DISCIPLINES

INTERDISCIPLINARITY

NEW CENTURY

PAGINA EN BLANCO

Disciplines and Interdisciplinarity in the New Century

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and
INTERDISCIPLINARITY
in the
NEW CENTURY

Edited by

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THE UNIVERSITY *of* SOUTHWESTERN LOUISIANA

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The cover illustration is an eighteenth-century French marine compass, sold by Guillotin à Honfleur. The compass rose is engraved on a magnetic plate constructed by de La Haye at Le Havre. Courtesy of the Stewart Museum at the Fort on St Helen's Island, Montreal, Quebec, Canada.

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Preface

The present volume collects papers presented at the Second Graduate School Colloquium of the University of Southwestern Louisiana, held late in the autumn of 1996. The theme is interdisciplinarity. The contributions reflect an acute tension between the prescribed rules for plowing straight furrows in a particular field, on the one hand, and the evocative opportunities suggested by the unblemished verdure across the fence in a neighboring field, on the other hand. The tension animates much discussion in universities today, but the colloquium suggests that disciplines undergo a process of evolution that is the natural condition of academic life.

We open with a lecture by Russell McCormmach about the burdens of the humanities and the sciences in the early part of our century. As the distinguished founding editor of the series *Historical Studies in the Physical Sciences*, McCormmach trained an entire generation in the art and the tradition of clear writing and persuasive scholarship from his positions at the University of Pennsylvania and Johns Hopkins University. His own research resulted in a prize-winning history of theoretical physics in Germany from Martin Ohm to Albert Einstein, *The Intellectual Mastery of Nature*, which he published in collaboration with his wife, Christa Jungnickel. He is known to wider circles for his novel, *Night Thoughts of a Classical Physicist*, a tale of the last day in the life of an old German professor during the waning months of the First World War, in which every incident is referenced by appeal to a corresponding archival record. This year he will publish with the American Philosophical Society, under his own name and that of his late wife, a study of the eighteenth-century natural philosopher Henry Cavendish. Echoes of McCormmach's style, built on clarity and concrete particulars, may be found at institutions of higher learning across the nation.

The volume concludes with a lecture delivered at USL by Philip Stratford about the rewards and the costs of translation. Stratford is the father of the tradition of literary translation between English and French in Canada, perhaps the world's

most problematic bilingual country. An authority on Graham Greene and François Mauriac (he edited the highly successful *Portable Graham Greene*), Stratford is the author of prize-winning translations of works by Antonine Maillet and René Lévesque, among other distinguished writers. The author and illustrator of children's books, in recent years he has turned to poetry and drama, producing a stream of collections, including *The Rage of Space*, a poetical exploration of astronomy and space exploration; *Seven Seasons*, an intimate portrait of the poet; and *Verse Portraits*, three poem cycles about painters Monet, Cézanne, and Matisse. He has completed a poetical *Guide to the Museums of Paris*, and he is presently at work on a collaborative, poetical defense of a united Canada. His interests range from the galaxies to snowflakes. On the latter:

It makes you think
(if you think at all)
of things both big
and very small.
Way up among
the vapour trails
they're born from specks
in comet tails.

He sees the natural world in human dimensions. He wrote about the 1996 referendum in Quebec over separation from Canada, "The best thing that could happen the night of Oct 30 would be about 15" of the white stuff. That would bring everyone back to reality (especially if we could say: 'It's no!')." Snow plays no linguistic favorites, he contends:

Snow à Montréal

The snow elle tombe
La neige it falls
La snow is falling
A little partout
La neige is tombé
Here et là
The snow, la neige
Est everyoù
The snow is tombing
Ci and there
La neige est fallé
All autour
La neige the snow
The snow la neige
At last the neige
Enfin la snow

Russell McCormmach patiently tried to instruct me in reading and writing when I was starting out. Philip Stratford lived down the road when I taught in Montreal. Both scholars reflected on the heavens. Russell McCormmach taught me about the history of Einstein's relativity, and Philip Stratford taught me how to see the phases of the moon. In an age when academics seek to become media *stars* (the term emerged in the nineteenth century just as the number of known stars in the heavens came to rival the population of the human race), the dedicated and penetrating labor of these modest scholars has much to commend. Their lectures are offered here in the hope that their thoughts may receive wider attention.

Memorial Day, 1997

PAGINA EN BLANCO

Disciplines and Interdisciplinarity in the New Century

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Albert Einstein and Hermann Broch: Science and Art in a World in Crisis

by
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In the following pages I shall address a subject that I have been studying in connection with my teaching. It is the broad subject of ethics and science in recent history. I will talk about it in connection with Albert Einstein and, for comparison, with his friend the artist Hermann Broch. I will focus on Einstein and Broch toward the end of their careers, around the time of World War II. It was the time when, I believe, their ethical and intellectual characters were especially clearly shown. Both men responded publicly on the basis of ethical convictions to the political criminality of the time. Both also retained their passionate dedication to their intellectual work.

In the background of my discussion of Einstein and Broch are recent threats to Western civilization. Much of what we prize in Western civilization was threatened by Naziism, with its combination of imperialist politics with scientific-technical warfare and an inhuman view of life justified by racist doctrine. A second threat to Western civilization was a response to Naziism and an application of science to war technology, the construction in America of the atomic bomb, motivated by the prospect that German scientists would produce the bomb for Hitler. The Nazis were defeated before German scientists had made much progress toward the atomic bomb. The bomb built by scientists in America was dropped instead on Japan, an originally unintended target for this spectacular means of human and material destruction. It brought the world war to a close and at the same time showed the world the greatly magnified power of science in war, one which would appear unlimited with the construction of the hydrogen bomb a few years later.

If we were were to list the horrors of recent time, the worst, the next worst, and so on, we would come up with different, but certainly overlapping, lists. I suspect that we would all rank

high the murder of millions of Jews and other peoples under Hitler's Germany and—whatever we think of its justification—the destruction of Japanese cities by American atomic bombs. At the end of World War II, many would have similarly ranked these two horrors. The killing of millions in the war and the prospect of an even more massive slaughter in the future brought into question the prospects of Western, if not world, civilization.

The end of World War II was a time of tempered hope, too. In light of the recent past and the imaginable future, leaders of the powerful states might be compelled to act responsibly and take steps to insure against another great war. Among the realistically hopeful and humane critics of the actions of politicians and the publics who supported them were a number of scientists and artists who included the physical scientist who was perhaps the most gifted since Newton, and one of the century's greatest writers of fiction—Einstein and Broch.

Einstein was out of the country when Hitler came to power in Germany in January 1933. He did not return and instead renounced his German citizenship, which did not stop the Nazis from revoking it right afterward, and he would have been forced out of his job at the Prussian Academy of Sciences if he had not acted promptly and resigned. Late in 1933 Einstein settled permanently in Princeton, New Jersey, with a position at the Institute for Advanced Study.

In 1933 Broch was living in his native Vienna, eking out a living by writing. With the Nazis in power in Germany, it was an especially difficult time for him, for he was no longer able to publish his writings in that country. By the time Germany annexed Austria, Broch was living in the Austrian mountains, where he was promptly arrested and jailed. Upon release he spent several months in Vienna frantically seeking a visa and fearing another arrest. After obtaining an English visa, he went to London; then, on an American visa, he set sail for the New World convinced that war was coming.

Although Einstein and Broch largely escaped physical persecution by the Nazis, they *were* driven from their homes and the social and cultural life they had known. As men of compassion and imagination, they were not spared, for they watched those left behind systematically denied livelihood, legal protection, human dignity, freedom, and, ultimately, the right to exist.

Einstein worked as a theoretical physicist for his entire adult life. In the ten years from 1905 to 1915, while successively examining patents in Switzerland, teaching in universities in several European countries, and holding a research post in the Prussian Academy of Sciences, Einstein completed his special and general theories of relativity and helped lay the foundations of the quantum theory. His scientific reputation largely rests on these early contributions.

From the mid-1920s the direction that the new quantum mechanics set for physics conflicted with Einstein's convictions about the nature of physical reality and the way physicists may describe it completely. Through his penetrating criticisms of quantum mechanics, he continued to clarify the foundations of physics. Most important to Einstein, however, was the constructive work that lay ahead. Developing the ideas he had worked on from almost the start of his career, Einstein sought to extend the theory of physical fields to encompass all of physical reality, the unifying task that remained the heart of his work to the end. Both Einstein's critical and constructive work in physics related to what he saw as the "ultimate goal" of all dedicated researchers; namely, to secure a "foundation of the whole of physics," by which he meant a "unifying theoretical basis . . . , from which all concepts and relationships of the single discipline [constituting the branches of physics] might be derived by logical process."[1]

Einstein pursued this unifying work by constructing one after another "unified field theory." In 1925 he thought that he had at last united the then two fundamental fields of physics, the gravitational and the electromagnetic, by permitting the fundamental quantity entering general relativistic theories, the metrical tensor, to be nonsymmetric. But the theory did not hold up, nor did the next theory, in 1928, based on the concept of distant parallelism. In 1930 he tried a five-dimensional theory. One after another, his theories ended up in the wastebasket after months or years of work. Undaunted by failure, he remained convinced that a unified field theory was a possibility, a hopeful path to follow toward a total theory of physics. There were tantalizing partial successes along the way, such as his proof, in the late 1930s, that the equations of the field contained the equations

[1]Albert Einstein, "The Fundamentals of Theoretical Physics," *Ideas and Opinions* (New York, 1954), p. 316.

of motion of bodies, a great advance in the unity, simplicity, and harmony of the theory. Einstein's unified field theory of 1945 was the one which, with variations, he continued to work on the rest of his life. In this theory, based, like his theory of twenty years before, on a nonsymmetrical metrical tensor, matter itself was contained in the field equations as a kind of concentration of the field or, technically speaking, as singularity-free solutions of the field equations. This theory embodied a unity of matter and field, which previous theories of physics usually treated as distinct entities, but it was still incomplete. For a while, a good many other physicists worked on Einsteinian unified field theories, but their number fell off as the search seemed increasingly unpromising. They came to think of Einstein as misguided in his continuing search. In fact, many physicists had a barely concealed contempt for Einstein's search, viewing it as a symptom of a reactionary spirit in one whose ideas a few years back had been anything but reactionary. Einstein spoke of the solitude that his unorthodox views on physics had forced on him.[2]

To many looking on, Einstein was professionally baffling as he persisted in his search for a unified field theory. They believed that if Einstein could not accept the new understanding of physics, he should concede that physics had gone in a more fruitful direction than his own and stop trying to reverse this direction. Distinguished physicists before him had done just that; they busied themselves with official responsibilities, and, in what spare time they had, they wrote on the history and philosophy of physics. Einstein did a minimum of these things. While working on the unified field theory, he wrote to a friend that what remained in his life was the "relentless work on difficult scientific problems," confident that the "fascinating magic of that work will continue to my last breath."[3]

By persevering in his search for a unified field theory with the same tenacity he had shown in his years of precocious invention, Einstein acted on his early understanding of the work of the truly original physicist. He believed that through his work the physicist, like the artist, seeks escape from the "personal," from the "painful crudity and hopeless dreariness"

[2]Banesh Hoffman, *Albert Einstein, Creator and Rebel* (New York, 1972), p. 228.

[3]Otto Nathan and Heinz Norden, ed., *Einstein on Peace* (New York, 1968), p. 554.

of everyday life. Einstein said that the physicist, like the artist, fashions a "simplified and intelligible picture of the world; he then tries to some extent to substitute this cosmos of his for the world of experience, and thus to overcome it. . . . Each makes this cosmos and its construction the pivot of his emotional life, in order to find in this way the peace and security which he cannot find within the narrow whirlpool of personal experience."[4] To the end of his life, Einstein escaped the "crudity" and "dreariness" of everyday his work, but he did not—and would not have wanted to—escape the ethical concerns of his day.

Broch was a writer nearly all of his working life. He had an uncommon start, for he was expected to become, like his father, a textile manufacturer in Austria. Dutifully, he prepared for the profession and went to work in the family firm, taking it over after his father's death in 1915. For the next ten years, he was, as he put it, a captain of industry. At the same time he began publishing philosophical and critical essays and occasional literature. In 1927 he sold the family firm so that he could devote himself to writing and continuing study.

Broch was greatly attracted to physics, Einstein's science. At the University of Vienna before World War I, he heard the great classical physicist Ludwig Boltzmann lecture on the philosophy of science. Upon his return to the university after the war, he deepened his knowledge of physics and the philosophy of science by studying with the Vienna Circle positivists and by attending classes on relativity theory and atomic physics. At one point, he planned to write a biography of the great German classical physicist and physiologist Hermann von Helmholtz; like many of his plans he did not carry this one out, but he did write a film script for a movie on relativity theory, a fictional treatment of an expedition to the South Sea Islands to test Einstein's prediction of the bending of light around the sun. (In fact, Broch planned to write a spectacular series of six movies on scientists, with which he hoped to combat the anti-intellectualism of the 1930s. Nothing came of it but a vast and futile correspondence with Warner Brothers.)

From the start, Broch discussed and developed his art in relation to science, especially to the new physics, believing that it

[4]Einstein, "Principles of Research," *Ideas and Opinions* (New York, 1954), pp. 220–1.

was left to the extrascientific, to literature, to treat the irrational, metaphysical side of experience. Moreover, he believed that since philosophy, like science, pursued its goals independently of outside values, it was again left to the extrascientific, to literature, to seek common values. As Broch explained in connection with his first novel, *The Sleepwalkers,* "Literature must concern itself with those human problems that are rejected by science because they are not open to rational treatment . . . and with those problems whose solution science, in its slower and more precise progress, has not yet reached."

To Broch, science and art have a common goal. As an artist, Broch fully understood Einstein's striving to contain, in principle, all physical phenomena within his theories. He believed that the writer and the scientist both seek an all-inclusive "world picture," that the goal of totality is inseparable from the work of each, and only their means differ. Science is a patient method of thought, penetrating the world by infinitely small steps, whereas art presents the world by symbols, impatiently, at once. The task of the writer is to bring together the world pictures, the partial visions of reality, of his time, including those of the scientist. They are the writer's vocabulary of reality, to which he applies his artistic syntax to give them meaning.[5]

Although scientific themes and characters do not enter his first novel, Broch drew on Einstein's theory of relativity to explain, if not to develop, its literary form. Broch's second novel, *The Unknown Quantity*, treats scientific themes and characters explicitly, the main character being a physicist and mathematician who expounds Einstein's theory and who tries to understand the personal meaning of his attraction to science. In Broch's last novel, *The Guiltless*, the two main characters discuss Einstein's theory at length.

Great as Broch's interest was in the new physics, he was interested even more in its relation to the mentality of the times. Whatever happened in physics, he believed, must happen elsewhere. Before World War I he had already convinced himself that the new physics, above all Einstein's theory, had signaled a revolution in thought, including ethics and aesthetics, and because for him revolutions in thought rather than political and

[5]Hermann Broch, "Das Weltbild des Romans" and "Einheit wissenschaftlicher und dichterischer Erkenntnis," *Gesammelte Werke* (Zurich, 1953–61), vol. 6, pp. 211–38, and vol. 7, pp. 83–87.

economic forces bring about historical change, he believed that the new physics was already deeply implicated in the evolving life of humanity.

In Broch's fiction, values, not science, hold principal interest, but science entered his understanding of values as the dominant direction of thought responsible for the development of pure, autonomous "value regions." Just as we speak of "science for itself," Broch observed, we speak of "art for itself."[6] In 1932, in his essay "Joyce and the Present Age," Broch wrote: "It is almost as though literature had been obliged to go through all the hells of art for art's sake before it could undertake the extraordinary task of bringing all esthetic elements under the dominion of the ethical."[7] In another way, too, science entered Broch's understanding of literature. Science is a method of gaining new knowledge, and knowledge can work against the "destruction and decay of values." To contribute to this work of healing, literature, too, must assume the "ethical task of cognition." In the present age, Broch concluded, "the work of art without an ethical aim is no longer valid."[8]

Broch's ethical thought can be seen in the spate of minor critical writings he published right after the war and in his theoretical writings on politics from the late 1930s. It can be seen in his novels, too, especially in their concern with politics. *The Sleepwalkers* portrayed the disintegration of German society, culminating in World War I and its immediate aftermath, a prophetic analysis of the condition—a "vacuum of values"—that brought on Hitler. His unfinished "Mountain Novel"—published posthumously as *Der Versucher*—attacked the political practice and ideology of the Nazis. His most explicitly political novel, *The Guiltless,* pointed to the indifference of Germans as the main reason for Hitler's success. Unlike his other novels, *The Death of Virgil* did not deal directly with twentieth-century problems, but it displayed Broch's ethical concerns as an artist in his relation to the political events he had experienced.

Broch was alarmed by what he saw as a European crisis of values, to which he responded by questioning the legitimacy of

[6]Broch, "Einheit wissenschaftlicher," *Gesammelte,* vol. 7, p. 85.

[7]Maria Jolas, ed., *A James Joyce Yearbook* (Paris, 1949), p. 105.

[8]Ibid., pp. 105, 107.

his art. As early as 1933, Broch raised the question in a talk on literature at the end of culture. He answered it in the affirmative at that time, arguing that art was a religion for the irreligious, and that it was a source of intuitive knowledge anticipating scientific knowledge. Then in 1937, Broch read a short story over the Viennese Radio that told of a dying Virgil who doubted the value of poetry, and although in the story, Virgil answered his own doubts, his answer did not long satisfy Broch. Through his successive rewritings and expansions of the story, Broch's doubts grew more radical.

Long before writing *The Death of Virgil*, Broch had noted a parallel between his own times and those of Imperial Rome. Although Christianity had not yet arrived, Virgil's times marked the end of paganism, a time when the old religious forms and values were dead. The Romans had their dictators, and they had been at civil war and murder. The decline of Europe in the twentieth century was foretold in the decline of ancient Rome.

The Death of Virgil covers the last night and day of Virgil, the greatest poet of his day. Although Broch's Virgil was very much his own invention, he drew on what he knew of the historical Virgil. In 19 B.C., Virgil went to Greece, presumably to obtain more local knowledge to finish his great poem the *Aeneid*, where he came down with a fever, and on returning to Italy he soon died. Legend has it that he left instructions to burn the incomplete *Aeneid* but that on Caesar Augustus's orders it was published. The poem glorified Rome, and it was admired for its aesthetic perfection.

The novel—which Broch referred to as a poem like the *Aeneid* itself and not as a novel—opens with Virgil's return from Greece to Italy and ends with his interior journey to death. In the loneliness of the night after he arrives in Italy, he reviews the whole course of his life. The next day he is visited by his friend Caesar Augustus, to whom he explains and defends his intention to burn the unfinished *Aeneid*, the manuscript of which he has beside him and on which he has worked for ten years. His intention to burn the *Aeneid* motivates the central arguments of the novel.

In confronting death, Broch's Virgil, for the first time, questions the meaning of art, which he has made his lifework. He realizes that in poetry "beauty in itself was never the impor-

tant thing."[9] Poetry must go beyond aesthetic boundaries, seek truth, and convey a knowledge of real life. He recalls his own medical studies and thinks that he "should have become a physician," serving humanity in that way. Feverish, he comes to see that his goals are not what he thought they were, aesthetic, but "knowledge . . . truth . . . perception." Up to then, his view of the world has been wholly aesthetic, and he condemns himself for his blindness, for not seeing that beauty masks the reality of cruelty. In his mind's eye, he sees "The gladiators wrestling to death for beauty's sake, the beasts set upon men . . . —the intoxication of blood, the intoxication of death, and withal the intoxication of beauty."[10] Suffering is real, and it is false of the artist to transform it into beautiful words or colors or tones. Virgil's emphasis on beauty has obscured the distinction between good and evil.

In arguing against Virgil's reasons for wanting to destroy the *Aeneid*, Augustus says that, "The work of art has to serve the needs of the people and, in doing so, the state." The *Aeneid* is already public property, as Augustus tells Virgil: "It is no longer your work, it is the work of all of us, indeed in one sense we have all labored at it, and finally it is the creation of the Roman people and their greatness." To that Virgil counters, "One cannot impose any duty on art, neither duty of state nor any other kind; for by so doing one makes art into a sham-art." Because of the age they are living in, "The duties of men go beyond the realm of art," and so they have "no other choice than to drop art."[11] In the end, Virgil overcomes his demand for artistic perfection and yields to Augustus, giving over to him the incomplete *Aeneid*.

Other twentieth-century writers have had doubts about art, but none has turned them into an artistic masterpiece as Broch did. Broch's radical questioning of art in *The Death of Virgil* had to do with the worsening of the political crisis in Europe. With reference to that novel, he said that in the "time of gas chambers," it was inadmissible, indeed immoral, to pursue art for its own sake.[12] The artist escapes the real world by immers-

[9]Broch, *Death of Virgil*, trans. Jean Start Untermeyer (New York, 1965), p. 243.

[10]Ibid., pp. 27, 319, 249.

[11]Ibid., pp. 312, 313, 334.

[12]Broch, *Gesammelte*, vol. 8, p. 280.

ing himself in the make-believe of beauty and, by appeasing the desire of his audience to escape the real world, he is treacherous. To write literature is to succumb to vanity and lies; Broch did not even want to be thought of as a writer, and he understood Kafka's wish to have his writings burnt after his death. What Einstein saw as positive in the escape from everyday reality offered by art and science, Broch saw as negative for the ethical spirit.

With Broch's arrest by the Nazis, the worsening political crisis became for him a personal crisis. He worked on the Virgil story in prison where, by his own account, he began to write about his own imagined death, no longer Virgil's. Later he suggested that the fundamental experience of Virgil only fully matured with his own knowledge of gas chambers. His haunting treatment of death in *The Death of Virgil* was in part his personal response to Hitler's coming to power and the reign of death that followed. It was a "strictly esoteric book," written, he said, almost against his will and by one who "to a certain degree lived on the edge of the concentration camps."[13]

Broch's published correspondence contains a letter from Einstein.[14] It is a surprising letter, since it does not have to do primarily with Einstein's physics, in which Broch was so interested, nor does it have to do with political questions, upon which Einstein corresponded with many people in many fields at this time. It has to do with literature and with the common source of art and science. Agreeing with Broch on the role of intuition, Einstein said that the essence of knowledge does not lie in its logical form, nor does the essence of poetry or music lie in meter or rhythm and chord. The essence remains mysterious, as something felt and not grasped.

Einstein's letter contains a more specific reference to literature, his reason for writing it. The letter is an appreciation of Broch's *Death of Virgil*, which had just come out, a copy of which Broch had given Einstein. In thanking Broch for the copy, Einstein told him that he was fascinated by Broch's Virgil.

Einstein's appreciation had to be flattering to Broch, especially since Einstein did not read much modern literature. Einstein believed in something like absolute standards in art,

[13]Broch, "Autobiographie als Arbeitsprogramm," *Gesammelte*, vol. 9, p. 51.

[14]Broch, 2 September 1945, in *Gesammelte*, vol. 8, p. 227.

which sounds paradoxical in one who was known for abolishing absolutes in physics. He had formed his tastes in art early in life, and they would not normally have run to the linguistic innovations of *The Death of Virgil*. Yet he would undoubtedly have found the philosophical aspects of the novel intriguing. Broch could assume Einstein's continuing interest in the novel, writing to Einstein about the reception of it. Broch and Einstein were by this time old friends.

Einstein had not known Broch personally before he came to America, but he had known about Broch. In 1937 Broch wrote to Einstein asking him to back a resolution he intended to submit to the League of Nations. In 1938, at the request of mutual friends in America, Einstein wrote on Broch's behalf to the American consul in Vienna to help secure him an American visa. Once in America, Broch could always count on Einstein to write recommendations for him for the minuscule foundation grants that largely supported him.

In 1939, the year after Broch came to America, he struck up personal relations with Einstein. As a result, he housesat for the Einsteins in Princeton in the late summer of that year, at a time when he was hard at work on *The Death of Virgil*. Broch stayed on in Princeton for several years and saw much of Einstein there, calling Einstein the "greatest human being" he had ever met.[15] Einstein's appreciation of Broch is also evident from his letter to Alvin Johnson in support of Broch's nomination for the Nobel Prize in literature. It was characteristic of Einstein that the weight of his recommendation had to do with the kind of man Broch was: "One of the noblest and sincerest characters I have encountered in my life," Einstein said.

To the American public Einstein was *the* scientific genius, but he was more than that. Bohemian in appearance, a virtuoso in his work, and fiercely independent in political thought, he had a fascination—Einstein called it a "peculiar popularity"—for Americans steeped in their individualist heritage. Like it or not, he was a public personality, a fact he used to gain hearings for causes that he regarded as ethically and politically desirable.

Before Einstein emigrated to America, he had had a record of public protest that went back to the start of World War I. From his denunciation of nationalism, chauvinism, and war in

[15]Thomas Koebner, *Hermann Broch, Leben und Werk* (Berne, 1965), p. 76.

wartime Berlin to his denunciation of McCarthy witch-hunts in Cold War America, what Einstein had to say about political questions was often unpopular with the authorities and their followers (as *Einstein on Peace* documents). He attacked those who encouraged the pathological fears that promoted hatred, enslavement, and slaughter of one people by another. As a humanitarian, he opposed cruelty and brutality, but he also opposed them because they threatened intellectual freedom, which was an essential condition for a man of his type and, as he believed, for a culture and a political order that accorded with the dignity of man. Otto Nathan, Einstein's editor and executor, suggests that his antipathy to war was rooted in his scientific vocation, that his religiouslike reverence for the order of nature made the killing of people by people appear to him a violation of that order.[16] In the same spirit, Einstein deplored political barriers if they separated peoples into, at times, fanatically xenophobic tribes, just as he deplored barriers to scientific exchange. In 1914 he advocated a United Europe, in 1919 the League of Nations, in 1945 the United Nations. After the atomic bomb and Hiroshima he advocated a world organization that would keep order between and among nations through a monopoly of police and military power.

During World War II, Einstein had less to say publicly about war than he had had before and than he had after, for he believed that the war against Hitler was just. After the atomic bombing of Japan, he came to regret the part he had played in drawing the attention of the American government to the possibility of atomic bombs through his letters to Roosevelt, but at the time, he and his colleagues feared that scientists working for Hitler would build the bomb first. Consequently, his name is forever associated with the first weapon of the type—atomic—by which our age has come to be known.

From 1945 on Einstein greatly stepped up his public activity. He wrote voluminously about civil liberties, the Jewish question, socialism, and other matters but, above all, he wrote about peace. He was a leader in the move to persuade Americans and others to abolish weapons and establish a world order.

Einstein rejected the suggestion that he bore responsibility for Hiroshima because of the theoretical formula—the one

[16]Nathan and Norden, *On Peace*, pp. ix-x.

equating mass and energy recognized by every literate person—that he had deduced from his relativity theory forty years before. The physicist Einstein could separate his past theoretical work from his present public actions to abolish atomic weapons. The writer Broch could not separate his work from his public actions and demanded that his work bear on ethical and political concerns. Storytelling was not enough.

Broch said that he had no biography, that he was what he wrote, but was not entirely fair to himself. Like many other Jews and intellectuals who escaped Hitler, Broch did what he could to help others escape. In any event, it was largely outside literature, outside *The Death of Virgil*, that Broch found a place for ethical action. He was unstinting in his efforts to help Hitler's victims, just as he was to help destitute Germans and Austrians after the war.

As Broch vacillated in his belief in the educational value of ethical literature, he turned increasingly toward the humanistic sciences. He recognized that he was a "theoretical man," as he termed it, not a practical politician; yet he wanted to do something that would have an impact on practical politics. With America's entry into World War II, Broch was diverted from finishing *The Death of Virgil* to working on a theory of mass psychology. For years he worked with great intensity on his theory with the hope that it would help make political history resistant to psychopathological phases. He placed much weight on its *scientific* nature.

Broch's mass psychology became part of his theory of humanity, which encompassed a democratic political and legal theory as well. His theory rejected all transcendental absolutes. The one absolute in his theory, an earthly absolute, which he saw as analogous to absolute limits in science such as the velocity of light in Einstein's theory, was that human enslavement is an absolute evil, and everything in Broch's theory following deductively from it. The recent past had taught the lesson of this absolute evil. Broch believed that it was the responsibility of the individual to resist enslavement in any form, and it was the duty of the individual to rebel against evil. The legal basis of democracy was both a bill of rights and a bill of duties, the bill of duties being original with Broch and occasioned by the racial riots in Detroit during World War II as well as by the persecution of the Jews in Europe. Broch submitted this bill of rights and duties to the United Nations.

In *The Death of Virgil*, Broch made the bearer of his thoughts on the relation of art to ethics in a time of historical upheaval a poet, Virgil. Broch wrote as a poet who spoke through another poet. With his abiding interest in physics and mathematics, he might have spoken through, say, Archimedes, a classical figure who also lived in a time of change, when the Hellenistic world was passing to the Roman. No doubt Broch could have made Archimedes bear part of his moral vision by making him question his use of science to build the most powerful weapons known to antiquity, but he could not have made Archimedes question the value of science itself by wishing his manuscripts destroyed at his death. In Broch's novel *The Unknown Quantity*, the physics professor who senses he is near death is obsessed by the need to see that his manuscripts are put in order, not destroyed, an obsession which moves the plot of the novel.

Today, the scientist who, like the poet, wants his manuscripts destroyed is imaginable. In his play *The Physicists*, the Swiss writer Friedrich Dürrenmatt imparts to his central character the futile desire to destroy his physical manuscripts out of concern for humanity, for the theoretical knowledge they contain entails the technical mastery of fantastic natural forces. Dürrenmatt's point is one most scientists would accept: It is arrogant of one to believe that potentially harmful knowledge will not be found independently by others if one has onself withheld it.

Einstein was forced to respond to the suggestion of withholding, which was put in the usual form of withholding research effort rather than already won knowledge. Impelled by the threat of atomic war, Einstein spoke out on the responsibility of scientists again and again after World War II. He saw the scientist, who by his vocation is necessarily a free and independent thinker, as in danger of enslavement. The scientist suffers a "truly tragic fate," for through his scientific work, he achieves inner independence, and at the same time he fashions the "tools which will not only enslave him but also destroy him from within." The scientist, Einstein said, has "retrogressed to such an extent that he accepts as inevitable the slavery inflicted upon him by national states" and "even degrades himself to such an extent that he obediently lends his talents to help perfect the means destined for the general destruction of mankind." The

only choice left to scientists "lies between non-cooperation and slavery."[17]

"Physicists," Einstein said, speaking as one of them, "happen to know a few things" that others do not; in particular, they known better than others the "danger created by the [atomic] weapons."[18] Einstein recognized that physicists who built the bomb were harassed by a "feeling of responsibility, not to say guilt." But the special responsibility that scientists bore in the atomic age was not a trade-off for guilt; rather it arose from the dependence of the military on the cooperation of scientists in devising further means of destruction. World War II had brought about a new relation of scientists to government, resulting in massive support for and hiring of scientists to conduct weapons research. By acting on conscience and refusing to yield to "immoral demands," Einstein thought, scientists could make the world safer. It was the duty of scientists to make clear to the public that there was no sure defense against atomic weapons short of their abolition, which could only be brought about by a world authority. The military wanted its bombs and its security, too, which gave scientists the task of exposing half-baked schemes such as dispersing the population into ribbonlike cities and placing industry in caves. The military mentality with its shibboleth of naked power was becoming orthodox thinking in America, and Einstein drew the parallel with Germany in its ruinous worship of power after Bismarck's successes. What had changed in the meantime was the "destructiveness of war" caused, above all, by atomic weapons.[19]

After World War II, Einstein wrote to a friend that the present "horrifying deterioration" of ethical behavior derived from the mechanization of life, a "disastrous byproduct" of scientific and technical modes of thought.[20] Yet to Einstein it was clear that the fundamental problem of the world was not science and that science was not its solution. The problem was "moral degeneration" abetted by the absence of a world political organization. What was needed was ethical politics, and since ethics

[17]Nathan and Norden, *On Peace*, pp. 536, 554.

[18]Ibid., pp. 355–6.

[19]Ibid., pp. 355, 343, 384-5, 347.

[20]Helen Dukas and Banesh Hoffmann, eds, *Albert Einstein, The Human Side* (Princeton, 1979), p. 82.

could not be deduced from scientific premises everything depended on "man's moral development."[21]

In Einstein and Broch, we see two supremely gifted and civilized intellectuals confronted by crimes against humanity in the recent past and by the threat of more crimes in the future. They responded in part as a scientist and an artist, deeply concerned with the relation of their work to the state of the world, the relation being fundamentally ethical, as we see in Einstein's concern with the scientist's responsibility and in Broch's with the artist's responsibility.

Einstein and Broch believed that human rights are not "written in the stars," but are earthly in origin. Both believed that since there are always those who would destroy rights by acting from aggressive instinct, the struggle to preserve rights is never-ending. Both believed that in addition to rights, there are duties, and that it is the individual's duty as well as right to refuse participation in action that he deems morally wrong. Both regarded enslavement as the ultimate human evil. Both were remarkably free from slogans in their efforts to make politics more humane.

Einstein and Broch knew, as we know, that the recent barbarism arose "from within, from the core of European civilization"[22] where great works of art were produced and where the great scientific and technical institutes were. The extermination of tens of millions of Europeans by Europeans, to say nothing of the related extermination of and by non-Europeans, in a brief thirty years following 1914 makes the normally reflective person question whether or not science and art have had any significant influence for the better on the political life of the West. Even to raise the question makes moot the argument about whether art or science is the center of Western culture. Under the circumstances, to be at the center might be unenviable, and we might understand Einstein's and Broch's conviction that, as Einstein put it, "The most important human endeavor is the striving for morality in our actions."[23]

[21]Nathan and Norden, *On Peace,* pp. 312, 514–5, 556.

[22]George Steiner, *Language and Silence* (Harmondsworth, 1969), p. 14.

[23]Dukas and Hoffman, *Human Side,* p. 95.

In his letter to Broch after receiving *The Death of Virgil*, Einstein wrote, "I am fascinated by your Vergil—and am steadfastly resisting him. The book shows me clearly what I fled from when I sold myself body and soul to Science—the flight from the I and We to the IT."[24] The meaning of the "IT" is spelled out in Einstein's "Autobiographical Notes"—or *obituary*, as he called them—which he wrote on request near the end of his life. "Out yonder there was this huge world, which exists independently of us human beings," Einstein wrote of his youthful discovery, and "the contemplation of this world beckoned like a liberation."[25] This "obituary" strips away all that is "merely personal," all that might divert it from the essential, which, in a man of Einstein's type, "lies precisely in *what* he thinks and *how* he thinks, not in what he does or suffers."[26] Einstein takes you on a mental journey beginning with his recollection of the wonder he sensed at seeing a magnetic compass at age four or five and ending with his most recent work on the unified field theory lying on his work desk at age sixty-seven. Einstein's characteristic equations on the final pages are written in the highly condensed language of tensors, letters of the alphabet bristling with multiple subscripts and superscripts, the expression of his latest striving for a total theory of the IT. Nothing could be further from the merely personal.

Throughout his ceaseless work on the unified field theory, his never-to-be achieved culmination of the world picture of the IT, of which he had begun to lay the foundations some forty years before, Einstein did not question the value of the pure quest for the laws of the IT. Similarly, Broch did not question the value of his quest for the laws of the I and We either, a quest which he had made his own. What Broch did question was the value of the pure quest for beauty, and he made that question, paradoxically, the heart of his mature artistic work.

The question of the ethics of pure science has given rise to controversy, for example, in connection with recombinant DNA research, and some scientists have taken a position that differs

[24]As translated in Hoffmann, *Creator and Rebel,* p. 254.

[25]Paul Arthur Schilpp, ed., *Albert Einstein: Philosopher-Scientist* (La Salle, IL, 1969), vol. 1, p. 5.

[26]Ibid., p. 33.

from Einstein's. The questioning of scientific as well as technological research will undoubtedly be with us, on a recurring basis, from now on.

An atypical artist in his own time, today Broch is all but unthinkable with his ethical objection to the "playlike quality of a work of art."[27] Yet there is the occasional artist who makes demands on his work as severe as Broch's. One is Solzhenitsyn, the witness who passes judgment on a political order founded on slavery and terror in, among other writings, *The First Circle*, the novel he likens to and names after Dante's *Inferno*.

The world of today has problems, for instance, those of the environment, which were not as arresting to Einstein and Broch as they are to us. But in addition, the world still has problems that Broch and Einstein were preoccupied with, including slavery, thought control, racism, and nuclear weapons. If their admonitions sound like moral platitudes—so they have been called—it is because the standard of moral judgments is not originality. In their world, a world in crisis, one in which the existing institutions of civilization seemed unequal to the forces of human destruction and social disintegration, they made a moving appeal to the moral nature of the individual.

Qualities of an individual that we regard as good, qualities such as compassion, empathy, breadth of distinterestedness, we associate with character. In ethical social action (a redundant expression, for as Einstein recognized, all social actions have ethical content), more than what we ordinarily think of as character is involved. Also involved is the individual's perception of the world. The best intentions when combined with distorted perceptions of reality have resulted in actions that we, looking back historically, can see as disastrous for humankind. Science and art, as Einstein and Broch knew, may not make our character better, but they jointly shape many of our perceptions of reality. Ethical judgements and actions take their starting point both in character and in perceptions of reality. In this sense, both science and art serve as guides through our ethical universe.

Acknowledgment

A version of this paper was given as a public lecture at Whitman College in 1978.

[27]Broch, *Gesammelte,* vol. 8, p. 280.

Note on Sources

Einstein conducts his readers on a tour of infamies of the twentieth century in *Einstein on Peace*, edited by Otto Nathan and Heinz Norden (New York, 1968); much of my material derives from this source. Writings by Einstein that I have consulted for his views on science include his "Autobiographical Notes" in *Albert Einstein: Philosopher–Scientist*, edited by Paul Arthur Schilpp, vol.1 (La Salle, IL, 1969), pp. 1–94, and his essays collected in *Ideas and Opinions* (New York, 1954). My observations on Einstein's life and on his work in physics are drawn largely from *Albert Einstein, Creator and Rebel* by Banesh Hoffmann, with the collaboration of Einstein's secretary, Helen Dukas (New York, 1972). The late Helen Dukas personally supplied me with information about Einstein's friendship with Broch.

Broch's novels incorporate his response to the political disasters of his time. The first was *The Sleepwalkers*, translated from the original German edition of 1931–32 by Willa and Edwin Muir (New York, 1964); the later *Death of Virgil* was translated from the German by Jean Start Untermeyer in 1945 (New York, 1965). In addition to these and to Broch's other novels, I have drawn on letters and essays published in his *Gesammelte Werke*, 10 volumes (Zurich, 1953–61), and on the personal knowledge of Broch that Edith Jonas Levy and Professor Hans Staudinger have kindly given me.

Broch scholars regard the literary experiments of *The Sleepwalkers* and *The Death of Virgil* as worthy of those writers Broch admired most, Kafka and Joyce. Although Broch scholars have their differences, they seem to be in reasonable agreement on Broch's concern with ethics. My account of Broch's life and work in connection with his ethical concerns derives mainly from Manfred Durzak, *Hermann Broch, Dichtung and Erkenntnis* (Stuttgart, 1978) and *Hermann Broch in Selbstzeugnissen und Bilddokumenten* (Hamburg, 1966), Thomas Koebner's *Hermann Broch, Leben und Werk* (Berne, 1965), Paul Michael Lützeler, *Hermann Broch: Ethik und Politik: Studien zum Frühwerk und zur Romantrilogie "Die Schlafwandler"* (Munich, 1973), and Ernestine Schlant's *Hermann Broch* (New York, 1964).

Higher Learning and Its Kinds

by
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Recently I convened a meeting of department heads and graduate coordinators of doctoral programs. My purpose was to propose a change in how visiting speakers benefited from Graduate School funds. The practice had been for each program to send along all manner of expense associated with a speaker; the dean would then silently second the request, provided that it came within the budgetary envelope allocated by tradition to the program. As an innovation, I proposed that speakers receiving significant support from the Graduate School be vetted by a committee of the Graduate Council, and further, that as the price of such significant support the speakers be asked to deliver a general talk to a sophisticated but nonspecialist audience of the Graduate School.

I made plain in advance my reasons for the change. It was good for the sun to shine on speakers invited to campus with Graduate School funds. Vetting speakers by the Graduate Council would make their qualities known to the Graduate Faculty. A general talk by a distinguished outsider was just the occasion to invite in people from the surrounding community. The university might pick up useful play in the local media. We would all benefit from listening to an acclaimed authority distill the wisdom of a lifetime dedicated to the search for new knowledge.

I arrived early in the meeting room, positioning myself at the far end of an oval table. I faced the door as colleagues arrived. Conforming to local custom, nearly everyone was on time. Waiting for the few laggards, we chatted. A professor was in a close race for election to the U.S. House of Representatives. I observed that a number of congressional representatives had doctorates. Maybe that was because a doctorate could be obtained easily from certain universities, a voice offered on my right. We must be vigilant at our institution, came another voice. I reminded the assembly that in previous times a Ph.D. could be had by any determined and adequately bankrolled university student, and at the best places—Berlin, Paris, Chicago, and so forth. Over the past generation, the degree had be-

come something of a monstrosity of hyperspecialization; even a hundred years ago, it had ceased to be an *inaugural dissertation* in a field of knowledge. Then the latecomers arrived, and I made my pitch.

With determined expressions, the disciplinary experts outlined why it was inappropriate for the dean and the Graduate Council to poach their *chasse gardée*. Many speakers spent only one night in town, and we would be inelegant to ask them for a general talk in addition to their presentations before specialized conclaves. Distinguished researchers, some said, could be incapable of giving an accounting in plain English. Think of the embarrassment if the audience for a general talk consisted of three students and a dog. And anyway, how could the Graduate Council judge the qualities of a specialist speaker, as proposed?

To these objections I noted that distinguished specialists could indeed speak in general terms about their work—they did so in elementary lectures and even in grant proposals. (One colleague in the room added that many specialists had such general lectures in the can, ready to roll.) If a brilliant specialist could not explain things in ordinary language, I added, perhaps the specialist should not benefit from the largesse of the Graduate School. We are all busy, I continued, but it was not unreasonable for a graduate coordinator to beat the bushes three or four times a year to provide a respectable audience for a speaker of distinction. We regularly judge accomplishment across disciplinary lines—in decisions about tenure, promotion, and membership in the Graduate Faculty. (One colleague affirmed that it was not uncommon for *his* vita to circulate among nonspecialists before he was invited to give a talk elsewhere.) In this procedure, we depend on measures such as production of master's and doctoral students, visibility through citations, the appearance of authoritative and substantial publications, and the receipt of research grants, awards, and prizes. Finally, vetting of a vita would act to caution programs against dressing heavyweight trunks on a lightweight mannikin.

The programs whose directors sat before me ranged across the humanities, the natural sciences, and engineering. Some programs had well-attended, weekly seminars with extramural speakers; others were blessed with a majority of independently minded students who would not readily attend optional assemblies. Some programs gave their funds to a handful of heavy hitters; others divided up their budget among a score of minor-

league players. In some programs words were common currency; in others, icons and cyphers predominated. All in all it was a standoff between the interests of higher learning in general and the perception that higher learning advanced only through specialization. Whence this antinomy?

The hallmark of the university enterprise for 900 years has been the principle that knowledge comes in kinds. Everything else that we see around us today in academia, from administrative hierarchy and state interference to the prosecution of research and the formalization of curricula, has been a later modification of this founding notion. Universities began with separate faculties for particular studies: medicine, law, theology, and the propaedeutic liberal arts. In each faculty there were lectureships for individual subjects. By the end of the fifteenth century, when a process of institutional natural selection weeded out inauspicious academic assemblies, chairs passed from one incumbent to another. Professors devoted their life to a discipline, whether music, astronomy, or Roman law. Rules of succession were fluid, and men moved regularly between chairs; new fields rose to prominence, and enterprising university curators created chairs to offer what students demanded. Ranks of instructors proliferated, as well as new faculties and colleges affiliated with the university. It remains that the entire process has been driven forward by the idea that there are communities of competent experts for specialties of learning. A university diploma has always signaled class and breeding, but above all it licensed someone to speak with authority in a specialty.

The license, though, has mutated over time. There are still chairs and doctorates in music and astronomy, medicine, law, and theology. The medieval disciplines of geometry and arithmetic, however, today find expression in mathematics, whereas the medieval disciplines of grammar and rhetoric are usually subsumed under a language-and-literature heading. The natural sciences and the humanities have extended over a wide spectrum of disciplines, options, tracks, and fields such as phytopathology, cognitive psychology, and semiotics.

The late Thomas S. Kuhn, the most influential twentieth-century writer about the workings of science, proposed the eighteenth century as a watershed for disciplinary divisions. It was when the experimental sciences—chemistry and its associated fields of metallurgy and mineralogy, along with architecture

and engineering—finally obtained a presence in the constellation of higher learning.[1] Until then, universities and colleges had been restricted to the *classical* sciences of the medieval quadrivium: astronomy, mathematics (arithmetic and geometry), and music. In the shake-out that followed, disciplines substantially changed form.[2]

German-speaking Europe in the nineteenth century, with its credo that specialization is the path to truth, effected the transformation. Ironically, the specialist ideology derived from an imperializing centralization of knowledge, at least in the natural sciences. Physics reconstituted itself as a mixture of Newtonian mechanics, thermodynamics, and electricity, all welded together by the mantra of precise measurement. Chemistry engaged in synthesizing natural compounds and discovering basic elements through hands-on laboratory experience and by following beliefs about the fundamental constitution of matter. Biology brought together botany, zoology, comparative anatomy, and rural economy. Though the humanities have been slower to assert control over one or another domain of knowledge, we still live in the shadow of a number of omnibus, nineteenth-century humanistic disciplines: psychology and history (spawned from philosophy), archaeology (deriving from classics), linguistics (emerging from comparative philology), anthropology (splitting off from natural history), and, to a certain extent, political economy (a refugee from law). It is no exaggeration to say that the middle of the century saw the crystallization of scientific disciplines that would dominate intellectual life for the next six generations.

The job market drove forward these perhaps unnatural recombinations of existing knowledge. Physicists and chemists shared responsibility for the Second Industrial Revolution of metallurgy, electricity, and chemicals. Biologists sought to circumscribe the unity and diversity of the living world, which had finally been made known completely to the European mind (the discipline was invented by Darwin's bull-dog, Thomas

[1]Evidence comes from the mining academies in Germany, Spain, and Mexico, the military engineering schools in France, and pegagogical activity surrounding the Newtonian and Lavoisien revolutions.

[2]John L. Heilbron has provided an illuminating account of the late eighteenth-century transformation in "A Mathematicians' Mutiny, with Morals," in *World Changes: Thomas Kuhn and the Nature of Science*, ed. Paul Horwich (Cambridge, MA, 1993), pp. 81–129.

Henry Huxley, as a way of reorganizing secondary-school instruction). Psychologists and political economists made themselves useful to state bureaucracies interested in controlling citizens of new nation states. Anthropologists advised North Atlantic rulers about how best to overrun distant civilizations. Students eagerly paid good money to be certified in the new disciplines by university professors.

By the early decades of the twentieth century, cracks had already appeared in the grand disciplinary pediments. Physics hived off electrical engineering, astrophysics, geophysics, and chemical physics. Chemistry split into organic, physical, and analytical branches, and it suffered creation of the great engine of medical progress called physiological chemistry, or biochemistry. Biophysics, genetics, and ecology seceded from biology. In the middle third of the twentieth century the parent disciplines suffered further attenuation through computer science, molecular biology, and a host of engineering subdisciplines. As for the humanities, the isolated, nineteenth-century professorships in esoteric subjects like history of science, epistemology, and sexology gave rise to major academic industries.

In times of intellectual ferment, the evolution and speciation of knowledge is a natural process. We chronicle the philosophers of Hellenic and Hellenistic times with awe. Thirteenth-century Europe, which saw the establishment of universities, experienced an explosion of classical, Islamic, and Chinese wisdom. The Italian Renaissance, the Scientific Revolution, the Enlightenment, and what we may call Industrial Modernism all substantially rearranged knowledge and its institutional representations. The soul of ferment may continue well after the body has settled into torpor. The dénouement of the Museum at Alexandria with Ptolemy and Galen, for example, took place after the Roman conquest of Egypt.

In times of senescence, institutions of knowledge tend to remain firmly rooted in tradition. We recall the Roman and Byzantine mummification of academic chairs, the Schoolmen and their Aristotle whom Galileo held up to ridicule, the professors of eighteenth-century Oxbridge ("sunk deep in their potations," historian Edward Gibbon remembered). The apparent decline of learning in medieval Islam has provided material for a generation of scholars. For well over a hundred years in the West, the academic curriculum of Ch'ing (Manchu) China

has provided a term—*mandarin*—to signify an administrative class trained to master obscure and irrelevant facts.[3]

Whether in bloom or in decay, knowledge has sifted out to become the property of experts—communities of competent critics. Pioneers of new visions of the world like Galileo, Gibbon, and Einstein have overwhelmingly been trained by disciplinary specialists. Autodidacts like Ambroise Paré, Benjamin Franklin, Humphrey Davy, Thomas Edison, and Srinivasa Ramanujan are exceptional. This is not to say that pioneering minds have confined themselves to one or another branch of learning. Einstein epitomized the disciplinary specialist in theoretical physics (admittedly a discipline whose practitioners saw themselves as the dominant players in natural sciences and beyond), and Gibbon was a classicist in the humanistic tradition, but Galileo spanned astronomy and mechanics—separate disciplines at the time. Other thinkers exhibiting great virtue in a number of disciplines come readily to mind: Ibn Sina (Avicenna) and Ibn Rushd (Averröes) in law, medicine, and astronomy; Leonardo da Vinci in nearly everything; Copernicus, Leibniz, and Newton in theology, law, and natural philosophy; the phenomenal Boerhaave, who at one time held four disciplinary chairs concurrently at Leiden; and Laplace and Gauss in astronomy and the physical sciences generally.

With certain exceptions like Henri Poincaré and Bertrand Russell, the wide-ranging *virtuoso*—someone able to make fundamental contributions to a number of disciplines—disappeared by the twentieth century. In his place came people who, like Huxley, self-consciously reorganized the boundaries of knowledge to suit their temperament. Many new disciplines were area-specific, such as Egyptology, Assyriology, seismology, radiology, and genetics. Other disciplines of a more general nature were concept-specific, such as epistemology, linguistics, criminology, eugenics, and perhaps topology. These formations clamored for respectability and a place in the academy.

The last third of the nineteenth century also witnessed a torrent of hybrid, interdisciplinary constructions from cosmical

[3] Simone de Beauvoir, *Les mandarines* (Paris, 1945), provides a fictional account for twentieth-century France; Fritz Ringer, *The Decline of the German Mandarins* (Cambridge, MA, 1969), sets the tone for nineteenth-century and early twentieth-century Germany.

physics and chemical engineering to biometrics and art history. The guiding notion was to cobble together bits and pieces of knowledge and produce acolytes with a special mission, whether predicting earthquakes and storms (cosmical physics), scaling up laboratory syntheses for mass production (chemical engineering), providing the state with justification for racist policies (biometrics), or publishing guidebooks for Continental tourists (art history). Although cosmical physics expired without issue and biometrics delivered its analytical techniques to scores of disciplines before itself passing out of existence, a number of the new hybrid disciplines are still with us, their parentage boldly displayed in journal titles and endowed chairs.[4] The fields are active and honored.

Every generation has tried to organize knowledge for its own ends. Medieval encyclopedias and codexes extend down to our own time. There have long been academies with titled chairs, abstracting journals with thematics headings, and detailed schemes for arranging books on the shelves of libraries. Reformers have tried to erect new structures for practical studies—the craft and technical schools that now threaten to overrun the early nineteenth-century ideal of pure learning. Yet neither revolution nor war nor natural calamity has compromised the *specialized* quality of higher learning. What has varied is the nature of specialization.

In 1995 the Board of Regents of the State of Louisiana, under Larry Crain, its commissioner of higher education, undertook a systematic review of state degree programs that existed in more than one public institution of higher learning. Too many duplicated programs wasted money, Dr. Crain avowed. Furthermore, the state was under an obligation to desegregate its universities in fact and in appearance. It was time to look into similar programs at historically white and historically black institutions. The Regents identified a good number of duplications. Highly paid consultants arrived from distant parts to survey the scene and issue draconian judgments. Universities responded to the perceptions of the outsiders. The usual amount

[4] I wrote about cosmical physics in my doctoral dissertation. The matter has recently been discussed at length in Elisabeth Crawford, *Arrhenius: From Ionic Theory to the Greenhouse Effect* (Canton, MA, 1996).

of prejudice and politics intervened. People tallied up whose farm had the most oxen gored.

The appraisals by consultants from elite universities featured howlers. Scholar–administrators from two distinguished midwestern universities, in their report on the humanities in Louisiana, recommended major cuts by affirming: "It is a fact of physical law that action produces energy, and the reallocations that we recommend should be carried out in the spirit of energizing further the disciplines we have discussed."[5] Some months after the authors of the report on the social sciences dismissed the master's program in psychology at the University of Southwestern Louisiana, the Conference of Southern Graduate Schools awarded their prizes for the best master's thesis and the most accomplished young faculty researcher to people in psychology at USL.[6] The review resulted in few major mutations. By the end of the process, Dr. Crain had ceded to a successor, a vigorous promoter of intercampus cooperation.

Largely overlooked, as overworked and underpaid academics in towns across Louisiana cast a wary glance forward in time, was the *nominalistic* nature of the review. The Regents and their consultants took as a fundamental premise that higher education has a mission to retail particular kinds of knowledge. In graduate education, where advanced training is keyed to facility in creating novelties, the Regents designated mathematics as a rare, general, and universal good, whose multiple manifestations are an unquestioned social benefit; mathematics is above reproach and beyond review.[7] Everything else hung on a name. At the University of Southwestern Louisiana, the College of Applied Life Sciences recently had the

[5] Jay Chatterjee and Robert Weisbuch, "Final Preliminary Report, Review of Duplicated Programs in the Humanities," submitted to the Regents of the State of Louisiana in September 1996.

[6] Orlando L. Taylor and Karen Rasmussen, "Final Report, Review of Duplicated Academic Programs in the Social Sciences for the Louisiana Board of Regents," 5 July 1996. The award winners are Dr. Daniel Povinelli and James E. Reaux.

[7] If one holds that medical education is "graduate" work, then a host of duplicated specialties were also excluded from review. It may be argued that education for the M.D. degree evacuated its claim to be a research-related endeavor when it suppressed the medical dissertation. We are led to conclude that the Regents have decided that radiologists and urologists are better for Louisiana than other professionals who have also not learned how to discover new knowledge—accountants, school principals, and computer engineers. This is a good argument for starting up new, public medical schools.

felicitous notion to rename fashion merchandising as apparel manufacture and design, but because the name of the new degree program resembles a degree program at another university, both were called into question. By the same token, our biologists were clever enough to call their doctoral program by the title, "Environmental and Evolutionary Biology"; as a result of this unique name, they avoided current scrutiny. Woe to a degree that is based on a program unique to Louisiana but which lacks an upscale name. Our English doctorate might have sailed through the review unquestioned had it been called "Creative Languages and Literatures of the English-Speaking Peoples."

What is an academic degree? Originally it was a corporate certification of accomplishment in a field of knowledge. The corporation (called a *university*) enjoyed privileges from the state, and so did its members, whether students, lecturers (who were also frequently students), or support staff like custodians and, later, printers.[8] The possessor of a diploma enjoyed complimentary privileges at other like-minded corporations. A doctor of medicine from Oxford, for example, could teach at a university in Paris or Salamanca. University certification in canon law also translated across national boundaries, as did (until the Reformation) certification in theology. The sheepskin, as we have seen, was a license.

Universities were not the only corporate certifiers of competence. A doctorate in medicine attested to social class and classical veneer (and most notably a knowledge of astronomy for predicting horoscopes), but until well into the nineteenth century, effective medical therapy remained the province of midwives, nurses, apothecaries, iatrochemists, barbers, and surgeons, all of whom for centuries had been practising outside university walls. These medical crafts were the provinces of

[8] The word *student* has lost nearly all its traditional meaning. Children who have just stepped out of diapers carry the designation, when *pupil* would do better. The word is even the designation of a dilettante, as when a grown man in one of the liberal professions confides that he is a student of opera. An original sense is preserved at Christ Church college, Oxford, where the teachers are called *students*. Until recently the French avoided the problem by calling elementary-school children *écoliers* and both secondary-school children and university undergraduates *élèves*; possibly the most coveted distinction in the French educational firmament is not *docteur* (a mere medical practitioner) or *professeur* (a mere school teacher) but *ancien élève de l'Ecole normale supérieure*—literally, a former pupil at the national school for pedagogues.

the guilds, and for this reason they were open to people unqualified to attend university.[9] The medical guilds licensed apostates and women, among others.[10] The situation continued into the twentieth century. In Great Britain, France, and the Netherlands, physicians could practice without a doctorate (the most famous nineteenth-century nondoctors of medicine are no doubt Madame Bovary's husband and Louis Pasteur). Other professions, like architecture and engineering, also had extramural certification; some technical professions, such as that of pilot, navigator, or plumber, still generally find no place in universities.

The present pattern of disciplinary evolution draws on two nineteenth-century traditions: the corporatist imperative from France and the social imperative from Germany. These imperatives correspond in a general way to the distinction made by Ferdinand Tönnies late in the nineteenth century between *Gemeinschaft* and *Gesellschaft*. *Gemeinschaft*, or community, was in his view the reservoir of traditional, conservative values. Communities were based in organic solidarity. They functioned on a local corporate level, and much depended on family ties and personal character. *Gesellschaft*, or society at large, operated under general, abstract rules and principles. Society had written, inflexible laws that affected people in a wide range of corporations and communities.[11]

The corporatist French tradition derives from the suppression of universities during the French Revolution. The revolutionaries saw universities as bastions of aristocratic privilege. They dissolved the universities in a vat of popular education. Each *département*, or political administrative unit, had an *académie* that supervised everything from elementary schools to faculties of medicine, and all the educational academies were part of the University of France. Into the vat were added new, independent, national schools. The *Ecole polytechnique* became an elite training ground for military engineers, admin-

[9]To this day a surgeon in England is designated *Mister*, to distinguish him from a mere medical doctor.

[10]Possibly the first woman to obtain a medical doctorate in modern times was Aletta Jacobs in the Netherlands during the 1870s.

[11]Tönnies, "La synthèse créatrice," in International Congress of Philosophy, Paris 1900, *Philosophie générale et métaphysique* (Paris, 1900), pp. 415–34, on p. 423, where Tönnies reviews his seminal publication of 1887.

istrators, and scientists; the *Ecole normale supérieure* eventually emerged as a nursery for intellectuals generally. To these *grandes écoles* there came a host of specialized schools—for everything from gunpowder manufacture and telegraphy to decorative arts and colonial administration. The schools recruited by examination and offered their own, independent certification. As a result, the diploma from a former university faculty came to mean very little beyond permission to teach in the public schools (the most common French counterpart to a bachelor's degree was in fact called a *licence*).

The social German tradition emerged from the renascence of universities after the Napoleonic interregnum. By the middle of the nineteenth century, universities had recaptured their authority as certifiers of both abstract wisdom and practical professions. In Germany, the university was the path to a career as physician, schoolteacher, customs officer, mining inspector, or industrial chemist. Because universities were the responsibility of the individual German states, experts of all kinds naturally held international (and following German unification, all-national) meetings to discuss the state of their field, in everything from chemistry to classics. The apparatus for continuing the meetings sustained learned periodicals and lobbied for additional state support. The disciplinary society owed allegiance to no institutional master. In Tönnies's terminology, it was a social phenomenon.

Even though disciplines are social entities, they find instantiation in particular communities. Strategies for disciplinary success depend upon both abstract principles and concrete justifications. To promote the training of acolytes, not only must there be jobs at the end of the course of study, but the curriculum must also have a semblance of internal coherence. Disciplinary prestige derives from a place of intellectual authority that goes beyond jargon and formalism. That is, even though it responds to market forces, a discipline must succeed on its own terms; it must be able to solve the problems that it posits. A discipline that cannot do this, whether early nineteenth-century phrenology or late twentieth-century urban planning, is in trouble.[12]

[12]Medicine may be seen as an exception. Until the middle of the nineteenth century in the West, medical doctors could not cure sick people more effectively than folk healers could. Much of traditional Galenic medicine, however, had little to do with therapeutics. Under its umbrella came fields of learning such as

One effect on graduate-degree programs of the recent review by the Regents of Louisiana is the erosion of social solidarity in favor of community referents. The Regents are relatively unresponsive to the fact that good jobs are available for people with doctorates—although the jobs may not in the graduate's area of expertise.[13] The message is that Semitic philologists or Baroque art historians, for example, are unwelcome to assume commanding positions in a government bureaucracy, and that meteorologists or quantitative historians need not apply to teach secondary-school mathematics. The premium is placed on specialized certification tailored to one or another industry. In graduate education, furthermore, the accent has gone to *curricula* rather than to *research*. In many fields the master's thesis is optional, and much of graduate education today is based exclusively on couses and examinations—precisely the French model of *grandes écoles* which had been displaced by the nineteenth-century research university.

We are prisoners in a mansion of many rooms, each of which is graced with splendid qualities. Nevertheless, those who urge the state to control the number and kind of diplomas do well to recall that academic certification has often been general, rather than specific. Doctorates of philosophy—the peculiar American appropriation of a certification that makes sense only in German-speaking Europe—are still awarded *without qualification*: A Ph.D. diploma from Johns Hopkins or the University of Pennsylvania, for example, indicates neither field nor faculty.[14] The Ph.D. is still primarily a testimony of good health, persistence, and imagination—qualities that appeal to many employers.

The Regents' exercise suggests one trend that must give pause to everyone who holds dear the mission of the university.

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botany and astronomy (professors of medicine knew which plants were poisonous and where the planets could be found). Biochemistry emerged in medical faculties, where it still resides.

[13]It has been said the New York investment firm of Lehman Brothers at one time held a weekly seminar in Chinese literature attended by staff who had taken a doctorate at Princeton. It could be argued that notwithstanding the subsequent flood of graduates from advanced schools of diplomacy, nineteenth-century diplomats trained in the classics succeeded admirably in preventing large-scale armed conflicts.

[14]Dutch doctorates, however, have long indicated specialties, such as mathematics, astronomy, physics, and so forth.

It is the erosion of the scientific and scholarly enterprise. Those who have regularly stared into the eyes of a hundred freshmen over the past quarter-century will affirm that today students are uninterested in knowledge for its own sake. They want a good job. The *advancement* of learning, something socially desirable over the past four centuries in the West, finds few supporters today. Rather, we are encouraged to develop technical specialties. We are urged to transform centers of education into trade schools. Science is threatened with absorption by technology.

Science disappeared in previous times, even while technological progress continued unabated. Consider the decline of the Hellenistic academies under Roman and then Byzantine rule—institutions preserved as faculties for abstract disputation over more than a thousand years. High medieval Europe is paradigmatic, where *scientia* was a pastiche of half-remembered generalizations from antiquity, juiced up with significant inventions from Islam and China.[15] The triumph of technology over science is, if not a prescription for economic success, at least no impediment to it. Consider the fundamental contributions to science and learning in the United States over the nation's first century. Ruthless technological vigor was manifest everywhere. But in matters of higher learning, we see only a handful of significant American innovators.[16]

Universities, like individual men and women generally, respond to a world that is not of their own making. We lack certain knowledge that the research university has reached the end of its run. Perhaps what we see is only a momentary gasp for breath before the onset of a second wind. Whatever the future holds, people who have dedicated their life to the advancement of learning should find it natural to emphasize the general qualities of science and scholarship. University professors must have full range of movement when speaking to acolytes; they must not be confined to a curricular straitjacket. It is time to reinvent the doctorate as a negotiation between professor and

[15]The technological engines of progress—the mechanical clock, firearms, movable-type printing, the magnetic compass, and sternpost rudder—all arrived in Europe from foreign shores.

[16]Americans figure hardly at all among the list of foreign fellows and correspondents of the Royal Society of London and the Paris Academy of Sciences before 1870. Over the next hundred years, with the rise of the research university, native-born Americans flood into these elite gatherings.

student. Courses on the doctoral level should be simply a means to the end of producing a significant contribution to knowledge. Nothing is lost if an English professor, for example, supervises a dissertation on Aristotle or Cervantes, or on Einstein's popular writings, for that matter. Why may not *any* member of a graduate faculty direct a doctoral dissertation? That is, broadly speaking, how things are done in England, France, and Germany. In these settings, the interdisciplinary urge continually cross-fertilizes established curricula and specialties.

Interdisciplinarity can prevent the disintegration of knowledge into isolated compartments, each one of which produces technically competent but imaginatively sterile outcomes. In an age where technical specialization is rampant, universities have an obligation to produce young people who can generate new ideas and who have a wide enough range of knowledge to respond quickly to new challenges. At its own peril does a state discourage a dedicated student who wants to learn about research by sitting at the feet of a competent expert. Public health is not threatened if a young woman seeks at her own expense to write a doctoral dissertation on Renaissance surgery under a particular mentor; standards of public instruction are not compromised if a schoolteacher writes a doctoral dissertation on delinquency and literacy; bridges shall not fall nor buildings topple if an engineer crafts a doctorate on the history of the bowed arch.

Theodore Zeldin, an authority on France and one of the most distinguished humanists of our time, has recently observed: "Most advances in science have been the result of intermediaries venturing beyond the boundaries or the paradigms of their disciplines, uniting insights which come from different kingdoms of knowledge."[17] Let us then encourage people to think deeply about all things—a proposition that no one reading these lines would dispute. This is not a call for anarchy, nor is it a cry opposing technical competence.

It is important to be clear that by invoking interdisciplinarity to free the research degree from the bonds of curriculum, one would not seek to privilege instruction for the advancement of learning over instruction for the guilds. Universities are assemblies of separate colleges and faculties with particular mis-

[17]Zeldin, *An Intimate History of Humanity* (1994; New York, 1995), p. 160.

sions, many of which relate directly to guild certification. But even as rather esoteric disciplines change form, so change is affecting professional corporations. Health-care delivery and medical certification are in flux, and traditional fields of technology—like civil engineering and electrical engineering—are being transformed almost beyond recognition. Interdisciplinarity can infuse new blood into tired veins.

The alternative to interdisciplinary reinvigoration is the wholesale abandonment of disciplines and expertise, a course that goes against the basic reflex of university life. In 1969 Gunther Stent, a pioneer in molecular biology, provided an explanation for Theodore Zeldin's observation about the stodgy character of all disciplines:

> The domain of investigation of a bounded scientific discipline may well present a vast and practically inexhaustible number of events for study. But the discipline is bounded all the same because its goal is in view. The awareness of this intellectual horizon embodies in it a yardstick for value, since the greatness of a scientific insight can be measured in terms of the magnitude of the forward leap toward the attainment of that goal that it represents. Hence there is immanent in the evolution of a bounded scientific discipline a point of diminishing returns; after the great insights have been made and brought the discipline close to its goal, further efforts are necessarily of everdecreasing significance.[18]

Universities are the place where innovation is balanced with tradition to produce new knowledge, not all of which resides in a familiar social setting. Universities maintain the balance less by enshrining fields of study than by adding bits of knowledge to the pan of tradition or the pan of innovation. Interdisciplinarity, in this view, prevents rigor mortis. Historian Raymond Grew has recently emphasized:

> Scholarship's claim to be cumulative rests on the recognition of specific methods and particular areas of study; yet to define a field of knowledge is to concede that much will be excluded. Most scholars,

[18]Stent, *Paradoxes of Progress* (1969; San Francisco, 1978), pp. 49–50.

> once suitably credentialed, soon proudly transgress some boundaries of field or discipline.[19]

Discipline has many faces, anthropologist Clifford Geertz reminds us.[20] From the point of view of educational administration, the nice thing about interdisciplinarity is that it is based upon established disciplines. Promoting interdisciplinarity is an inexpensive way to explore new configurations of knowledge. This is of special interest for us in Louisiana. Public institutions increasingly find it difficult to compete with private universities, which have extraordinary resources dedicated to maintaining esoteric learning. If we seek to ape Harvard or Stanford, we shall remain sharecroppers in specialist fields of study. Let public institutions celebrate their democratic roots by judiciously freeing knowledge from its artificial confinement. The spirit of thousands of talented university professors may train tens of thousands of young men and women to create new ideas and new ways of seeing.

[19]Grew, "Editorial Foreword," *Comparative Studies in Society and History: An International Quarterly, 38* (1996), 1.

[20]Geertz, *After the Fact: Two Countries, Four Decades, One Anthropologist* (Cambridge, MA, 1995), p. 96.

Communicating Interdisciplinarity

by
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A pair of British debaters came to Lafayette in November 1996 to challenge the University of Southwestern Louisiana team on the issue of *political correctness*. One member of the forensic team, a doctoral student in English at the University of London, met with a member of the USL Communication faculty before the debate. She began to discuss her dissertation on the political economy of the British publishing industry, and then, glancing at the office bookshelves, observed communication texts she had used in preparation of her thesis. It was a rare moment—a doctoral candidate in English identifying common ground between disciplines—but it should not be.

Higher learning, in its ideal form, is a dialogue, an enlightened conversation among members of the academy and their constituents. Such learning is by nature cooperative; students learn from selected disciplines about diverse subjects, important issues, and a variety of principles and practices. Missing from this conversation, though, is a viable means for sharing insights among members of the academy. Disciplines reflect coherent and self-contained ways of examining the world, but such self-containment has become the rationale for collecting knowledge and dispensing it from separate compartments, and ignoring a greater academic heritage.

Scholars have long wrestled with a dilemma in academic purpose by reconciling the needs of the individual with the demands of society. Quintillian, for example, considered the summit of learning to be the accumulation and mastery of the skills of an accomplished orator whose use of logic and rhetorical appeals could sway public opinion.[1] This Roman educator, however, recognized that an eloquent and skillful speaker must also have an excellent mind, one that sustains personal char-

[1]S. E. Frost, Jr., *Basic Teachings of the Great Philosophers: A Survey of Their Basic Ideas* (New York, 1962), pp. 212–13.

acter through the management of public and private affairs; in other words, he advocated an interdisciplinary education.

The Apologists of the early Christian church narrowly focused academic pursuits on literacy and mathematics in order to copy the sacred books and to calculate holy days and church festivals, but by the end of the sixth century, the monasteries distinguished between schools for religion (*interni*), and those for education (*externi*) devoted to the "seven liberal arts" of rhetoric, dialectic, grammar, arithmetic, geometry, music, and astronomy.[2] In both schools, the aim was to protect the human soul from sin. The Catholic clergy was responsible for teaching, but few priests had the temerity to challenge doctrine until Martin Luther confronted the church on the issue of indulgences. Luther's ideas, and his integrity with regard to the individual's responsibility for inquiry in defiance of accepted dogma, fostered the Protestant Reformation and begat a movement of enlightenment.

In Great Britain, two scholars emphasized diametrically opposing ideas in scholarship. English poet and schoolmaster John Milton urged students to turn to the sages of Greece and Rome to seek intellectual fulfillment. More inclined to the progress of society was Francis Bacon, who promoted scientific methods as the cornerstone of intellectual development. He taught students to rid their minds of bias and prior opinions in order to collect data from which to draw objective conclusions or hypotheses for further testing.

Jean Jacques Rousseau held that education should be forward-looking, but that it must be protected from restrictive, authoritarian forces that threaten it with the same constraints that the church employed in an earlier time. Rousseau contended that if education were thus freed, then knowledge would be created and succeeding generations could learn from their forebears.

In modern times, the goals of interdisciplinary learning are thwarted by a new hierarchy. This is especially true in higher education in the United States, where compartmentalization of specific areas of inquiry predominates in the institutional structure. Joseph Pelton has criticized "the most prestigious and the largest research universities," which he said were "locked into an industry of specialized information generation

[2]Ibid., pp. 214–15.

The former president of the Association for Schools of Journalism and Mass Communication proposed a curriculum based on three requisites. The first was interdisciplinary learning, "reflecting the contemporary belief that all media of communication are engaged in essentially the same functions (gathering information and creating and disseminating messages)."[7] Vernon Keel said his plan, instituted at Wichita State University, would combine disciplinary strengths in an "interdisciplinary matrix."[8]

Historical Overview

Communication as a distinct, disciplinary domain emerged in the early 1900s from two separate fields: vocational journalism and rhetorical instruction. Both struggled to gain acceptance in the liberal arts, and both suffered from insularity and fragmentation. Speech teachers, marginalized in English departments and at academic conferences, formed an academic alliance in 1914.[9] The National Association of Academic Teachers of Public Speaking, an offspring of the National Council of Teachers of English, was designed to elevate the status of speech teachers above their position as second-class scholars in a field dominated by literary criticism.

Mass communication research became an accepted field of scholarship after World War II through the efforts of early communication educators, such as Wilbur Schramm, who nurtured the field from its academic and vocational roots by establishing research institutes at Iowa, Illinois, and Stanford. Schramm's educational training, which had culminated in a doctorate in creative writing, informed him of the merits of an interdisciplinary approach. He also had the good fortune to mingle with a host of scholars from cognitive psychology, sociology, and political science, who came to contribute their efforts toward understanding propaganda and persuasion during wartime, and who later contributed to the study of mass communication.[10]

[7]Cited in Blanchard and Christ, *Media Education*, p. 160.

[8]Ibid.

[9]Robert C. Jeffrey, "A History of the Speech Association of America, 1914–1964," *Quarterly Journal of Speech, 50* (1964), 432–44.

[10]Everett M. Rogers, *A History of Communication Studies: A Biographical*

Complementing Schramm was Willard G. Blyer in Wisconsin, who began training future journalism and mass communication professors in Madison.[11] Schramm had proposed a blueprint for the Iowa School of Journalism in 1943 with an undergraduate journalism curriculum composed of one-fourth journalism skills courses and three-fourths social science and humanities courses, just the ratio that Professor Blyer had advocated in Wisconsin.[12] Blyer created the concept of journalism as an academic field of study, whereas other universities had treated it as little more than a vocational trade.[13]

From its initial coalescence in the 1940s, the field of communication study grew in strength during the 1950s and 1960s, with several forces shaping it. Jesse Delia's historical overview of communication research reveals that the three areas exerting the most influence on contemporary communication research were the study of mass media, the examination of the media's role in social and political life, and the survey and analysis of professional practices across social science disciplines.[14] Historically, communication research has been an integral part of social science disciplines, valued for its focus and growth following the advent and development of every new channel of communication over the past 100 years or so.

A turning point in the communication field came when Bernard Berelson posed a troubling question in the spring 1959 issue of *Public Opinion Quarterly*.[15] Berelson, a political scientist known for his work in content analysis, asked if communi-

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Approach (New York, 1994).

[11]Willard G. Blyer (1873–1935) was one of the founding fathers of journalism and mass communication education in the United States.

[12]Rogers, *A History*, p. 465.

[13]Rogers writes on p. 467 in *A History* that Schramm returned to launch the first academic program in communication study in the School of Journalism at the University of Iowa in 1943. He nurtured this area by creating academic units in "communication," authoring the first textbooks in this discipline, and awarding the first doctoral degrees in the field at the University of Illinois. In 1947 Schramm became the first person in the world to hold the title of "Professor of Communication."

[14]Delia, "Communication Research: A History," in *Handbook of Communication Science*, eds Charles R. Berger and Steven H. Chaffee (Newbury Park, CA, 1987), pp. 20–98, on pp. 22–3.

[15]Berelson, "The State of Communication Research," *Public Opinion Quarterly*, *23* (1959), 1–6.

cation research was "withering away." If the discipline of communication were dying, one professor replied, it was at least a lively corpse.[16] More sanguine was Elihu Katz's explanation that the ferment found in communication research "can be attributed to an invasion by a broader set of multidisciplinary concerns and particularly to a reunion of the social sciences with the humanities."[17] Katz argued that, although communication research had borrowed its perspective from philosophy, sociology, and linguistics, "it has made some important contributions of its own."[18]

George Comstock took exception to this view by noting that the discipline suffered from three distinct maladies: "parochialism, timidity and rigidity."[19] The same infection may be running throughout much of the academy today, as scholars find their efforts at interdisciplinarity discouraged in favor of the more potent forces protecting specialized knowledge and the insularity of academic areas. Consider the recent report of the Freedom Forum, arguing for a return to schools of journalism and lamenting trends to consolidate departments of communication.[20]

The cure for timidity is courage, of course, but courage directed toward what end, and by what means? Academic courage should be aimed boldly at interdisciplinary efforts, where scholars who hold a forum in a discipline other than their own should be recognized and honored. The solution to rigidity is greater flexibility in the academy—flexibility in teaching as well as research. Collaborative efforts across disciplines should be encouraged rather than relegated to second-class status in favor of traditional strains of solitary focus. Why should scholars not combine their talents to teach subjects in both the humanities and behavioral sciences? Such collaborative efforts can be encouraged in the classroom and should not be re-

[16]Wilbur Schramm, "Comments on 'The State of Communication Research,'" *Public Opinion Quarterly, 23* (1959), 6–9.

[17]Katz, "The Return of the Humanities and Sociology," *Journal of Communication 33* (summer 1983), 51–2, on p. 51.

[18]Katz, "The Return," p. 51.

[19]Comstock, "The Legacy of the Past," *Journal of Communication, 33* (summer 1983), 42–50, on p. 46.

[20]Betty Medsger, *Winds of Change: Challenges Confronting Journalism Education* (Arlington, VA, 1996).

stricted by bureaucratic barriers. Synergy, the cure for parochialism, may be found in ecumenical efforts such as the present colloquium, where specialists from diverse disciplines are called upon to reason and respond to each other's ideas, words, and arguments. Parochial barriers may be removed by sharing academic philosophies on a more regular basis. Why not hold forums where professors outline the objectives of their respective disciplines and individual programs? We can turn our attention to society's larger problems in such settings. Is there not common ground for an economist, a sociologist, a political scientist, and a communication scholar to examine the causes and cures for racism in our society? Why not a symposium bringing together diverse talents from multiple disciplines to discuss environmental hazards confronting our community? The larger benefits of interdisciplinary education include a broader perspective of all areas of the academy, greater flexibility, and a refreshing variety in the perspectives that engage our interest.

The alternative is to continue to pulverize infinitesimal bits of knowledge, to persist in cross-referencing our colleagues and mentors, to ignore the larger picture in favor of the smaller, safer snapshots of what we already know to be true. Such a low-risk, low-maintenance life of scholarship is not adequate for the challenges of a shrinking but multicultural and complex world interconnected with a myriad of sounds and images transmitted by hundreds of transponders to every corner of the globe.

Fortunately, several examples of such innovation in higher education point the way for the future. *The Chronicle of Higher Education* reports that the University of Chicago is changing its traditionally conservative outlook to foster interdisciplinary thinking by appointing humanities scholars to select professorships.[21] *The Chronicle* reports that Brown University, to secure its commitment to a flexible curriculum, has identified 270 university courses in a guidebook that invites students to explore interdisciplinary thinking in small, discussion-oriented settings.[22] Courses are listed and grouped in seven general-education categories, and interested students may select among those offerings. As a result of initiatives implemented at the

[21]Liz McMillen, "A New Cadre at Chicago," *Chronicle of Higher Education,* 22 March 1996, pp. A10–11.

[22]Scott Heller, "Curriculum Update: Brown Offers a Menu of Interdisciplinary 'University Courses,'" *Chronicle of Higher Education,* 28 October 1992, p. A20.

Graduate School of Education at the University of Utah in Salt Lake City, collaborative preparation programs for educators are now based on an interdisciplinary approach to special-needs students, and educators collaborate with one another in a team-based approach.[23]

The importance of interdisciplinarity in higher education has long been recognized in Europe.[24] British universities now facilitate the rise of multi- and interdisciplinary learning by integrating medieval and modern history. Wattleton points to the successes of interdisciplinary research involving DNA and the use of magnetic resonance imaging techniques in biology and medicine.[25] In this time of shrinking support for higher education, it is imperative that the administrators in colleges and universities around the country encourage progressive and innovative efforts to share ideas and knowledge across the curricula.

Conclusion

Academic isolationists upholding Shakespeare's injunction to be neither a borrower nor a lender will soon find themselves suffering from intellectual poverty. To aid in the sharing of ideas across disciplines, we must, like our students, become frequent and familiar visitors to each other's domains. By embarking on a wider focus in complementary areas we may begin the journey across the multidisciplinary bridge to the future. Arguments in favor of the present system have been primarily bureaucratic ones, reflective of the larger bureaucracies that accommodate public institutions. The academy should be changed, but not just to improve administrative efficiency—it should also be changed to promote intellectual efficiency and academic enlightenment. In Germany, Fredrich Wilhelm Froebel attempted to place emphasis on a natural system of learning.[26] In Froebel's kindergarten, both the natural development of individuals and their contributions to the group were

[23]Nancy Winitzky and Susan Sheridan, et al., "Interdisciplinary Collaboration: Variations on a Theme," *Journal of Teacher Education, 46*, 2 (1995), 109–19.

[24]Ian Fitzgerald and Shaun Hodgkinson, "British University History Now," *History Today, 44*, 8 (1994), 53–7.

[25]F. Wattleton, "The Blocks on Interdisciplinary Research," *New Scientist*, 6 April 1991, p. 8.

[26]Frost, Jr., *Basic Teachings*, pp. 223–4.

emphasized. To symbolize this unity, Froebel began class with students holding hands in a circle before breaking them up into smaller groups for creative learning activities, and he ended class with the same circle, which symbolized the unity of the group. The academy has yet to learn from Froebel that we must join hands across disciplines.

Commentary on "Communicating Interdisciplinarity"

by
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The opportunity to respond to Professors Jung-Sook Lee and William Davie's paper is a privilege. The arguments offered both directly and by implication are considerable. Given time limitations, I shall relinquish my desire to discuss the many issues raised by these writers and restrict my response to a more general exploration and extension of the dynamics of interdisciplinarity as presented, rather than proffering an oppositional critique of the paper.

Lee and Davie recommend that the academic community emulate the field of communication as an exemplar of interdisciplinarity, since, quoting Schramm, it "is the most interdisciplinary of the liberal arts."[1] Indeed, communication can serve us well. I suggest that within the liberal arts there are other fields of inquiry that also serve as models. Philosophy, for example, is inclusive of philosophy of science, language, the arts, as well as the study of value and ethics and all that they encompass. In fact, there is little that does not fall within the purview of philosophy. Similarly, history addresses the history of science, the arts, politics, and so forth. Further, history may include a descriptive, narrative, or normative focus.[2] Music is composed of the study of historical musicology, sociology of music, ethnomusicology, aesthetics, and the psychology of music, including acoustics, education, poetry, language, and so forth. I cannot imagine teaching Impressionism in music without including artists and the symbolist poets. Without doubt there are other exemplars among the liberal arts.

[1]Wilbur Schramm, "Comments on 'The State of Communication Research,'" *Public Opinion Quarterly, 23* (spring 1959), 6–9.

[2]Thomas S. Kuhn, *The Structure of Scientific revolutions*, 2nd ed., enlarged (Chicago, 1970), on p. 8.

Now there is certainly agreement with Lee and Davie's position that interdisciplinarity respecting both teaching and research needs to be taken more seriously than it has been. At a theoretical level Lee and Davie offer the argument that interdisciplinary education provides a broader perspective, refreshing variety, and flexibility in research. But what does this mean in actual practice? The answer is neither simple nor easy.

Great care must be exercised that the academic community not adopt a reductionist approach like the one offered by Eric Hirsh.[3] Hirsh assumes that if people are able to identify items in his list of "What Literate Americans Know," they have achieved cultural literacy. Similarly, to integrate medieval and modern history as the British do is not sufficient to achieve interdisciplinarity. Nor, I contend, is the rare occasion when an English major includes discussion of the political economy of the British publishing industry in a dissertation.

One might ask then, what exactly constitutes interdisciplinarity with respect to teaching and research? Lee and Davie would seem to suggest a *mix and stir* recipe. Mix together in proper proportions a little anthropology, economics, political science, psychology, and sociology, stir carefully, and one has communication scholarship. But let us examine this mix and stir approach more carefully.

I believe that interdisciplinarity needs to take into account the strengths and weaknesses of each ingredient and weigh its potency in the mix. It is not, after all, a simple blending of all ingredients into some bland, undifferentiated batter that constitutes interdisciplinarity.

When engaging in interdisciplinary inquiry, one multiplies the number of paradigms from which one draws. There are both benefits and problems to this approach. Teachers, students, and researchers are challenged to grapple with the nature of knowledge in each discipline. Even within one's own discipline, there is necessarily a level of incomplete knowledge.

In addition, in an interdisciplinary approach to research, the number of literatures from which one draws is multiplied, as is the time needed to study these literatures. The question of breadth versus depth is central. "[A] discipline must succeed on

[3]Eric D. Hirsch, Jr., *Cultural Literacy: What Every American Needs to Know* (Boston, 1987), pp. 152–215.

its own terms; it must be able to solve the problems that it posits."[4] But what happens when the underlying problems of several disciplines must be addressed? Faculty particularly face the question of what is expertise and what defines an acceptable level of competence within each particular discipline.

Yet the argument persists that the more perspectives we bring to bear, the richer our research and teaching. In multiplying and combining traditions, however, there are both positive and negative epistemological factors as well, and they are not always correctly applied. The interdisciplinary approach, for example, through only partially understanding paradigms or assuming and accepting them as good, sometimes results in insufficient critique of these models.

For example, with the growth of psychology as a field, music education embraced psychological research and the scientific model as the research method of choice. This model has been applied to the study of the aesthetic response. Consequently, researchers at Florida State University have developed the Continuous Response Digital Interface (CRDI), which purports to measure subjects' responses to a musical stimulus as it unfolds in real time. By moving a dial a subject reports continuous judgments on his or her aesthetic response to music.

> Irrespective of whether the construct of the aesthetic experience is considered from the essentialist's or operationalist's perspective, claims that the aesthetic experience is adequately sampled by responses on a single _/_ continuum seems ambitious at best and reductionist at worst. . . . The task [appears] more plausible as an indicator of music preference than of the "aesthetic experience."[5]

While we can probably all agree that courage, flexibility, and ecumenical effort are necessary in striving to join hands and build bridges, and that structural variables and bureau-

[4]Lewis Pyenson, "Higher Learning and its Kinds," supra, p. 30.

[5]For a complete discussion of the CRDI research, see Charles P. Schmidt, "Research with the Continuous Response Digital Interface: A Review with Implications for Future Research," *Philosophy of Music Education Review 4, 1* (1996), 20–32, on p. 27.

cratic systems are certainly a detriment to our doing so, I submit that the other factors I have identified must be addressed as well.

Finally, the assumptions we hold regarding interdisciplinarity will determine how we conceive it. In turn, that conception will have implications for the way we teach our graduate courses, the manner in which graduate students prepare and defend their research proposals, and how we adjudicate such interdisciplinary research. If, as faculty, we believe that interdisciplinarity can avert the disintegration of knowledge into isolated compartments that produce imaginatively sterile outcomes,[6] we are challenged now more than ever to respond to these issues.

[6]Pyenson, p. 33.

The Perils and Promises of Interdisciplinarity in the Humanities

by
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In working with students who are learning to write papers and theses, I insist that they give careful attention to titles, for good titles betray the fundamental themes or ideas of a work as well as indicate the topic of investigation. Following my own advice, I chose a title that indicates my stance: Practicing interdisciplinarity in the humanities is fraught with peril but bright with promise. I could just as well have turned the title around and chosen "The Promises and Perils of Disciplinarity in the Humanities," for the sword of disciplinarity is two-edged as well, and practicing a rigorous adherence to disciplinary study, while conventionally promising, is equally fraught with peril.

To avoid any suspicion that I am simply begging the question, I wish to be clear at the outset. I believe the promise of interdisciplinarity in the humanities far outweighs any peril, that the richest and most effective studies in the humanities cannot escape crossing discipline lines. That said, I must also add a caveat: Crossing disciplinary lines requires courage and fortitude gained only from thorough grounding in a single field. Rather like the cliché about grammar that insists one must first know the rules before breaking them, we must develop intellectual strength in one area before venturing into another, or we flirt with intellectual anarchy. Disciplinarity and its apparent antithesis, interdisciplinarity, which is not really an antithesis at all, are in fact complementary. Rather than thinking in terms of either/or, I prefer both/and. I believe that each enhances the other.

Titles often imply or suggest subtitles. Emulating the kind of subtitles commonly appended in eighteenth- and nineteenth-century literary works, I might have added to mine, "The Perils and Promise of Interdisciplinarity in the Humanities, Or, The

Adventures of a Reluctant Interdisciplinarian." Perhaps I should have, as I reached the positions I hold today not from a model logic, but from what was at times a hard-lived professional experience. I want to draw on that experience because I believe it provides at least anecdotal evidence of contemporary economic and professional tensions between disciplinarity and interdisciplinarity.

I *was* a reluctant interdisciplinarian, although, as in some arranged marriages, I came to love and appreciate the environment in which I found myself without deliberate choice. I completed a doctorate in history in the mid-1970s, just at the time the academic job market evaporated. Like every Ph.D. in history, I had a field of specialization, Anglo-German diplomacy in the 1930s. I also had family and financial constraints, and I quickly discovered what so many hopeful Ph.D.'s in all humanities fields discovered in the mid-1970s: Few universities were begging for my specialty, or even for Ph.D.'s in history at all. Those were the years when Ph.D.'s in the humanities often drove taxis or took whatever jobs they could get to pay the bills.

I was luckier, thanks to a university administration open to new initiatives. I gratefully took a part-time, nonteaching position developing a women's archival collection in the University of Southwestern Louisiana's Center for Louisiana Studies, also at that time the home of the university archives. Women's studies, then in their infancy, and Louisiana Studies, like British or American or Francophone or any area studies, are, by their nature, interdisciplinary.[1] I found little application for my expertise in twentieth-century Anglo-German diplomacy, but constantly drew on my historical and literary training for many projects and tasks in the five years I worked there. (I had majored first in art, then in French, and finally in English at the undergraduate level, and had a minor field in English literature at the Ph.D. level.) When I did get a teaching job, it was in the university's fledgling Interdisciplinary Humanities Program, in which I later served as director for another six years. Graduate work in history gave me the qualifications I needed to

[1]Simone de Beauvoir's *The Second Sex* (New York, 1971) was one of the first works issuing a call for a reexamination of women's role in western societies and has become a classic in the field of women's studies. De Beauvoir drew from texts in biology, anthropology, philosophy, sociology, history, and fiction in her analysis. Lillian Robinson, "Forum on Interdisciplinarity" in *PMLA, Publications of the Modern Language Association of America, 111*, 2 (1996), 271-311, on p. 278.

obtain the job, but every major and minor field I had explored in a rather checkered educational progress gave me the ability to perform the job.

I undertook and completed graduate work at a time when American universities were undergoing profound change, just as they are doing now. As the Cold War developed after the American victory in World War II, programs in Soviet studies, Latin American studies, and even American studies developed in order to strengthen understanding and support American traditions and to prepare a labor pool to serve in Communist-threatened trouble spots throughout the world. In the 1960s and '70s, the Civil Rights movement and the social movements that it spawned stimulated the emergence of interdisciplinary programs in African-American studies, Chicano studies, and women's studies.[2] These programs introduced topical analyses that eroded, if not erased, disciplinary boundaries.

Programs such as these are presently under attack through the antagonism that has developed toward them in the multicultural academic wars of the 1990s. Many face elimination now that the Cold War has ended.[3] New economic imperatives, however, perhaps a war of another sort, are replacing Cold War stimuli in reshaping contemporary curricula. Global culture studies are growing in popularity because of the imperatives of the global marketplace. The belief that if the United States is to maintain economic world leadership, or even hold its own, in the global competition for markets encourages claims that American universities must "internationalize the curriculum."[4] The result has been an unresolved tension between the centrifugal forces of interdisciplinarity and the centripetal forces reasserting disciplinary lines.

Interdisciplinary exploration has deep roots in Western culture. Oscar Wilde warned us that the truth is never pure and rarely simple. John Milton, in a mid-seventeenth-century essay on "The Doctrine and Discipline of Divorce," insisted: "Truth . . . never comes into the world but like a bastard."[5] Mil-

[2]George Yudice, *PMLA*, "Forum," pp. 275–6.

[3]Stanley J. Heginbotham, "Rethinking International Scholarship," *Items*, *48* 2/3 (1994), 33–40.

[4]Richard L. Standheusen, *Global Marketing* (Hauppauge, 1994), pp. 99–100.

[5]John Milton, *The Doctrine and Discipline of Divorce*, "To the Parliament of

ton's choice of the word *discipline* in connection with his searing experience of divorce indicates its early etymology. If today the word suggests orderly or prescribed conduct or behavior, or practiced self-control, when it first appeared in thirteenth-century Middle English from French and the Latin *discipulus*, meaning pupil, it meant punishment, a definition many of our students might applaud.[6] Milton lived in a turbulent world, one another scholar described as "a world turned upside down" where all the orthodox certainties were subject to reexamination.[7] In his 1644 *Tractate of Education* Milton argued, "Where there is much desire to learn, there of necessity will be much arguing, much writing, many opinions, for opinion in good men is but knowledge in the making."[8] Neither he nor many of his thoughtful contemporaries would have subscribed to the modern notion that knowledge is gained only through a lifetime of single-minded dedication to one area of inquiry. John Locke, the physician and scientist, is known to us for his epistemological insight and his political philosophy, and Francis Bacon, the politician and bureaucrat, for his wide-ranging studies and his new method of testing ideas. All of them would have applauded their contemporary Archbishop Robert Leighton's prayer, "Deliver me, O Lord, from the errors of wise men."

In the late twentieth century, such antagonism to disciplined—even punishing—preparation in a limited field seems foolhardy. The explosion of knowledge that resulted precisely from the intellectual adventuring of our seventeenth- and eighteenth-century forebears demands exclusion and militates against tendencies to interdisciplinarity. One can no longer be an eclectic polymath; technical and vocational imperatives require expertise. Specialization is so commonly accepted that it is hard sometimes to remember that the boundaries of traditional fields of study are scarcely more than 100 years old.[9]

England, with the Assembly," in *Complete Prose Works of John Milton*, 2, eds Douglas Bush, et al. (New Haven, 1959), p. 223.

[6]*The American Heritage Dictionary of the English Language*, 3rd. ed. (New York, electronic version from Infosoft International, 1996).

[7]Christopher Hill, *The World Turned Upside Down* (London, 1975).

[8]Milton, *Tractate of Education*, in Bush et al., *Complete Prose*, 2, pp. 362–416.

[9]See Lawrence Levine's 1993 presidential address to the Organization of American Historians, "Clio, Canons and Culture," *Journal of American History*, *80* (1993), 849–67. Despite pressures to remain intellectually focused, interdisci-

Although specialization prevails within humanities fields, contemporary theory and an admiration for wide-ranging knowledge of literature and the arts have nevertheless encouraged interdisciplinary trends. Julie Thompson Klein notes that although the roots of the concept of interdisciplinarity can be found in Plato, Aristotle, Rabelais, Kant, Hegel, and other "interdisciplinary thinkers," the twentieth-century idea resonates with theories of a unified science, a general knowledge.[10] Timothy R. Austin of Loyola University of Chicago, writing for a "Forum on Interdisciplinarity" in the March 1996 *PMLA* journal, noted that for some two decades *interdisciplinary* has been a pervasive accolade in the humanities, suggesting collegiality, flexibility, collaboration and scholarly breadth—"the academy's equivalent to parenthood and apple pie."

Interdisciplinarity is currently an academic buzzword—a seductive term among granting agencies, centers of advanced study, and some journal editors (who counter those who vigorously shy away from it). It is often used to support the value of the humanities in universities with tightly written preprofessional, vocational and technical curricula that leave little room for courses in the humanities. Because educational institutions everywhere (and particularly in Louisiana) have suffered acute financial exigencies, many humanities programs have been consolidated, if not starved, and justified mainly in a service role for technical or scientific programs deemed more important.

Recognizing the ambivalence that rules in academe, however, and the dangers of misconceived interdisciplinarity, Austin warned that the term should be used neither to lionize nor to disparage, neither to elevate scholarly work or to marginalize it. Keenly aware of both the perils and promise of interdisciplinary study in the humanities, he urged that scholars constantly

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plinary humanities programs and agencies have flourished at American universities from New York to California and have proven strengths. As examples, I would cite the Interdisciplinary Humanities Center at the University of California, Santa Barbara, the Humanities Center at the University of Utah, and the pioneering interdisciplinary degree programs offered at New York University, Syracuse University, and Florida State University.

[10]Klein, *Interdisciplinarity: History, Theory and Practice* (Detroit, 1990), p. 19. Klein is widely recognized as one of the prevailing authorities on the subject of interdisciplinary in the United States.

remind themselves of the permeability and fragility of the membranes surrounding whatever discipline or subdiscipline they elect.[11] Austin recognized that the arbitrary divisions that today divide humanities fields are simply fallacies. The fields of study that concentrate on the human experience, those fields we call the humanities, fundamentally hold shared views and common concerns and should not be, in the great French scholar Fernand Braudel's words, condemned to well-walled gardens.

Scientific models, as academic disciplines, shaped humanities fields since the late nineteenth century. Historical research, for example, in the United States, England, Germany, and France, followed models established by Leopold von Ranke and Auguste Comte. Ranke, who is generally recognized as the father of the modern discipline of history, established the seminar method at the University of Berlin and insisted that the only valid interpretations of the past were those that showed it "as it actually was," and thus only as careful, scientifically critical examination of documentary evidence could prove without question. Auguste Comte, sometimes called the father of sociology (he originated the term), formulated the theory of logical positivism, insisting that all phenomena (and he was primarily interested in social phenomena) be explained scientifically, by observation, hypothesis, and experiment.[12]

As in so many other areas, World War I brought about a rejection of the nineteenth-century deification of science, and in the field of history as well as in literature and the arts, a call arose for new methods of achieving understanding. As early as 1912 in the United States, James Harvey Robinson called for "a new history," one which would transcend earlier primarily political and constitutional histories, and which would embrace "every trace and vestige of everything that man has done or thought since he first appeared on earth."[13] If Robinson seems impossibly ambitious, he nevertheless anticipated a direction that would necessitate familiarization with theoretical and

[11]Timothy R. Austin, *PMLA*, "Forum," pp. 272-3; see also Alan Rauch, *PMLA*, "Forum," pp. 273-4.

[12]Robert William Fogel, "'Scientific' History and Traditional History" in *Which Road to the Past? Two Views of History*, eds Fogel and G. R. Elton (New Haven, 1983), pp. 5-10.

[13]Robinson, *The New History: Essays Illustrating the Modern Outlook* (New York, 1912), p. 1.

methodological approaches developing in other humanistic fields.

French historian Marc Bloch, pondering the nature of historical learning while hiding from the Gestapo in 1942, reached the conclusion that it is pointless to establish "tedious and inflexible" limitations to the search for truth.[14] Bloch, one of the founders of the *Annales* school of historical writing, had an enormous impact on the nature of contemporary historical studies. Taking its name from the review he founded with a colleague in 1929, the *Annales* paradigm demands freedom from provinciality of thought and a recognition of the interconnectedness of intellectual investigation.[15]

Seekers of truth about the human experience, Bloch insisted, should not be "the rules committee of an ancient guild, who codify the tasks permitted to the members of the trade, and who, with a list once and for all complete, unhesitatingly reserve their exercise to the licensed masters." Science, he noted, often found its most successful craftsmen among the refugees from neighboring areas; Pasteur was not a biologist nor Durkheim a sociologist.[16] In calling for more open-minded methods of investigating cultural phenomena, Bloch asserted his conviction that, "Each science, taken by itself, represents but a fragment of the universal march toward knowledge . . . in order to understand and appreciate one's own methods of investigation, however specialized, it is indispensable to see their connection with all simultaneous tendencies in other fields."[17]

[14]Bloch, a veteran of World War I, reënlisted in 1939 in the French army at the age of fifty-three. After the French defeat in 1940, he lost his professorship at the Sorbonne because of his Jewish ancestry. He refused to leave France and instead became a member of the French Resistance. The Nazis captured and executed him June 1944, shortly after the Allied forces landed at Normandy. His book *The Historian's Craft*, written without notes and from profound conviction, asserts his tenacious belief in the value of humanistic study. See Eugen Weber, "About Marc Bloch," *American Scholar*, *51* (1981–82), 73–82; Marc Bloch, *The Historian's Craft*, trans. P. Putnam (New York, 1953), pp. *viii–ix*.

[15]Bloch and Lucien Fevre founded the *Annales d'histoire économique et sociale* in 1929; it assumed the name *Annales: Économies, Sociétiés, Civilisations* in 1946. Fernand Braudel served as editor in the 1950s and '60s, when the journal acquired international prestige. The journal, and the "*Annales* paradigm" deriving from it, revolutionized the nature of historical writing.

[16]Bloch, *Historian's Craft*, pp. 20–22.

[17]Ibid., p. 18.

Robinson in America and Bloch and the *Annalistes* in France opened new doors to cultural studies in history. Their followers and similar pathbreakers in other humanities fields deplored the circumscriptions of positivist approaches: narrow cannons, arbitrary judgments, the idea of intellectual borders as customs barriers requiring passports to cross.[18] Although the dominant institutional pattern has been for scholars in the humanities to contain themselves in academic departmental ghettos, intellectual directions have blurred theoretical, even methodological approaches. Hayden White and Dominick LaCapra, for example, have emphasized the literary dimension of social experience and applied literary criticism in historical interpretation, while Clifford Geertz has moved it in the direction of cultural anthropology.[19] Michel Foucault, Roland Barthes, Claude Lévi-Strauss, Jacques Derrida, and Jacques Lacan (to name only the most significant figures), in widely influential works and theoretical analyses that breached disciplinary boundaries, have demonstrated that human phenomena, including science and technology, are subject to social and cultural influence.[20] Their theories have affected interpretive approaches in all humanities disciplines; indeed, rapidly advancing multimedia technologies such as hypertext and the World Wide Web operate by the same paradigm shifts that underlie such theories. Both push us to abandon conceptual systems founded on ideas of center and margin and to replace them with concepts of networks and links.[21] I am not certain that we can any longer escape interdisciplinarity, even if we want to. Theory and technology form a united attack on outdated orthodoxies.

My own unasked-for but employment-driven forays into interdisciplinarity led me to recognize its merit, even its in-

[18]Herbert Blau, *PMLA*, "Forum," pp. 274–5.

[19]See, for example, Dominick LaCapra, *History, Politics and the Novel* (Ithaca, NY, 1987); Hayden White, *Metahistory: The Historical Imagination in Nineteenth Century Europe* (Baltimore, 1973); Clifford Geertz, "Blurred Genres: The Refiguration of Social Thought," in Geertz, *Local Knowledge: Further Essays in Interpretive Anthropology* (New York, 1983), pp.19–35.

[20]Rauch, *PMLA*, "Forum," p. 273.

[21]George P. Landow, *The Convergence of Contemporary Critical Theory and Technology* (Baltimore, 1992); R. Barbara Gitenstein, "Fate's Telegram: Humanities Curriculum and Pedagogy for the Twenty-first Century," *Interdisciplinary Humanities, 11*, 3 (1994), 3–10.

evitability, but, as is often true, it was experience that led to theoretical justification and not the other way around. I became an interdisciplinarian out of necessity, and then became a convinced one. I learned, from having to cross departmental and disciplinary lines, of the intellectual growth and stimulation that resulted, of the crazy pleasures of what Regent's Professor Robert Wallace of Northern Kentucky University called "Chasing the Loon," an exhilarating way of knowing a pond—"The loon time after time dives out of sight and comes up who knows where."[22]

I also experienced the dizzying sense of inadequacy that inevitably accompanies leaving the safe harbor of the ingrained and often-practiced discipline, a discomfort our students feel all the time. In trying to fight it, I benefited from the collegiality that developed from sharing, sometimes arguing, perspectives with colleagues. Joan Wallach Scott, director for some years of Brown University's Pembroke Center for Teaching and Research on Women, wrote of her experience in meeting the challenges of wandering into new fields. "These were the problems of language and translation," she said, "of the adaptability of reigning disciplinary paradigms. . . . I experienced these problems not only as abstract issues but acutely as questions of professional and political identity."[23]

Scott recognized, as did I, the degree to which graduate training in a major discipline marks our intellectual behaviors and identities. Disciplinary rigor provides, to borrow T.S. Eliot's phrase, that still point we all need in a turning world. If disciplinary boundaries are increasingly fuzzy, every discipline has, happily, established rules, approaches, and methods. Interdisciplinary study is enriched by the fact that individuals from differing disciplines do not share the same blinders, do not examine problems in exactly the same way. Only differing perspectives challenge assumptions and keep them from becoming intractable axioms. Interdisciplinarity benefits from cross-fertilization.[24] That, in fact, is part of its promise.

[22]Wallace, "Chasing the Loon: The Crazy Pleasures of Comparing the Arts," *Interdisciplinary Humanities, 12*, 2 (1995), 3–17.

[23]Scott, *Gender and the Politics of History* (New York 1988), p. 1.

[24]Marianna DeMarco Torgovnick, *PMLA*, "Forum," p. 282.

Intellectual risk, however, can produce terrifying anxiety. East Carolina University's Lillian Robinson described the fears that strike when we confront other disciplinary paradigms:

> The angel I hear—who sounds more like the bank robot reciting my inadequate balance than any imaginable angel—scornfully inflates my attempts to use the insights of other disciplines as polymath grandeur . . . the fear that I can't possibly know anything about economics or government because a whole department in the next building *really* knows the subject is paralyzing and unproductive.

Academic practices amplify that scornful voice. Others beside Robinson have met obstacles to collaboration and scholarly cooperation.[25]

My experience also brought me to this further peril of pursuing interdisciplinary paths. I recognize it as a kind of prevailing schizophrenia in American higher education—an emphasis on narrow specialization rules in academic hiring and promotion. In our administrative structures and our evaluations of our colleagues, we cling to the myth that knowledge is contained within Braudel's well-walled gardens. Interdisciplinary theory may prevail and interdisciplinary programs exist and even thrive in some places, but more commonly interdisciplinarity meets resistance in academic departments and units operating with slender resources and seeking to maintain disciplinary territories. "Majors" are fiercely protected, despite the evidence from students that the smorgasbord of upper-level classes they are required to take even within one field often lacks any cohesiveness or coherence.[26]

The problem lies not in humanistic theory, which is increasingly asserting that knowledge is an interconnected web, but in limited managerial and administrative imaginations. Faculty must be "placed," their salaries must be located in some departmental budget, teaching loads and student credit hours must be assigned and balanced, performances must be evaluated. De-

[25]Robinson, *PMLA*, "Forum," p. 278; see, for example, Elizabeth Lapovsky Kennedy, "In Pursuit of Connection: Reflections on Collaborative Work," *American Anthropologist, 97* (1995), 26-32.

[26]See Ned Scott Laff, "The Myth of the Academic Major," *Perspectives, 26*, 1 (1996), 5–18.

partment heads in history or literature hesitate to stand in judgment over philosophers or sociologists—nor are the philosophers or sociologists eager to have them do so. Interdisciplinary faculty members are commonly *borrowed* from traditional faculties and frequently find that their service in interdisciplinary programs and activities must be subordinated to departmental obligations. *Merit* is too often only recognized for contributions to teaching or research in *home* fields—and salary raises accompany only that recognition. Administrative realities and financial incentives powerfully reinforce disciplinary loyalties and discourage intellectual adventuring.

Some years ago I taught part-time at an independent Episcopal school. One of my colleagues, new the same year I was, held a Ph.D. in geology from Oxford University, whose press had published his widely acclaimed dissertation. He had left a tenured associate professorship at the University of Florida to take a job as head of the Science Department at a young secondary school in the canefields of Louisiana. When I asked him why, he replied, "Because at the university level, I found myself having to learn more and more about less and less, and it was boring me to death." He had found the golden track to success in academe intellectually stupefying. Getting an academic position in the first place often depends primarily on paper qualifications—the all-powerful curriculum vita—showing training in the desired field, publications, courses taught. Then, merit and promotion, fame and glory, prizes, academic rewards of all kinds, still come primarily with recognized authority on one subject or area of specialization. Too wide-ranging a curriculum vita generates a suspicion of dilettantism. Universities have grown so complex in structures, so narrowly compartmentalized in specialized fields, that, once established on the golden track, opportunities for cooperative teaching and research are difficult and sometimes almost impossible. The very idea of abolishing academic departments or of directing advanced research outside one's own field produces indignation and fierce protection of academic preserves. Territoriality is one of the most perilous problems any interdisciplinarian faces.

Disciplinarity rules university and departmental administrative infrastructures, and its perils—a tendency to discourage creative adventuring, the stifling of wide-ranging inquiry, the condemnation of methodological transgressions, and the investment of prodigious energy in territorial protection—are

only dimly and occasionally acknowledged. Particularly in times of financial stringency, disciplinary territories are fiercely protected and boundaries between fields are strenuously defended, despite the fact that some disciplinary boundaries are so highly permeable as to be inherently interdisciplinary. The consequence has been that, instead of consolidation fostering confidence in knowledge of a field, specialization has resulted in the fracturing and fragmentation of disciplines, and subdisciplines, and sub-sub-disciplines, fostering a sense of bewildering inadequacy in mastering a field.[27] While universities throughout the United States are attempting to bridge the chasms by developing programs such as USL's Francophone Studies Program, environmental studies programs, or cross-disciplinary programs such as cognitive science, they seldom give them the priority support provided to traditional departments. One of my colleagues, in reacting to the overwhelming importance placed on disciplinary boundaries and specialization, even tried to defend interdisciplinary humanities as an academic discipline. The turf battles she fought in seeking recognition for an interdisciplinary program made her equally territorial about interdisciplinarity. If interdisciplinarity is presently a popular slogan, its real strength still lies in its rhetoric rather than its practice.

A reigning confusion about the meaning of interdisciplinarity compounds the difficulties of cultivating new approaches in teaching and research, leading to such contradictions as the discipline of interdisciplinary humanities. Multidisciplinary approaches, the juxtaposition of various disciplines such as music and literature, or cross-disciplinary combinations, such as music and mathematics and history, are frequently assumed to be interdisciplinary, producing confusion in students exposed to a sequence of teachers in poorly coordinated team-taught endeavors. Interdisciplinary efforts, on the other hand, bring together individuals trained in differing fields in a common effort on a common problem.[28] Interdisciplinarity is more than a

[27]Julie Thompson Klein, *Crossing Boundaries: Knowledge, Disciplinarities and Interdisciplinarities* (Charlottesville, 1996), pp. 44–5. Klein notes that as older fields have subdivided, they have confronted fragments of other disciplines. The deeper specialization goes, she argues, the greater the inevitability that specialists will meet each other and specialties overlap.

[28]For an introduction to the methodological approaches to interdisciplinary pedagogies, see Julie Thompson Klein and William G. Doty, eds, *Interdisciplı-*

juxtaposition of related or unrelated disciplines; it explores mutually shared creative concepts and procedures.[29]

Unsuccessful cross-disciplinary and multidisciplinary experiments resulting in shallow pedagogy or research have reinforced suspicions that interdisciplinarity fosters glib and shallow scholarship. Too often, however, such charges threaten to throw the baby out with the bathwater. Interdisciplinary experimentation, like all stick-your-neck-out experimentation, may indeed fail to meet its expected level of success—it is not "a mantra or a magic potion." Boundary-crossing work is only as good or as bad as the individual scholars who practice it, and it works best when the same rigor that is applied to disciplinary specialization is applied to interdisciplinary problems.[30] Interdisciplinarity, nevertheless, promises to reinvigorate university programs and, more pragmatically, to stretch inadequate budgets. If improperly practiced without punishing disciplinary rigor, it can lead to shallowness—and therein lies perhaps its greatest danger—but properly applied it fosters energy, insight, versatility, and a recognition of the community of learning. Too insistent a disciplinarity, on the other hand, can become dogmatic, thereby restricting understanding. More than twenty years ago, the University of Florida's Richard H. Green defended interdisciplinarity in literary studies by noting:

> Much of our best . . . scholarship has been, and is being, produced by those whose learning included other languages and literatures, intellectual and cultural history, and the fine and applied arts of the period in which the culture was made. Currently, much valuable work is being done by those who combine important developments in psychology, anthropology, linguistics, and politics with the witness of literature as cultural event.[31]

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nary Studies Today. New Directions for Teaching and Learning (San Francisco, 1994).

[29]For a thorough discussion on the nature of interdisciplinary versus cross- or multidisciplinary approaches, see Centre for Educational Research and Innovation (CERI), *Interdisciplinarity: Problems of Teaching and Research in Universities* (New York, 1972) and Stephen H. Dill, *Integrated Studies: Challenges to the College Curriculum* (Washington, DC, 1982).

[30]Torgorvnick, *PMLA*, "Forum," p. 282.

[31]Green, "The Politics of Change in the Research-Oriented Department," in

Green's statement applies equally to any of the humanities fields, all of which share an emphasis on interpreting texts and contexts, although the nature of the text may vary, and mediating the relationships between the two. More importantly, in a world increasingly dominated by the mechanical values of technology, the humanities fields share an emphasis on human values and the supremacy of the human dimension. In 13 B.C. Horace wrote, "It is sweet to let the mind unbend on occasion."[32] If we in the humanities are to retain the strength to resist the encroachments of the ignorant armies deifying technological and budgetary idols, we shall have to let our minds unbend a little. The path to cooperative innovation may be perilous, but the promise is bright.

Prospects for the 70s: English Departments and Multidisciplinary Study, eds Harry Firestone and Michael F. Shugrue (New York, 1973), pp. 105-14, on p. 110.

[32]Horace, *Odes*, bk. IV, ode xii, line 127: "Dulce est desipere in loco," which can also be translated as "Wisdom at times is found in folly." Casper J. Kraemer, Jr., ed., *The Complete Works of Horace* (New York, 1963), p. 295.

Commentary on "The Perils and Promises of Interdisciplinarity in the Humanities"

by
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Perhaps, borrowing from the African American *call and response*, an important perfomance dynamic in my own interdisciplinary scholarship, my response should simply be, "Amen." I further affirm Vaughan Baker's excellent and insightful presentation, however, by adding to that "Amen" my own testimony based on my experiences with interdisciplinarity in the humanities and, more specifically, in folklore studies. I also came to interdisciplinarity, in part, because of circumstances. Like Dr. Baker, I found my intellectual home by pursuing scholarship in areas that have relatively few to very few self-standing, autonomous departmental homes. There are, for example, only three Departments of Folklore in North America—and it seems certain that there will not be any more. Folklore is, and should be, an interdisciplinary field; folklore studies draw from many traditional departmental bases, including English, modern languages, history, music, art, anthropology, sociology, geography, architecture, and so on.

As Dr. Baker points out, the tension created with the perceived or actual antagonism toward interdisciplinarity and the maintenance of traditional lines and approaches is unresolved in American universities. As she also says, there is the tension between idea-sharing and institutional compartmentalizing. Our perceptions of these issues have everything to do with what Richard Bauman, Professor of Folklore at Indiana University, has called "our sense of our location in institutional and intellectual space."[1] Unfortunately, institutional borders and boundaries are much more rigid than those of intellectual space, and as we move across and within intellectual space, we are often forced to deal with the strictures and rules of institutional

[1]Richard Bauman, "Folklore as Transdisciplinary Dialogue," *Journal of Folklore Research, 33* (1996), 15–20, on p. 15.

space. For example, the budget lines of institutions are in departments defined by disciplines.

Bauman is particularly concerned about these issues because he does not believe that folklore can or should be construed as an automonous discipline. Bauman further says:

> I believe that the great strength of folklore at its best lies in the principled upholding of the transdisciplinary, integrative perspective that comprehends human expression, society, culture, history, and politics within a unified frame of reference. From this vantage point, the problem becomes one of articulating this transdisciplinary vision with the disciplinary rubrics under which academic departments are organized.[2]

Bauman also stresses that keeping the "transdisciplinary connections in view" allows a "relationship of intellectual reciprocity."[3]

I like Bauman's use of the term *transdisciplinary* rather than *interdisciplinary*, and this issue of terms and the implications of terms is a very crucial issue in folklore at present—with debates about how much the term *folklore* itself marginalizes the field of study. The term interdisciplinary encourages the concept or implication of "betwixt and between," where one moves into liminal space and then either returns to the status quo or moves on to a new and different state. The term transdisciplinary encourages the "border" model; borders are maintained and recognized, but without border guards. One still recognizes the boundaries of disciplinary paradigms, but they can be crossed and crisscrossed, or perhaps even danced across, following the rhythm of one's own intellectual pursuits. This metaphorical dancing across borders encourages a creative space where new concepts can be explored and old concepts can be viewed in a different way. "Seeing with a native eye" from the perspective of another disciplinary paradigm gives us insights that we cannot gain from closely guarded borders.

Is interdisciplinarity a kind of perpetual liminality—in Victor Turner's terms a constant "betwixt and between" produc-

[2]Ibid., p. 15.

[3]Ibid., p. 17

ing high anxiety along with change?[4] Or rather, using anthropologist Renato Rosaldo's model of "border crossings," is it a creative space with a high tolerance for ambiguity, contradictions, and "intellectual reciprocity"? Rosaldo contends that such borderlands are not "analytically empty transitional zones but . . . sites of creative cultural productions that require investigation."[5]

Here at the University of Southwestern Louisiana, intellectual space and institutional space enmesh very nicely in my experience with folklore studies. Francophone Studies students, based in the Modern Languages Department, may take a graduate-level folklore minor for the Ph.D. in Francophone Studies. Barry Ancelet, at present, is directing a folklore/ethnomusicology dissertation for a Ph.D. in English. Folklorists based in the English Department may also serve on committees for Francophone Studies students who are pursuing a folklore minor. The university administration has encouraged and rewarded our interdisciplinary efforts.

As Dr. Baker argues, interdisciplinary studies are vital within the humanities, and they should include all fields of study that concentrate on the human experience. Interdisciplinary studies should also engage areas of the humanities with other areas of study. One of the most interesting and exciting sessions at the 1996 American Folklore Society meeting was a panel on "Cognitive and Evolutionary Psychology and Folklore." David C. Rubin, Professor of Experimental Psychology at Duke University, presented a paper on "Oral Traditions as Cognitive Systems" in which he examined the oral traditions of epics, ballads, and counting-out rhymes from the perspective of cognitive psychology. There is, of course, something quite appealing to folklorists about a cognitive scientist studying "Eenie, Meenie, Miny, Moe," "One Potato, Two Potato," and other counting-out rhymes. Rubin, however, recognized both the promise and the perils of this kind of interdisciplinary study. In the introduction to his 1995 book, *Memory in Oral Traditions: The Cognitive Psychology of Epic, Ballads, and Counting-Out Rhymes*, he explains that eighteen years earlier, at a meeting of musicologists in 1977, he had first realized the possibilities of

[4]Victor W. Turner, *The Ritual Process: Structure and Anti-Structure* (Ithaca, 1977).

[5]Renato Rosaldo, *Culture and Truth: The Remaking of Social Analysis* (1989; Boston, 1993), p. 208

combining the theories and methods of cognitive psychology with the study of impressive feats of memory transmission that occur in oral tradition. He reveals his awareness of the academic perils of such studies by adding, "As soon as I got tenure, I started on the project in earnest. This book is the result."[6]

Rubin's comment reminds us that this kind of interdisciplinary groundbreaking takes time—a time of uncertainty and risks. One can imagine his explaining to a tenure review committee that he was studying "Eenie, Meenie, Miny, Moe!" It also reminds us that the very best in interdisciplinary studies produces something new—a new perspective, perhaps, that allows us to *see* in ways that were not apparent before. If we accept, as folklorists do, that "tradition is the creation of the future out of memory of the past,"[7] we must also accept that the study of memory and cognition is vitally important to the study of folklore. In fact, the theme of the 1997 American Folklore Society meeting is "Folklore and Memory."

Vaughan Baker notes that the antagonism toward interdisciplinarity is caught up in the various academic wars, including multiculturalism. She also notes that interdisciplinarity has flourished in American universities even as it is being attacked, at times, as nondisciplinary or antidisciplinary. As the Modern Language Association makes clear (with its thirteen interdisciplinary divisions as well as its "Forum on Interdisciplinarity" in the March 1996 issue of *PMLA*), interdisciplinarity is a vital concern of contemporary literary and cultural studies. Stanley Fish, in his article "Being Interdisciplinary Is So Very Hard To Do," ties interdisciplinarity to his basic theory that *context* is all and supports "the impossibility of the interdisciplinary project, at least insofar as that project holds out the hope of releasing cognition from the fetters of thought and enlarging the minds of those who engage in it." At the same time, he acknowledges that "interdisciplinary studies are all around us. What is it that all these people are doing?"[8] Whatever it is that we do in interdisciplinary studies, the tensions of border

[6]David C. Rubin, *Memory in Oral Traditions: The Cognitive Psychology of Epic, Ballads, and Counting-Out Rhymes* (New York, 1995), p. *ix*.

[7]Henry Glassie, "Tradition," *Journal of American Folklore, 108* (1995), 395–412, on p. 395.

[8]Stanley Fish, "Being Interdisciplinary Is So Very Hard To Do," *There's No Such Thing As Free Speech* (New York, 1994), pp. 231–42, on p. 242.

crossings and boundary maintenance are not likely to go away. Fortunately, however, neither are the academic mavericks (or academic outlaws, as some folklorists have been called) who see the possibilities and the need to explore them. As Roland Barthes has written, "Interdisciplinary work . . . is not about confronting already constituted disciplines (none of which, in fact, is willing to let itself go). . . . Interdisciplinarity consists in creating a new object that belongs to no one."[9]

In spite of the perils, the great promise lies in making a legitimate place (even if it is on borders and in margins) for the innovative connections of interdisciplinary studies. I join Vaughan Baker in urging that the humanities move in directions that transcend traditional borders.

[9]Roland Barthes, "Jeunes Chercheurs," *Le Bruissement de la langue* (Paris, 1984), pp. 97–103.

Physics and Its Disciplinary Cousins

by
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In 1965, Rudolf Peierls, a theoretical physicist, wrote a philosophical book review[1] of a philosopher's book, *The Concept of the Positron*.[2] This analysis, though certainly a careful, well-executed exercise in interdisciplinary studies, contains a cautionary introduction from Peierls:

> The discovery of the positron was one of the important and exciting developments of modern physics. It therefore seemed natural to suppose that a physicist familiar with the discovery, its background and its consequences, should possess the necessary qualifications to understand and appreciate the book. But the study of the book makes it very clear that its field is the philosophy of science, and that this is a game played with rules and based on motives which a scientist does not necessarily understand or appreciate. This review is therefore necessarily amateurish in character like a laymen's review of a technical monograph.

It is with equal trepidation that I venture into historical questions and value judgments of the multiplication of disciplines, fields, and subfields, and the merits of bridging or tunneling between and among them.

Divisions and Specialties

When the University of Virginia was founded in 1819, Thomas Jefferson saw to the establishment of eight independent schools or chairs, based on European models and his own sense of the important. They were:[3]

[1]Peierls, "Review of *The Concept of the Positron* by Norwood Russell Hanson," *History of Science*, *4* (1965), 124–9.

[2]Norwood R. Hanson, *The Concept of the Positron* (Cambridge, MA, 1963).

[3]Philip A. Bruce, *A History of the University of Virginia, 3* (New York, 1920), 322–3.

Ancient languages (Latin, Greek, and Hebrew, along with ancient history and geography);

Modern languages (French, Italian, Spanish, German, and English, along with modern history and geography);

Mathematics and all its branches (including military and civil architecture);

Natural philosophy (mechanics, statics, hydrostatics, hydraulics, acoustics, and optics, with astronomy "attached" here);

Natural history (botany, mineralogy, zoology, chemistry, geology, and rural learning);

Anatomy and medicine (anatomy and surgery, history, progress and theories of medicine, physiology, pathology, and pharmacy);

Moral philosophy (science of the mind, general grammar, and ethics); and

Law (common and statute, chancery, federal, civil, and mercantile law, law of nature and nations, and principles of government and political science).

In considering Jefferson's vision and his departmentalization, one should remember that he disapproved of that which consolidated and regimented—his preference was always for "numerous bodies moving in their own separate orbits."[4] For a long time, Virginia was the only university with the following rule: "Every student shall be free to attend schools of his choice, and no other than he chooses."[5] That is, there were no prescribed curricula. To some extent Jefferson decided on his list of schools with financial as well as philosophical considerations in mind. The university could not, he regretted in his first draft, afford a separate chair in anatomy, an omission rectified and finally included in the list above. Jefferson indicated that astronomy should (it eventually did) have its own chair. Each of the professors holding the chairs was lodged in his own Pavilion (a rather fine, well-designed home and classroom, with adjoining student rooms) located along an open green and connected to neighboring pavilions. Jefferson imagined that more chairs and professors would be added in the future, thus expanding the "Academical Village."

[4]Ibid., p. 326.

[5]Ibid.

The Village did grow. In 1851 the School of Law divided into two departments, and, in 1856, ancient languages became Latin and separately Greek. In 1865, after the Civil War, a major reorganization occurred; broad departments were formed, made up of several schools (professors).[6] Today, after many expansions, divisions, and subdivisions, there are at least seventy-seven departments at Virginia as well several graduate schools and hundreds of faculty.[7] In the Physics Department, for example, there are forty-one faculty working with twenty research associates, twenty-two staff, one hundred graduate students, and seventy-two undergraduates.[8] This one department has more subspecialties (disciplinary cousins) than its great grandparent, natural philosophy, had students.

Closer to home, Southwestern Louisiana Industrial Institute (SLII) was founded in 1898 and opened its doors as a secondary school in 1901. By 1923 it was a college, Southwestern Louisiana Institute, offering three degrees: an Academic Bachelor of Arts, a B.A. or B.S. in Education, and a B.S. in Home Economics. Prescribed curricula became part of the College of Liberal Arts in 1926, and there were various departments with several instructors. Agriculture, commerce, and engineering were completely prescribed, whereas English-foreign language and science-mathematics were partially prescribed. In 1939 there was a College of Agriculture, and in 1940 a College of Engineering was formed from Liberal Arts. In 1933 there was a professor and head of a Physics Department with an assistant and later an instructor. After major revisions occurred in 1945, there were fifty-one degree programs including one in physics, though there was little research. Graduate programs were added in the late 1950s,[9] and in 1960 SLI became the University of Southwestern Louisiana. Today USL's Physics Department numbers eight professors with seven research specialities.

[6]Ibid., p. 325.

[7]University of Virginia. http://www.virginia.edu/schools (25 October 1996).

[8]Physics Department, University of Virginia. http://www.phys.virginia.edu (25 October 1996).

[9]Lea L. Seale, *A Brief History of Southwestern Louisiana Institute* (Lafayette, LA, 1958).

Virginia and SLI are but examples. I could have chosen from the old—Harvard—to the recent—Florida Atlantic—and most in-between to illustrate the division of the academic community into disciplinary departments and often sharply drawn subspecialties within these departments.

The subdivisions have occurred not only because of developing administrative philosophies but also because of the expansion of the knowledge base in almost all fields. One observes this expansion by considering the publication of journals. The *Physical Review*, the foremost U.S. physics journal, was founded in 1893 and published at Cornell until 1913, when the American Physical Society published its Volume 1, Second Series of the *Physical Review*. The inaugural volume for the first six months of the year contained 33 articles in 480 pages from all areas of physics. The *Review* grew in size, and the semimonthly issue of 15 December 1963, contained 494 pages. The next year the *Review* divided into Section A, General Physics, and B, Nuclei and Elementary Particles. It further subdivided in 1970: Section A, General; B, Solid State; C, Nuclear; and D, Particles and Fields. Each section was separately shelved in libraries according to the appropriate subsection of the Library of Congress classification scheme. The disciplinary cousins were finding their separate homes. In 1990 the burgeoning Section A underwent mitosis to form Section A1: Atomic, Molecular, and Optical Physics and A15 (15th of the month in contrast to the 1st): Statistical Physics, Plasmas, and Fluids. A recent single issue (1 October 1996) of A1 contains 153 papers in 1,183 pages.

Another illustration of the expansion and subdivision of physics is found in the growth of the number and specialized nature of journals published. Sixty-seven percent of the first volumes of journals in section QC (physics) of Dupré Library are dated after 1950, forty-one percent after 1960. Thus, although in Jefferson's time it was possible to be well-read and conversant in all areas of natural philosophy and probably several others as well, this not possible today.

At a colloquium on the theme, "The Identification of Progress in Learning" (at Colmar, France, sponsored by the European Science Foundation), Professor John Ziman of the Imperial College of Science and Technology, London, presented the opening address.[10] Using his own original research field and

[10]Ziman, "Pushing Back Frontiers—or Redrawing Maps" in *The Identification*

one of his publications, he illustrated the subdivision of physics into its many subfields and specialties. He discussed the effects of discoveries in one branch of the subject on other branches and how long their effects last. In a figure, he illustrates how his paper is catalogued (in a classification scheme used by secondary information sources) among the various subdisciplines and fields of physics.[11]

Professor Ziman suggests "half-lives" for the various subdivisions of physics: fifty years for a subdiscipline like Condensed Matter Physics; ten years for the subfield of Electrical Conduction in Metals. Using citation analysis, the half-life of a paper can be shown to be five years.[12]

The term half life in radioactive decay is appropriate only for a large ensemble of decaying nuclei. I suggest that its use by Ziman is also apposite. The number of specialties and publication of works in them have perhaps grown large enough not only to resemble decaying nuclei, but also to resemble randomly dancing molecules. Like molecules interacting with only their nearest neighbors, we physicists (and scholars in general) primarily interact with the closest of our disciplinary cousins.

Departments

Most universities in the United States have evolved a common departmental structure. As with any evolutionary development, the growth of our academic structures from the groupings of medieval scholars to modern departments seems to suggest that there has been a selective advantage in the development of this form of disciplinary structure. Anderson argues that there are, in fact, five advantages to the departmental system that lead to its selection and retention: [13]

> Departments have provided a suitable milieu for the development, preservation, and transmission of knowledge;

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of Progress in Learning, ed. T. Hägerstrand (Cambridge, MA, 1985), pp. 1-12.

[11]Ibid., pp. 1-2.

[12]Ibid., p. 11.

[13]K. J. Anderson, "In Defense of Departments," in *Academic Departments*, ed. D. E. McHenry (San Francisco, 1977), p. 8.

> Departments possess the advantage of familiarity and a defined hierarchy of authority and have become the basic administrative unit of the academy;
>
> Departments provide a milieu in which faculty members may interact with a minimum of misunderstanding and superfluous effort. The new faculty member is provided with a means to acquire the necessary understanding to adjust to the institution;
>
> As coherent groups, departments can operate more efficiently in the university organization than can individual faculty members. They provide protection, support, and division of necessary but uninteresting labor; and
>
> A scholar's achievement cannot be appraised wisely except by his or her professional colleagues within the discipline, locally represented by members of a department.

Critics of the present departmental structures point out the isolation of professors, inhibition of new fields of knowledge, and the narrow specialization of courses and research. Dressel, Johnson, and Marcus question whether the department is the appropriate unit to serve such diverse functions as undergraduate instruction, graduate instruction, basic research, applied research, and service. They conclude that although the departments contribute to the basic store of knowledge, they have become arrogant and lost the vision of service.[14]

It seems to me that in this large ensemble of people and scholarly activity that has been described in terms of half-lives, there are probably broad ranges of arrogance, service, and narrowness or broadness of vision. There are those who are focused on narrow, but important, fields and those who focus on minutiae. The anecdotal evidence for fault within the departmental system can probably be balanced by similar evidence of its merit. I think that like any insular societal group, the scholarly ensemble tends to fall into comfortable and convenient ways of carrying on its administration as well as its internal interactions. One of the hazards of this kind of comfort is a lack of experimental development.

[14]P. L. Dressel, F. C. Johnson, and P. M. Marcus, *The Confidence Crisis: An Analysis of University Departments* (San Francisco, 1970), p. 222.

Change and Interdisciplinarity

In the past, radical changes have come from outside of the academy. War, for example, has often been a catalyst for institutional change. Witness the University of Virginia after 1865, SLI after World War II, and so many colleges and universities during the Vietnam War. The intense research efforts of the wartime scientists in the 1940s have left an indelible mark on the history of physics in the twentieth century and on the academy. Many people (for example, engineers, managers, scientists) were brought together to solve problems, often apart from their own discipline or specialty. The people were young, bold, and willing to think in new ways. The societal effects of their research in the Manhattan Project have not all been positive, but the names and the research of the cohort of the youth of the Manhattan District will long be noted: Feynman, Bethe, Teller, Alverez, Nedermeyer—the litany is long. New fields and departments have developed rapidly in the margins of the old.

From within the disciplines, revolutions of thought and structure do emerge. Some are small, affecting only a subfield (for Ziman, a ten-year half-life); others are broader, some are even candidates for *kuhninization*. In the academy, departments do relish the breakthroughs and revolutions of thought, are excited by them; but administratively departments tend to maintain the status quo. We don't advertise for research revolutionaries. We advertise instead for a "low-energy, experimental nuclear physicist," a scholar of "transcendentalist literature," a "coastal wetlands ecologist," or some other subspeciality. Departments are content for scholars to fit comfortably into the established structure and do the research for which they were initially hired. Rarely do they cultivate new explorations and alliances outside of subfields or, heaven forbid, disciplines. We often forget the farmer's wisdom that "there's often more fertile ground under fences than in the middle of fields." I would find it interesting to have the physicist, the transcendentalist, and the ecologist spend leisurely blocks of time together in each one's milieu. This would selectively breed, so to speak, new ideas and approaches to research and scholarship.

Straddling Fences—A Case Study

In 1975, Harry Kroto, a young chemist and microwave spectroscopist at the University of Sussex, became interested in the discovery of polyatomic molecules in interstellar space whose adsorption bands are in the microwave region of the electromagnetic spectrum. In the previous seven years the new field of astrochemistry had been born. Kroto and David Walton, a specialist in organic chemical synthesis, teamed together to synthesize some interesting molecules and measure their microwave spectrum. Multiply-bonded, linear molecules seemed to hold possibilities for distinctive microwave spectra. After Walton synthesized cyanobutadiyne (H-C≡C-C≡C-C≡N), HC_5N, Kroto measured the spectrum and then convinced a former colleague, Takeski Oka, at Canada's Herzberg Institute for Astrophysics, to look for this spectral signature with a radio telescope. Oka agreed, even though conventional thinking argued that such a complex molecule in space would be unlikely. In November 1975, however, HC_5N became the largest molecule then known to be present in the interstellar medium. With difficulty, Walton made HC_7N (it polymerizes easily), and Kroto and Oka found its interstellar signature. They followed with HC_9N, and others found $HC_{11}N$ in 1982.

In 1984 Kroto traveled to a conference on microwave spectroscopy in Austin, Texas, and saw Bob Curl from Rice University. He had met Curl at a meeting in England seven years before and had invited him to Sussex. Now Curl returned the favor and invited Kroto to visit Rice. Curl was working with Richard Smalley, a chemical physicist studying clusters of semiconducting materials, and they were finding and identifying interesting molecules by laser time-of-flight spectroscopy. With his astrochemical interests in mind, Kroto wondered aloud if interesting long chain carbon systems could be made this way. Curl expressed interest, but Smalley did not. Although Smalley agreed in principle with them, he couldn't imagine diverting his equipment from his planned research schedule. When Kroto returned to Sussex, he found that there were several reports on experiments that had produced interesting carbon clusters. Kroto and Curl continued to press for some carbon experiments on the Rice equipment for over a year until Smalley skeptically agreed.

On 25 August 1985, some graduate students at Rice set up the first experiment and saw an interesting distribution of carbon

clusters. Kroto, Curl, and Smalley joined the graduate students and over the next few days began to ponder the significance of the dominant C_{60} and C_{70} cluster peaks in the time-of-flight spectrum. By 10 September, they were convinced of the particular stability of C_{60}. After trying various ways to imagine a very stable structural form of 60 units, there was long discussion of the futuristic structures of Buckminister Fuller. In an all-night session, Smalley empirically put together a closed structure model of hexagonal and pentagonal faces. With a carbon atom at each of the vertices, the bond structure was correct. It's a soccer ball, a mathematics colleague reminded them the next day. What to name it? Ballene? Spherene? Soccorene? Kroto: Buckminsterfullerene![15] On 14 September, they typed a letter to *Nature*.[16]

Along the fences between astrochemistry, the chemical physics of semiconductor clusters, laser time-of-flight spectroscopy, and futuristic architecture, a fertile ground was plowed, and a new form of carbon was discovered that was later found by others to come in many more closed shapes. Researchers soon learned that this kind of carbon could be produced easily, and hundreds of discoveries by many people followed. Consequently, yet another new field of study emerged, with even more impacts in many other fields. And in 1996, Kroto, Curl, and Smalley shared the Nobel Prize. I was pleased to see that the graduate students, James Heath and Sean O'Brien, who provided dedicated yeomen's service, were formally mentioned in the award.

Conclusion

I believe that the extraordinary success of the physicists and chemists of the Manhattan Project was in large measure due to their early, intense, interdisciplinary research experiences. Though we cannot wish for catastrophe to perturb the halls of learning, it seems to me that we should regularly attempt to stir the system a bit. Harry Kroto stirred, and a new research field was born. We, you and I, have little control of the larger ensemble, and perhaps even USL is too large to stir conveniently, but

[15]J. Baggott, *Perfect Symmetry: The Accidental Discovery of Buckminsterfullerene* (Oxford, 1994).

[16]H. W. Kroto, J. R. Heath, S. C. O'Brien, R. F. Curl, and R. E. Smally, "C_{60}: Buckminsterfullerene," *Nature, 318* (1985), 162–3.

the occasional wave is surely in order. We know that the departmental system will probably remain stable for some time, but we need to perturb it. We need to foster interdisciplinary collaboration by removing barriers and establishing meeting places and forums where the disciplines can and must interact. We also must ensure that faculty who venture to straddle the interdisciplinary fences can expect encouragement and an evaluation and reward equal to that of their colleagues who remain on their safer side of the fences. And students should not find difficulty in obtaining their degrees if they join in these efforts. It's easy to speak of institutes, centers, and programs of interdisciplinary research, but if equality of evaluation of the people in them does not follow, these structures will usually fail. The academy and its departments need to assert concretely that they value interdisciplinary efforts. Here at USL I think that a prize or an award would be in order for those who engage in the most interesting and productive collaborations.

In my own research, where nuclear physicists, geochemists, and ecologists work together, my ambition is to find a poet with whom I can roam Louisiana's coastal marshes and estuaries. These places are too valuable to be left only to the scientist's dry, passive-voiced sentences. In crossing the fence to the magic of these places, the poet, too, would find a rich ground of inspiration.

Translation and the Future of Canada

by
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By profession I am a teacher of English and comparative literature; by avocation, a poet; somewhere in between, I am a translator. This is to say that I think of translation in the highest possible terms.

Everyone is always knocking translation: *Traduttore, traditore*, says the old Italian proverb—"the translator is a traitor." Robert Frost's definition of poetry was "what is left out of the translation. . . ." Paul Valéry said that translations were never finished, just abandoned, and many other distinguished writers and poets have said other disparaging things about translation, often when they know little or nothing about it.

I am not a theoretical translator; I am a practitioner. What I know about translation, I have learned (I am learning) as I go along. But though unschooled, I have had an interesting career as a translator of mainly Quebec writers. I would like to share a few observations on the art of translation, say a little about translation in Canada, and tell you why I think of translation as being a good model for the future of my country.

Unlike the detractors of translation, I am an enthusiastic and committed supporter of translation. Of course I recognize the limitations of the craft. So complex and so subtle are the linguistic parameters and the cultural contexts of translation that, scientifically speaking, it probably *is* impossible to do. As you probably know, from an engineering point of view the bumblebee is said to be incapable of flight, but *Eppur si muove*, it not only moves but it flies! So it is with translation.

People are quite ready to recognize translation as one of the interpretive arts. The translator, like the musician, the actor, the dancer, works from a given text and gives it a second life. Often the interpretive artist is indispensable to the life of the original work. So it is with translation. The translator is the instrument, the instrumentalist, who projects the original toward another, wider public. Shakespeare would be unknown in

Germany, and Don Quixote in America, if it were not for the good offices of skilled translators. We are all in their debt.

But while this secondary role of interpretation and dissemination is generally recognized, I always find that the creative side of translation is denigrated and played down. People are ready to accept *interpretive* in the sentence, "The translator is an interpretive artist," but they are much more uncomfortable with the *artistic* side of the proposition.

If you will permit me to be a little vainglorious, I would like to set some corrective ideas in motion by viewing this with a creative bias. Suppose we allow, for the sake of argument, that absolutely perfect translation is impossible. Yet even if translators are condemned by the nature of their work to perform an impossible act, immediately a further possibility suggests itself: Perhaps translation, far from falling short, may be an improvement on the original! Some of the victims of my translations have modestly suggested as much: Jean Le Moyne once told me that he wasn't sure what parts of his book of essays, *Convergences*, meant when he wrote them, but that it all came clear when he read the translation. Félix Leclerc said his *Fou de l'île,* which I translated as *The Madman, the Kite, and the Island*, was not just translated but transfigured, and that he rediscovered his story in its first youth when he read the English version.

I do not cite these examples so much to flatter myself as to make an important point: Translation is not just transcription, but a creative act. Far from being a traitor, the translator is a creator. *Traduttore, creatore*. The translator must exercise all the skills of the original author, must be penetrated by the subject, must intuit enigmatic depths of character, must be acutely sensitive to the mysterious unfolding of the plot, and must caress, coddle, incubate, and lovingly hatch every last word. Thus, the translator must have the stamina, finesse, and the imaginative scope of the writer being translated, or at least must, without false modesty, aspire to these things. It may sound like nonsense to make this claim, but when, as a translator, I am in full creative swing and am carried away by the work—on my flight of the bumblebee you might say (and I remember this sensation particularly when I was translating Antonine Maillet's *Pélagie la Charette*)—I have the absurd feeling that what I am doing is not translating but restoring the text to its original language!

One more short example: When I was translating the autobiography of René Lévesque (a job he could very well have done himself because his English, or rather his American, for he learned a lot of it in the U.S. Army, was totally colloquial), we were working in close tandem. The publisher wanted both versions, his French and my English, to appear simultaneously. M. Lévesque liked my translation and paid me the highest compliment in classical Québécois: "*C'est bon*," he said. "*C'est même très bon. Vous avez le feeling.*"

There was just one problem. His text wasn't finished yet. I was getting one chapter at a time. About three-quarters of the way through, I caught up to him because he had developed a bad case of writer's block. "Listen, M. Lévesque," I told him jokingly, "I know how the story ends. Why don't you let me finish it for you, and you can translate me?" I hasten to add that he got over his block and that the ending is his own, but he did take some of my suggestions. The translator is always the writer's closest reader, and sometimes plays the role of editor too.

So much for the creative side (or creative pride). But I must insist that translation *is* creative. One cannot be dismissive about it. I take it to be axiomatic that translation calls on every quality that is necessary for an original act of creation. I suppose one might say, turning the glove inside out, that so-called creative acts are themselves acts of translation, attempts to translate some imperfectly grasped vision, concept, or reality. As the Québec poet Robert Melançon says: "*Un poète n'est jamais qu'un traducteur qui transpose en mots ce qui échappe aux mots.*" A poet is nothing more than a translator transposing into words things that lie beyond words.

To come back with a bump to the practical side of the question, I can guarantee you that when one is engaged on a translation, there is no imaginative energy left over for anything else. Forget that novel, those poems, or short stories—one's creative juices are completely absorbed in the task. It is not left-brain work. If one has translated ten books, one has written ten books. Translators are well and truly writers in the most demanding sense of the term. They should be judged as such, seriously and unsparingly. They are not, as the public at large often thinks, some kind of literary parasite on one of the lower rungs of the cultural ladder. In fact, it takes a poet to translate a poet, and a good one; a dramatist to translate a dramatist; a person with a deep knowledge of, and love for, the novel to translate a novelist,

and so on. Even in the humbler reaches of translation, it takes great technical knowledge and skill to translate even a very functional text.

Of course I may be speaking to the converted. But even converts need to profess and hear professed the articles of their faith, *n'est-ce pas*? And it never hurts to say again what an exciting, exhausting, endlessly stimulating thing it is to meet the multiple, magnificent challenges of translation. We *know* what people outside the profession can never guess. We *know* the riches and rewards (more spiritual than material, to be sure) to be gained from the practice of this ancient and noble art.

To illustrate the particular attributes of good translators, I often use the image of a smuggler. Translators are, in fact, dealers in literary contraband, transporting precious products across a linguistic frontier for consumption in another country. They are not just carriers, however; they must know their products like connoisseurs, must be familiar with their products' most intricate qualities and must be experts in the language, culture, and customs of the supplier country.

At the same time, translators must be fully acquainted with the arts, tastes, and mores of the country where they are going to market their products, for they must not only get them there, but must skillfully find ways to persuade the natives of the desirability of their somewhat exotic merchandise. And it goes without saying that translators must know every twist and turn, every pass, precipice, and slippery slope of the goat paths that they habitually follow between the two languages. Perhaps it is because translators are so sure-footed and ambidextrous that they are viewed with envy and suspicion. Perhaps this is what earns them their bad name—their versatility is seen as shiftiness. *On ne sait jamais quand il va changer de langue ou de pied.* Translators are crafty, elusive; by virtue of their dual citizenship they are untrustworthy characters, double agents living in a no-man's land, *personæ non gratæ* on both sides of the border.

Now one might think that a country like Canada, with its two languages and its own internal borders, would be an excellent training ground for highly skilled literary smugglers. The country is officially bilingual in two of the world's major languages, one of a very few in this situation. The two linguistic communities, designated by those ugly words *francophone* and *anglophone* (I always want to say *anglo-saxophone*), by the

equally ugly hyphenations *English–* and *French–Canadians*, or by the politically sensitive terms *Québécois* and *The Rest of Canada*, these two linguistic communities are to all intents and purposes culturally autonomous, each boasting a lively culture that has few ties with the other's culture. And yet the two communities share over two centuries of common history, tradition, government, trade, and environment. Their closeness demands mutual interest, respect, and understanding; their differences demand translation.

In actual fact, literary translation has been a Johnny-come-lately on the Canadian scene. There have always been reams of official, governmental, administrative translations, and a whole army of official translators and interpreters to assure that government services are available to all citizens in both English and French. But literary translation—that is, the regular, highly competent translation of the best that is written, said, and thought in the other community—has only begun to become a reality in the past twenty-five years.

This upsurge in literary translation is due to one thing—a generous cultural incentive provided by the federal government since the early 1960s to foster all the arts in Canada. The Canada Council, founded in 1957, has been instrumental in professionalizing the arts in Canada and in lifting them from a colonial to an independent status. In the '60s, in conjunction with a burst of national pride caused in Quebec by the Quiet Revolution and in English Canada identified with Expo '67 and the hundred-year anniversary of Confederation, the Canada Council launched programs to support musicians, dancers, orchestras, theaters, artists, writers, and publishers across the country. It is no exaggeration to say that this changed the face of the country. It gave Canada a visage and a voice. In fact, it gave the country *deux visages et deux voix.*

Translation was one of the beneficiaries. Before 1960 translation of Canadian writers into either French or English had been hazardous, uneven, and sporadic. In the ten years after the Canada Council inaugurated a translation program in 1972, more books were translated, in both directions, than in the 200 years before. Since 1965 over 600 new titles have appeared. To have an idea of what this represents in American terms one must multiply by ten, for most things in Canada are just one-tenth of what they are in the United States.

What the Canada Council did was underwrite the cost of translation of Canadian authors so that publishers could add translations to their lists at little added expense. Since writing in both French and English was experiencing a boom at this time, there was a great deal of interest in what was going on in the other literature, and many publishers availed themselves of this opportunity to publish translations of books from the other side of the cultural border. To begin with, there were about twice as many translations from French into English as in the opposite direction, but now the pendulum has swung the other way and slightly more books are translated into French.

Many of my colleagues, bilingual friends and writers, and university teachers with a good knowledge of the other language began to translate seriously in the 1970s. In 1975 a group of us formed the Literary Translators Association of Canada/ *L'Association des Traducteurs et Traductrices Littéraires du Canada* to ensure high standards, to lobby for good working conditions, and to encourage a lively discussion of all matters pertaining to translation, from the practical to the theoretical.

Our association has been very successful. It now numbers over 120 members (multiply by ten) and represents translators working not only in English and French but also in a dozen other languages. The emphasis is still transnational, however, and it has borne fruit, for many courses in Quebec literature in translation have opened up in English-speaking colleges and universities. Literary translation is now officially recognized as being on an equal footing with fiction, drama, and poetry in our national yearly literary prizes, the Governor General's Awards. Yes, translation in Canada in recent years has been an American-style success story and we are proud of the fact. Of course (and this is our typically Canadian way of looking at things), there is a down side to all of this, or at least some ambiguity. For all the titles translated, for example (a great many for such a small country), how many are read? How many are reviewed? (For a long time it was an unwritten policy in the French press not to review any English-Canadian books, even in translation.) How many publishers, despite the government handouts, really promoted the translations they published, giving them equal billing with their other offerings? How many publishers took government money just to swell their lists? How many translators took it just to swell their pockets or their egos? And above and beyond all, the ugly certainty looms that the day

the Canada Council withdraws its support, literary translation in Canada will drop dead. (And in these pinched days of shrinking budgets, how much longer, the whole arts community is asking itself, can the Canada Council hold out?)

And if one day translation gets slashed, or stabbed in the back, or cut to the quick, will it have been worth it after all? What shall we write as its epitaph? "At the time, the translation program seemed to be worth the price of a combat helicopter." Something like that might be suitable. Or perhaps, "Apparently for economic reasons, on July 1, 1997, literary translation in Canada ceased to exist."

Now I know you are all on the edge of your chairs waiting for the third part of my talk: why I think of translation as being a model for the future of my country. And I suppose you have seen me coming from a long way off. So although I am not a politician or a political scientist, or even a very political animal of any description, let's see if I can tie this all up together.

Suppose, first of all, that there is no future for my country as we know it today. Suppose Quebec separates. What will be the future of translation in that case? One thing you can be sure of in a sea of uncertainty, is that the millions the federal government now spends on the translation of Quebec books into English and vice-versa will be instantly diverted into other channels. What will happen to the broader bilingual services now provided countrywide? I do not know. Will what is left of Canada retain its bilingual status ? I do not know. But there will certainly be a great pressure to reduce or eliminate bilingualism as a way of saving a little to offset some of the big economic losses that will inevitably follow separation, though this will only be a drop in the bucket.

But permit me to stick to the literary side and ask: "What about translation in the new République de Québec?" The Quebec government now offers limited services in English, but it has nothing like the federal government's experience in the field. As for offering support to literary translation, it is unknown on the provincial level. There have been a few half-hearted gestures, but they have died on the vine. The only initiatives taken within Quebec to support translation are initiatives taken by the anglophone or the allophone communities. I am thinking, for example, of the excellent bilingual poetry magazine *Ellipse*, published by the English Department of the Université de Sherbrooke, of the trilingual Montreal arts magazine *Vice Versa*, of

the English publishing house with the French name, Véhicule Press, and its poetry in translation series called *Guernica*. (All these ventures, by the way, are funded by the Canada Council.) There is always lots of talk by Quebec politicians about "reaching out to the ethnic communities" but this seems in reality to be a one-way street, meaning that the way is open for the ethnics to integrate with French Quebec. As for encouraging translation, Quebec has traditionally been quite happy to leave that to the federal government in Ottawa, even when its own writers are those being translated, when its own publishers are those printing the translations, and its own booksellers (perhaps) selling them. As I mentioned, there has been a long-standing conspiracy of silence in the French press with regard to English–Canadian literature in translation. It is interesting to note, by the way, that this freeze-out does not extend to American books: Half the books on French bestseller lists in Quebec bookstores are American bestsellers, usually translated in Paris by metropolitan French translators.

Although there is a lively group of English writers in Quebec (they provocatively call themselves The Quebec Society for the Protection of English Language and Literature, or QSPELL), there are no courses on English–Canadian or Anglo–Québécois literature in translation in French colleges or universities. The typical response of Québécois teachers and writers, let alone politicians, when asked to consider broadening the curriculum to include something in English (or in translation) or to collaborate in some extra-Quebec project, is to say, with a polite shake of the head, "No. Very sorry, but there is much too much going on here in French, and much too much for us to do *chez nous* for us to become involved in something in English or outside Québec. There just isn't time."

Mind you, I am very sensitive to this argument and full of admiration for the artistic vitality of Quebec (although this waxes and wanes just as it does elsewhere). And I am in favor of the French language legislation in Quebec, Bill 101. I can even stand some of its more manic clauses because I want French culture to flourish in Quebec—and wherever else possible—and if the only way to ensure this is by passing a law, I am for that law. I also know how fragile cultural institutions are and how much they need to be protected. It is not for nothing, as Trudeau said, that Canadians sometimes feel like a mouse bedded down with the American elephant. I also know how threat-

ened and self-conscious Québécois are about the language question. Mother-tongue issues are traumatic; they are as closely attached to strong emotions as *mother* in the family, or *tongue* in the mouth.

Ceci dit, when and if Quebec becomes independent, a lot of attitudes will have to change. The nervous, inward-looking will have to become trustful extroversion. The negative, querulous, hothouse approach to culture will have to disappear to be replaced by open, positive, creative thinking. Quebec will have to accept responsibility for fostering its own talent, translating its own books, and marketing them abroad, and it will need to cultivate many outside contacts. In exchange, it will then perhaps feel confident enough to open its doors to other cultures and find stimulus in exposure to other languages and traditions, even those represented by minorities living within its own borders now.

Of course, there are many Québécois artists who have already taken this step—one could name Denys Arcand, Céline Dion, Robert Charlebois, Robert Lepage, Antonine Maillet, and others. But many have not, and the old, narrow attitude is widespread. Jack Warwick, in a book called *The Long Journey*, writes of two traditional kinds of Québécois, drawing his images from the history of La Nouvelle France: There is the *habitant* who lives within sight of the steeple of the parish church, cultivates his own garden, pushes back the forest, and divides his land into long strips to be passed down, *les 30 arpents*, to his large family. Then there is the other type, the *voyageur*, who ranges freely across the continent from the St. Lawrence to the Rockies and the mouth of the Mississippi, who is open to new experience, who lives off the land as he moves, intermarries with the Native Americans, and is only happy when out of sight of the village church steeple. I think we still find modern equivalents of these seventeenth-century types in Quebec today.

Now it may seem to you that I have just given a recipe and a justification for separation. As a student of both English and French literatures in Canada, I must say that to all intents and purposes, culturally speaking, separation already exists. The differences between the two literatures and their two literary communities are, as I have said, longstanding and outstanding. The two cultures are as different as the languages, French and English, the very different media for their dissemination. But, as I have intimated, I do not believe in the model of linguis-

tic and cultural isolation. I do not believe (perhaps because of my Anglo-Saxon, *laissez-faire* upbringing) in a model that seeks to ensure the *purity* of language and culture by legislation that censors other languages and cultures. I do believe that political, linguistic, and cultural monomorphism leads to a parochialism that causes asphyxiation and paralysis. In the Canadian context I believe that the proper model for our future is not mutual exclusiveness but mutual understanding, not competition but cooperation, not independence but interdependence, and not cultural protectionism but cultural cross-fertilization. In short, everything that translation stands for.

Let me try out the translation model in a different way: Let me take our own Literary Translators Association as a potential model. (I do so, I hasten to say, on my own head; many members might be unhappy to hear me speaking this way, even metaphorically. So be it.) Although the great majority of translators in our group live in Montreal, our executive officers, sometimes French, sometimes English, most times both, are chosen from across the country. Far-flung members, from the Atlantic and Pacific coasts, have regional representation. For practical reasons, meetings are generally held centrally, sometimes in Toronto, most times in Montreal, but members come from east and west. The language of the meetings is whatever comes first, French or English; often a speaker will begin in English and finish in French, sometimes in Franglais. Paradoxically, there is no formal translation. The assumption is that we will continually be silently translating each other as we go along. The ambience is generally congenial. If tempers flare, it is usually against publishers' bad faith or breach of contract, or reviewers' ignorance or stupidity.

A representative of the Canada Council generally puts in an appearance and listens patiently to our accomplishments and grievances. We really do have the impression that the Canada Council is listening, for many of the innovations in the Canada Council's translation program have come from our suggestions. Besides subsidizing travel to our annual meetings, for example, the council also pays for translators to visit the authors they are translating; this encourages international travel and the publication of Canadian books in translation abroad. Is it paternalistic? Yes, I suppose so. It is true that state institutions of this kind are open to abuse, even of the worst kind, which is when the granting body becomes a political or propagandist agency. But

by good luck and good management the Canada Council has escaped this fate and is known by both French and English writers as open-handed and fair-minded. If it is paternalistic, it is so in a benign way. The Quebec government, though, is the absent parent; it is never represented at these meetings.

Now you may say that all this is very idealistic, and that what it really represents is the fact that we translators, a small, insignificant group, depend entirely on this kind of easy communication and bilingual *entente* for our livelihood; that our association is not the image of our country but just the image of our profession.

And so it is. For besides being double agents and contrabandists, translators are bridge-builders. They live by opening communication routes between people who otherwise would not communicate. It is all very well for Canada to be known as a bilingual country, and great strides have been made in this direction. That is all to the good; bilingual people have more fun, twice as much fun. But the fact remains that 80 percent of our population is not bilingual and never will be, and this is where translation comes in, as a bridge between people.

And goodness knows we need bridges today. Fragmentation and fracture and factionalism are bad options. Like the United States but in its own way—made more dramatic by the language fact—Canada stands for accommodation of variety, for tolerance of difference, not for excessive or oppressive uniformization but for intelligent cohabitation. And translation, the image of such accommodation, tolerance, and cohabitation, serves this end.

Of course there is something artificial about the Canadian arrangement. To accommodate our differences is costly, unwieldy, and fraught with irritating problems that will not go away. But Canada's history is made up of dealing with such problems, meeting challenges, and making tough decisions. We have not always sought the easy way out. At one point in our history it might have been easier to suppress the French language, the Code Napoléon, and the Catholic religion (the British tried it in Acadia, but it didn't work); at another point, if you'll pardon me saying so, it would have been much easier to join the United States. It would have been much easier to observe the north–south flow of continental geography and not insist on building a huge, impractical country on an east–west axis. It would have been much easier to ignore and starve out French

speakers and culture outside Quebec or to let Quebec look after them. It would have been much easier not to invest millions in national radio and television networks like Radio-Canada and the CBC, or in a bilingual film producer like the National Film Board—one might have (and there are lots who argue for this today) simply let commercial interests dictate our destiny. It would have been much easier to eliminate the Canada Council and let 'market value' determine the direction and flow of our culture. And it would have been much easier and much cheaper simply to let translation shrivel and die.

But Canada, as much as translation, stands for doing difficult things, for attempting the seemingly impossible, for believing in values that are more than just commercial. And listen, if with all the privilege and good fortune we have enjoyed over the centuries we cannot maintain those other values we stand for—accommodation, tolerance, cohabitation, and civility—what hope is there for more beleaguered parts of the world? This is not a time for division, but for diversity. A time not for *e pluribus unum*, but for plausible pluralism. Not simply a time for change, but a time for exchange.

It will not be easy to meet the challenge, even with a great deal of good work, good will, and good luck. So many of the values and institutions we have built are at risk today. But our country itself was built by accepting risks and meeting challenges, and I believe we can shoulder this one too and share our skills in communication and bridge-building with the rest of the world.

And what will we communicate? The story, complex and intriguing, of how, despite all odds and difficulties, we have lived together, respecting and enjoying each other's differences and, to the best of our abilities, have kept on translating each other.

A week ago I flew back to Montreal from Paris, in over the huge St. Lawrence estuary, down, as Northrop Frye says, the gullet of the great river, like Job being swallowed by the whale, down that thousand-mile esophagus, the St. Lawrence Seaway, down toward the Great Lakes, the entrails of the continent. After we flew over Newfoundland, the first land discovered in North America by Vikings and by Portuguese and Basque fishermen, looking out the plane window to the north, for two hours all you could see was lakes and rocks, and trees and rivers and snow

and ice and trees and rocks and snow and lakes and rocks and ice and rivers and ice and trees and snow. Home. Our home and native land. We were flying home. For two hours you couldn't see a single human habitation. And then we banked south and picked up the river, *le fleuve* as the French say, a special word for a noble river that empties into the sea, although the St. Lawrence at this point is as wide as a dozen French *fleuves*. Along the river, just barely so, you could see the old farms and fingers of fields spreading back perpendicularly to the shore, as well as the old river road snaking along beside the river, lined with Quebec farmhouses like a continuous street and every so often the silver roof and spire of a village church sparkling in the sun. The old river road, in Louis XIV's time "*la route royale*," later, in George III's time, "the King's Highway," later still, old Highway No. 2, and now part of the TransCanada Highway or *La Transcanadienne*, or simply *The T-Can*, stretching away 3,000 miles westward to the Pacific. You know, you can stand almost anywhere on the T-Can and look north and say, as the poet Frank Scott's father did, "Look north, Frank, look north! There's nothing there between you and the Pole!"

Then we left the river and veered north again and on both sides of the plane there was nothing but ice, snow, rock, lakes, etc., etc., growing closer and closer as we lost altitude. Closer and closer. . . . If you didn't know, you might think we were coming in for a forced landing . . . no sign of habitation or civilization anywhere, on either side. . . . If you didn't know, you could never tell we were flying just a few miles away from a vibrant bilingual metropolis of two million souls. . . . The plane doesn't crash but touches down to a perfect three-point landing on a piece of tarmac lost in a wilderness of trees, snow, ice, rivers, etc., just a thirty-minute drive from the bright lights of Montreal.

Home. My country. The true north strong and free. *Terre de nos aieux*. A place of history and wilderness and possibilities and contradictions. Room to grow. A place to share. A place to inhabit and cohabit and civilize. *Eh bien, je dirai même plus. Tout cela, je pourrais le répéter en français. Et le message serait exactement le même. Ça se traduit très bien. Mais je ne le ferais pas à cette heure. Je vous épargnerai ça.*

They say no man is a prophet in his own country. I have figured out why—because you have to leave your country to see it

properly, to see it anew. But I composed this text in France and I am delivering it in Louisiana, so perhaps my predictions will come true after all. Like all translators I am filled with unquenchable optimism.

Notes on Contributors

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MODERN SCHOLARSHIP divides into two camps—the *splitters* and the *lumpers*. The splitters hold, along with the great authority of ancient astronomy Otto Neugebauer, that the path to knowledge is paved in specialist endeavor. The lumpers contend, along with the prolific author on Oriental myth and sacred writing Mircea Eliade, that specialist disciplines are *instruments de travail* to be commanded by inspiration when formulating more general truths. Universities today are organized into disciplinary departments and specialist schools, and progress toward a particular degree is regulated in great detail. Academia nevertheless recognizes that detailed knowledge can pass from one specialist field to another. How does that happen? What are the circumstances for the rise of a new specialty? Are there values and methods common to all specialist curricula, from speech pathology to stone carving? Have we reached a turning point in higher education, where students shall be urged to acquire [illegible] rather than depth of knowledge?

The present volume addresses these issues. The largest [illegible] the contributions derive from one in a continuing series of colloquia organized by the Graduate School of the University of Southwestern Louisiana. Talented professors from music, [illegible] humanities, and the natural sciences reflect on the nature of disciplines and interdisciplinarity. They emphasize that [illegible] has a natural history where specialties evolve and [illegible] where new specialties contend for authority in the academic world. The volume begins with a lecture by the prize[illegible] historian of science and novelist Russell McCormmach [illegible] ethical obligations of both art and science. It concludes [illegible] lecture by the distinguished translator and poet [illegible] about the importance of the art of translation in [illegible] Emerging from this collection is the sense that spec[illegible] generality are the two complementary poles that [illegible] university life.

[illegible] compass, [illegible] Honfleur. The compass rose is inscribed on a plate [illegible] Stewart Museum at the Fort, St. Helen's Island, Montreal, Q[illegible]

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