Big Science or Bricolage: An Alternative Model for Research in Technical Communication

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Abstract*—*Two research traditions inform contemporary technical communication research. With its physical science orientation and organizational capaciousness, the tradition of Big Science originated in the laboratory of Ernest O. Lawrence. With its humanistic orientation and individualistic singularity, the tradition of bricolage was identified in the fieldwork of Claude Lévi-Strauss. The current celebration of the former in technical communication research serves to reify a power-driven impulse for utility. The two cultures that result from such an impulse—the organizational professional and the academic researcher—have little common ground for research. To interrupt such harmful dynamics, an orientation to research is offered that celebrates successful past work in technological innovation, information design, the communication process, and the ways those processes emerge in specific contexts. To foster the continuation of such research, a community-based model is offered that draws its strength from the tradition of the bricoleur.

Index Terms*—*Big Science, bricolage, community, domain of technical writing research, praxis, research milestones, research model, technical communication research.

Technical communicators raise questions. As members of a reflective profession, we treasure a fundamental aphorism: There is no thought that cannot be entertained. Leaders in the field such as Ann M. Blakeslee and Rachael Spilka have correctly reminded us that the future of the field depends on scholarship, and so recent questions have focused on the context, methods, barriers, and outcomes of our research [1]. Are the theories we use our own, or are we forever carrying water for other disciplines? Do we consolidate what we do, or are we eternally involved in case studies? When barriers to research are overcome, do we find that there are narrow gaps or deep chasms on the other side? Is our research too removed from practice? Too difficult for practitioners to find?

In this essay (an attempt in the way intended by Montaigne), we begin by identifying two investigative traditions in order to establish a domain for research in technical communication. We turn, then, to attitudes that exist within the domain, and we identify the presence of value dualisms that are damaging to research. We conclude with a suggestive review of seminal research in our field, and we offer an attitude toward research that focuses on research communities rather than research funding.

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BERKELEY AND BRAZIL

If the Lawrence Berkeley National Laboratory, with its mega scientific instruments, budget, patronage, and prestige, is the canonical institutional expression of Big Science, then Ernest O. Lawrence, Nobel Laureate and founder of Berkeley Lab, is Big Science's emblem. When Lawrence's experiments with high-voltage accelerators could no longer fit on the table top of his University of California laboratory, he set up the radiation laboratory in an unused building on the Berkeley campus. Lawrence recruited brilliant scientists to the Rad Lab and proselytized the work of the cyclotron, which could create a number of high voltage applications, to California's burgeoning hydro-electric power industry. With industry support, federal and state funding, and private philanthropy, Lawrence was able to capitalize resources into an enclave for the flourishing hybrid science that would become nuclear science, feats made even more remarkable because this was 1931 and the height of the Great Depression [2], [3]. With $1.15 million in funding from the Rockefeller Foundation, Lawrence's team built a mighty 184-inch cyclotron and unified the elements that would become known as Big Science: immensity in size, in technology, and in sponsorship.

What followed the inception of Big Science is well known to those of us in technical communication: the post World War II advent of the corporate sponsorship of science, the industry it created, and the concomitant need for technology transfer and for those who could write about technology.

The discipline of technical communication has an identifiable ontology, and it is associated with Big Science. But what about its epistemology?

There is, of course, the tradition of Lawrence and his research of highly charged particles—research that, in the military-industrial complex of the 1950s, fueled the nation's new economy and employed writers who translated that work for a receptive American culture. But in the field of technical communication, there is a second tradition, one that abjures the monolithic system and concentrates, rather, on context. While Lawrence was receiving the Nobel Prize for physics in 1939, his contemporary, Claude Lévi-Strauss, was completing his first ethnographic fieldwork in Brazil. While Lawrence may be understood as an emblem for large-scale scientific inquiry conducted across time and circumstance, Lévi-Strauss celebrated small-scale investigations conducted within specific contexts. Nowhere is the spirit of that celebration clearer than in his description of the epistemology of the BRICOLEUR (a jack of all trades) whose methods produce BRICOLAGE (representations that are appropriate to context-rich complex situations). Lévi-Strauss was quite sensitive to the division and relations between the two ways of knowing: "The 'bricoleur' is adept at performing a large number of diverse tasks; but, unlike the engineer, he does not subordinate each of them to the availability of raw materials and tools conceived and procured for the purpose of the project" [4, p. 17]. Lévi-Strauss' relationship with the linguist Roman Jakobson led to his belief that there are central aspects of communication, senders and receivers and shared codes, that are best understood within specific circumstances [5]. The more we can know about the particularities of these signifiers and the ideas they signify, he believed, the better. Indeed, Lévi-Strauss' attention to local practice and language was profoundly influential. When Paul Feyerabend, for example, proposed that "the events, procedures, and results that constitute the sciences have no common structure" [6, p. 1], philosophers of the social sciences such as Martin Hollis serenely answered, following Lévi-Strauss, that there are always common structures because actions, language, and practices have rule-based meanings regardless of the presence of science [7].

The goals of systematized science and ethnographic inquiry are very different and very real. The engineer, as Lévi-Strauss would have called Lawrence, was always "trying to make his way out of and go beyond the constraints imposed by a particular state of civilization, while the 'bricoleur' by inclination or necessity always remains with them" [4, p. 19]. As metaphors of epistemology, both Big Science and bricolage can be seen as having connections to our disciplinary practices in technical communication. The former is the desired research mechanism, a received view inherited from physics, and from it we learned to seek external funding in order to support large-scale projects (as we also learned the pleasures of returned indirect cost); the latter is the linguistically oriented research theory of communication, inherited from anthropology, and from it we learned to set agendas that would support locally developed research (as we also learned the pain that comes from transcribing our own interviews). The problem is that our profession seems to have confused means (research infrastructure that provides financial support) and ends (appropriate research methods that provide knowledge). We seem to believe that, somehow, funded research will save the day.

Big Science has become identified with funded research, the seemingly best way to create meaningful investigations of the physical world; bricolage has become associated with close reading, a lesser way to create meaningful interpretations of the human world. From the beginning, both were scientific, unafraid to shed myths in favor of methodological scrutiny. Both were unafraid to take things apart. Both endured. Only one, however, prevailed. The presence of the Big Science paradigm in technical communication research is evidenced powerfully in Blakeslee and Spilka's 2004 review of the state of research in technical communication [1]. Their study design is well considered in its use of information from surveys, position papers, and published literature. Their findings—that too few people are working on complementary research, that the academic-practitioner relationship needs to be strengthened, and that the field is in need of greater external funding—suggest that the challenges to the field are enormous. To face these challenges, they propose a Big Science model for funding, one that will unify the profession of technical communication. They wish to travel a proven path, and their impulse is to make their way out of and go beyond the constraints imposed by a lack of financial support.

The problem, of course, is that something may be lost along the way.

Attitudes Toward Context: Praxis and Utility

Aristotle would have agreed with Lévi-Strauss's formulation of the cultural researcher. For Aristotle, PRAXIS—the philosophical parent of the concept of the bricoleur—is the signifier for practical action applied to a specific, determined end. In other words, praxis is action undertaken for a precise use, not for ends that would serve other contexts. Here is Aristotle:

> Practical wisdom [praxis] ... is concerned with things human and things about which it is possible to deliberate; for we say this is above all the work of the man of practical wisdom, to deliberate well, but no one deliberates about

> things invariable, nor about things which have not an end, and that a good that can be brought about by action. The man who is without qualification good at deliberating is the man who is capable of aiming in accordance with calculation at the best for man of things attainable by action. [8]

Praxis is concerned with the usefulness of "the ultimate particular fact" brought forward into action. Praxis, thus, requires PHRONESIS, a fundamental understanding of people and the contexts in which they live. The pursuit of knowledge, thus, becomes applied, as skill (TECHNE) is demonstrated in context. For Aristotle, whatever good was to be accomplished could be achieved within a specific situation. Praxis is, therefore, a virtue. Modern philosophers—Martin Heidegger, Hans Georg Gadamer, and Richard Rorty—became engaged in the philosophy underlying praxis because it served as a critique of the Enlightenment view of the world that empiricism was the sole path to truth [9].

It appears that, in technical communication, the philosophers' critique has not been well received. A universal drive for utility underlies technical communication research. Davida Charney notes the imbalance created in studies of technical and professional writing by our reliance on qualitative studies and rejection of objective methods. "By producing numerous individual subjective studies, we have constructed a broad shallow array of information, in which one study may touch loosely on another but in which no deep or complex networks on inferences and hypotheses are forged or tested" [10, p. 591]. As we read the classic quantitative studies in our field, such as Lee Odell and Dixie Goswami's "Writing in nonacademic settings" [11], we are therefore to make a mental note: The findings are based on a study of five administrators and six caseworkers. The utility may be limited because of a failure of sample size. The tension between the need for specific knowledge and the desire for universal applicability is unresolved.

Yet the validity of Odell and Goswami's research was so very great, and their findings shed light for many of us who worked in such settings. Must we, with Stephen M. North, reject such work as modest and neat but, ultimately, of little value because there was no control group [12]? Is it really true that, unless we have the funding to expand the sample size, we are only skipping stones? Must the work of technical communication research be in the mode of, say, the Framingham Study? Yes, we are told. Begun in 1948 to investigate coronary disease in America, the study has to date yielded a wealth of information regarding prevalence and incidence of disease. Researchers associated with the study coined the term "risk factors" as they identified health barriers, and subsequent investigation has continued to incorporate new strategies for analysis, including quantification of the genetic determinants of cardiovascular disease [13]. This kind of study is, implicitly, the standard we should pursue in technical communication. Longitudinal in nature, empirical in design, unified in focus, research studies of this sort would yield a wealth of information about communication in nonacademic settings.

Such funded research, the received voice holds, is not to be. Brent Faber, a facilitator at the 2003 ATTW Research Network, lamented that our field suffers from a lack of fundable research: we lack presence and recognition at the National Science Foundation and the National Institute for Health [1]. Perhaps our research is just not interesting enough, or perhaps our methods are not sound. Perhaps we need better grant writers, or perhaps we need more informed grant readers. Whatever the case, we are doomed.

So we are left, sadly, with only a practitioner's knowledge, clearly not the desired end. The divergence between practitioners and academics, which is so often described in our journals that it has become a standard trope, is reified by Blakeslee and Spilka: "Unfortunately, the relationship between academia and industry in technical communication has always been somewhat strained" [1, p. 83]. The academy, they remind us, wants to see practice informed by theory, and industry is concerned about the lack of relevant research. The presence of two cultures is apparent here, their duality solidified through the observation that "it seems as though the divide between us will never be bridged" [1, p. 88].

What good, after all, does it do for a writer in an environmental engineering firm to read a book such as *Ecospeak* by M. Jimmie Killingsworth and Jacqueline Palmer [14]? The task at hand is to write an environmental impact statement (the ultimate particular fact for the engineer), and a study of tropes of meaning surrounding environmental communication would have little relevance for someone who is calculating the amount of water that a new housing development will drain from the town aquifer. Just as the utility of our research is limited, so too is our relationship with the very individuals we seek to serve, the others. They (the professional writers), we are led to think, could not or would not want to follow the subtleties of rhetorical theory advanced by Killingsworth and Palmer; we (the academic theorists) could not or would not embrace the complexities of deadlines and formulas and costs.

We are lost. We do not have sufficient funding. We are not going to get such funding. We will be left only with an endless stream of industrially oriented case studies that will never allow deep or complex networks of findings authenticated by the traditionalist paradigm. Academics ethereally gaze to heaven, and

practitioners drag their knuckles on the ground. Research in technical communication is doomed.

WHY ARE WE DOING THIS TO OURSELVES?

Within the field of technical communication, why does the devotion to praxis exist in the first place? Why return to that elusive concept, especially when it apparently is getting us nowhere?

The answer is critical: Language, created by humans, exists in context. While the paradigm of Big Science emerged as the desired utilitarian goal of all research, praxis, by its very nature, embodied something quite different. As Martin Hollis points out, there is "no single and commanding analysis of causal explanation in the philosophy of the natural sciences [think Berkeley National Laboratory and the Framingham Study] which social scientists [think technical communications researchers] are bound to accept" [7, p. 91]. Hollis provides four reasons for the difference. First, human actions have meaning; second, the meaning of an action and what the actor means by it are related to language; third, unlike radioisotopes and chromosomal regions, humans have normative expectations, and thus a scientific method designed for physics and medicine is unsuited to capture the meaning that people construct and expect in their lives; and, fourth, humans construct and hold theories—particles and genes do not [7]. There is presently a conflict between what we feel we should be and what we are. This confusion has real costs.

As a profession, we have, however unwittingly, allowed the emergence of harmful value dualisms. We have confused the research infrastructure of Big Science with the theories and methods of communication research. We have embraced the image of the enlightened world of the researcher and the dark cave of the practitioner in ways that guarantee further division. With those who have publicized a literacy crisis in our country for over a century [15], [16]—and those who have recently declared a research crisis in the field of composition [17]—our field appears to be bent on determining that there is a crisis in technical communication research.

The costs of such blame are enormous, reflections of the power relations that Michel Foucault notes are the principal features of the establishment of power in the west: negative relations (researchers are failing themselves and others); insistence of rule (researchers must identify a coherent body of knowledge); a cycle of prohibition (only the causal explanations of the physical sciences yield valid results); a logic of censorship (research that embraces complexity by questioning traditionalist research design is to be avoided); and a uniformity of the apparatus (persistent calls for wise researchers who legislate knowledge and grateful practitioners who will use it). As Foucault puts it in identifying this "juridico-discursive" pattern, you may have liberation if you assent, or you may be "always-already trapped" if you demur. Such exerted dynamics of power result in legislation and obedience [18]. If allowed continued exertion, these dynamics of power will certainly not foster research communities. There is no new knowledge that will interrupt these dynamics, even in a world imagined by Thomas Kuhn.

It is, rather, the existence of communities that may lead us to an alternative research model. Indeed, it may be that we are in far better shape than we imagine.

THE WAY WE WERE: LESSONS FROM HISTORY

Table I includes what are, arguably, major research milestones in the early history of our field, research that established the domain of technical writing research. The table is organized according to Kenneth Burke's Pentad, a system that allows a series of dramatistic events to be viewed in context [19]. We have deepened that category of agent by using Deborah Brandt's concept of sponsors. In her important research, she defines sponsors as "any agents, local or distant, concrete or abstract, who enable, support, teach, and model, as well as recruit, regulate, suppress, or withhold literacy—and gain advantage by it in any way" [20, p. 19]. In Table I, we have identified the sponsors of each study.

The 1960s technology revolution created both an escalated demand for technical communicators in industry and a ubiquitous tool for our work, as well as a rich focus for our research. A number of pioneers in computers developed complex machines to support computer modeling of nonsequential writing and ways to access information by stressing connections among ideas. One group of hypertext innovators, Andries van Dam at Brown University, working with Ted Nelson and other researchers, created the first working hypertext system, Hypertext Editing System. Van Dam was funded by an IBM contract to develop computer graphics and printing, but he and Nelson explored hypertext on the IBM mainframe as a secondary project. IBM later sold the Hypertext Editing System to the Houston Manned Spacecraft Center, which used it to produce the Apollo space program documentation [21]. At the same time, an unrelated event, the plain language movement, was gaining momentum in the United States; in the early 1970s, the National Council of Teachers of English in the U.S. formed the Public Doublespeak Committee, and President Richard Nixon decreed that the Federal Register should be written in laymen's terms. The National Institute of Education contracted the American Institutes for Research, the Document Design Center of Carnegie-Mellon University, and Siegel & Gale, Inc. (a New York design firm) to conduct and apply research leading to improved design and readability

of public documents. Janice Redish conducted this watershed research in the late 1970s at the Document Design Center and ushered in a new view of writing as problem solving activity and a new era of funded research in communication [22]. At its height, the Document Design Center was a multi-project institute with 45 employees and a $12 million budget [23]. Also conducting empirical research, using both quantitative and qualitative methods, Linda Flower and John Hayes developed a process model of composition as they studied the behavior of actual writers preparing documents. Flower and Hayes gathered and coded transcripts of writers speaking out loud as the writers juggled a number of simultaneous constraints and demands. This think-aloud protocol, developed by Flower and Hayes and their associates over a decade, would become a standard method for studying the problem solving strategies that people use in composing [24]. What has also become a standard method for our research, looking at rhetorical context, had its beginnings in the early 1980s. Lee Odell and Dixie Goswami went into the field to answer the question, "When writers in nonacademic settings address different audiences or try to accomplish different purposes, are they likely to vary syntax or other linguistic features?" [11]. This contextualized research of writing in nonacademic settings provided information on what writers do as part of their day-to-day work. Odell and Goswami changed forever our concepts of rhetorical context and analytical strategies for writing in organizations.

It is clear that each of these projects was externally funded. The Van Dam team, funded by an IBM graphics contract, clearly followed the Big Science model with its instruments, budget, and prestige. Yet the research was more computer science than communication, and it would be Janice Redish of the Document Design Center who would begin to teach us what we now know about usability. The $12 million budget of the Document Design Project was impressive, yet it was the exception in that it funded an army of individuals under federal dollars from the Departments of Health, Education, and Welfare. An exception, the Document Design Project is perhaps better compared to, say, the Office of Technology Assessment—another agency that operated under a specific federal charge—regarding its budget. The norm for funding is closer to that obtained by Odell and Goswami, dollar amounts that supported, perhaps, some released time or some summer salary. The three-year National Institute of Education grant that supported Odell and Goswami's research totaled $130,000. What ensured the success of the research noted in Table I was not allocated dollars but research integrity.

Taken together, these milestones in research give us a way to envision the domain of research in our field: a new system of linked information in documents provided by technology, a new need for understanding information design, a new cognitive method for understanding the provisions of document usability, and a new acknowledged necessity of understanding communication in social contexts.

By 1981, as Fig. 1 suggests, the variables of technical communication were established.

TABLE I
RESEARCH MILESTONES IN TECHNICAL COMMUNICATION

Scene (The Background of the Act)	**Act (What Took Place)**	**Agent (Who Performed the Act)**	**Purpose (The Motives Behind the Act)**	**Agency (The Means Used)**
Brown University, computer research labs, 1967	Developed the first hypertext system on commercial equipment, the Hypertext Editing System	Andries van Dam and Ted Nelson **Sponsor**: IBM graphics contract	To create nonlinear electronic editing system for documents	Hierarchical structure and cross-references created with IBM/mainframe
The Document Design Center, 1979	Compared four different versions of a patient package insert (content, organization, language, and design)	Janice C. Redish **Sponsor**: National Institute of Education (DHEW)	To describe language and design differences related to consumers' understanding and attitudes	Content analysis; graphic features analysis
Center for the Study of Writing, Carnegie Mellon, 1979	Analyzed transcripts (protocol) of subjects who composed essays while saying aloud to a tape recorder everything that was going through their minds as they wrote	Linda Flower and John Hayes **Sponsor**: National Institute of Education (DHEW)	To understand the cognitive processes of writing by examining detailed activities of a subject performing a writing task	Think-aloud protocol; protocol analysis
A County Department of Social Services, 1981	Interviewed five administrators, six caseworkers in the agency and analyzed all documents written in two-week period (pink memos, white memos, letters on agency letterhead stationery)	Lee Oddell and Dixie Goswami **Sponsor**: National Institute of Education (DHEW).	To determine the reasons that and the extent to which writers in non-academic settings varied syntax and lexical cohesion, according to rhetorical context.	Measurement of syntactic features and cohesive ties; draft evaluation; discourse-based interviews

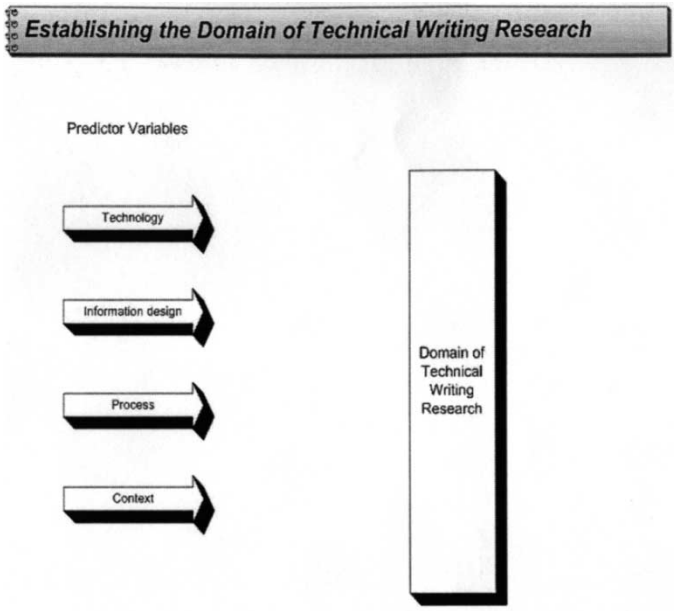

Fig. 1. Establishing the domain of technical writing research.

We do not mean to claim that our field's scholarship since 1981 is exiguous; on the contrary, we acknowledge its richness, sophistication, and depth. Since 1981, it may, arguably, be demonstrated that research in technical communication has centered on these four areas, with subsequent research iterations of these themes. Nearly a quarter of a century reveals our field's indebtedness to the research paradigm reified by these four studies. Viewed in a relational context of predictor (independent) variables associated with the outcome (dependent) variable of effective communication, our field appears to have set the domain for successful research, research that is based in a sound tradition that was established some 23 years ago. The Society for Technical Communication celebrated its fiftieth anniversary in 2003, and that community-based organization is proof of our enduring power. Surely Johndan Johnson-Eilola and Stuart Selber's *Central Works in Technical Communication* [25], as well as Tim Peeples' *Professional Writing and Rhetoric* [26], both collected works of important research and scholarship in technical communication, are significant contributions toward building that coherent knowledge base for our field. Within the community of technical communication, there are an impressive number of high-quality graduate programs and journals and conferences, each the traditional signifier of professional status and growth. Put another way, it is hard to align our history with our gloom.

Resistance: A Focus on Community

In response to assertions that we are not doing significant research in our field, we advocate resistance. To begin such resistance, those of us who undertake technical communication research might recognize that there is only the specific site, that arena that Frank Lentricchia describes as the forum for transformation [27]. The good acts that Aristotle (and Heidegger, Gadamer, and Rorty) all urge us to do—whatever theory is to be developed, whatever research is to be conducted, whatever online manuals are to be produced—are good acts in and of themselves if they improve the lives of people within those environments. The agendas of publication, the getting of grants, and the accumulation of prizes are something else altogether. Perhaps we might recognize that value dualisms are always harmful, that distinctions between "us" and "them" are responsible for the great race, gender, and culture divides that continue to plague even our post-modern culture of contingency. "We" are not the researchers, and "they" are not the practitioners. As Antonio Gramsci reminds us, we are all intellectuals. Some, the paid ones, are the traditional intellectuals; some, those who do the thinking and organizing for a social group, are the organic intellectuals. But both think because, in the absence of class bias, all are philosophers [28].

Whether we want to acknowledge it or not, there is a good deal to be cheerful about in the community of technical writing research. The practices of the bricoleur are not, thankfully, those of the physicist, and products of both are vastly different. If there is a reality check that is needed, it is in the ways we frame our descriptions of our work and ourselves. We need to celebrate our multi-methods and praise our sense of ourselves as creators of bricolage. Of course we can participate in Big Science, but we must also remind ourselves that we have infrastructure models that are locally based and appropriate to our methods: the Society of Technical Communication is an excellent community that well matches the web of meaning we investigate in our research. If we embrace, with Richard Rorty, a sense of solidarity with each other and discover in our commonalities—across academic and industrial barriers, for instance—that there is nothing beyond context [29], we stand a good chance of building the kind of community that the late and much missed Alan C. Purves believed was possible in the third information transformation, the world of the new media in cyberspace [30]. Purves' message was important: We must cope with the future by indexes of hope. Among the forms that hope will take is that of community, a term that implies a common inquiry, a shared space, respect for the individual, and respect for others. Such communities are often leaderless or have shifting authority.

If we adopted this version of a future for technical communication research, we would begin with an acknowledgment of the gains we have made and a celebration of the work before us. We would find ways to use technology to enable us to form research communities in asynchronous fashions,

meeting across time and circumstance on platforms currently designed for e-learning. Information design, our inherited second variable, would be centered, perhaps, on aesthetics and ethos, on ways to break down boundaries between readers and writers. Case studies of the composing process of writers and web designers would be collected, and each case would have value because it helped deepen knowledge, not to serve as a lesser prelude to experimental research. And the study of context, the fourth variable, would attend more to the power of the anarchic. Within this domain, questions such as those posed by Cezar M. Ornatowski and Linn K. Bekins—"How can the demands of technology, the dictates of economics, or the demands of national defense be reconciled with a democratic ethos? How can the different voices in the public sphere, large and small, powerful and meek, gain a fair hearing?"—would become more common [31, p. 267].

Our leaders would be determined by their identified and demonstrated research ability as bricoleurs, and those abilities would be sought by other investigators in other communities. Types of research would not be as important as the research questions at hand, and hierarchically arranged methods would dissolve. In the heart of decentralization, networks of researchers would be formed. Little would stand in the way of the new generation of technical communication researchers described by Laura J. Gurak and Ann Hill Duin, those with "interdisciplinary training and a world view that embraces digital communication, research and teaching" [32, p. 197]. Researchers would seek sponsors when needed, but much would be accomplished without sponsors as well.

"We seek to understand," Purves wrote, "to apprehend reality, and to attempt to comprehend the totality because it is part of our nature. Although as the creatures of our culture we can never attain that comprehension that we seek more than momentarily, we must keep trying" [30, p. 219]. Daily, we would remind ourselves that the work we do is good. That is enough, and we need to get on with it.

REFERENCES

[1] A. M. Blakeslee and R. Spikla, "The state of research in technical communication," *Tech. Commun. Quart.*, vol. 13, no. 1, pp. 73–92, 2004.
[2] D. J. Price, *Little Science, Big Science*. New York: Columbia Univ. Press, 1963.
[3] P. L. Galison and B. W. Hevly, *Big Science: The Growth of Large-Scale Research*. Stanford, CA: Stanford Univ. Press, 1992.
[4] C. Lévi-Strauss, *The Savage Mind*. Chicago, IL: Univ. Chicago Press, 1966.
[5] T. Eagleton, *Literary Theory*, 2nd ed. St. Paul, MN: Univ. Minnesota Press, 1996.
[6] P. Feyerabend, *Against Method*, 3rd ed. London, U.K.: Verso, 1993.
[7] M. Hollis, *The Philosophy of Social Science: An Introduction*. Cambridge, U.K.: Cambridge Univ. Press, 1994.
[8] Aristotle. The Nicomachean Ethics. [Online]. Available: http://classics.mit.edu/Aristotle/nicomachaen.6.vi.html
[9] *Hermeneutics and Praxis*, R. Hollinger, Ed., Univ. Notre Dame Press, Notre Dame, IN, 1985.
[10] D. Charney, "Empiricism is not a four-letter word," *Coll. Composition Commun.*, vol. 47, no. 4, pp. 567–593, 1996.
[11] L. Odell and D. Goswami, "Writing in non-academic settings," National Inst. Educ., Washington, DC, ERIC ED214 163, 1981.
[12] S. M. North, *The Making of Knowledge in Composition: Portrait of an Emerging Field*. Upper Montclair, NJ: Boynton/Cook, 1987.
[13] W. B. Kannel, "The Framingham study: Its 50-year legacy and future promise," *J. Atherosclerosis and Thrombosis*, vol. 6, no. 2, pp. 60–66, 2000.
[14] M. J. Killingsworth and J. S. Palmer, *Ecospeak: Rhetoric and Environmental Policy in America*. Carbondale, IL: Southern Illinois Univ. Press, 1992.
[15] G. Graff, *The Literacy Myth: Cultural Integration and Social Structure in the Nineteenth Century*, 2nd ed. New Brunswick, NJ: Transaction Pub., 1991.
[16] R. Ohmann, *Politics of Knowledge: The Commercialization of the University, the Professions, and Print Culture*. Middletown, CT: Wesleyan Univ. Press, 2003.
[17] S. M. North, "The death of paradigm hope, the end of paradigm guilt, and the future of (research in) composition," in *Composition in the Twenty-First Century: Crisis and Change*, L. Z. Bloom, D. A. Daiker, and E. M. White, Eds. Carbondale, IL: Southern Illinois Univ. Press, 1966.
[18] M. Foucault, *The History of Sexuality: An Introduction*. New York: Vintage, 1990, vol. 1, Transl. Robert Hurley.
[19] K. Burke, *A Grammar of Motives*. Berkeley, CA: Univ. California Press, 1945.
[20] D. Brandt, *Literacy in American Lives*. Cambridge, U.K.: Cambridge Univ. Press, 2001.
[21] A. van Dam. (1987) Hypertext '87 keynote address. Memex and beyond. [Online]. Available: http://www.cs.brown.edu/memex/
[22] J. C. Redish, "Differences in the language and design of four PPIs for valium," Nat. Inst. Educ., DHEW, Washington, DC, Tech. Assistance Rep. 1, ERIC ED 192336, 1979.
[23] (2005, Feb.). Comtech Services, Inc. Center for Information-Development Management, CIDM Associates/Ginny Redish. [Online]. Available: http://www.infomanagementcenter.com/ginny.shtml

[24] L. S. Flower and J. R. Hayes, "A process model of composition, Document design project," Nat. Inst. Educ., DHEW, Washington, DC, Tech. Rep. 1, 1979.
[25] J. Johnson-Eilola and S. Selber, *Central Works in Technical Communication*. New York: Oxford Univ. Press, 2004.
[26] T. Peeples, *Professional Writing and Rhetoric: Readings from the Field*. New York: Longman, 2003.
[27] F. Lentricchia, *Ariel and the Police, Michel Foucault, William James, Wallace Stevens*. Madison, WI: Univ. Wisconsin Press, 1988.
[28] A. Gramsci, *Selections from the Prison Notebooks*, Q. Hoare and G. N. Smith, Eds. New York: Int. Pub., 1971. Transl. Q. Hoare and G. N. Smith.
[29] R. Rorty, *Contingency, Irony, and Solidarity*. Cambridge, U.K.: Cambridge Univ. Press, 1989.
[30] A. C. Purves, *The Web of Text and the Web of God: An Essay on the Third Information Transformation*. New York: The Guilford Press, 1998.
[31] C. M. Ornatowski and L. K. Bekins, "What's civic about technical communication? Technical communication and the rhetoric of 'community'," *Tech. Commun. Quart.*, vol. 13, no. 3, pp. 251–269, 2004.
[32] L. J. Gurak and A. H. Duin, "The impact of the internet and digital technologies on teaching and research in technical communication," *Tech. Commun. Quart.*, vol. 13, no. 2, pp. 187–198, 2004.

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