. Tell the audience what great things they will understand or know how to do as a result of your talk.

Focus. It is best to have a central, exciting concept. Relate the central, exciting concept of the day to some cosmic truth.

**The Entree**

Cycle over the difficult ideas. Give a one-paragraph overview. State the theory. Show an example. Work a problem. Give a one-paragraph review. Realize that 20% or more of the audience at any given time are thinking about something else.

Use verbal punctuation to help people follow your argument. "This is a bad representation for three reasons: first, it makes nothing explicit ...; second, it is a bad representation because ...; and third ...." Kennedy used verbal punctuation effectively in the 1960 debates with Nixon even though he numbered his points "One..., two..., two...."

Use examples, analogies, and exceptions to delineate the concept. "This is an arch; this is not an arch; this is almost an arch...."

Ask real and rhetorical questions to keep people's brains actively engaged.

Suggest a simple experiment with a curious, unexpected result. Make it fun for people to talk about your stuff. "Look at the full moon. Note that it seems flat."

Have an eccentricity. Make it fun for people to talk about you. Chew tobacco or wear a rope belt. Erase with both hands. Tousle your hair. But note that extreme eccentricity is bad form for younger people. Something cute and endearing in an elderly full professor may be pretentious in a youthful assistant professor.

Cultivate gestures. Point at the board a lot. This may be good even if the things you point at are unrelated to what you are saying.

Look people in the eye. Find the person that likes the stuff and look at him often. This establishes that you are not a videotape.

Be with the people. Walk toward and away from the audience as well as left and right to help break down the implied barrier. Avoid rooms with a platform.

Deflect obstructionists. Tell them you will deal with their question after class because it is a detail, tangential, has a long answer, has already been explained, or you have to think about it. In any event, do not annoy the others by getting sidetracked into something.

*(Continued on Next Page)*

## Lecturing Heuristics

*(Winston, from preceding Page)*

**Props**

Use props. If you are talking about vision, show pictures. If you are talking about force sensors bring one. Take along a few blocks if your talk is about the blocks world. Unroll a giant check-plot of an IC if you have been working on design aids.

Drink coffee. You need something to do occasionally when you want to stop and think. Pipes are out these days.

**The Board**

Practice board work. Neat drawings, particularly in color, create the impression that the lecturer cares. Use color. Care.

Make lists. Have the audience help.

**The Viewgraph Projector**

Decide what you want to say on a transparency and say less. Avoid small print that no one can read. You are speaking, so there should be little or nothing to read anyway.

Hand them out. If you rely on transparencies to carry the lecture along, hand out copies in the beginning. They go by too fast to take notes.

Never read a transparency. Reading a transparency will drive about 20% of your audience nuts. Paraphrase instead.

Never cover up part of a transparency. The cover up technique will drive about 10% of your audience nuts. Use overlays instead.

Stand near the projected image. Do not force viewers to divide their attention.

Do not let anyone darken the room. The darker it gets, the less alert people will be.

Prepare drawings carefully. Neat drawings, particularly in color, create the impression that the lecturer cares. Use color. Care.

**Have an eccentricity. Make it fun for people to talk about you. Chew tobacco or wear a rope belt. Erase with both hands. Tousle your hair. But note that extreme eccentricity is bad form for younger people. Something cute and endearing in an elderly full professor may be pretentious in**

Repeat important points.

**Videotapes, Movies, and Slides**

Avoid videotapes, movies, and slides until the end. For these you must darken the room and this will put some people to sleep, never to waken until it is time to march out.

**The Dessert**

Do not talk more than an hour. This is the attention span most people have been trained for. If you must speak a little longer, say so in the beginning so people can pace themselves. Take a break in the middle if you must speak more than a little longer than an hour.

Stop when you are done. Do not babble on if you have nothing to say.

Top things out. Observe that the promised understanding or procedure has been delivered.

Show a movie. Mention early that it is coming so that people will have something to look forward to.

Tell a joke.

Hand out the gifts. This is the time to distribute papers, so that people cannot fidget with them while you are talking. There are obvious exceptions.

It is hard to end a lecture. Previewing the next lecture always seems to lose — people start dashing for the door like lemmings rushing for the sea. ♣

• • • • • • • • • • • •

# *Letters*

To The Faculty Newsletter:

Several people have raised the question of why there were no women among the inaugural group of Margaret MacVicar Faculty Fellows. Some have also asked why this year's Fellows all came from the Schools of Engineering and Science.

First, let me say that I am confident that this first group is one which Margaret would have been proud to be associated with—indeed, she knew and had worked with most of them over the years. They are a remarkable set of teachers.

As to the process, we sought and received nominations from every member of the MIT community: students, faculty, and staff. I then convened a committee of faculty and students, men and women from across the Institute, who reviewed all the nominations and made recommendations to me regarding the selection of this year's Fellows. That the first group consisted entirely of men reflected the fact that most of the nominations were for men, most of whom were from the Schools of Engineering and Science. The objective was not to achieve a group representative of our demographics, but to honor the very best undergraduate educators among the nominees.

I have every hope that next fall more members of the MIT community will participate in the nominations process, and that the nominations will include more women and more faculty from the Schools of Architecture and Planning, Management, and Humanities and Social Science.

**Mark S. Wrighton**
**Provost**

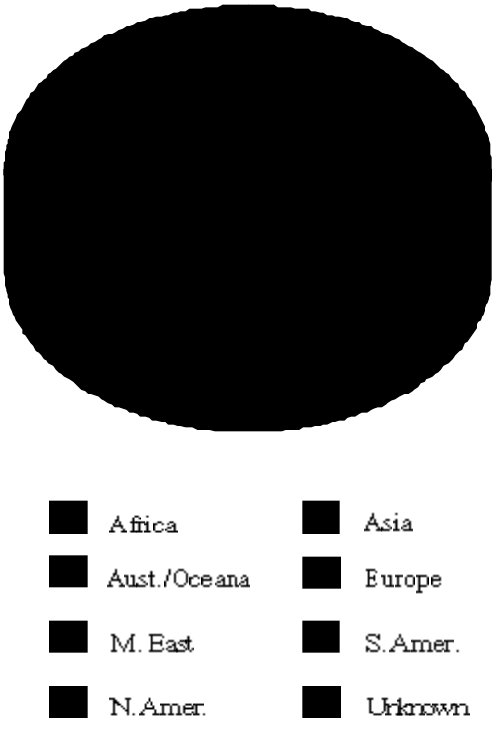
# M.I.T. Numbers

## International Visitors*

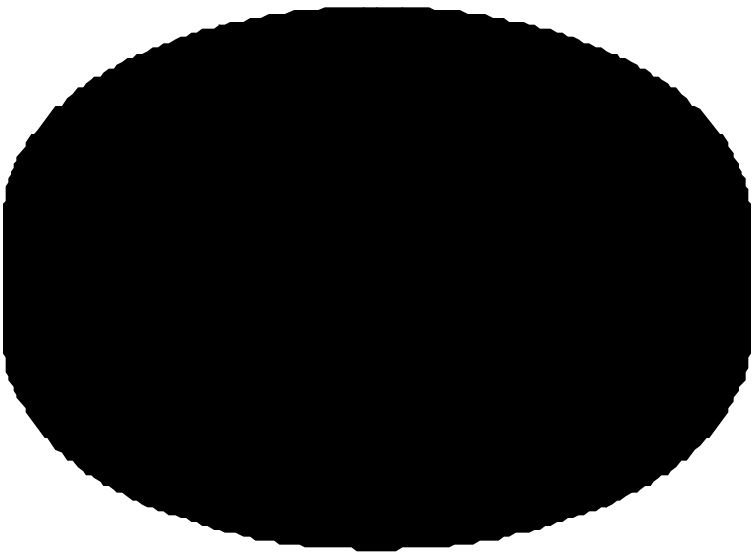
| | FY 1970 | FY 1975 | FY 1980 | FY 1985 | FY 1990 |
|---|---|---|---|---|---|
| Africa | 8 | 8 | 15 | 13 | 18 |
| Asia | 84 | 145 | 282 | 422 | 580 |
| Australia/Oceana | 23 | 19 | 37 | 31 | 21 |
| Europe | 217 | 249 | 425 | 533 | 660 |
| Middle East | 42 | 57 | 91 | 139 | 117 |
| Central America | 3 | 6 | 3 | 3 | 5 |
| South America | 15 | 22 | 49 | 44 | 61 |
| North America | 36 | 50 | 71 | 100 | 100 |
| Unknown or Not Available | 6 | 4 | 0 | 5 | 5 |
| **Total** | **434** | **560** | **973** | **1,290** | **1,567** |

*International visitors are individuals who have been sponsored and appointed by MIT during the course of each fiscal year. The length of stay varies for each visitor. Some are in residence for the entire year; some for only a few weeks.

**FY 1970**




**FY 1990**



**Source:** *MIT Factbook*, June 1991