JOHN HARVARD'S

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Curricular Course

Faculty of arts and sciences (FAS) dean William C. Kirby has outlined the work on revising the undergraduate curriculum that he envisions yielding "formal proposals that can be presented to the faculty by the end of the academic year." In a letter to professors and students on September 20, he summarized the principal goals for curricular change reported last spring (see "Addition by Subtraction," July-August, page 55), and described how the work would proceed.

As Kirby and College dean Benedict H. Gross confer informally with faculty members and students, various committees and offices are also at work. Their tasks include reviewing expository writing; rethinking instruction in basic science and technology; reconsidering concentration requirements (and the timing of concentration choice); planning how "every...student may have a substantial international experience"; changing advising (perhaps by connecting freshman dormitories to upperclass Houses); and envisioning "a possible January term."

Kirby himself chairs a group engaged in the "difficult work of considering how to translate our larger intellectual purposes into a program of general education requirements, and the challenge of establishing criteria for Harvard College Courses." In the future, students are expected to fulfill many of their distribution

Photograph by Jim Harrison

New Look

The two buildings of the Center for Government and International Studies, flanking Cambridge Street, give a new look to Harvard's eastern edge. This view, up Prescott Street, shows the work in progress in mid September; occupancy is scheduled for the spring.

requirements with those as yet undefined offerings. To stimulate thought on general education (see also "Educating Undergraduates," September-October, page 61), Kirby solicited essays from several senior faculty members during the summer.

Among the respondents, Kenan professor of government Harvey C. Mansfield stressed the "pressing need to make our curriculum more demanding," with students giving "more time to their courses and less time to extra-curricular activities." Porter University Professor Helen Vendler advocated equipping students with "the desire to learn more" throughout their lives, in part by "prepar[ing], each year, an independent reading plan displaying some cohesiveness, purpose, and depth, but based solely on pleasure," for which the "only closing requirement would be a list of books read, and a brief report of the intellectual results, together with a project-proposal for the next year." Still others, including Carswell professor of East Asian languages and civilizations Peter K. Bol, outlined frameworks for common, integrative courses. These faculty members' essays, along with those of colleagues, are available at www.fas.harvard.edu/curriculum-review. Excerpts from other essays follow.

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Biologist Edward O. Wilson, Pellegrino University Professor emeritus, addressed the convergence of formerly separate disciplines on common problems and methods, and the exciting opportunities for teaching created as a result.

The middle domain is a region of exceptionally rapid intellectual advance. It, moreover, addresses issues in which students (and the rest of us) are most interested: the nature and origin of life, the meaning of sex, the basis of human nature, the origin and evolution of life, why we must die, the origins of religion and ethics, the causes of aesthetic response, the role of environment in human genetic and cultural evolution, and more.

If I learned anything in my 41 years of teaching, it is that the best way to transmit knowledge and stimulate thought is to teach from the top down. Address questions of the kind just listed, then peel off layers of causation as currently understood, in order to teach and provoke, and in growing technical and philosophically disputatious detail. Explain, for example, aging and death as best can be done with knowledge of evolution, genetics, and physiology, then explore the consequences in demography, and next proceed laterally, if wished, into the consequences to history, religion, ethics, and the creative arts. Do *not* teach from the bottom up, e.g., "first we'll learn some of this, and some of that, and we'll combine the knowledge later to build a picture of something larger."...[P]ut it up whole as quickly as possible, show why it matters to them and will for a lifetime, then dissect to get

HARVARD PORTRAIT

Daniel S. Fisher

Daniel fisher likes to ask difficult questions and, although he is a theoretical physicist, his latest inquiries have led him to tackle problems in modern biology. For example: How does one make sense of the vast amount of data that the life sciences now generate? Modern physicists, as it happens, are unafraid of mountains of apparently random information because they have tools for finding patterns, for querying the chaos. Recently, the professor of physics and applied physics has been working with Markus Meister, professor of molecular and cellular biology, to develop frameworks for understanding how the human eye processes visual information, distinguishing, say, between a capital letter *E* and a capital *B* on an eye chart. "The random movement of your eye is on a scale as large as a blackboard," says Fisher, while the difference between the two letters is minute. How do our neurons deal with or perhaps make use of the eye's jitters? he wants to know. Fisher has advanced models to try to understand this and other problems, such as how the brain performs complex tasks almost as quickly as simple ones. Research has shown that "there is not enough genetic information to wire the whole brain," he explains, so if it is wired by a somewhat random process, what kind of random wiring would be needed for it to operate as fast as it does? Fisher's models of "small world networks," which propose that any one neuron is separated from any other by a small number of steps—think six degrees of separation in the brain—have been consistent with experimental data. But "Processing this parallel?" he marvels. "No one, I think, has the faintest idea of how the brain does this."

Photograph by Tracy Powell

as close to the bottom as possible....

If this perception of optimal presentation is correct...the best approach to general education in the future seems to be less disciplinary and more problem-oriented. The problem (or big issue) addressed...could be of the following kind: the nature and consequences of human nature, the basis of moral reasoning, the crisis of global fresh water supply and its solution. Such an approach would require some breadth on the part of the instructor, or team-teaching by a group of complementary experts.

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Professor of Greek and Latin Richard F. Thomas, chair of the classics department, focused on the disappearance of historical perspective.

Our country has become remarkably and alarmingly presentist. Popular culture and self-absorption tend in the direction of allowing us to live purely in the present, oblivious of the past and unheeding of the needs of the future....[G]iven the political season and our own recent history I cannot resist giving one anecdote. In 1947 General George C. Marshall delivered a speech at Princeton University, including the following words:

> I doubt seriously whether a man can think with full wisdom and with deep convictions regarding certain of the basic international issues of today who has not at least reviewed in his mind the period of the Peloponnesian War and the fall of Athens.

Why do these words now sound so quaint? Thucydides (without whom we know next to nothing about the Peloponnesian War) is as useful a guide now as he was 60 years ago....

In Athens 2400 years ago the free adult male population voted for the war, while our Senate did the same two years ago. That the motives for each group's doing so were in some cases shared is something worth knowing and reflecting on. But if Colin Powell were to say what Marshall then said, the response from some 90 percent of a contemporary commencement audience...would presumably be puzzlement. Why? Has some other text replaced Thucydides...as a guide for our citizens in

their reflections about the perils of invading and occupying other nation states? Or rather have we for whatever reason dispensed with the need to reflect deeply about the past and the lessons it has for us? If so, the loss is not just a loss in aesthetic appreciation, rather it is a loss that puts our society in some peril.

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Smith professor of molecular genetics Andrew W. Murray, chair of molecular and cellular biology and director of the Bauer Center for Genomics Research, focused on common exposure to science, analysis, and humanistic values.

Through much of the twentieth century it was perfectly acceptable for a recently minted liberal arts B.A. to take pride in an ignorance of science and technology....My father, a historian with a strong interest in the history of science and technology, took a perverse pride in being so poor at arithmetic that he paid his teenage children to calculate the average of his students' examination scores....

We need to produce graduates who are scientifically literate enough to play an important role in public debate over the applications of science in society, to understand that the course of sciences depends on an aesthetic tradition as much as it does on utility, and to realize that the relationship between art and commerce can be as complex as that between science and technology. Is the singer whose jingle sells artery-clogging burgers more or less culpable than a microbiologist whose genetically engineered bacteria are used by others to build biological weapons, and how much should each of them consider the larger consequences of their work?

Putting science squarely into a liberal education will take two year-long courses. The first is a course in the natural sciences that would provide an integrated introduction both to the sciences themselves and to the ways in which they convert data into information and information into knowledge. By focusing this course on a single question it should be possible to begin with a group of poets and end with them understanding the philosophy and methodology of science to the point where they would read and critique the primary literature in at least one field. "How do we hear?" would introduce elements of physics, biology, chemistry, linguistics, psychology, and make reference to poetry and music....

The second new course would be an investigation of analysis and exposition that would combine reading, writing, speaking, and statistical analysis. The merits of speaking and writing clearly are obvious, but statistics merits special attention, because it is the branch of mathematics that every citizen needs to understand. Generations of high-school students and college science majors have been forced to suffer through calculus classes, whose lessons most will never apply, without ever being seriously exposed to statistics. This subject, through its analysis of probability, touches every aspect of our lives from our insurance policies...to our opinion about the existence of the paranormal....

I believe that we should subject the humanities to the same treatment as the sciences, by finding single questions that could motivate a two-semester course that would introduce the connections between disciplines and the critical ideas within them. For example, a course entitled "Who Am I?" that explored Joyce's writing could start with *Dubliners* and end with careful analysis of sections of *Ulysses*, would easily span history, politics, literature, psychology, and ethics, and would have manifold links to the scientific course "What Is Life?"

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Professor of economics Edward L. Glaeser presented "a strong case for replacing the eclectic approach to learning, embodied in the Core...with far more focus on the methodology of science."

If the goal of a Harvard education is to learn how to learn, and if learning is ultimately the crafting and testing of hypotheses, then Harvard should focus on teaching three major skills: crafting hypotheses that are both creative and logically consistent, testing hypotheses empirically, and communicating knowledge. These three skills are as necessary in the study of Renaissance art as they are in physics. After all, the claim that a floral still life symbolizes the crucifixion is as much a testable hypothesis as anything in string theory. The current Core curriculum often seems to emphasize the differences across disciplines; the similarities are far more important.

The skills involved in generating hypotheses include both creativity and logic. These skills are taught in three complementary ways. First, students need wide exposure to the significant hypotheses in a field. Second, students need continuing opportunities to try and craft

Tenure Travails

During the 2003-2004 academic year, the Faculty of Arts and Sciences (FAS) extended 32 tenure offers, just four of them to women (only one of whom accepted). Citing those figures—and a steady decline in the proportion of offers made to women since 1999 to 2001, when more than one-third of the candidates sought as FAS professors were women—26 tenured men and women wrote a detailed letter of concern to President Lawrence H. Summers and FAS dean William C. Kirby in mid June. The letter and the replies, dated July 23, were leaked to *Science* in mid September, prompting broad debate on the faculty's makeup.

The FAS professors' letter emphasized the importance of "statements from university leaders that regularly affirm a strong institutional commitment" to diversity. Summers stressed that "our recruitment process [must] not be hindered by failures of energy, imagination, or openness," and focused on "increasing the fraction of departmental offers that go to women." Kirby addressed departmental processes, too, and outlined "extra-departmental mechanisms," driven by his new divisional academic deans, to prompt progress.

All the parties were to discuss matters further on October 6, after this issue went to press; a full report will appear in the January-February issue of this magazine.

their own hypotheses. Third, students need particular training in mathematics and philosophy, which provide the basis for logical analysis.

Modified survey classes can combine a wider exposure to the range of hypotheses in a field than many existing Core classes, with a more intense immersion in scientific method than traditional survey courses.... But current Core classes are indeed much better than traditional surveys in teaching that ideas are to be generated and challenged, not blindly accepted.... The way forward is to offer classes that combine the breadth of traditional surveys with the spirit of challenging conventional knowledge....

After learning how to craft logically consistent hypotheses, students must learn how to test these hypotheses with empirical evidence....In many areas, such as biology or psychology, laboratory experiments provide the key method of refuting claims. In the social sciences, economists and sociologists rarely claim that one event will always cause another event, but rather that, when one event occurs, the second event becomes more likely. As such, statistical work is the norm. In history and the humanities, hypotheses are often about individual events, and a claim can be refuted by a single piece of historical evidence. A single letter from patron to artist can potentially refute a hypothesis about who painted a masterpiece.

Endowment Gains: Last Hurrah?

VERY STRONG RETURNS on investment boosted Harvard's endowment $3.3 billion last fiscal year, to a new record of $22.6 billion as of June 30. Harvard Management Company (HMC) reported on September 15 that total investment return for the year was 21.1 percent, up smartly from the 12.5 percent return achieved in the prior fiscal year (see "Rebounding Returns," November-December 2003, page 59). That capped more than a decade of unusually—and perhaps unsustainably—robust results (see "Harvard by the Numbers," opposite).

"Obviously, it was a good year," said HMC president Jack R. Meyer, M.B.A. '69. He cited both the absolute return on invested assets ("It's hard to complain about 21 percent") and the value added by the investment professionals, whose aggregate return exceeded benchmark measures of market performance by 4.7 percentage points ("About a billion dollars—that's a big number and gratifying"). He also noted that HMC's results exceeded the median performance of a universe of large institutional funds by nearly 5 percentage points, and of the 25 largest university endowments by about 4 percentage points.

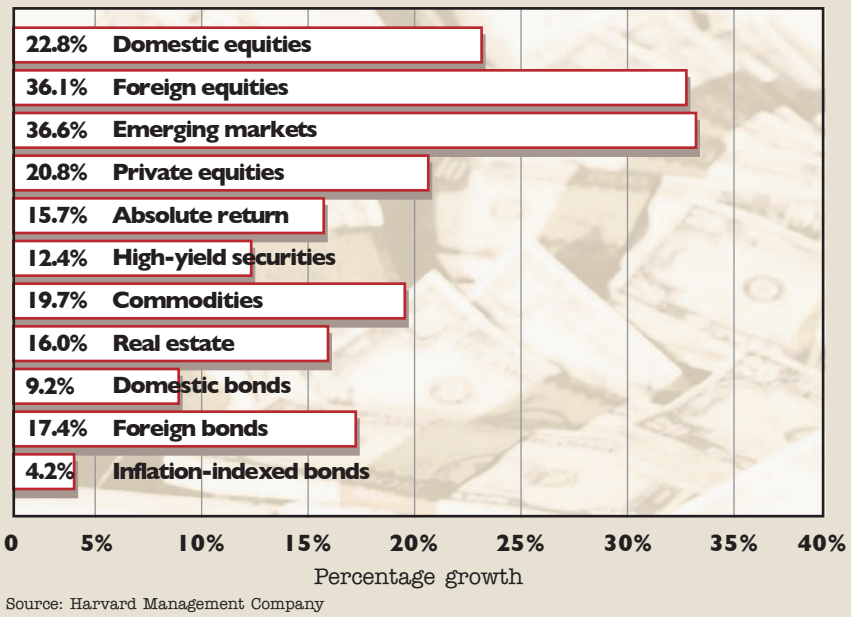
Meyer highlighted the consistent performance across HMC's investments: in 9 of 11 asset classes, Harvard's funds exceeded the market benchmark. (During the past decade, for all nine categories with 10-year histories, HMC managers have outperformed their market benchmarks.) In a strong market, all classes of equities, which typically make up about 45 percent of endowment assets, produced robust returns—from 20.8 percent for private equities to 36.6 percent for emerging-markets investments (see chart below)—and exceeded market returns, albeit narrowly.

Domestic and foreign bond portfolios (together, about one-sixth of total assets) exceeded their benchmarks by 12.6 and 9.8 percentage points, respectively. The fixed-income portfolio managers, Meyer said, "continued to hit the ball out of the park" in an interest-rate environment completely different from that prevailing in fiscal year 2003—a vivid demonstration, he maintained, that their performance is based on technical trading strategies, not on making interest-rate bets or assuming extra credit risk relative to the market overall.

The only sectors where HMC lagged were in high-yield investments and real estate. In the former, Meyer said, two out of three strategies did well, but an absolute-return portfolio focused on bankruptcies underperformed. Real-estate investments, premised on improvement of acquired properties, did slightly less well than funds focused on existing top-quality buildings.

The value of the endowment reflects not only investment returns, but also the flow of funds in and out—and those capital changes are increasingly large. As a rough calculation, from the $19.3 billion value at June 30, 2003, about $810 million was distributed to support University programs, and $90 million more was applied to Allston-related activities (a special annual distribution from capital gains). Investment returns and nearly $258 million in gifts for endowment then yielded the 2004 total of $22.6 billion.

Fiscal 2004 Endowment Performance



Source: Harvard Management Company