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A Humanistic Academic Environment for Learning Undergraduate Mathematics

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Liberal Education in the Liberal Sense

Speech for the Brown University Graduate Commencement Ceremonies

May 25, 1992

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This past spring, the Brown University Graduate Commencement featured two student speakers, of which I was one. My speech was inspired by the contrast between my own devotion to intellectual pursuits in every field (but especially in mathematics and poetry) and the very different, disparaging views of academia which I've encountered in my students and colleagues alike.

The premise of my speech was that professional and personal reasons abound for pursuing knowledge in multiple disciplines. Being a graduate student with little exposure to the existing literature, when I first set about writing this speech I believed that I was a modern pioneer. I quickly realized that this was not at all the case. Within the past decade treatises have been written on this subject, conferences have been held, books have been published. The ten minute time limit on my speech, despite my concentrated efforts at paring, was exceeded.

I was struck by the response that I received—I seem to have struck a chord that was eager to resonate. People approached me with further examples, personal anecdotes, and practical and philosophical arguments supporting my views. I do not take this as a sign that the majority is “on my side” or even that times are changing; but I am indeed encouraged by the strength and support that is available for those of us who dare to be diverse.

Members of the Board, Distinguished Deans, Honored Guests, but especially to all those who are graduating today—congratulations! Today, after these ceremonies are over we will spill out into Thayer Street like so many marbles spilled out of a bucket, and we will roll off in our own directions to take our places in the world. What I would like to talk about—briefly—is a matter that touches our lives as academics and scholars, and that is the question of how others perceive our work. By “others” I don't mean just colleagues or administrators, I mean the public, our students, our

friends and family. And by that token, I'll also discuss the way in which we view fields other than our own.

When mathematicians tell people what we do, more often than not we hear, “Oh, I never could do math!” While it's true that the nation is not as mathematically literate as we'd like it to be, what is especially disturbing is the implicit pride in their ignorance. Would these same people say, “Oh, I never could learn to read!”? And yet this theme of noble disdain is heard across the disciplines. “I never could memorize dates, balance my checkbook, learn to spell, read poems that don't rhyme”.

Yet another disturbing aspect of these replies is their tendency to reject the deepest and most beautiful aspects of a field for a superficial stereotype. I wish I could say that with advanced education, the prejudice against delving beneath the surface of a subject not one's own disappears, but

There is a perception that human beings are more wholesome when ignorant and more ingenuous when they shed their excess intellectual baggage.

I'm afraid I can't. The Council for the International Exchange of Scholars reported last year that many American scholars see foreign travel as irrelevant to their fields—and *therefore* they don't attempt it¹. As another example, Harold Howe, former Vice President of the Ford Foundation, recently lamented that in “a country with the greatest and most pervasive commitment to education in all its forms of any other in the world,” the subject of pedagogy is still disparaged². “Pedagogy” is not only the method but also the art of teaching.

Why do these attitudes persist? In some fields, such as education, it is a matter of snobbery. In other, especially the sciences, the answer often contains some aspect of fear. Consider for example Shelia Tobias' hit *Overcoming Math Anxiety*³. Newly emerging fields are considered frivolous or overly political (Women's studies and Semiotics are good examples of this). Pecuniary decisions play an important role: what does one do with a degree in archeology? But most frequently, there is a perception that human beings are more wholesome when ignorant and more ingenuous when they shed their excess intellectual baggage:

"I took four years of French in High-school and now I don't remember a word." If somebody said that to you, would you be more likely to say, "I'm sorry to hear it," or "Yeah, me neither"?

That these attitudes persist even among well-educated persons within liberal arts institutions is often laid at the door of efficiency. Today's graduate institutions, the argument goes,

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are becoming more-and-more institutes for advanced research and less-and-less centers dedicated to broad-based knowledge. A scholar of early European literature who wants to learn more about issues of race and ethnicity, or a physicist who wishes to devote part of her summer to improving her teaching, soon learns that these 'extra-curricular' activities hamper research and thereby the time-to-dissertation or the chances of getting tenure. In terms of reward systems, it becomes apparent to graduate students and struggling young that the university hires molecular biologists and classicists rather than scholars in the broad sense. The argument concludes: We have ceased to be a nation of universities, and instead have become a nation of multiversities. Because so much of this argument focuses on the question of whether these phenomena are new or whether they are deeply entrenched in tradition, I'd like to give a

highly-expurgated) version of the history of graduate education.

At the end of the eleventh century, itinerant teachers began settling near monastic schools in Bologna, Salerno, Paris, Oxford, and Cambridge. The first universities were not intentionally designed to be centers of knowledge; they were actually formed as guilds or trade unions which were associated with the nearby school (*Universitas Magistrorum et Scholarium*). Paris in 1200, was the first University to receive a charter, which meant that they were permitted to offer degrees which conferred upon the recipient the right to teach anywhere in the kingdom. As an aside, the first student to flunk did so out of Paris in 1426. It may not surprise you that he sued the University. (His suit was unsuccessful)⁴.

Graduate education in the United States is incredibly new. Prior to the 1870's, colleges were often directed by the clergy, who were more concerned with orthodoxy and decorum than with learning. The first president of the University of Chicago, Dr. Harper, was an avowed critic of the American educational system, saying that it had "actually destroyed the intellectual growth of thousands of strong and able men."⁵ And, of course, that wasn't even half the problem!

Although there were places that offered limited graduate education (Brown had graduate students as early as 1859), there was no place which had a program devoted entirely or in the main to graduate education and research. As late as 1874, the President of Harvard University declared it would be impossible to "deliberately undertake" such a program⁷. But two years later in 1876, John Hopkins University opened the first American graduate school and likewise a new era in American education. When Brown University boasts of a graduate school that is over a hundred years old, it places itself among the innovators of that era.

It becomes apparent that graduate education was formed in the United States not so much out of lofty ideals as out of a more fundamental pragmatism. Graduate schools were designed to meet the needs of a society that was ready to blossom academically, but which was notoriously ill served by the current state of affairs.

One of the unusual aspects of American education today is its emphasis on the liberal arts, modelled after the German principles of *Lehrfreiheit* and *Lernfreiheit*. A college student in the U.S. is not required to declare a major until almost half-way through college—the sophomore year. Compare this with systems in other countries where students begin specializing in high-school if not earlier. An undergraduate education in the U.S. emphasizes and at some schools mandates curricular diversity. And yet, in 1978 Joseph Duffey, then Chair of the National Endowment for the Humanities, estimated that seventy percent of our undergraduates are pre-law or pre-med, and that only one in sixteen major in the humanities⁸.

By the time we reach graduate school, the impetus to expand our intellectual horizons has been replaced with demands that we focus our knowledge. The rewards for specialization at the expense of extra-departmental scholarship are tangible: passing prelims, promotion, tenure. And when you see the light at the end of the tunnel, it's hard to change course. It has been said that the definition of originality in graduate students is "the capability to present their professors' ideas back to them in a way that they'd never thought of before."

What view does this give us as we leave? I'm afraid I have painted a much drearier picture than I wanted to. The rewards for academic diversity may be less forthcoming and less tangible, but they are not less. Reaching beyond the academic borders of one's discipline results in "bridges built, inertia combatted, old icons broken"⁹. What is often lacking in external impetus is made up for in buckets by our individual aspirations, which are in turn made more feasible by the rhetoric, if not the finances devoted to scholarship and liberal education in their most liberal sense. In the most ideal and idealized worlds, we truly become the "teachers of the love of wisdom", doctors of philosophy. I would like to close with a quotation by Kenneth Boulding, former president of both the American Association

for the Advancement of Science and the American Economic Association:

It may well be that the only answer to this problem [of generalization versus specialization] is redundancy, inefficiency, extravagance, and waste. [But] One could indeed argue that the main reason for getting rich, that is to say, for economic development, is to permit the human race to indulge in these last four delights.¹⁰

Thank you very much.

FOOTNOTES

1. C. D. Goodwin and M. Nacht, ("Missing the Boat: the failure to internationalize American higher education", Cambridge University Press, 1991)

2. Harold Howe II, *Foreword*, (American Graduate Schools of Education, 1982), p. vi

3. Sheila Tobias, ("Overcoming Math Anxiety", Houghton Mifflin: Boston, 1980)

4. W. H. Rouse Ball, ("A Short Account of the History of Mathematics", Dover Publications, 1960), pp. 139-143.

5. W. Carson Ryan, ("Studies in Early Graduate Education", The Carnegie Foundation for the Advancement of Teaching, 1939), pp. 3-14.

6. *ibid.*

7. *ibid.*

8. Joseph Duffey, *Graduate Education: A Case for the Public Interest*, ("The Philosophy and Future of Graduate Education", The University of Michigan Press, 1978), pp. 1-6.

9. C. D. Goodwin and M. Nacht, *op. cit.*, p. 49.

10. Kenneth E. Boulding, *Graduate Education as Ritual and Substance*, ("The Philosophy and Future of Graduate Education", The University of Michigan Press, 1978), pp. 143-155.