

# The MIT Faculty Newsletter

Vol. III No. 3

December, 1990

## Provost's Perspective: Issues for the 1990's

Mark S. Wrighton

On Wednesday, October 10, 1990 President Vest asked if I would take on the role of provost in his new administration at MIT. Five days later I moved into the provost's office. My first two months have been filled with a remarkable and stimulating set of new experiences learning about the scholarly and educational ambitions of the faculty and students, while also trying to keep up with the day-to-day responsibilities associated with the administrative functions of the provost's office. The scope and quality of the programs here is most impressive. Unfortunately, the hectic pace of learning has not left much time for the long-term thinking crucial to the provost's office. For this reason, I am grateful to the *Faculty Newsletter* for providing an occasion to think about issues confronting MIT in the 90's.

A shared conviction of the academic community here is that what we choose to do we should do well. My role as the chief academic officer is to help provide the infrastructure within which the students and faculty can realize the maximum fraction of their potential most easily and pleasantly. Further, through collegial interactions and collaborations it is my hope that we can expand the

(Continued On Page 8)

## *The Francis Bitter National Magnet Laboratory: Past, Present, and Future*

Robert G. Griffin

### Part Two

#### **Seitz-Richardson Report and the NHMFL**

In 1970, as a consequence of the Mansfield amendment, the NSF assumed funding responsibility for the Francis Bitter National Magnet Laboratory (FBNML), and the budget began a steady decline to its present level of 30% of the 1970 funds. Thus, despite the continued scientific and technical achievements outlined previously, there were many aspects of the Laboratory which were in need of a significant financial infusion. Further, in the mid 80's the Europeans and Japanese made major commitments to upgrade and expand their magnet laboratories (at Tsubuka (where a new \$100 M lab is under construction), Tokyo, and Sendai in Japan and at Grenoble, France), and thus, U.S. research was in imminent danger of falling significantly behind. Recognizing this problem the NSF assembled a panel of experts, headed by Profs. Fred Seitz (Rockefeller) and Robert C. Richardson (Cornell), to guide the U.S. efforts in this field. The panel was free to recommend anything they saw fit - including termination of all U.S. research in this field.

(Continued On Page 13)

## Editorial

### **The President's Vision**

President Charles M. Vest's remarks in the last issue of this *Newsletter* provide us with a vision for transition to the next millennium under his stewardship.

The vision he projects is one that all of us can enthusiastically embrace. It is intellectually rich, stimulating and consistent with the forward-looking tradition established by his distinguished predecessors. If properly implemented, it will help to assure that MIT remains a leading center of research and education in the increasingly integrated global community that is emerging.

Chuck Vest deserves our thanks and applause for pointing the way, but he also needs broad-based faculty input and cooperation in order to effect the changes within MIT that are needed in order to transform vision into reality. In particular, he invites us to join with him in defining "what we want MIT to be a decade hence and begin taking the action necessary to realize that definition."

We believe that many members of the MIT community join us in welcoming this invitation, and we know we speak for the faculty as a whole in saying that we look forward to working together with him, and with the rest of the

(Continued On Page 3)

**From The Faculty Chair - Page 5**  
**The Francis Bitter National Magnet Lab - Page 7**  
**Macho Madness in the Middle East - Page 9**  
**Reflections of a Recent Provost - Page 11**

**Table of Contents - Page 2**

## MIT Faculty Newsletter

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

## Table of Contents

Provost's Perspective: Issues for the 1990's	1
The Francis Bitter National Magnet Laboratory: Past, Present, and Future	1
<u>Editorial</u> The President's Vision	1
<u>From The Faculty Chair</u> Plans for the Chronologically Advantaged	5
<u>Context Support Office</u> IAP Activities For Faculty	6
FIRP Activities	6
<u>Reflections</u> The Francis Bitter National Magnet Laboratory	7
Macho Madness in the Middle East	9
Reflections of a Recent Provost	11
<u>An Open Letter to the Faculty</u> Improving Student Representation on Institute Committees	12
Letters	14

List of Authors for this issue - Page 4.

## Editorial

### The President's Vision

(Continued From Page 1)

community, to make MIT an even better place to live and work and study.

In effect, our new president has invited us to speak out freely and to engage with him in an exchange of ideas about the future of MIT. Taking him at his word, and with a view toward advancing a process that we see as long overdue, we here single out for discussion two specific aspects of the rich vision that Chuck Vest has presented to us, and conclude with a single specific constructive suggestion regarding implementation.

#### Changing World/Emerging Challenges

Perhaps the most certain thing that can be said about the decade ahead is that it will be a period of far-reaching and rapid changes both globally and locally. We agree with President Vest that "MIT is blessed in abundance with the ingredients necessary for continued excellence as a university." In this connection, he mentions: "bright and creative students; a faculty and environment that encourages - indeed demands - intellectual excellence of the highest order; and a community that can face difficult problems thoughtfully, responsibly, and forthrightly."

Given the depth and scope of the many challenges presently confronting us, and given the refractoriness to fundamental internal change that is a notorious hallmark of academic institutions, it is the last of these three ingredients that strikes us as most problematic. It is also the most fundamental. Let us therefore address it first.

It is not a matter of serious dispute that substantial internal changes will have to occur if MIT is to retain and extend its preeminence in scholarship and education in the face of changing external realities. In effect, we have no real choice but to do, both individually

and collectively, what must be done in order to begin to come more effectively to grips with at least some of "the fundamental issues facing humankind."

As President Vest tells us, one of the things we must learn to do differently and better is "to work cooperatively with other sectors of our society." We wholeheartedly agree. New cooperative

**...something must be done without delay to make the MIT environment less fiercely internally competitive and a generally more humane place to live and work and study.**

external arrangements must be created and implemented if we hope and expect to make a meaningful contribution to the resolution of the local and global problems that we face.

However, as a wise saying has it: "Home is where one starts from." And this brings us to the second aspect of the vision that we want to address.

#### Students, Faculty, and Environment

Granted, our students are intellectually outstanding, highly motivated and hard working. We are not bad either.

Nevertheless, as everyone is aware, MIT is not doing as good a job as it might when it comes to attracting or retaining students and faculty. One reason for this - the main reason perhaps - is that there is something not quite right about an academic environment where IHTFP doesn't mean "I have truly found paradise," where students routinely liken learning to "trying to get a drink of water from a fire hose," and where the single most common

institutional descriptor says simply: TECH is HELL.

As our former president, Paul Gray, and others among us have so often insisted, and as so many officially authorized studies, reports, and pronouncements have proclaimed, something must be done without delay to make the MIT environment less fiercely internally competitive and a generally more humane place to live and work and study.

We do not at all mean to minimize the problems of implementation that this will entail. At very least, many aspects of our academic structure and mode of administrative organization will have to be reconsidered, along with the present state of faculty/student/administration/staff relations. But problems of implementation should not delay the taking of steps that can be taken, for example, to renew and maintain the dynamism of a faculty that has been the intellectual "backbone" of MIT. For instance, the new administration already has before it an **Open Letter to President Vest** (*MIT Faculty Newsletter*, Vol. III, No. 2) concerning the need for a creative institutional response to some of the changing realities of family life and work life faced by all who work and study here. An expeditiously supportive response would go a long way toward helping to shape a more sustainable future for the Institute.

#### Implementation

Everything that has been said thus far points to the need for a renewal of our sense of ourselves as a community within a larger community that it is our collective responsibility to serve. But how realistic is it to hope (or expect) that MIT will be able to work more cooperatively with other sectors of society unless or until we learn to work more cooperatively with each other within the MIT

(Continued On Page 4)

## The President's Vision

(Continued From Page 3)

community?

As we approach the coming millennium, it becomes virtually axiomatic that those of us - students, faculty, and members of the administration - who sincerely aspire to contribute constructively to the sustainable resolution of human problems of broad scope and great urgency must first of all begin to overcome the many and varied barriers that have heretofore so effectively prevented us from working together more closely.

One of those barriers is made up of the numerous bad experiences many faculty members have had with past efforts to rethink priorities and restructure policies and programs at MIT. Many of us have had good reasons to feel unfairly excluded from participation in deliberations/decisions to which we felt ourselves capable of making meaningful contributions; some have participated in such activities only to be disappointed, in the end, by failure at the point of implementation. Over the past decades there have been many committees and commissions whose

efforts have ended thusly.

Unless indications are forthcoming that things will be different, those who have had such experiences will understandably hesitate to become involved in the process to which President Vest now calls us.

We sincerely hope that MIT is on the verge of a great renewal of purpose. But, in order to be in a better position to decide for ourselves where we stand, individually and collectively, we first need to know more about President Vest's vision than he has thus far allowed us to see. And we need to learn more from him about his intentions regarding implementation. We thus await with great interest his response to the aforementioned **Open Letter**, and look forward to hearing how he proposes to implement his idea of us all working together "to define what we want MIT to be a decade hence and to begin taking actions necessary to realize that definition."

Hello Chuck. Welcome aboard, Mr. 15th MIT President. Pawn to king four; your move.

**Editorial Committee**

### Next Issue

As the new semester and the new year get underway, the next issue of the *MIT Faculty Newsletter* will feature commentary on what's next for MIT.

Taking our cue from President Vest's vision of the future of the Institute, articles will focus on issues such as junior faculty (questions of tenure, recruiting), selecting students (qualifications and qualities), MIT as a global versus a national institution, the issue of fund raising, and others.

We encourage submissions on topics such as these, or on any subject of interest or concern to the MIT faculty and the Institute.

Please send all pieces to: *MIT Faculty Newsletter*, 38-160, or to any member of the Editorial Board. And don't forget our electronic mail address: **FNL@ZEISS.MIT.EDU**.

And a happy and healthy holiday season to all!

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### Authors

**A. Douglas Carmichael** is Professor, Ocean Engineering.

**Stephan Chorover** is Professor, Brain & Cognitive Sciences.

**John Deutch** is Institute Professor.

**Robert G. Griffin** is Professor of Chemistry; Associate Director, Francis Bitter National Magnet Laboratory.

**Maureen A. Horgan** is Program Administrator, Provost's Office.

**Henry D. Jacoby** is Professor, School of Management; Chair of the Faculty.

**Benjamin Lax** is Professor Emeritus, Physics; Director Emeritus, Francis Bitter National Magnet Laboratory.

**Mark S. Wrighton** is Provost; Professor of Chemistry.

**FROM THE FACULTY CHAIR****Plans for the Chronologically Advantaged**

Henry D. Jacoby

As of 31 December 1993 it is likely that universities will join most of the rest of society under federal law: we will no longer be allowed to impose a mandatory retirement age for faculty members. The change raises several questions for MIT. Will the removal of a retirement age lead a significant number of faculty to stay on past sixty-five? Past seventy? Past seventy-five? Will we need new procedures for review of faculty performance, to be able to deal with those cases where commitment outlives capacity? And are there changes in the

of most occupations. Research and teaching are activities that one can actually do at advanced years, and scientific curiosity and commitment to students often continue on, even though in some disciplines it may be ever more difficult to keep at the forefront. Also, a few decades of survival at MIT tends to condition most faculty to a life of intensive work, even to the exclusion of other interests, and the prospect of stopping cold can be quite unattractive. Many will delay, avoiding the break.

In the short-term of the 1990's, when

augmentation of the current menu of alternatives with a form of staged retirement. Between ages 65 and 67 a faculty member could elect to enter a half-time arrangement (in full tenured status) if he/she agreed to retire at age 70. During the half-time period, salary would be at half of the full-time level, and retirement contributions would be reduced accordingly. All other benefits would continue as if the person were full-time. Duties during this half-time period would be negotiated between the faculty member and the department head.

The improvements in post-retirement life were not worked out in detail in the Adler-Holland scheme, but their ideas included a new Institute office to provide advice and assistance regarding volunteer activities at MIT and outside, computer access, a social space at the Institute, and some level of access to office space and secretarial services.

These suggestions were not put on the table early enough to be refined and implemented by the previous administration. The question of retirement policy will likely be on the agenda soon, however, because any expansion of the options needs to be accomplished so those facing retirement in the next few years can make plans with the full map of possible paths at hand.

Retirement is not an issue that interests all faculty. But those of us "in the zone," or approaching it, should talk to our colleagues at other universities, think about what we might like to see implemented, and discuss the alternatives among ourselves. Our Faculty Section of the Committee on Faculty-Administration, chaired by Jack Ruina, has a continuing interest in this issue, and I also will be happy to be a channel for ideas anyone wants to propose.

***Research and teaching are activities that one can actually do at advanced years, and scientific curiosity and commitment to students often continue on....a few decades of survival at MIT tends to condition most faculty to a life of intensive work, even to the exclusion of other interests, and the prospect of stopping cold can be quite unattractive.***

retirement options, within the law forbidding discrimination on the basis of age, which can facilitate retirement?

Views differ as to what will happen to patterns of faculty retirement when the constraint is removed. Some people believe that retirement at around sixty-five is deeply ingrained and, so long as retirement plans do not provide a financial incentive to work longer, faculty will retire about as they do now, without being forced. MIT's arrangement now provides less incentive than the standard plan at other universities. In any event, the squeezing of tenured slots for junior faculty will probably occur only in a very few departments at any one time, because of variations in demography, so delayed retirement is not likely to become an Institute-wide issue.

Others worry that, if not pushed, the scholar/teacher is more likely to work on into later years than are the members

MIT turnover will be great, delayed retirements might actually help some departments. But in the longer term, with increasing longevity of individuals and a total faculty component that may be stable at best, delayed retirements could have a severe effect, both financial and intellectual.

No one knows the answer. However in recent years considerable thought has gone into the search for arrangements that might help guard against problems, mainly by thinking of ways to ease the transition and make the life of emeriti more attractive and significant in terms of the continuing relation to the Institute. Last year, on encouragement from the administration, one such plan was developed by Dick Adler of EECS, since tragically lost to the Institute, and Dan Holland, retired professor at Sloan and now senior lecturer. Their idea, called a Half-time Option Plan, involved the

Context Support Office

The Context Support Office is sponsoring five IAP activities this year. Two of these are expressly aimed at the faculty although, of course, everyone is welcome to attend and participate. The first of these targeted activities is strictly utilitarian, a two-hour roundtable discussion on integrating Context into subjects [Wednesday, January 23, 2:00-4:00 PM, Room 10-280]. The object here is to bring together those faculty with some experience in this area with others who would like to begin introducing Contextual material into their classes. There is a wide variety of styles, ranging from setting aside Context blocks or optional out-of-class sessions, to the seamless interweaving of Contextual material into the course. The

**IAP Activities For Faculty**

goal of the roundtable is to discuss the relative efficacy of these methods and the relation between the pedagogical method and the message we send our students.

The second faculty-oriented activity is aimed rather higher. We have planned the first in what we hope will be a series of discussions of The Art of Engineering. The goal here is to understand what we mean by that often-used phrase in sufficient detail that we can explain it to our colleagues who have no idea what we mean and eventually to see how we can teach the art along with the craft. This first symposium will start off with a discussion of the art of engineering in its classic sense, with presentations by Cyril Smith and by David Billington of

Princeton University. Billington has published widely in this area and many of us are familiar with his books.

The afternoon session will begin an inquiry into whether the art of engineering is (or should be) changing in response to modern technical and social changes. Joel Moses will have something to say about this to get the discussion going. This activity will be a true symposium with presentations, discussion, food, and drink (boxed lunches and soft drinks). It will be held in Killian Hall from 9:30 AM to 4:00 PM on Thursday, January 17.

Look out also for our People Mover Contest. Faculty are eligible for the prizes and we may get a real Faculty Club out of this one.

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## *FIRP Activities*

Maureen A. Horgan and A. Douglas Carmichael

The Faculty Instructional Resources Program (FIRP) in the School of Engineering, with help from the Office of the Dean for Undergraduate Education, has been instrumental in organizing two different programs during the past year that focus on the development of teaching skills. The FIRP committee began a program of video feedback for faculty in the School of Engineering and a seminar series on teaching-related topics, both of which had the full support of Dean Gerald Wilson.

Last Spring, FIRP and the Center for Advanced Engineering Study (CAES) worked out a program through which any Engineering faculty member may have his or her class videotaped by the CAES. The tape is given to the faculty member immediately following the class, and a peer review process is available if desired.

Faculty from many different Engineering departments participated in a seminar/discussion series this past term as seminar leaders. Besides imparting some hard-earned knowledge on how to plan, lecture,

and integrate design and contextual topics into engineering education, they fielded some intense questions on the role of teaching in the promotion and tenure process, and departmental expectations of junior faculty.

The goal of the seminars was to offer some "how to" advice on various teaching-related topics, and to foster discussion on the role and process of teaching in the School of Engineering. Professors Donald Sadoway, Ed Crawley, Lawrence Lidsky, August Witt, Preetinder Virk, Kim Vandiver, Nam Suh, Harry West, and Roger Kamm participated as seminar speakers. Attendees included junior and senior faculty members, graduate students, library staff, and others.

Each session consisted of a short presentation on techniques and/or philosophies of teaching, followed by open discussion. Many questions were asked, both on the material covered and on cultural attitudes toward teaching and learning at MIT.

Junior faculty expressed concern about

whether the signals they are receiving regarding the apparent increased emphasis on teaching in the promotion and tenure process are real, concern that they will not be "caught in the middle" - that is, taking the message to heart and developing a balance between teaching and research allowing for excellence in both areas, and then being evaluated by a committee that focuses primarily on research contributions.

Graduate students spoke of the need to start the process of learning to teach sooner. Many who are working at MIT as research assistants would welcome the chance to gain some teaching experience, even if only for a limited number of hours. Facing a classroom for the first time when one is a newly-hired junior faculty member is not a welcomed experience.

Professor Patrick Winston will present an IAP seminar entitled "How To Lecture" on Tuesday, January 29 at 11:00 AM in Room 6-120.

Classroom videotaping for feedback on teaching skills is also available. Contact CAES, x3-7603, for more information.

Reflections**The Francis Bitter National Magnet Laboratory**

Benjamin Lax

**Part Two****Politics and Problems**

The seventies ushered in a new era in the history of the Magnet Laboratory. Political events, such as Sputnik, had given birth to the Laboratory, and now political events (the Mansfield Amendment) altered its fortunes. Specifically, Mansfield contended that the Air Force had no business supporting a basic research facility and demanded its divesture. Funding for the laboratory was then transferred to the NSF, but not before a cutback from \$2.5 million to \$2 million. Fortunately, we had some outside contracts to cushion the blow. We cut back research, which was already shrinking some due to inflation. But, this change of sponsors did give us a new opportunity.

When we first proposed the laboratory to the Air Force, we specifically cited high field plasma fusion as one of our goals. The Air Force insisted that we remove this objective from the proposal since it was the province of the AEC (now the DOE). In spite of this, when we built the laboratory, we installed two giant flywheels and designed the motor generator set to deliver 30 megawatts for a minute or so - we had fusion in mind. When Dr. Artsimovich (inventor of the tokamak) from the Soviet Union lectured in 1969 about the tokamaks, we conceived a project which evolved into the successful Alcator program and ultimately led to the creation of the Plasma Fusion Center.

We also started a laser plasma program using high fields, led by me and Daniel Cohn. Ironically, this was supported by the Air Force, and it led to the laser diagnostic program in support of Alcator. We also initiated a major program in high field NMR under the leadership of Leo Neuringer, which had a strong scientific component, with student participation under Bob Griffin. Spin polarized tunneling in high field in

superconductors was demonstrated by Meservey and Tedrow. Nonlinear optics and magneto-optics was begun by Aggarwal and myself. The study of atomic spectroscopy with lasers in high field by student Mike Rosenbluh led to the discovery of motional Stark effect.

A number of difficulties arose under NSF sponsorship. A greater emphasis was placed on the facility aspect of the Laboratory and magnet development, at the expense of internal scientific research and personnel. At the same time, the MIT administration desired

less and less.”]

Only outside research contracts from other agencies allowed the maintenance of a decent research level and student support. The magnet technology program prospered from the Alcator project, the MHD (magneto hydrodynamic) program, the Nuymegen hybrid project, and the NIH NMR program. We managed to achieve a level of competence in high field technology unequalled anywhere. Unfortunately, this disintegrated in 1980 with the Reagan cancellation of the

**A number of difficulties arose under NSF sponsorship. A greater emphasis was placed on the facility aspect of the Laboratory and magnet development, at the expense of internal scientific research and personnel....The NSF also wanted MIT faculty, but with primary financial support from MIT.**

more faculty participation, presumably with NSF support of their research, from the core contract. The NSF also wanted MIT faculty, but with primary financial support from MIT.

These conflicting demands could not be resolved. NSF insistence on greater use by outsiders and the attendant cost as a primary user facility at level funding, precluded the Magnet Laboratory from becoming simultaneously an MIT academic laboratory and a national facility as well. These contradictory demands in the face of a diminishing research component and the double burden of rising inflation and inadequate funding hurt the laboratory. [During a meeting of the National Academy of Sciences in Washington, I complained to Guyford Stever, the director of NSF. His comment was, “you are doing fine.” My comment was, “Yes, your people expect more for

national MHD project and the departure of Alcator to the Plasma Fusion Center which was created circa 1977-78.

A partial list of the scientific accomplishments in the 1980's features the discovery of the fractional quantum Hall effect by a user group from Princeton and Bell Telephone Laboratories. The Buckley prize was awarded for this work. There was building of the highest field hybrid magnet achieving 350 kilogauss; the construction of a pulsed magnet reaching 69 T for milliseconds, a record field time regime (the innovative use of Nb-Cu composite allowed this achievement); and a fiberoptic technique with lasers and optical sources which has enhanced the magneto-optical capabilities, especially for the studies of superlattices and quantum wells in high field magnets.

(Continued On Back Page)

## Provost's Perspective: Issues for the 1990's

(Continued From Page 1)

aggregate potential of individuals and achieve greater educational and research goals as an institution working together. I am privileged to be in my new position and take seriously my role to serve the students and faculty.

MIT's central mission is education and research. We are a research-oriented university with an emphasis on science and engineering, and arguably we are the flagship of this academic community. It has been assumed that we should work toward strong synergism between our formal educational programs and our research activities. Developing an even better coupling of our strength in research with our formal educational objectives is one of my goals.

Additionally, we should continue to build on our special emphasis on science and engineering in the activities of the rest of the Institute. Our five schools can work together to provide a unique educational setting. As an example of our uniqueness, the Sloan School has an especially close relationship with the rest of the institution, in comparison to the business schools at Harvard, Stanford, or Penn.

In another area, our School of Humanities and Social Science contributes subjects in an integrated fashion, interleaving its offerings with science and engineering subjects throughout the undergraduate years of study. This approach is quite different than that used elsewhere to provide a so-called liberal education before a scientific or professional one. The School of Architecture and Planning is engaged with programs involving both Sloan and Engineering. There are opportunities to forge stronger connections among our five schools and there are interesting initiatives underway already.

In order to remain a leader among leaders, we must effectively develop human, financial, and space resources and deal with a large number of internal and external forces facing us and other

research-oriented universities. The human resources of the Institute are remarkably strong now, but the decade ahead promises to be one of great competition. We must aggressively recruit the best students to study here and attract and retain the best faculty. Further, to remain excellent, it is imperative to broaden the participation of women and underrepresented minorities in the academic programs. Those here share the responsibility to help attract and retain outstanding colleagues. Financial and space resources are obviously critical and their prudent deployment will be an essential component of my role as provost.

By any objective measure the financial resources of MIT are considerable. However, the aspirations and ability of faculty and students far outstrip the ability to provide all of their needs. It is clear that another component of my role as provost will be to help set priorities among outstanding proposals, in order to most effectively use what we have. It is important to recognize that we have done well in fostering the development of new areas such as molecular biology, biotechnology, advanced materials, information and communication sciences, and new educational initiatives like the Leaders for Manufacturing program.

Work in areas such as the global environment and telecommunications is being considered and may involve new kinds of working relationships among departments, schools, labs and centers. Doubtless other intellectual revolutions will be taking place and we want to be positioned to lead them.

In connection with resources, the *Campaign for the Future* is an endeavor in which I will participate. This Campaign promises to add to the flexibility to undertake new programs, increase salaries, and enhance our facilities. I am anxious to work with the faculty to help achieve their financial needs for

new programs. We are roughly where we should be to achieve our goal of \$700 million by the summer of 1992, with about \$542 million in pledges and receipts as of December, 1990.

Aside from human and fiscal resources, it is important to realize that other issues need to be addressed. It is evident that we need to do even more in developing partnerships with government, industry, and individuals. The public at large is attentive now and we must work hard to communicate our value to society. Efforts to establish an *appropriate* role for MIT in K-12 education, for example, are important. The United States is looking for leadership in education, research, and innovation, and I am confident that we have the people to provide it.

In concluding, let me provide a little information on personal style and accessibility. First, my e-mail address is [wrighton@eagle.mit.edu](mailto:wrighton@eagle.mit.edu), and I use it regularly. Indeed, many people are discovering that this form of communication can yield a rapid response! Second, I regard myself as a member of the faculty and welcome the opportunity to meet with more members of the community and to hear firsthand about issues and desires. I want to build on the traditions of a close relationship between the faculty and those of us charged to work on their behalf. Third, it is my intent to work with students, faculty, and members of the administration in a team effort.

Doubtless there will be issues ahead that will require decisions which will be difficult. In those cases where the decisions are mine, my pledge is to be mindful of the trust placed in me and my responsibility to the Institute as a whole. Finally, I am thoroughly convinced that MIT will remain a leader among the leading research universities of the world. I am equally convinced that it will not be easy!



## Macho Madness in the Middle East

Stephan L. Chorover

I've never been there, but from what I've been able to glean from a reading of some maps and history books, the sheikhdom (now state) of Kuwait is hardly worth any of us or our children dying for. Indeed, it looks to me like nothing so much as a New Jersey-sized, privately-owned, family oil business with a flag.

The majority of its 2 million inhabitants are barred from all meaningful forms of political participation in Kuwaiti affairs. Moreover, under the Ottoman Empire, Kuwait was a district of Basra Province and thus, with Iraq, ethnically, geographically, and socially part of the same country. In 1899, Britain arbitrarily divided them and ran Kuwait as a crown colony until setting it up in its present form in 1961 - at least partly with the intention of land-locking Iraq and denying it the only portion of its former coastline capable of providing a significant deep water port in the Persian Gulf.

Iraq, for its part, has a population of roughly 18 million. It is about the size of California and includes that portion of the valley of the Tigris and Euphrates known in older literature as Babylonia and Mesopotamia. As such it contains what the history of our culture teaches us to think of as the "cradle" of our civilization. How ironic it is that this particular place becomes the focus of our thoughts as we enter what conceivably may be the most fateful six weeks in human history.

I am choosing my words carefully.

At his news conference on Friday, November 30, President Bush went out of his way to emphasize that the war that he and his men are preparing to wage against Iraq is not going to be "another Vietnam." This, as I take it, was intended to be reassuring. But what it really means (as the Secretary of State's subsequent Senate testimony on Dec. 5 makes clear) is that the U.S. is planning to act much more decisively and to use a much higher level of deadly force in

countering Iraq's annexation of Kuwait than it did in attempting to crush the combined NLF and PRV forces in Vietnam.

What is it all about? Is there no other way out? As Noam Chomsky rightly pointed out in the last issue of this *Newsletter*, we can learn a lot, both about ourselves and about the position of the U.S. in the world today, by paying close attention to the pretexts by which the

Africa, East Timor, and in many other cases, the voting record of the U.S. in the United Nations reveals this country as the single most consistent opponent of U.N. efforts to deal with blatant violations of international law, to protect the environment, and to condemn acts of aggression and invasion.

Saddam's takeover of Kuwait doubtless is a "naked" act of aggression. But is it any more so than, say, Bush's invasion

**If the alleged "high principles" are nonexistent and the defense of Kuwait is not worth a single drop of blood, why are there almost half a million U.S. troops in the Persian Gulf and Saudi Arabia? ...why is our government deploying enough highly-explosive nuclear and non-nuclear ordinance in this area to destroy the whole world several times over?**

President and his men are attempting to justify their evident refusal to consider a negotiated settlement of the present crisis.

Surely the most lofty of these pretexts is that "we are taking a stand on high principle; when you take a stand on high principle, you don't compromise." Included among these supposed principles are such familiar ones as: "territory cannot be acquired by force, aggressors cannot be rewarded, and the threat of use of force in international affairs is intolerable."

As Chomsky makes clear, the historical record belies the claim that the U.S. government is acting on high principle. "You can't uphold principles selectively," notes Chomsky. "And you certainly can't violate a principle systematically. If you do, it's not a principle...." Nevertheless, in respect to Grenada, Central America, the Israeli-occupied territories, Southern

of Panama? Time and time again, the U.S. has vetoed U.N. Security Council resolutions calling on our government to account for its aggressive behavior in Central America. In 1989, a resolution condemning the U.S. invasion of Panama was likewise vetoed. At the time, the only operative "principle" offered in justification was "opposition to outside interference in the inter-American system." Saddam Hussein and others have advanced essentially the same argument about the Iraqi annexation of Kuwait. It is, they say, an Arab matter best left to a regional resolution. To the U.S. government, this argument is unacceptable.

What is going on here? If the alleged "high principles" are nonexistent and the defense of Kuwait is not worth a single drop of blood, why are there almost half a million U.S. troops in the Persian

(Continued On Page 10)

## Macho Madness in the Middle East

(Continued From Page 9)

Gulf and Saudi Arabia? Leaving aside the biological and chemical weaponry stockpiled in readiness on both sides of the line that President Bush claims to have drawn in the sand, why is our government deploying enough highly-explosive nuclear and non-nuclear ordinance in this area to destroy the whole world several times over?

Noam Chomsky explains it in terms of "a long-standing principle of U.S. foreign policy: no independent indigenous force may gain substantial

fifths of the world's net annual production of nonrenewable energy and mineral resources, while the remaining 80 percent of humanity (mostly living in the southern hemisphere) must make do with a mere 20 percent.

Let's make no mistake about it. While George Bush and Saddam Hussein are playing their characteristically male missile-pointing games of "chicken" and "looking each other straight in the eye to see who'll blink first," the future of humanity in the biosphere hangs in the

insane logic by which nonexistent "high principles" are invoked to justify going half way around the globe to bring death and destruction to the cradle of our civilization, and the crazy rationality of justification according to which "it was necessary to destroy the village in order to save it." What will it take for us to learn that this kind of thinking does not suffice to solve human problems of broad scope?

Let's not kid ourselves. The "village" that is in danger of being destroyed in the war that the President and his men are preparing to wage is none other than the planet we inhabit. To look at the military confrontation developing in the Middle East today is to see a general confirmation of the truth contained in a remark that Albert Einstein made about the unleashing of atomic power. It "has changed everything," he said, "save our ways of thinking, and we thus drift toward unparalleled catastrophes." Today, more than ever, "We need a new way of thinking if humanity is to survive."

The choice facing us is clear: either we allow ourselves and our children to be sacrificed, in untold numbers, to the ultimate macho pathology of a war to maintain our addiction to oil, or we start shaking ourselves free of the largely unacknowledged and potentially suicidal patterns of thought that have brought us to this brink. Time is short, to be sure. But it is surely not too late to stop the madness and to begin to kick some of the bankrupt habits of thought that have for so long been associated with our addictive worldview, value system, and lifestyle. There is a new and vibrant anti-war movement rising. Let's make the next six weeks count!

**What is wrong with U.S. military moves in the Middle East is that they are part of a foreign policy absurdly aimed at maintaining an unsustainable domestic lifestyle; one that is outrageously profligate in its commitment to commodity production and consumption.**

influence over the world's energy supplies, which are to be controlled by the U.S. and its clients." But by what right can we presume to preserve, protect, and defend, our privileged access (and that of the rest of the so-called "developed" world) to the planet's diminishing fossil fuel energy supplies and other natural resources?

What is wrong with U.S. military moves in the Middle East is that they are part of a foreign policy absurdly aimed at maintaining an unsustainable domestic lifestyle; one that is outrageously profligate in its commitment to commodity production and consumption. Nor is this lifestyle a purely U.S. phenomenon. As things now stand, it is part of a system of international arrangements whereby one-fifth of the world's population (living mostly in the northern hemisphere) consumes four-

balance. I am not trying to be melodramatic. Indeed, all talk of "high principles" aside, the violence of the war that is about to break out in the Middle East is not likely to be limited to the region in which the U.S. is preparing to fight it. And the chances that war will actually break out are markedly increased by the macho mindsets and jingoistic posturings of this nation's leaders.

Unless we stop it before it starts, the cost of carrying this crazy U.S. policy through to its conclusion will be immeasurable in both human and ecological terms. Are we really so addicted to our compulsively consumptive lifestyle that we are ready, willing and able to sacrifice our children to secure access to the drug that fuels it?

The President says this is not going to be another Vietnam war. But what difference is there, really, between the

**The MIT Initiative For Peace meets Mondays at 7:00 PM in the Stratton Student Center, Room 450. For more information, call 253-4885.**

## *Reflections of a Recent Provost*

John Deutch

The invitation to contribute an article to *The MIT Faculty Newsletter* encouraged me to reflect on issues that I encountered as provost about which I believe the faculty should be more aware. Many candidate issues came immediately to mind: international relationships, government policies toward universities, basic research funding, budget pressures, the growing importance of civility and tolerance in our community and on and on.

I have decided to discuss the issue of academic misconduct for several reasons. First, as the recent Baltimore/Imanishi-Kari case illustrates, there is growing public interest on this subject, much of it based on abject misunderstanding about how science and universities work. I believe this issue will continue to require thoughtful and politically effective responses from the scientific community. Second, it is not widely appreciated that MIT has one or two cases of alleged scientific misconduct each year that are resolved with great expense of time and personal anguish for the individuals involved. The faculty, of course, should understand and support the policies and procedures at MIT that are in place to deal with the few cases which arise. The faculty may also wish to consider changes that will strengthen the importance placed on academic integrity at MIT in order to both minimize the occurrence of misconduct and to better prepare our students and research co-workers for their scholarly careers.

It is unquestionably true that there is growing interest in Congress and in the federal agencies that sponsor research about how grantee institutions respond to cases of alleged academic misconduct. There is particular concern about protection of "whistle blowers" because of a perception, unsupported by any evidence, that universities protect established investigators. In response to Congressional interests, federal agencies have issued regulations requiring that certain procedures are in place to deal with cases of alleged academic misconduct. Certain agencies, for example NIH, have become active in overseeing how well grantee institutions are dealing with specific cases.

In my opinion, the principal responsibility for regulating academic conduct must rest with the university or sponsoring research institution where the research is being conducted. While the government certainly has the authority to regulate scientific conduct in the research it sponsors, I do not believe the government has particular competence to deal effectively with these matters.

However, if this view is to prevail, universities must convince the public and Congress that fair and effective mechanisms are in place in the university system to deal with instances of alleged academic misconduct. This will require that the universities take the necessary steps to assure academic integrity in their institutions. Universities must also describe to the public what they have done in a thorough and convincing manner. This cannot be done in response to a particular controversial case.

I believe it is desirable, as some have suggested, for universities to establish an independent board of leading scholars and administrators that can comment publicly about what makes sense in the regulation of academic misconduct, apart from any specific case. Such a board would also prove useful in constructing model policies and procedures and in providing advice to institutions on the suitability of candidate policies and procedures.

In my view, three steps are required by universities to set their house in order; two of these steps are relatively evident and currently in place at MIT; the third step is less conventional and not currently in place at MIT. First, there must be explicit and clearly understood policies and procedures for dealing with cases of academic misconduct. Second, a record must be compiled to demonstrate that the university can deal with cases of alleged scientific misconduct in a fair and effective manner through a process that protects the rights of both the accused and the accuser.

Third, I have come to believe that an orientation on good research practice should be offered to every student and research worker who comes to MIT. Many

will say that this is unnecessary for the type of individual who is at MIT. Unfortunately, this has not always been my experience. More importantly, many of the cases of alleged scientific misconduct emerge from situations where interpersonal relations have faltered and misunderstandings arise about intent and response. Today, co-workers, especially junior co-workers, expect a degree of participation in the research process which has not always been the practice. The peremptory and indignant response of a senior investigator to an inquiry about evidence, credit, or correctness, can and does set into motion actions and misunderstandings that, in turn, lead to accusations of misconduct.

In sum, questions of academic integrity are often intertwined with human relationships. Accordingly, I would urge that the orientation that I am suggesting about good academic practice takes place in a broader context of the kind of research environment expected in MIT laboratories, emphasizing in particular respect of human relationships between members of the research group. It seems to me that such an orientation, which should be the responsibility of the department or interdepartmental laboratory, need not be too time consuming and I believe could be of long-term value to those who receive it.

Because cases of alleged scientific misconduct frequently are accompanied by allegations of poor mentoring, harassment, and conflict of interest, it is tempting to broaden the definition of academic misconduct to cover violations of all important norms of conduct that govern the university. I believe it is important to maintain a narrow interpretation of academic misconduct, limited to abuse of the process of scholarship, e.g., plagiarism, falsification or misrepresentation of data, improper authorship, and insist on scrupulous adherence to the highest standards of conduct of scholarship. This is the only way to maintain the integrity of the scientific process and to demonstrate to our students the importance of honesty in scholarship.

*An Open Letter to the Faculty***Improving Student Representation on Institute Committees**

The Graduate Student Council (GSC) and the Undergraduate Association (UA) feel that there are problems with student representation on MIT's committees, and we feel that they can be solved by ensuring that committee chairs understand their responsibilities to the student bodies.

**Appointment of Student Members**

When a committee is formed, the GSC and UA each submit a list of names of candidates for the student positions, if there are any. It is important that the committee chairs select their students from these lists.

Section 1.71 of the Rules and Regulations of the Faculty, paragraph 3 reads:

*The undergraduate and graduate student members, if any, of each Standing Committee shall be appointed from an ordered list of nominees provided by the respective student governments. The term of the student members of the Standing Committees shall be one year, and shall begin on June 15.*

Admittedly, this rule applies only to the standing committees of the faculty, and not to all Institute committees. By custom, however, all committees select their student representatives this way. On the other hand, there are some Institute committees which have either not selected students at all, or have not chosen students from our lists. We think that it is important that the above rule be adhered to by all committee chairs.

There are chairs of several Institute committees who have not selected student members at all, despite the fact that their committees have student positions and they have been sent lists of nominees by the GSC and the UA. Presumably there is no need for us to explain what is wrong with the student representation on these committees. There are other chairs who have selected students, but not any of the ones from our lists. This means that there are students on those committees about whom the GSC and the UA know nothing, and who will have no contact with their governing bodies.

Before submitting lists, the GSC and the UA conduct extensive interviews to

find the most appropriate candidates. We consider factors such as the responsibility of the students, their competence, their eagerness, and their ability to stay in touch with their respective governing bodies. This contact with student government will ensure that both (a) the members hear the opinions of the student bodies they represent, and (b) the student governments are aware of what is going on in the committees and can communicate with their constituents. Students who have no contact with their governing bodies do not have the resources to adequately survey student opinion or to relate their committee's progress to the student body. Therefore, we feel that the candidates that we nominate will be much better equipped to serve on a committee than a student who has no GSC or UA contact.

We want student members on the Institute committees to be able to represent the views of their student bodies. This can only be achieved if the committee chairs select students from the lists that the student governments provide. We therefore implore all faculty members on committees not to overstep the GSC and the UA. Please select students from our lists.

**Consensus and Dissent**

We feel that in order for committee reports to be representative, all opinions must be taken seriously. This means that if there is disagreement on some point in a committee's report, either consensus must be reached through further discussion, or dissenting opinions must be included in the report.

In the past, some committee reports have been written without any attempt to represent the opinions of the student members. Some reports have been published before some of the committee members had even seen them. In cases such as this, it must be possible for the unrepresented members to include a dissent in the report. Otherwise, the incomplete report will stand as the culmination of the committee's study, as if all opinions had been considered and included.

When the GSC and UA asked for the

right to include dissents in committee reports, the response of the President's office was that the reports should be written under consensus, and that the official report itself should include any dissenting views. We agree with this sentiment. It is far preferable for a report to be complete than to be incomplete and have dissents included. However, if a committee chair refuses to acknowledge a viewpoint, then there must be some way of including it.

We ask all faculty members serving on committees to attempt to take all opinions seriously, and to try to include them all in committee reports. If it is not possible to come to a clear consensus, then we ask for dissenting members to be allowed to include dissenting opinions in the reports. This requires that all of the committee members see the draft of the report before it is published, so that dissenting opinions can be acknowledged and included. This does not seem unreasonable, and we think it is necessary if the reports are to represent all involved: faculty, administration, staff and students.

**Conclusion**

The problems outlined here are very simple. Some committee chairs have either not selected student members at all or they have not selected them from the lists provided by the GSC and UA. Some committees have produced reports that do not represent the opinions of the student members. Presumably these problems have come up because the committee chairs have been unaware of their responsibilities and that they will be solved when the committee chairs fully understand their duties. Perhaps it would be a good idea for the faculty to produce a document that outlines the responsibilities of a committee chair.

The GSC and UA ask only that the committee members do what is necessary to ensure that student opinion is represented as fairly and responsibly as possible.

**David Hogg** with the GSC/UA Governance Committee. December 10, 1990.

## The Francis Bitter National Magnet Laboratory: Past, Present, and Future

(Continued From Page 1)

The panel's conclusions - which evolved largely from a meeting on the subject held at Airlie House, VA in August, 1986 - are contained in the "Report on Large Magnetic Fields" and predicted that much high quality science could be performed, providing up-to-date high field facilities were available. The panel recommended spending \$100 M over about 5 years to equip a lab with four essential capabilities: (1) a variety of high field water-cooled magnets producing fields up to 25 T; (2) design and construction of a 45 T DC hybrid magnet; (3) pulsed magnets for fields in excess of 75 T for millisecond duration; and (4) design and construction of a 1 GHz NMR magnet.

In December 1989, the NSF proposal solicitation for the National High Magnetic Field Laboratory (NHMFL) appeared with a deadline for submission of May 1, 1990, and three schools submitted proposals - MIT, Florida State University (FSU), and New Mexico State University (NMSU). There were three stages of peer review. In the first all three proposals were reviewed, rated, and ranked by 10 mail reviewers. The MIT proposal received 8 excellent, one excellent-to-very good, and one very good, and was the choice of 9 of the 10 as the site of the NHMFL. FSU was second and NMSU third.

The second stage consisted of a site visit which occurred in late June, 1990, when a team consisting of 8 scientist and engineers visited all three sites and prepared a report. The site visit team was critical of some nontechnical aspects of the MIT proposal and was impressed with the financial offer, about \$60 M, promised to FSU by the State of Florida. Thus, they felt that the case was somewhat closer than portrayed by the mail reviews. However, in the end the site visit team decided that there was too much risk in making an award to an institution with no expertise in large magnetic fields. They therefore voted unanimously to award the NHMFL grant to MIT.

In the third stage of the review, both the mail reviews and the site visit report were discussed by the Materials Research Advisory Committee (MRAC) in July and a recommendation was prepared for the

director of NSF. MRAC voted 12 to 1 to award the grant to MIT, stating that "the proposal from MIT is excellent and the best of the three proposals in terms of scientific and technological quality and should be funded..." Thus, of the approximately 30 experts who reviewed and discussed the three proposals, about 28 favored MIT, 2 favored FSU, and NMSU was eliminated from the competition. Bob Richardson has said that he left the MRAC meeting in July believing "that it was inconceivable that the NSF management would award the grant to FSU" (rather than MIT).

In late July David Sanchez, a new Assistant Director of Mathematical and Physical Sciences at NSF, requested that David Litster and other appropriate MIT officials come to Washington to discuss details of a \$60 M, 5 year budget before the final decision was announced. Accordingly, Litster and Ken Smith journeyed to NSF on July 20 for what is now a well documented meeting where Sanchez decided that indeed MIT was unenthusiastic about the NHMFL. NSF management cited this meeting as crucial in their decision to ignore the overwhelming body of peer review discussed above and, on August 17, announced the NHMFL would be located at FSU.

### Present and Future of the FBNML

Of course, we at the FBNML and the MIT administration had been following the peer review process closely and were well aware that the results were "28:2." Thus, we and the rest of the scientific community were shocked that NSF could consider placing the NHMFL at FSU. Almost immediately it was decided that a request would be placed before the National Science Board (NSB) to reconsider the decision. The letter justifying the request was authored by Litster and consisted of 12 pages of detailed rebuttal of the memoranda by Erich Bloch and the letter by David Sanchez to the NSB members. Copies of this material are available upon request.

While we at the FBNML were never optimistic that the NSB and NSF would reverse themselves, we nevertheless thought that it was important to document the fact that a judgement error had been made,

and Litster's letter outlines this in detail. Briefly, in presenting the case to the NSB, the NSF made numerous statements about MIT which were either untrue or incorrect. When they quoted something from the site visit report or the mail reviews it was highly distorted and out of context. It is clear that they would have to go to great lengths to justify overturning the overwhelming peer review, and it is extremely disturbing that they would actually do this.

In addition to the protest directly from MIT, there were also numerous letters from users of the lab and from four members of the site visit team written to NSF and to the NSB - we are told over 100 total. One of the clearest of these was by Prof. Paul Chaikin of Princeton who was on the site visit team and a member of the Seitz-Richardson panel. He wrote to the NSF and NSB that the site visit team had arrived "at a specific recommendation - to fund the lab at MIT. Once a clear and unambiguous recommendation had been made it was natural to praise the loser (intended to be FSU) and point out the faults of the winner (intended to be MIT) so that the former could build on their strengths and the latter could correct its weaknesses." In concluding, Chaikin states that he "would like to dispel any idea that the proposals were judged 'equal' and emphasize that the site committee felt unanimously that the nation's best interest would be served by funding the MIT proposal.... The Bitter lab is a jewel that should not be tossed away lightly." Similar letters were written by three additional members of the site visit team, and concurring views have been expressed by two others.

Given the results of the peer review, it is reasonable to inquire why the NSF management decided to pursue the course that they did. The most obvious and probably the most compelling reason is the cost sharing offered by the State of Florida, amounting to \$58M over five years. Unfortunately, even after this expenditure of funds from both the State and NSF, the U.S. will have (according to NSF and Florida documents) only about 80% of the facilities

(Continued On Page 15)

## Letters

### Don't Shoot the Elephant

To The Faculty Newsletter:

In H.D. Jacoby's article "Class Warfare at MIT" [*MIT Faculty Newsletter*, Vol. III, No. 2, November 1990], I was intrigued by the comparison of Independent Activities Period to "a 1000-pound elephant." The source of my puzzlement at this comparison is the well-known fact that a full-grown African elephant weighs in at 16,000 pounds (7300 kg, or 8 tons), and the Indian variety at 11,000 pounds (5000 kg, or 5.5 tons) [Reference: Encyclopedia Britannica, 15th ed., v. 4, p. 442 (Chicago, 1989)]. Therefore, a 1000-pound elephant must be either very young and immature, or else woefully undernourished. Since it is inconceivable that an MIT faculty member could make an order-of-magnitude error in such a basic zoological fact, I concluded that Prof. Jacoby is using a particularly subtle analogy to convey the message that IAP still needs more time to mature and reach its full potential, or that IAP needs to be better nourished with faculty enthusiasm; indeed, both of these propositions are likely to be true.

Just two considerations will, I hope, illustrate this premise. For those seeking an increase in academic content and credit during IAP, our experience has been that IAP is a very suitable experimental test bed for trying out and fine-tuning new curricular materials. An example is the Laboratory in Protein Chemistry (5.135), which, after being offered and enthusiastically received in two successive IAP's, has been expanded and further developed into a major component of our new Advanced Elective Chemistry Project Laboratory (5.34).

Valuable as this sort of effort might be, however, I would not want to see IAP turned into a compressed "Winter Semester" - if we want a three-term quarter system, then we should

implement one. In its present form, IAP has a significant additional benefit. The presence of a four-week period between Christmas Vacation and the beginning of Spring semester makes it possible for faculty, and especially students, to devote intensive effort to intellectual work without diversions by class and seminar schedules. This is particularly true for undergraduate research involvement, which is supposed to be an important component of our overall educational approach. I'm sure everyone has had the experience of a UROP student who, with the best of intentions, has never managed to complete a project during a regular academic semester but does so in a burst of activity during IAP. Shooting the elephant (doing away with IAP, that is) would foreclose this kind of opportunity.

J.I. Steinfeld

Professor of Chemistry

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To The Faculty Newsletter:

Professor Noam Chomsky, in *The MIT Faculty Newsletter*, November 1990, writes: "Saddam Hussein became a monster because he violated a long-standing principle of U.S. foreign policy: no independent indigenous force may gain substantial influence over the world's major energy supplies, which are to be controlled by the U.S. and its clients."

Mr. Chomsky is from 15 to 40 years behind the times. The Persian Gulf and Venezuelan governments unilaterally took a 50 percent oil profit share in 1950. That seems like "substantial influence." By 1970, these indigenous governments took nearly 90 percent, which seems like overwhelming influence. By the mid-1970's these governments had expropriated the company holdings. "Power grows out of the barrel of a gun," and they had the guns.

Their action was logical. The multinational oil companies had been unable to restrain competition, and the price (inflation-adjusted) had declined by about 80 percent from the end of World War II through 1970. The governments controlled the market much better. By 1980 they had raised the price by a factor of over 10, incidentally inflicting much damage on the economies of industrial and less-developed countries. Like many great conquests, this was not easy to maintain. The price fell, though not to 1970 levels, and the governments have now forced it up again.

In the now-notorious interview with Saddam Hussein a week before the invasion, the American ambassador sympathized with the financial "needs" of a regime which kept a million under arms out of a total population of seventeen million; and disclaimed any interest in local territorial disputes. The obsequious tone, and the apologies for truthful statement about Saddam Hussein made in Congress and the news media, confirm that only "indigenous force" has any influence over the oil supply from the Persian Gulf.

M. A. Adelman

Professor Emeritus, Economics

### Professor Chomsky Responds

At issue is the thesis that U.S. policy has been guided by the principle that no **independent** indigenous force in the Middle East may interfere substantially with control over the energy resources of the region by the U.S. and its clients. The data that Professor Adelman cites bear only marginally on this issue. Adding relevant factors, we find that the cases he mentions are among those when the U.S. supported or readily acquiesced in actions by **dependent** client states, in particular, Saudi Arabia (with the bulk of the oil), regarded as an acceptable manager. I will keep to the Middle  
(Continued On Next Page)

## Letters

### Professor Chomsky Responds

(Continued From Page 14)

East, to which the thesis applied, though the pattern is similar elsewhere.

The 1950 case has to do with the revision of the Aramco-Saudi arrangements. It was supported by the U.S. government. Well before, the State Department had expressed concern that a decline in Saudi Arabian income would weaken it vis-a-vis British-dominated Iraq, "jeopardizing the unique cooperation...existing between... [the] U.S. and Saudi Arabia," with its great benefits for U.S. oil interests in the competition with Britain (still quite significant) and other global concerns, among them, Saudi intervention "blocking Arab League sanctions against the Middle East oil industry during the Palestine War." For such reasons, the U.S. favored steps to raise the income of our Saudi client, and urged other companies to follow the same model (an Aramco proposal, as the Saudis withdrew earlier requests).

The events of the 1970's are too complex to review here, but they fit essentially the same pattern (see my *Towards a New Cold War*). Management of the energy system remained largely in the hands of U.S. oil companies and client regimes, notably Saudi Arabia and Iran, which, together with Israel, "served to inhibit and contain those irresponsible and radical elements" that might harm U.S. interests (Henry Jackson, the Senate's leading ME oil specialist, 1973). Jackson's interpretation conflicts with Adelman's because he is considering broader economic and strategic issues - those relevant to the thesis under discussion. The situation changed with the overthrow of the Shah, installing an independent ("irresponsible") regime that the U.S. sought to overthrow, with the assistance of Saudi Arabia, Israel, and Saddam Hussein. The data that Adelman cites require interpretation within a broader context that introduces global planning

and objectives, the range of options available (the U.S. is not omnipotent), and the transition from colonial rule to other means of domination.

In the specific case at hand, a few days after the July 1958 nationalist military coup in Iraq, the U.S. and Britain, which dominated ME oil production, agreed to grant Kuwait nominal independence to avert nationalist reactions, while reserving the right "ruthlessly to intervene, whoever it is that has caused the trouble," to ensure that the oil fields in Kuwait, Saudi Arabia, Bahrain and Qatar "must be kept in Western hands." The same two countries are gearing up for war today.

The relevant evidence seems to me to confirm the thesis at issue, including what is now happening. Until August 1, Saddam Hussein was considered a relatively dependable "moderate" and granted lavish support. On August 2, he revealed that he would pursue his independent course. At that moment, he made the familiar transition from amiable client to monster, and his massive crimes suddenly became a reason to destroy him and safeguard U.S. dominance. No one familiar with the policy record should have been at all surprised.

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*The MIT Faculty Newsletter* welcomes letters in response to articles or on any and all topics of interest to the MIT community. Please write to us at: *MIT Faculty Newsletter*, 38-160; or via e-mail at [FNL@ZEISS.MIT.EDU](mailto:FNL@ZEISS.MIT.EDU).

### The FBNML: Past, Present, and Future

(Continued From Page 13)

that currently exist at the FBNML. They will not have DC fields in excess of 30 T such as now exist at MIT, there are no plans to build the centerpiece 45 T hybrid magnet, and no plans to construct high field NMR magnets. Thus, despite the impressive cost-sharing, the U.S. will in five years be in a less competitive position. Further, all of the technology for the Florida lab will be imported primarily from Grenoble, a strategy which insures that the NHMFL will always be in an inferior position.

Finally, what does the future hold for the FBNML? Of the many mistakes that the NSF made with regard to the NHMFL, one of the most serious was outlined in Sanchez' letter to the NSB in September, 1990. Specifically, it was suggested that the approximately 300 regular users of the MIT facilities could be sent to Grenoble and Japan to perform experiments following the termination of the facility at MIT. This suggestion betrays a serious misunderstanding of the factors involved in high field research and provoked a predictable outcry from the user community. As a result, the NSF has now requested the FBNML remain open for three years, and that we submit a proposal for funding for this purpose. If this proposal is indeed funded, it will permit us to retain much of the scientific and technical staff of the lab, and at the same time arrange alternative long-term funding.

It does not make fiscal or scientific sense to close a world-class facility like the FBNML. It has been peer reviewed again and again as the pre-eminent laboratory in high field science and technology. Its continued existence will insure that the US maintains its competitive position in this field of endeavor.

[The author would like to acknowledge the contributions of Prof. J. David Litster and Dr. D.S. Stevenson to this series of two articles.]

Reflections**The Francis Bitter National Magnet Laboratory**

(Continued From Page 7)

The combination of dilution refrigerator and the hybrid magnet achieved a record of the important physical quantity of  $B/kT$  used to observe low  $T$  quantum effects in matter. The extensive use of the facility to measure properties of high  $T_c$  materials by visitors and staff highlighted the critical importance of the Laboratory's capabilities.

In spite of setbacks and the further loss of support during the 1980's after my retirement as director, the MIT Magnet Laboratory still boasts the capability of operating more high field magnets with greater reliability than all the other national laboratories combined. Laboratories in Europe and Japan were patterned after the MIT Magnet Laboratory, conducting the types of experiments which were pioneered at MIT.

**The NSF and FSU**

MIT can be proud that for a fleeting time, much like Camelot, it had the best high field laboratory in the world. We created a whole field of research which is being duplicated in Japan and Western Europe. Yet through political myopia, poor judgement and lack of wisdom, it may disappear. It is going to take at least ten years, if it can be accomplished at all, for Florida State University (FSU) to duplicate the degree of competence and capability that already exists at MIT.

The loss to the MIT Magnet Lab of scientific research projects and leadership, in some areas can be attributed to inadequate funding by the NSF and its policies which favored magnet development and facility enhancement at the expense of research personnel. Many talented candidates seeking positions at the Magnet Lab were turned away for lack of funding. Even those at the Laboratory left for more permanent positions in academia, industry, or elsewhere at MIT. If major blame is to be placed anywhere, the NSF bears that burden.

How can you have a thriving laboratory when there are no resources to hire young talent, attract students, or pay for distinguished visiting scientists? In this regard the contrast between the decade of the sixties under the Air Force and the seventies under NSF are like day and night.

imaginative and spelled out a whole program of new experiments. In contrast, the FSU proposition does not meet the peer review criteria, 1) a track record of scientific accomplishment in high field research and development, 2) identifiable leaders in these areas of science and

**The disregard of the nearly unanimous recommendation of the Technical Review Committee by NSF Director Erich Bloch and the National Science Board (NSB) constitutes political malice, and ill serves the best interests of the nation and the scientific community.**

Yet had the NSF chosen MIT as the site for a truly properly funded National Laboratory, with less emphasis on hardware and more on science and the acquisition of talent, MIT would have no trouble revitalizing the Laboratory. Even at the present level of funding it remains the premier facility of its kind in the world - all it needs is a proper level of support. The call for higher fields cannot replace vision, ingenuity, and innovative creativity; and MIT has been a magnet for talent that possess these attributes. The alternative is a likely prescription for possible failure and a long shot gamble at best. Even if FSU eventually succeeds, it will take them a decade to catch up to us, with the cost of the facility and the development of all the instrumentation probably exceeding \$100 million. In the meantime, Japan and Europe will forge ahead while the U.S. struggles to maintain a competitive third place.

**Why FSU Was Chosen**

In my opinion, in making the award to FSU, the peer review system was ignored, and subsequent actions constituted misguided political mischief. When we proposed our laboratory in 1958 we were the pioneers and leaders with a worldwide reputation in scientific accomplishments in technology. The proposal was

technology, and 3) existence of facilities and instrumentation which can be used to carry on a program. Any proposal to the NSF requires these three elements. All of them are absent in the FSU proposal. The disregard of the nearly unanimous recommendation of the Technical Review Committee by NSF Director Erich Bloch and the National Science Board (NSB) constitutes political malice, and ill serves the best interests of the nation and the scientific community.

Dr. Gottfried Landwehr, who was director of the Grenoble High Magnetic Laboratory (a competitor) from 1978-1983, echoes this sentiment: "If I were a nationalist, I would applaud the decision of the NSB because it will be a setback to the U.S. efforts in the field. Although I may do injustice to the proposal of the colleagues from FSU, I am convinced that the realization of the present plans would result in a loss of the present U.S. lead in the field. I believe that it would have been much better to ask MIT to establish a new high magnetic field facility. The Francis Bitter National Laboratory was the first facility of this kind in the world. It has played a leading role for a long time, both in the field of magnet technology and in physics."