



CHAPTER FOUR

Darwinian Medicine for the University

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The University: Its Defects and Defenses

Darwinian medicine explores the evolutionary origins of sickness, with the goal of treating the sick more effectively (Nesse and Williams 1994). By spelling out what evolution had in mind, so to speak, when it endowed the human body with the propensity to get sick, Darwinian medicine helps us to assess the benefits and costs of alternative medical interventions.

The distinction between *defects* and *defenses* is central to Darwinian medicine. A broken leg is a defect—one would not want to leave it alone just in case some good came of it. A fever, on the other hand, is a defense: it brings discomfort, it creates tissue damage, it depletes nutrients, and in extreme circumstances the patient might die from it. But fever also serves useful functions: it keeps bacterial pathogens in check, it serves as a signal to the patient to take it easy, and under ordinary circumstances it helps the patient survive. Darwinian medicine takes the position that fever is an evolved response, with the implication that we must trade off the costs and benefits of suppressing a fever when treating it.

This chapter applies Darwinian medicine to the university. Much that looks like a defect of the university is in fact a defense. Defects are bad; they need to be eliminated. Defenses look bad, but they are subtle

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design solutions that evolved in interaction with a demanding environment; they need to be preserved, or at the very least it needs to be recognized that eliminating them comes at a cost. The vexed institution of tenure is an example of a defense, as are the impossibly rigid boundaries separating the disciplines.

Effective university reform must distinguish between defects and defenses so it can eliminate the defects and go lightly on the defenses. Making such distinctions requires an understanding of what the university is *for*—what problems the university was designed, or evolved, to solve.

I contend that the function of the university is to enable deep specialization. The structures of the university emerged to solve several problems: how to nurse deeply specialized scholars, how to protect them from each other and the outside world, and how to pool the results of their distributed inquiries.

The problems to which the university is a response are hard problems, and there is no free lunch. Institutional solutions are generally second best in the sense that they constitute the best solution feasible in light of environmental constraints (in which case they are a defense), or they are less than second best (in which case they are defective).

As a necessary by-product of fulfilling their productive functions, the structures of the university have a tendency to ossify. It is precisely because the powerful incentives and protections afforded by these structures are intertwined with their potential for ossification that it is hard to disentangle where the defects of the university end and its defenses begin.

The university's built-in tendency to ossify and the commingling of defects and defenses explain why the structures of the university are so resistant to change and improvement—why they are hard to change in the first place, and hard to change for the better.

To complicate matters, ossification implies that a solution that worked well initially (it started out as a defense) can become dysfunctional over time (it ends up becoming a defect). For this reason, any practical project of reforming the way the university is governed needs to respect its thick history and local detail. Armchair theorizing cannot say definitively, "This is a defect—off with its head" and "That's a defense—better not mess with it."

The remainder of this chapter is structured as follows. I begin with a short history of the university. Drawing on history, I argue that the structures of the university that enable deep specialization are naturally and inherently resistant to change. What makes the university strong

is precisely what makes it weak. I spell out how institutions of higher education can be designed to remain intellectually vibrant and structurally pliable even though their constituent elements—deeply specialized scholars and discipline-based departments—are doomed to ossify.

A Short History of the University

In the history of the human race, the medieval university stands out as one of the great political institutions of all time. It drew Western Europe out of the Dark Ages and into the light. It invented cosmopolitan structures and norms that are still with us today.

Two archetypes emerged in twelfth- and thirteenth-century France and Italy. Paris offered a free space for the theological debates that prepared the way for the Reformation. In Bologna, students trained in the legal statutes and reasoning that would come to support increasingly complex political and economic institutions all over Europe.

In both cases, a complex institution crystallized, the result of a decentralized process of annealing. The institutional structures in Paris and Bologna were shaped by conflict with their environment, and in similar ways, but they ended up at opposite ends of the governance spectrum, Paris controlled by its faculty, Bologna by its students.

Paris attracted students from all over Europe. They came to hear the charismatic Peter Abelard apply the scholastic method to questions of speculative theology, such as whether the bread and wine consumed during mass truly turn into the body and blood of Christ, or only in spirit. In an age permeated by religion, in which any position outside of that defined by the church was considered heresy and heretics were burned at the stake, the *sic et non* (pro and con) exploration of a theological issue was nothing short of daring, and Abelard's students picked up on the fact that he was onto something big.

The University of Paris thus started out as an amorphous group of faculty and students collecting in and around the Cathedral School of Notre Dame, with few norms and no internal organizational structure in place. Over the years, the faculty fought with the church over rights and entitlements, including in particular the right to appoint new faculty. The pope and the emperor were drawn into these fights, and the faculty played them off against each other.

Migration, boycott, and violence pushed forward the cause of the faculty. It helped that the medieval university had no physical plant—the faculty could threaten to leave for another city and take the uni-

versity (themselves and their students) with them. On occasion, this threat was realized, in which case it led to new university foundings in surrounding cities; mass migration turned out to be the mechanism by which the idea of the university, and its emerging structures, spread.

As each bitter conflict was resolved, some protective piece of structure fell into place—some right was awarded here, another entitlement there. Pieces of structure were negotiated to prevent future conflict, or to encourage nonviolent conflict resolution, or for damage-control purposes. In this way, over the course of a century, an extraordinarily complex institution emerged brick by protective brick. In a decentralized process planned by nobody, structures evolved that protected the inhabitants of the university from the outside world. Thus, in the midst of the Middle Ages, an era not known for its intellectual tolerance, the university carved out a safe space for scholarly inquiry.

Because it was the faculty who led the fight against the church, Paris ended up with a governance structure dominated by the faculty: it was the faculty who voted on the issues of the day, staffed the administration, set the curriculum, and appointed new faculty.

As the university became increasingly differentiated into schools and departments, and factions within schools and departments, and factions within factions, it became internally conflicted. The members of a faction tend to reserve the most intense feelings of hatred for their intellectual neighbors rather than for the inhabitants of faraway worlds. This makes it very hard for faculty in the same, or closely related, fields to agree on appointments and curriculum design.

Protective structures followed faculty infighting: strong walls sprang up to separate the departments and schools, and federalist structures emerged. The voting procedures that aggregated the preferences within and across departments and schools became ever more complex. The university thus developed an intricate internal organization to protect the faculty from each other.

Meanwhile, students flocked from over the mountains (the northern and western parts of Western Europe) to study law in Bologna, and it was they who led the fight that created a great university. Foreign students did not have the same rights and entitlements as the citizens of Bologna. They were vulnerable to exploitation by the local townspeople, especially landlords and tradesmen, with no legal recourse. If a drunken student got into a fight and killed a local, he would be judged by a jury consisting of local citizens, and the outcome would not generally be favorable—hence the students' demand to be judged by their student peers.

The foreign students banded together for reasons of protection. They formed nations, that is, groupings of students with shared geographic origins. Collectively, they fought the Commune of Bologna for rights and entitlements. Here, too, the weapons of choice were migration, boycott, and violence. Once again, in the course of a century a complex institution emerged, loaded with rights and entitlements protecting its inhabitants from the outside world—but now, because it was the students who carried the water, the university ended up with a governance structure dominated by students: it was the students who voted on the issues of the day, staffed the administration, set the curriculum, and appointed the faculty.

The institutional structures that emerged in Paris and Bologna include bottom-up governance, representative assemblies, decentralized federalist structures, complex voting procedures, and institutionalized forms of conflict resolution (the latter snuffed out the violence that used to be an inevitable by-product of conflict).

The idea of the university emerged, manifesting itself in rights and norms such as *ius ubique docendi* (the right to teach at any institution after graduating from one of them), open access, open information, and free inquiry. These norms, powerful as they are, are ultimately derivative to the institutional structures of the university: a norm of free inquiry is not worth much without a structure in place that protects the inquirer from being imprisoned, killed, or (worst of all) ex-communicated.

The Middle Ages saw the emergence of complex voting procedures in the Italian city-state and of bottom-up governance processes in the medieval guild; but the politics of the city-states remained violence prone, and the guilds did not exactly embrace ideas of open access and open information. The university was unique in the astonishing combination of structures and norms it developed, allowing its inhabitants to engage in peaceful intellectual inquiry and protecting them from the outside world and from each other.

In its early fighting years, the medieval university was as intellectually vibrant as its structures were pliable. Once its structures, and the associated protections, got locked in, the university ossified intellectually. The scholastic method, wild and wonderful in its early years, matured and joined the establishment, finding its apotheosis in Thomas Aquinas's *Summa theologica* (the title itself has an end-of-history quality, quite unlike Abelard's title, *Sic et non*, which has an open-ended air about it). The scholastic method degenerated into an ever more refined system of logic-chopping exercises applied in a mindless and mechanical way to questions of great irrelevance, as in, how many angels are

there on a pinhead? As the society surrounding the university became more interested in history and language, and more empirically oriented, the scholastic method was doomed.

The medieval university missed the boat come the Renaissance. In Italy, many universities continued to apply the scholastic method for one hundred years after the society around them had reinvented itself in full. The intellectual underpinnings of the Renaissance were developed in private academies outside the university. Humanist ideas got picked up by newly founded universities, including universities in northern Europe far away from the geographic center of Renaissance action.

During the religious wars of the sixteenth and seventeenth centuries, institutions of higher learning were established by local rulers seeking prestige and control (the principle of *cuius regio, eius religio* applied not only to countries, but also to universities). The university in Europe was in decline in the seventeenth century and became utterly moribund in the eighteenth century. It was missing in action during the Enlightenment and the Scientific Revolution, which largely took place outside the university, in private academies, societies, and salons. Many of the leading scholars and scientists were independently wealthy, and it was their wealth, not the protective structures of the university, that afforded them "a room of their own."

After a steady decline lasting several centuries (and contradicting the idea of history being an "ever upward-lifting" process), nineteenth-century Germany entered the world stage with a couple of innovations that, together with the inventions of the medieval university, came to define the modern university.

Progressive reformers developed the norms of *Lehrfreiheit* (freedom to teach) and *Lernfreiheit* (freedom to learn). Wilhelm von Humboldt, in particular, promoted the idea that science is not a fixed body of knowledge that students can mechanically learn by heart. Our understanding of the world is necessarily incomplete, and the quest for knowledge is an ongoing enterprise of which students must be an integral part so they can partake in the emerging understanding, which is as much about process as it is about results. Even while Humboldt established the primacy of research over teaching, his humanist approach emphasized the unity of inquiry and learning. It was thus that Germany developed the idea and institution of the deeply specialized research professor who combines research and teaching on a single discipline-based subject.

Deep specialization and the disciplines emerged in tandem, and for a reason. Because the world is complex and the individual brain is limited in its cognitive grasp, the task of figuring out how the world works needs to be split up into manageable pieces, but then the results of all the distributed inquiries need to be pulled together to form a synoptic picture—the ultimate goal, after all, is to help the human race gain control over harsh and capricious Nature (including human nature). To this end, the university slices the world into a hierarchically ordered set of disciplines and fields within disciplines and subfields within fields. A deeply specialized scholar will spend his life tending to some obscure question, which in isolation is pointless. His research gains meaning and impact only if it is pooled with the research of other scholars who are working on the same or closely related questions, and the research of a group of scholars gains meaning and impact only if it connects and cumulates within the larger discipline.

In Germany, discipline-based deep specialization had a powerful impact. Germany started out economically backward and as an intellectual backwater. It emerged as a leader in the industrial revolution in large part because of its universities. German science and industry flourished as a result of its pathbreaking research and teaching in physics, chemistry, agriculture, forestry, and other disciplines of central importance to industrialization.

In the case of Germany, university reform was shaped by an element of design—Humboldt's brilliant ideas as they manifested themselves in the newly founded University of Berlin. The vibrant German model was copied all over the world, including the United States (Johns Hopkins, Cornell, Chicago). In Germany, it ossified. Deep specialization, and its attendant narrow-mindedness, battled the humanist desire for holistic understanding—and won. Lack of competition and inflexible bureaucracy contributed to the decline. Today, the German university is largely moribund.

The idea of the university, and its institutional manifestation, was refined over the course of eight centuries. The university is a hybrid mix of bottom-up elements, which were shaped by evolution, and top-down elements, which are the result of deliberate design. The structures and norms of the university allow people to conduct systematic and cumulative research and thereby gain a better understanding of the way the world works. The medieval university with its emphasis on speculative theology and law helped Western Europe shake off the suffocating yoke of the church and develop complex political and economic

institutions. The German university with its cutting-edge applied research and humanistic teaching ideals contributed to the industrialization of the German economy and the consolidation of the German nation.

What Makes the University Strong Makes It Weak

The history of the university gives us an idea of what the university is *for*. The university is home to structures that nurse and protect and connect deeply specialized scholars.

There is a dark side to the history of the university. It is largely a history of ossification punctuated by bursts of intellectual vibrancy and structural innovation. In the large sweep of history, change occurs not because existing scholars, departments, and institutions move with the times, but through replacement. New ideas and methods are developed by new generations of scholars working in newly founded disciplines. New structures that support new forms of inquiry and learning emerge in newly founded universities.

Existing institutions do change—some of them, some of the time. When institutional change occurs, it is typically in response to the political or economic threat posed by competitors. Departments have a harder time reinventing themselves, and when they do, it is because of generational turnover, for individual scholars tend not to change at all.

The tendency of the university to ossify is an integral aspect of its positive function to enable deep specialization. As knowledge cumulates, it necessarily moves on. Inevitably, areas of inquiry that are vibrant today will be overrun by the masses tomorrow and be dead meat the day after. But the constituent elements of the university—deeply specialized scholars and discipline-based departments—cannot easily change their stripes simply because their stripes are the way they are for a reason.

Tenure is supposed to give individual scholars the freedom to think unthinkable thoughts, embark on high-risk-high-return research programs, stand up to “the powers that be,” and so on. It doesn’t always work that way, or even most of the time. In the university, it is the tenured faculty, above all, who are the fundamental source of ossification.

The problem is in part emotional, in other part cognitive, and it lies in the scholarly brain. First, the identity of a scholar, his connections and loyalties, are defined by his socialization in graduate school.

Second, as a result of his graduate training, his brain is locked into seeing the world in a particular way, and he is blind to new ideas and methods that slice the world in a different way.

To understand the nature of the problem, we need to take a look at graduate school. It takes about seven years for an uncommitted amateur to become an engaged scholar. Graduate school shapes the student emotionally and cognitively as it draws him into a scholarly community. It is the peer group that adopted him in graduate school that will later write referee reports when he submits articles to journals, and outside letters when he comes up for tenure.

A scholar who changes horses in midcareer loses the support of his peer group and is forced to reinvent himself from scratch. This requires personal courage and the willingness to take a risk, and these are not traits the tenure system selects for. Past behavior is the best predictor of future behavior, and it is a rare occurrence for a scholar who was conformist enough to attain a tenure-track position and achieve tenure to suddenly buck the trend and cook up wild and wonderful ideas in midcareer, let alone in old age.

Graduate school brainwashes the student—literally, in the sense that it rewires his brain connections—into becoming a *Fachidiot*, that is, an expert who has a very particular way of seeing the world. The expert is equipped to make extremely fine distinctions on one dimension even while he is blind to the existence of other dimensions.

Laypeople are as easily impressed by experts as they are contemptuous of them, and for good reason: they are awed by the subtlety of expert analysis, especially if it gives them purchase on some part of the world, and they deplore the experts' inability to apply common sense and take a holistic view of a problem. The universally felt ambivalence toward experts tells us something important about the existence of a "budget constraint" in the human brain. A layperson who turns into an expert does not stay the same on all dimensions of his thinking except for the one dimension on which he gained expertise: the expert's ability to see in great depth on one dimension reduces his appreciation of other dimensions. And indeed, the expression *Fachidiot* translates as "he who knows a lot in his area of expertise but is a total idiot when it comes to other areas."

The multiyear process of enculturation by which a student becomes a scholar generates an emotional and cognitive lock-in. The problem is that (undesirable) lock-in is a necessary by-product of (desirable) deep specialization. If the purpose of the university is to reap the gains from deep specialization, there must be a process in place that turns uncom-

mitted amateurs into engaged experts, and such a process necessarily produces *Fachidioten* with rigid identities and warped cognitions.

The *Fachidiot* is nothing by himself—he is necessarily part of a group consisting of like-minded individuals competing with other groups. Part of the explanation of ossification lies in the individual expert's brain, but the other part can be found in the expert's social embeddedness, or in the interaction of expert brains.

The workings of scientific groups can be understood only with reference to the evolution of those parts of the human brain that are in charge of regulating social interaction.

Social cognition and social emotions developed in the human brain approximately thirty thousand to three hundred thousand years ago. In this ancestral environment, humans clustered together in tribes of 150 members, or thereabouts, and they were continually at war with other tribes. The emotional and cognitive makeup of the human race is designed to support cooperation within tribes and competition between tribes. Humans work well in groups of 150—this is the number of people who can interact regularly, communicate face to face, and learn to trust each other.

The clusters that form the backbone of scientific networks typically count about 150 members. Groupings of scientists have a small-town feel to them—think of the pervasiveness of gossip, which serves both a social policing function and an epistemological function, as in “you can't trust his regressions, he always fudges the data.”

Scientific clusters play an enormously important motivational role—important because deeply specialized inquiry can quickly become dreary and alienating, and there needs to be something in place to keep scholars chipping away at some minuscule problem that in isolation is utterly meaningless. Within clusters, scholars give each other the emotionally comforting sense of belonging to a community and the spiritually uplifting sense of contributing to a larger purpose, and they dole out professional recognition and status.

Scholars are energized not only by within-group approval but also by between-group competition. A scholarly peer group typically stands in an enemy relationship with a competing group that largely shares its way of viewing the world but comes up with a competing answer to some critical question. The identity of a scholar is defined in large part by the opposition to the competing group whose members are seen as stupid, or wicked, or both.

Consider, for example, two groups that are obsessed with questions concerning the size and stability of the money multiplier. One group

“proves conclusively” that the money multiplier is large and stable, whereas the other group “demonstrates beyond any doubt” that the money multiplier is small and unstable. The two sets of results yield opposite conclusions about the proper conduct of monetary policy, and each group considers the policy prescriptions of the other group to be utterly irresponsible.

At times, the two groups converge on some theoretical or empirical point, but then they immediately part ways on some new dimension of the problem, as a result of which their disagreement about the proper conduct of monetary policy keeps right on ticking. To the uninitiated, it looks like new arguments and evidence keep on chasing the same old conclusions. But scientific progress manifests itself in the gradual creep of conclusions made possible by the partial convergence of the competing factions. Then again, it is possible that the gradual creep is moving around in a circle—scientific progress doesn’t follow automatically from factional conflict.

Factionalism at its best ensures that the two sides of one dimension of an issue get explored thoroughly before the conclusion moves on—at which time a new dimension opens up, and its two sides in turn get explored thoroughly. Scholars end up doing a thorough job not because they are obeying an ethical mandate to explore all sides of the issue thoroughly, or because they care about the truth, but because the two sides of a given dimension “belong” to two competing groups and because there is a process in place that moves the system on to a new dimension when the exploration of a given dimension is exhausted. Scholars are intensely driven by the prospect of beating “the others”—of bombing them out of the water by demonstrating definitively that the money multiplier really truly is large and stable over time—not! As a motivating force, the social utility of their research pales in comparison, which is just as well because the ultimate purpose of their research can be quite obscure at times.

Factionalism does not figure prominently, or even at all, in formal philosophies of science. The idea that factional conflict drives scientific progress sits uncomfortably with the normative ideal of the lone scholar in single-minded pursuit of the truth dispassionately engaging in classical hypothesis testing. The scientific process is loaded with social cognition and social emotions. If science is successful, it is because its motivational structures are consistent with the cognitive and emotional makeup of the human brain, and in particular with the human desire to cooperate in small groups and compete with other small groups. Factionalism is the motor of scientific progress, and historically

it is factionalism that has moved the university out of its ossification trap.

Disciplines ossify in a very peculiar way. Factional conflict keeps them moving, and so the inhabitants of a discipline tend to believe they are making progress over time, and indeed, sometimes they are. But one important function of the disciplines is to protect the established lines of inquiry, and when those lines become obsolete, they keep right on protecting.

Disciplinary job market and reward structures shape which kinds of inquiry are advantaged and which kinds are not. They tend to discourage interdisciplinary research, and since the cutting edge often lies in the interstices of the disciplines, this is a problem.

Disciplines are controlled by journal editors and leading scholars who collectively decide what gets published in the top journals, who is awarded tenure, and which activities are to be supported by grants and showered with honors. There are selection biases in place that create a tendency for self-perpetuation. Perhaps most importantly, there is a natural bias toward gerontocracy that benefits scholars who are in mid-career or even "over the hill." This is the group from which journal editors and leading scholars are drawn, and they will tend to favor traditional work and support clones of themselves.

Scholars are part of a scientific network that cuts across universities, and this network typically covers a specialized subfield within a discipline. In their home institution, scholars are members of a discipline-based department that includes many different specialized subfields. Like disciplines, departments consist of scholars who clone themselves in hiring and promotions because they feel emotionally more comfortable with people who think like them; because they feel threatened by newcomers with different ideas; and simply because the new is the wicked.

The logic of departments, however, differs from the logic of disciplines. Departments have two special problems: a morale problem and a problem of Balkanization. First, a department consists of a mix of cosmopolitan scholars who are part of national networks, scholars with local loyalties who are involved in teaching and administration, and scholars who have given up on life and are deeply frustrated. Second, the department contains a collection of narrowly specialized scholars who don't interact with each other intellectually because they don't speak the same language.

The morale problem is fundamental to the university because of the random nature of scientific progress. Some scholars work out, and most

don't, and many of the deeply specialized scholars who don't work out end up as flotsam. The value of the university lies in those who work out—it's just that it's impossible to predict in advance who that will be. Prediction is impossible because the attributes that make an individual scholar excel are only partially located in her brain—they mostly lie in the interaction between her brain, the surrounding brains, and the environment. The successful scholar is in the right place at the right time, and the idiosyncratic attributes of her brain connect with the idiosyncratic attributes of the brains around her in just the right way. With the right combustible mix in place, the resulting insights, which are collectively produced, find novel application to problems posed in the literature or the outside world. When this occurs, the effect is magical, and this is what the university is all about. The problem is, most of the time there is no magic, and the question is, what should we do with the empties?

The university is a cruel institution. It takes the best and the brightest, promises them the world, and then it throws most of them to the dogs. The vast majority of scholars start out as fresh-eyed and bushy-tailed newly minted assistant professors; their careers peak as they become tenured associate professors; and from then on their human capital declines steadily for reasons that are mostly not under their control. As a result, there is a lot of bitterness and resentment floating around in the heads of the tenured faculty. If the resulting morale problem is not properly addressed, it will stand in the way of intellectual renewal because frustrated faculty will clog the collective decision-making processes of the university. A well-designed university picks up its burned-out faculty and moves them into other activities they can take pride in, such as teaching or administration.

(Empathy with burned-out tenured faculty might come across as misplaced, given that the tenured faculty contribute to the overproduction of Ph.D.s, as a result of which many of the best and brightest never reach the level of assistant professor in the first place, which creates a lot of unhappiness. A mind is a terrible thing to waste, and this mass wastage of minds is a disgrace to the university. Politically speaking, however, frustrated tenured faculty are more important than are the rejects of the academy: the latter don't vote.)

To understand the problem of Balkanization—and to see why this is a hard problem—consider the example of an economics department whose stated goal is to hire and promote “excellence.” Of course the stated goal of the department will not generally correspond to the actual goals of all faculty in the department: there are always some faculty who

get very anxious about hiring and promoting scholars who are better than they are, and for this reason alone mediocrity can beat excellence. For now, let's go with the stated goal. It turns out that excellence is a rather vague goal, and once the highly specialized faculty begin to entertain concrete candidates, they will disagree violently on who is excellent. (Not that there is any actual violence: in this respect, the structures of the university are doing their job.) The economic theorists, the labor economists, the macroeconomists, and the economic historians—they all support different candidates, and since each group constitutes a minority in the department, no candidate would ever gain majority support if each group voted its preferences.

A malfunctioning department is Balkanized, and its members will not agree on anything, including hiring and promotions. Such a department will ossify quickly.

A well-functioning department will follow a decision-making process involving logrolling, that is, reciprocal deference to specialized subgroups. Today, it is the turn of the labor economists to identify their desired candidate, and everybody else holds their nose and votes along. Tomorrow, it is the turn of the macroeconomists, and everybody supports *their* selection sight unseen.

As a result of this universalistic decision-making process, the department will tend to hire and promote ever more of the same: scholars who are excellent as conceived by traditionally defined and narrowly specialized groups. Suppose the cutting edge in economics is a new field that encompasses parts of traditional fields (an example might be political economy, which cuts across monetary economics, international trade, public finance, and much else besides). Or suppose the cutting edge is not represented in the department at all (an example might be behavioral and experimental economics, which includes elements of psychology and uses empirical tools that are not standard fare in other subfields of economics). Then the department will fail to hire candidates on the cutting edge because the labor economists and the macroeconomists will use their turn to hire clones of themselves. And if the department hires one of "them" by accident, the outsider will do less well come promotion time because departmental resources are allocated by subfield and the political support structures are tied to the subfields. Thus, there is a seminar series in labor economics and in macroeconomics, and not in political economy or experimental economics, and so the scholarly misfit will have relatively less opportunity to connect with his peer group. External labor economists and macroeconomists, not political economists or experimental economists, are asked to write

tenure letters, and so the scholar who is neither fish nor fowl will end up looking weaker than he really is—on paper, which is what matters in a bureaucratic promotion system.

And of course if the cutting edge involves interdisciplinary inquiry, an economics department that is oriented exclusively toward meeting the standards of the discipline of economics cannot cope at all.

But let us not kill the departments and disciplines all too quickly. They have evolved to protect scholars from each other and from the outside world, and their protection function is all too easily overlooked. Structures that mute conflict tend to be underappreciated when they do an excellent job because little if any conflict is observed in equilibrium—and so people forget about the problem that is being solved by the structures and “see” only the pathological implications of the structures. Based on their partial understanding, they propose structural reform. It is only when the structures are torn down and conflict breaks out that it becomes apparent that the structures were doing some good.

Consider, for a moment, an economist and a historian who are coming up for tenure. They have very different takes on the issue of globalization. The economist thinks “more is better,” and he has money and material goods in mind. In his Panglossian world, everybody benefits from free trade, especially the poorest of the poor, and if the countries that are political and economic basketcases would only adopt the superior political and economic institutions of the West, they could work their way out of poverty and achieve the same high standards of living as the West.

In comparison, the historian looks through the glass darkly. She sees globalization as the direct descendant of colonialism and imperialism. If the West is rich (and it is of course merely materially rich; spiritually it is impoverished), it is because the West stole from the poor—it extracted resources from the countries it colonized and as a by-product screwed them up politically and economically, which is why many of the former colonies are such a mess.

The economist despises the historian for her nonrigorous method—thick description of local and historical detail, no grand theory, lots of left-wing ideology. The historian is horrified at the way the economist acts as if a reductionist theory can apply universally to all countries and explain all of history: what an impoverished understanding it is that economics promotes!

Now imagine the two (or their friends in their respective departments) could vote on each others' tenure cases. It would be a disaster. Neither of them would survive. And yet it is arguably useful for the uni-

versity to have both (or even more than two) sides of the globalization debate represented in its walls. And it does—because the tenure process neatly separates faculty who can't possibly get along: economists vote on economists, and historians vote on historians.

Deeply specialized scholars and discipline-based departments are the way they are for good reason. They are the engines behind scientific progress, a dynamic force that has changed the face of the earth, and yet they are deeply conservative.

Managing Change in the University

Universities are all about deep specialization. This is why they can get stuck in time—and do. The question is how institutions can be designed to remain intellectually vibrant and structurally pliable even if their component parts necessarily ossify.

At the level of the individual scholar, little if anything can be done; ditto at the level of the departments and disciplines. At the level of the institution, there is hope, though history tells us that there is no easy solution to “the problem of the university.”

The single most important factor affecting the quality and content of the research and teaching in an institution—the factor that determines whether the institution is on the knowledge production frontier—is the selection of academic personnel. For good *and* for bad, the selection of academic personnel (recruiting and promotions to tenure) is firmly controlled by the departments, which are self-governed and self-perpetuating.

So what's a reform-minded university leader supposed to do? The decision-making processes in her departments are impenetrable. She cannot effectively order the departments to hire and promote scholars on the cutting edge: she does not have the specialized expertise to challenge the faculty if they fail to do her bidding. For the same reason, a university president cannot set up an effective incentive scheme. If she promises a 10 percent pay raise to the faculty in all departments whose hiring and promotion practices are on the cutting edge, one of two things will happen. Either the faculty will claim that they are hiring and promoting on the cutting edge, in which case the president lacks the wherewithall to check the faculty's claims. Or, if the president defines an operational measure of the cutting edge, the faculty will play to the measure, and since the measure is necessarily simplistic relative to the reality of the (deeply specialized) cutting edge, the incentive scheme

will end up backfiring awfully. In the last resort, the president could get rid of the departments altogether. But departments are efficient ways of collecting deeply specialized scholars and organizing their teaching. And in the modern era it is highly ranked departments that define a highly ranked university, and the ambitious president cares deeply about improving her rankings.

What the president can do is put into place structures that promote internal competition and thereby exert pressure on the departments to become more flexible and nimble-minded. Internal competition can be achieved by piling cross-cutting structures on top of the departmental structures. For example, an interdisciplinary program might draw on the discipline-based departments to staff its courses. Internal competition can also be put into place by linking units of the university that naturally have something in common even while they pander to different constituencies. For example, there is an overlap in the research and teaching of the economics department and the business school.

The idea is to connect the units of the university in a way that encourages resources to flow in the direction of (relatively) better performance. So, for example, if the interdisciplinary program is vibrant and does a better job at attracting students than do the discipline-based departments, then the dean could allocate faculty positions to the interdisciplinary program. The faculty who get hired into the interdisciplinary program would be housed in one of the feeder departments, which ensures that there is some discipline-based quality control going on. The presence of the interdisciplinary program changes the personnel selection process in a subtle way: the departments retain their veto powers but they lose their agenda-setting powers—they can prevent candidates from getting hired and promoted, but they cannot select candidates. This solution is not perfect: there will be some excellent interdisciplinary candidates who will not pass muster with the departments. But it does allow for change at the margin: there will be some candidates whom the departments would not have chosen to put on the agenda, but once those candidates are on the agenda, especially if they are not seen to be directly competing with candidates the departments have identified as their own, they can attract a majority of the departmental vote. With this solution in place, the home departments will grow over time in the direction of the interdisciplinary “action.”

Along the same lines, both the economics department and the business school could offer business economics to undergraduates. If students self-select into the courses taught by the business school because the faculty in the business school take teaching more seriously, and if

resources follow the flow of students, there will come a point where the economics department will have to rethink its "take-no-prisoners" approach to undergraduate teaching and overhaul its dated curriculum.

To promote change, decentralized structures must preserve diversity even while they enable competition. Diversity is valuable for two reasons. First, it keeps a multiplicity of perspectives alive. The scientific process is inherently deeply uncertain: we do not know which strains of research and teaching will be valuable tomorrow. Universities need to hedge their bets. When the action moves on, they must have someone on the ground who will pick up the ball. Second, diversity allows experimentation to occur. Diverse departments engage in different activities, and some activities will turn out to be more successful than others. The less successful departments can then adopt the successful experiments.

Diversity and competition complement each other: it is diversity that makes people and projects stand out in the first place, and it is competition that allows for the dissemination of better-performing strategies and successful experiments.

To preserve diversity, decentralized structures must be messy and loose. The competition between the units must be limited in scope. All-engulfing competition has a tendency to homogenize—if everybody is chasing the same rewards under identical environmental constraints, everybody will end up behaving the same way, and if there are selection effects, there will be a homogenization of types.

One way to limit competition is to put multiple cross-cutting and partially contradictory performance criteria into place. Different departments can then choose to meet different combinations of criteria. This way each department is forced to confront competitive pressures, and yet it can maintain a unique profile because it gets evaluated by a unique combination of performance standards.

Designing effective decentralized structures is difficult because we must give up our natural tendency to think in binary extremes. On the one hand, we do not want each academic unit to operate as an independent and isolated island, with no performance measure in sight. This will lead to poor performance in research and teaching for sure. On the other hand, we do not want to put into place simplistic quantitative performance standards that apply uniformly to all units. Such a scheme will surely backfire, first, because it fails to respect local detail and, second, because faculty will max out on the dimension of their performance that is being measured even while they continue to shirk on other dimensions.

While it is important to implement some degree of competition, which necessarily implies the use of performance standards, we must avoid incentivizing everything in sight. The university must retain some free and open spaces for playful exploration and random happenings. There is a need for incentives, but incentive schemes should not be so tightly wound that they prevent faculty from working on projects that will pay off only in the long term, or that are high-risk high-return, or politically controversial.

Leaving slack in the system makes state legislators nervous because they suspect that the slack will be exploited by lazy deadwood faculty, and they don't want the taxpayer to pay good salaries to faculty who are doing nothing but living the good life. But we must keep in mind that it is not the first goal of the university to avoid paying faculty for doing nothing. (Indeed, given the potentially debilitating morale problem of the university, there is something to be said for paying the nonproductive faculty well.) The first goal of the university is to enable deep specialization, and if there is one thing history tells us, it is that deep specialization occurs when scholars are given a room of their own—unsupervised and unincentivized slack, for short.

Last but not least, ossification depends on the university's relationship to the outside world. Departments and disciplines that are not linked to constituencies outside the university can keep right on trucking in self-referential circles. They will move with the times if they are permeable to the outside world. In medicine, faculty who want to get National Institutes of Health (NIH) grants must select research topics and employ methods that find the approval of the NIH, and since the NIH is tied to Congress, and Congress is accountable to the American people, new developments in the external society feed into the medical schools and influence medical research. Thus, we now examine whether doctors treat African American patients differently, and we now include women subjects in medical trials.

In the short space of a decade, biology has completely resliced itself as a discipline in response to the external job and profit opportunities offered by biotechnology. The case of biology is instructive because it shows us how important it is not to go all the way: molecular biology has lost its slack because it has been taken over by the profit motive. Ideally, the university is partially permeable to the outside world, and it is best for it to have multiple cross-cutting connections and multiple contradictory external constituencies.

Managing change in the university is not about putting centralized command-and-control systems in place or defining simplistic profit

centers and performance standards or infusing the university with business values—this would be the death of the university. On the other hand, if the university is left in the hands of the faculty, it will surely turn into bone. Managing change is about designing decentralized structures that encourage competition, preserve diversity, and keep the university connected to the outside world.