Men At Work: Inspecting the Foundations of Technology Education

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To review or not to review the Council on Technology Teacher Education (CTTE) Yearbooks? To invoke Shakespeare, himself a literary critic, is of some consequence to the dilemma. This is after all, a literary business in which we're engaged. Mark Sanders, previous editor of the *Journal of Technology Education* (JTE), was ambivalent about the prospect of these reviews. My proposal, made in February 1995, to submit CTTE yearbooks to peer review, after publication, was discouraged by the President of the CTTE, Everett Israel. The CTTE yearbooks, I was told, went through a review process prior to acceptance. In the case of the 1995 yearbook, these initial "reviewers" would be the editors and some of the authors. Comments from the reviewers of a draft of this manuscript also suggested that CTTE yearbooks ought to be excluded from the post-publishing review process.

The more resistance that I encountered, the more my original intuitions were reaffirmed: There are very substantial reasons for reviewing CTTE yearbooks. Despite any anxiety, postpublishing reviews are still the soundest mechanism for providing critical feedback for reflexion. My review essay comes at a difficult time for the 1997 yearbook authors and editors. On this, I can offer little consolation. As an assistant editor for the JTE who has been recruiting book reviewers, I'll be encouraging reviews of the CTTE yearbooks. By this exercise, we will eventually spell out new characteristics of scholarship. We can hopefully open a dialogue on what we want to see in technology education texts, including the CTTE yearbooks. We might begin by asking in an era of dwindling opportunities and resources: For what and whom are the CTTE yearbooks for?

But to decide that the CTTE yearbooks should be reviewed is not to decide on how they ought to be reviewed. How books ought to be reviewed is a contentious and political issue (Davis, et al., 1988). How should we review our own yearbooks? Is our profession better served by engaged criticism than by automatic praise?

I struggled with this essay. How does one begin to review a text of 639 pages? How does one review a text that represents the product of a foundation-building enterprise? How does one critically engage with leaders in technology education who have dedicated 25 or 30 years of their life to their profession? I can assure those whose work was brought under critical review that my critique comes *not* out of disrespect, but out of concern for that same profession. I too have been part of its past, but have a different interest in its future. I judge progress differently.

Initial Groundwork and Site Analysis

Foundations of technology education have been deteriorating for some time. Structures built on the foundations have been crumbling in the US as ground under, and winds in, the academy shift. Conditions have gotten increasingly harsh over the past decade. Fewer than one dozen technology education programs are left standing in Faculties of Education (Volk, 1993). Jammed doors in those institutions confront young scholars who want to do technology education "within" these faculties. If it's not unreformed teachers who are to blame for the crumbling structures, then it's the demolitions of university governance; or, bulldozing feminists with their jackhammers.

Industrial educators in the US planned a restoration project during the early 1980s, which became known as "technology education". For others elsewhere in the academy, the project of redoing technology studies also became attractive at this time (i.e., Science and Technology Studies). In Education Studies, the adventure of undermining problematic foundations and redefining the field of social foundations was underway. Immediately, the discourses and literatures in "technology" *and* "education" studies stood to refigure into stakes and standards of scholarship in "technology education." The ground of standards for scholarly work in technology *and* education studies shifted. Insularity and parochialism stood to be challenged in the industrial and vocational fields.

But by reading the *Foundations of Technology Education*, which aimed to scholarly deal with issues such as curriculum, history, philosophy, research and teacher education, you would never know any of these changes have been occurring. Insulation and plaster are used to patch the cracks of the old foundations. Insulation, or insularity, is chosen over an open, broad range of content and critical engagement with issues. Contention and endemic problems are plastered over where a reworking of systemic underpinnings is required. Partitions are placed at the expense of criticism, discourse and reflexion. While old foundations are reinforced, the new are placed on top with little regard for seismic resistance. This comes as no surprise. It has worked that way for three generations of industrial, technology and vocational educators.

For the most part, insulation has marked the rest of the academy as well. Witness the insulated walls between "vocational" and "academic" education; where in the academy, little incentive was offered to create windows or cross thresholds. Physical partitions reinforced cultural divisions. Insularity and parochialism were tolerated at best, and expected at worst. Alas, the university world has changed, and the stakes for "what scholarship counts" in the academy have become much higher.

After my inspection of the *Foundations of Technology Education*, I get a sense that most of the authors are insulated from intellectual and political currents within technology education and the academy. There is a neglect of, and lack of engagement with: (1) relevant controversies and studies within technology education; (2) social foundations and education studies in general; and (3) the lively field of Science and Technology Studies (STS) including feminist critiques of education in technology.

I'll treat this review metaphorically as a structural and detailed inspection, in a spirit similar to those in the construction industry. "Foundation", after all, is a metaphor itself. Sarcastic humor is also used as a literary tool. The essay is intentionally provocative. My intentions are to spell out some new issues of scholarship, to inform the yearbook development process, and to provide the reader with a review or inspection of the 1995 yearbook. If indeed the purpose of the book was in laying and repairing foundations, then analysis can focus on structural content and details. Curriculum, philosophy, and history are especially troublesome foundations within this text. Leadership and the integration of Math, Science and Technology (MST) are somewhat solid. What is found in the *Foundations of Technology Education*? What isn't there? And what ought to be there?

Danger: Men at Work

Warning: Hard-hat Zone

As for my own standpoint, I'm a 38 year young, white man who has been hanging around this construction site since my childhood days. I finished my teacher education training in industrial arts in 1984, taught at the secondary level for 3 years, and returned to graduate school. I took my Masters and was doing my Ph.D. work when the University of Maryland's department fell in 1992. Now that I'm inspecting this current site as a technology teacher educator in Canada, what do I find?

The *Foundations of Technology Education* does not ask "What can technology education be?" It attempts to answer "What is technology education?" It attempts to build or repair the foundations for "understanding" technology education as a "world" movement (p. xii). Had this project been planned with some humility, or as just one possibility among many for technology education, the site could be analyzed differently. As its implied intent is one of laying and repairing foundations for understanding, work within will be judged accordingly.

Before looking at the repairs made by individual workers, there are some contracting and structural weaknesses to point out. The repaired foundations seem to rely on these

weaknesses. It is in these wider terms that the *Foundations of Technology Education*, the 44th yearbook of the CTTE, can begin to be analyzed.

Company Office: Authorized Personnel Only

The contracted authors, most with a teacher education background, are representative of the demographics of the technology education professoriate in the US. Of the twenty authors in this text, including the editor, *one* was a woman. Of the nineteen men, *one* was a person of color. Ageism is equally as stark, with about 75% of the authors over 55 years old, and half retired or within five years of retirement at the time of publication. All of the authors hold doctorate degrees and spent their careers within the US. Demographics of the authors are also reflected somewhat by the membership of the International Technology Education Association (ITEA). For the approximately 5600 ITEA members, demographics include: Women=2%, Men=98%. Of these, about 6% are African American and other minorities. About 45% of ITEA members are in the 41-55 year age range (Ulatowski, 1993; Volk, 1995).

For the most part, the authors seem to hold similar ideological views of technology education, which is reflected as consensus in the text. Over 50% of the authors played a part in the two "Jackson's Mill" consensus building efforts of the 1980s, and most of these have assumed some form of leadership and power within the ITEA or CTTE. The list of authors suggest a tacit model, where age, race and gender translate into position, power and (author)ity; and coincidentally, into expertise, know-how and merit.

There is no evidence that equity and opportunity are worthy union values for work on this site. Nor is there evidence that foreign labor was considered. This hiring practice did not result in diversity at the work site, or total quality design. Considering that a number of people with foundational expertise were overlooked, it appears that skilled labor was not always a concern. As it was, the division of labor and power used must have been difficult for the general contractor to manage, and basically "who's in charge here?" is unclear.

No Blueprints on Job Site

What notions of "foundations" went into the planning and design process? The only mention of what the editor and authors might have in mind is this: "This yearbook provides the reader with a foundation for understanding" technology education as it is "recognized throughout the world" (p. xii). Who this "reader" was meant to be is unclear. Was it to be students of technology education? The position of the authors on "foundation" *and* audience, which seem crucial, should have been explained in the Preface or a brief Introduction should have been included. There is no explanation why some foundational materials were included and others excluded. Was there any logic to the selection process? As is evident, contemporary notions and questions of educational foundations in the academy were completely unknown or disregarded. Of course, designs for "foundations of education" and "educational foundations" have existed since at least the 1930s in the US.

"Educational foundations" were up until the mid 1980s generally understood as the convergence of several disciplines applied to the study of education. The cultural foundations underlying education as studied through anthropological, comparative, economic, historical, philosophical, political, psychological and sociological inquiry constituted the field. Journals like *Educational Foundations* and *Interchange* articulated this work and discourse. As critical, feminist and post-modern studies began to erode away some foundations in the 1980s, the field of social foundations faced a crisis of unity and purpose (Brooks, 1994; Johanningmeier, 1991; Tozer, 1993). This erosion and crisis continue today.

The trouble with the *Foundations of Technology Education* is that it articulates neither customary nor contemporary views of foundations. None of the traditional areas or disciplines of educational foundations are at all explicit. The text has no clear purpose or definition. The editors should have done some initial work in understanding academic notions of foundations and their critiques. Contemporary critiques, histories and visions for foundations should have been engaged. A blueprint for the text should have embodied, or consciously rejected, proposals for contemporary directions in foundations such as those in the spring 1990 issue of

Teachers College Record (TCR). The TCR was a summary of a 1989 conference on educational foundations at the University of Illinois. Here, themes of mind and culture, learning and teaching, race and ethnicity, and gender emerged as crucial to work in the foundations of education. The notion of "foundation" as a useful metaphor was questioned in an era of postmodernism and the deconstruction of "solid truths". A working knowledge of foundations and postmodern critiques would have changed the design of the book and brought coherence to the CTTE project. This would have been a much different book if it was attuned to notions of educational foundations, and *if* indeed it was for students.

Made in USA: Holds Up to 28 PSI

A large majority of the materials found were made for and in the US. Yet, without "in the US" following the title, it is expected that the cultural scope of the book would be explained by the editor in the preface, or in the first chapter. This is not the case. Gene Martin, the editor, makes a claim that the text will provide a foundation for understanding something "known and recognized throughout the world as technology education" (p. xii). The *Foundations of Technology Education* falls flat against this claim. Its scope is narrowly reflective of US practices.

Suggestively, the book was positioned to rationalize technology education in terms of US national interests, strategy and its economic competitiveness (pp. 15, 19). Herein lies the ethical contradiction that neither this book nor the ITEA leaders have addressed. "Winning" the economic stakes on US terms means that other countries, cultures and ecologies continue to lose. As represented here, technology education is not a project of justice, liberty, tranquillity and sustainability. With the ex-American Industrial Arts Association now postured as the ITEA, one might reasonably expect to see manifestations of work to be much more inclusive and sensitive to cultural nuance (c.f., O'Riley, 1996; Zuga, 1994). A similar conclusion can be made of the ITEA's Technology For All American's Project (TFAA) (Petrina, in press).

In Chapter 17, Kendall Starkweather writes of the ITEA's hopeful status as an international umbrella organization, but has yet to adopt the cosmopolitan values necessary for a multicultural venture. For example, the ITEA's relationships with business and corporate cultures to promote competitiveness have yet to be balanced with the same efforts toward human rights, labor, non-profit, and environmental organizations and companies (p. 550). For the ITEA's links to the corporate world, the National Science Foundation (NSF), and the National Aeronautics and Space Agency (NASA) technology has been about American competitiveness.

As is evident in text and references, the editors and individual authors had not ventured outside the US. The *International Journal of Technology and Design Education* (IJTDE) was not cited even once, and was omitted in Chapter 19, Mark Sanders' summary of professional journals! Even in Chapter 15, William Dugger's "international chapter," 14 of 19 references are from US authors. Canada is *not* mentioned in this chapter, nor elsewhere. A simple survey of Layton's (e.g. 1994) edited volumes would have been a help. Working from this American-centered view, Dugger asserts that the "epistemological roots" of technology education lie in the US (p. 483). Of course, the temporal and geographic roots of technology education are not clear, and left to scholarship and debate. But this reflects the tone of much of the book, where historical and other open questions are stated as authoritative fact. Evidently, contracting some foundations out to foreign labor would not have served these interests.

Pile Materials Here: Shelf Life Extended

The monumental size of the *Foundations of Technology Education* could have been trimmed immediately by 110 pages had the editors rationally chosen to exclude chapters 8-11. The material of these chapters seems to have been prefabricated and stamped out of chapters authored in CTTE yearbooks over the previous five years. In fact, the authors of these four chapters, Richard Henak, Stanley Komacik, Jane Liedtke and Richard Seymour edited the thematic yearbooks (and authored chapters) from which the "new" material was pulled. Since

then nothing new has been added to the rhetorics on communications, construction, manufacturing and transportation industries. Certainly, a biotechnological industries chapter would have been a new addition.

Other chapters could have been eliminated, trimmed or consolidated. Chapter 2, the bulkiest in the text, covers 92 pages where the last 57 pages represent an attempt to (re)write industrial technology and engineering into the history of technology education. These pages could have been trimmed as unjustified, as Israel fails to provide a case for this revision in history and to position himself within historical work in his field and engineering education. Chapters 3 and 4 could have been consolidated and rewritten as one. Chapter 4 duplicates work on "technology and the humanities" published by Walter Waetjen in a 1990 monograph. Emerson Wiens and Waetjen could have benefited by co-authoring, and tuning into and surveying the lively scholarship of feminists and Science and Technology Studies (e.g., Jasanoff, et. al., 1995). The two curriculum chapters (7 and 12) by Thomas Wright could have been condensed into one. Chapters 17 and 18 could have been consolidated or eliminated, as much here fits standard brochure protocols. It's difficult to see any "foundational" purpose of Chapter 17, on the ITEA other than legitimization. And the merely descriptive "Professional Councils and Associations" by Donald Lauda (Chapter 18) seems to have been a misdirection of talent, considering his knowledge on curriculum. Chapter 19 by Sanders is incomplete, and a missed opportunity to tackle some tough normative issues concerning publishing in technology education. Reflective thought on his experience as editor of the JTE would have been a contribution. In all, I count about 300 questionable or redundant pages—roughly one-half of the book—that could have been eliminated by judicious design and resource management.

Caution: Under Repair

Consensus Building: Keep Out

For curriculum, the entire book seems to be underpinned by a consensus toward the technology discipline as defined by Paul DeVore, and directors of the Industrial Arts Education Project during the 1960s (pp. 3, 11-13, 16-17, 254-269, 273-279, 287-398). The discipline of technology is strictly speaking, a fabrication contrived by industrial arts educators confronted with disciplinary doctrine and subjugation since the early 1960s (Petrina, in press). There is no natural nor logical reason that technology education should be rationalized through disciplinary doctrine. There are alternatives, yet they are not presented. Design and technology (D&T) is given about three pages (pp. 270-271, 410-411), and is dismissed as an approach supported by a "limited number" of educators in the US (p. 409). It is something "promulgated by TIES magazine" (p. 409). Hence, the constructive work in D&T in the US by Patricia Hutchinson and Ronald Todd is marginally noted in a single citation. Interdisciplinarity is given about two pages (pp. 195-196). The text overlooks two essential questions: Is it democratically fruitful to teach technology *via* the technology discipline? Does the contrivance make good curricular sense in the late 1990s?

In a hopeful but telling statement, Bensen admits: "Outside the fields of technology education and the philosophy of technology, however, there appears to be little awareness, interest, or acknowledgment that technology is a discipline" (p. 3). One wonders what philosophy of technology he is talking about (not indicated). Philosophers of technology have not been the least bit interested in "acknowledging" that technology is a discipline. Nor have philosophers preoccupied themselves with the details of disciplinary taxonomies for technology. The latest synthesis of the philosophy of technology by Mitcham (1994), does not in any way allude to an academic "discipline" of technology. In fact, the opposite is true of Mitcham and most others in Science and Technology Studies: there is nothing natural about any discipline, including those of the sciences. Contriving a discipline is a political and problematic act (Petrina, in press). Philosophers of technology have however, been acutely interested in

the phenomenological aspects of working with technology (Mitcham, 1994). Here, John Dewey figures prominently.

Not surprisingly, philosophical foundations in this book were left to crumble, leaving new structures sitting on sand (Petrina, 1994; Petrina, 1997a, 1997b). There is not even minimal engagement with the work of Dewey, which is arguably central to any foundational discussion in technology education. Neither his work on education nor technology is given a discussion or citation. Deweyan philosophy and pedagogy have evidently been abandoned for what is essentially an ideological, and ultimately conservative, disciplinary project (p. 262).

Chapters that deal with curriculum (Chapters 1, 7-12) lack a developed philosophical underpinning, and appear out of touch with curriculum theory in general *and* technology education specifically. The seven chapters on curriculum are woefully inadequate when for instance, the research of Karen Zuga (e.g., 1987, 1989, 1991, 1992, 1993, 1994) is not mentioned nor cited even once. Missing is the work on curriculum of Dennis Herschbach (e.g., 1984, 1989,1992a) and Theodore Lewis (e.g., 1991a, 1991b, 1992, 1993; 1994). Chapter 13 on instructional strategies is similarly insular and lacks an engagement with critical and general methods and critiques of Bloom's taxonomy (e.g., Doll, 1972; Joyce & Weil, 1996; Lakes, 1994; Moore, 1982; Simon, Dippo & Schenke, 1991). Whether intended as an undergraduate, graduate or general text, the editors should have cast the work in current literature and critique.

There are serious problems with curriculum and theory that are continually reproduced and ignored in technology education in the US. For example, curriculum efforts continue to develop without an examination and confrontation with basic assumptions, and the entrenched disciplinary and "systems" models, and "technological method," continue as basic building blocks (pp. 11-13, 276; c.f., Petrina, 1993, 1994, in press). The use of a systematic method may in fact distort the process which technology educators are trying to encourage (Jeffery, 1991). The problematic of theory is absent, and the avoidance of basic, critical literature within technology education demonstrates a lack of knowledge concerning curriculum in the larger

arena of education studies (e.g., Pinar, et al., 1995). Authors on the curriculum chapters are either unaware of, or chose to ignore critical challenges, missing an opportunity to engage in scholarly discourse. For either student or general reader, curriculum should *not* appear as unproblematic or without theory.

Inasmuch as philosophy and curriculum were neglected, history was provided without historiographic purpose or engagement. In Chapter 2, it is not at all clear why Israel attempted to append 57 pages of the histories of industrial technology and engineering technology onto technology education. The historical relations between industrial technology and industrial education are contentious, and are far from the complimentary picture that Israel paints. As Volk suggests, the relations are somewhat antagonistic in terms of the duel interests adopted by education faculties during the 1970s and 1980s (Volk, 1993). Similarly problematic are the historical relations between technology and vocational education, but analysis and interpretation were evidently not on Israel's agenda (pp. 35-54). The case made is weak for dedicating 18 pages of industrial technology to this chapter, but Israel also for appends 39 pages of engineering technology and engineering education to this chapter without historiographic reason.

By his telling of the history of engineering education, it is not clear that Israel understands the temporal interrelations between engineering and industrial education. In all fairness, neither have historians of engineering described these interrelations. Yet this history is extremely important in understanding the increasing distance and antagonisms between engineering and industrial education during the 20th century in countries like Canada, England, Scotland and the US. In antebellum US, engineering education had begun as an effort in disseminating "useful knowledge" of the practical arts to the working class. But by the late 1800s, engineering education was yielding to corporate demands and scientific knowledge (Noble, 1977, pp. 20-49; Reynolds, 1992; Stevens, 1995, pp. 105-175). While engineers might have supported Calvin Woodward's and other efforts with technical high schools the late 1800s, it's not clear where these new professionals stood in regard to industrial education initiatives in the

1920s. By World War II, it was difficult to find engineers speaking out in favor of industrial education. Israel does *not* provide insight on the detachment of engineering from working class issues and industrial education. The links between are both problematic and fascinating in the US, but are *not* fleshed out by Israel. Instead, he provides unproblematic histories of industrial technology and engineering over necessities of reweaving African and hispanic Americans, women or an international perspective back into our histories of technology education (c.f., Gradwell, 1996; Johnson, 1996; Zuga, 1996). Wright's brief history in Chapter 7 is similarly ideosyncratic (pp. 254-257).

The recent history of technology education according to Wright, begins with a "Meeting of the Minds" in 1981 (p. 257). It's notable that out of the 21 "Minds" that evidently were worth meeting with, 20 were men. When 25 "Minds" were selected to meet again in 1989, 3 women were present. At each meeting, one person of color attended. The consensus (re)produced since that time reflects serious class, gender and racial problems in content and curriculum structure. Donald Maley's work is marginalized in this recent history as "child-centered" (p. 280) and for a suggestive "lack of identified content" (p. 256). Maley was not present at the "Meeting[s] of the Minds," and is given very little note throughout the entire text. He does receive a bit of due attention in the MST chapter however (pp. 196-197). The curriculum work of others during the 1980s is not mentioned. Women and people of color were not mentioned, and evidently were not a part of the curriculum "building" efforts. The contentious question of "what happened?" in far and recent years is situated on contested terrain, and the history of technology education will be most productively written outside an exclusive "progress" ideology.

By neglecting and failing to engage with historiographic issues and writing, Israel and Wright appear out of step with the historical work on the US written in the 1990s (e.g., Foster, 1994, 1995a, 1995b; Gradwell, 1996; Herschbach, 1992b, 1996; Johnson, 1996; Lewis, 1991b, 1993, 1994, 1995; Pannabaker; 1995; Petrina, 1995, in press; Petrina & Volk, 1995a, 1995b; Zuga, 1992, 1993, 1994, 1996). Israel could have also benefited by referring back to

history written in the 1980s, such as the 1981 yearbook. While *some* sources in the 1990s were unpublished at the time Israel and Wright were writing, future arguments will have to engage with the historiographic shift.

High Voltage Shock Hazard: Do Not Touch

The "F" word, feminism, does not appear in the text. Feminist literature on the education and work of girls and women in technology over the past decade constitute serious challenges to the foundational structures of technology education (e.g., Acker & Oatley, 1993; Appleton & Ilkkaracan, 1994; Brown 1991; Bryson & de Castell, 1995; Damarin, 1994; Gaskell, 1995; Hynes, 1994; Murphy, 1992; O'Riley, 1992, 1996; Phillips & Taylor, 1980; Rothschild, 1989; Smith & Turner, 1990; Weisbard, 1993; Wajcman, 1991, 1993; Zuga, 1994, 1996). Feminist material was suggestively too hot to handle on the job site, or has not been not read by the authors. Gender and equity are clearly not concerns in this book, where the intent was to provide a "foundation" for understanding a world movement called technology education! Using British Columbia as a typical example, the teaching force in middle and secondary school technology is less than 1% women, out of about 950 teachers. Enrollment of young women in the senior technology courses is about 8% (i.e., grades 10-12). Any way the profession is sliced—curriculum, enrollments, teachers, work, professoriate, ITEA membership, leadership and power—gender is a significant issue. The same can and should be said about race. Neither gender nor race were problematized, or mentioned, in the chapters on curriculum (chapters 1, 5, 7-12), history (chapters 2, 7) or teacher education (chapter 14). Neither was gender nor race mentioned in chapters 3 and 4, which were designed to deal with social issues of technology.

Labor is also conspicuous by its absence. There seems to be a crafted attempt by technology educators to exorcise labor and work from their discourses on technology. The authors of chapters 8-11 overlooked labor, much as it was neglected in the CTTE yearbooks covering the communication, construction, manufacturing and transportation industries. Labor

and technology are inseparable, yet interrelations were ignored in the chapters which should have at least mentioned the problems (Chapters 1-4, 7-13). Here again, the authors seem out of touch with efforts in critical pedagogy that extend from vocational to general education. These efforts have problematized the intersection of education, labor and technology in a helpful way (e.g., Bernard, 1987; Lakes, 1994; Noble, 1994; Petrina, 1995; Shor, 1988; Simon, Dippo & Schenke, 1991). A large percentage of technology education has been and will remain "vocational" or "tech-prep like" at the secondary levels, despite a rhetoric that ignores this fact. A continual neglect of class, labor and work is a disservice to students and their future. Technology cannot be understood, nor should it be studied, outside a sociology of labor and work. Similar observations in this book can be made concerning ecology and the environment.

Concrete Columns: Potential Compressive Strength=1,500 PSI

Chapters 5 and 16 engage current literature inside and outside of technology education. It would be difficult to find two people who have done more work in MST than James LaPorte and Mark Sanders. In chapter 5, LaPorte and Sanders position MST integration as a workable and researchable endeavor. They talk about more than the integration of MST subject matter, and provide current examples and research synopses where activities and projects serve integrative purposes. Their insight into MST has, however, a few key omissions. The chapter is heavy handed toward MST, and loses its interdisciplinary momentum without a mention of other viable subject combinations. Recommendations made for research and teacher education, like those made in chapter 14, are vacuous without recognition of the roles that class, gender and race play in math, science and technology education. In terms of gender, these are among the three most biased subjects against young girls, and most underrepresented subjects by women teachers, in the secondary schools (Kahle, 1983; Shroyer, et al., 1994). Does MST help or hinder the work of young women in each of these subjects? What has MST done for the enrollment of women in technology or physics teacher education? Their recommendations

are also narrow without a recognition of various learning theories underpinning much of the work in math and science education (but *not* technology education). While constructivism is listed as a learning theory (p. 209), LaPorte and Sanders fail to recognize the centrality that this theory has played in moving science educators toward integration. Constructivism, enactivism, and socio-cultural theory have played pivotal roles in the discourses of math and science education (Davis & Sumara, 1997; Osborne, 1996; Wheatly, 1991). As MST is presented as a pillar or column in this text, it would be helpful for the authors to analyze the theoretical underpinnings of the endeavor.

No one has written as extensively as Robert Wenig on leadership over the past ten years in technology education. Chapter 16 begins with an overview of general research, and ends with a refreshing and honest report of concerns with leadership practices in technology education. Interestingly, data collected by Wenig suggests that problems noted above in this inspection are the same problems noted by a sample of leaders in the ITEA. The lack of concern for minorities, women and younger members, and closing of university programs were noted along with a concern for a "good old boy" network of decisionmaking (p. 524). His review of literature on leadership in this profession suggests that, like philosophy and curriculum theory, leadership as a topic of study has been ignored (pp. 525-526). Wenig also recommends that the CTTE be "reinvent[ed]", which may also include a "reengineering" of the yearbook development process (p. 534). While Wenig surveyed relevant literature outside of technology education, it would be helpful for him to broaden his analysis and theory in future research. He, like other authors, would also benefit by reviewing the IJTDE (e.g., Dahnke, 1993). He could problematize structural gender, race and power in the ITEA as a crisis, and cast this within a framework of the micro-politics of organizations (i.e., Bacharach & Mundell, 1993; Hoyle, 1985).

An interesting juxtaposition appears when one turns to the next chapter, where the ITEA model of leadership is described. Here, one finds the Board of Directors at the center of the ITEA universe, with members orbiting around the perimeter of this core (p. 545). It suggests a

line and staff model with four layers between members and Board. And reflecting the gender problematic of this book, the ITEA has for the past two years been controlled by a Board of twelve men.

Final Site Assessment: Suspend Contract

There is little about the *Foundations of Technology Education* that passes this inspection. Overall, there seems to have been a contracting problem and if it were in my power, the general contract would be suspended. However, I wouldn't go as far as condemning the entire site. There are some helpful sections as indicated. With hope, this inspection will help interrupt our current momentum to construct and repair foundations without consideration of a range of interests and possibilities.

Foundations of Technology Education is sometimes pedantic in both structure and content. As the book neglects the new contentions of educational research, epistemology and pedagogy, its currency is questionable. The text appears (author)itative where history, curriculum, teaching and technology are presented as unproblematic. Without a broad understanding of technology drawn from critical theorists, feminists and STS, as well as design and engineering, technology education in this book is insular. Without engaging in larger cultural and international discourses, the book is parochial. Without confronting the profoundly moral issues that market competition entails within an "international" organization, leadership in the ITEA to be questioned on ethical grounds. On whole, the book is far from being foundational, in spite of sweeping claims made up front (pp. iii, xii, xv). There are too many violations of today's standards of academic scholarship. The text lacks a clear audience and purpose. Some parts are written as policy recommendations, others as undergraduate overviews. This made the book difficult to review. Basic academic components like current literature and critique are absent from all but three chapters. Much of the content, without contention, in the book is stagnant; indeed the foundations are often like monuments for ideas.

Without border crossing, criticism and exchange, or the work of feminists, neo-Marxists, post-structuralists, race theorists and STSers, the field arrives intellectually stunted in the academy. Scholarship *has* been refigured; questioning in feminist, multicultural and multi-disciplinary studies *have* reshaped the mix. It is readily recognized that there is a significant ideological component to education in technology. On this ground, it is technology teacher education in the US, and NOT public schooling, that is falling. There is indeed a new spirit with which the current generation of technology educators will have to negotiate the new turns facing them within the academy. This requires a turn toward the all important problem of how we as educators and researchers come to understand education *and* technology.

For these new students of technology *and* education studies, the shrinking university job market and challenges of scholarship make dogmatism intolerable. Consensus ought to hold no reigns on their thought. Controversy and contention are engaged, and nurtured into excitement.

Preservation of some foundations is necessary for those whose interests are in industrial archeology. In addition to periodic inspections, it will take archeological work to discover what is set in stone. Yet rather than any foundations, perhaps the erection of this 639 page bibliophilic monument testifies to a time when the translation of age, geography, gender and race into authority was incontestable.

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