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Globalization Amid the Cornfields: Teaching Sustainable Practices in the American Midwest

Recent discussions of globalization have focused on the disruptions caused by companies relocating and/or outsourcing (Rosenberg, 2004; St. Amant, 2002; Griffiths, 2001), on overseas opportunities for technical and professional communicators (Dautermann, 2005; Hargie et al, 2003; Ding, 2003), or on problems inherent in globally competitive markets (Starke-Meyerring, 2005; Jeyaraj, 2004). This article [1] offers another view as it describes three Midwestern sites that are global players, compete in international markets and offer competitive products, and are located in the somewhat unlikely setting of the American Midwest, representing globally competitive organizations built amid the cornfields. Each of these sites addresses Johndan Johnson-Eilola's (1996) explorations of post-industrial knowledge work. Johnson-Eilola builds on the work of Robert Reich (1992), Shosanna Zuboff (1989) and Daniel Bell (1976) to describe the emerging inhabitants of the post-industrial workplace first envisioned by Peter Drucker (1959).

This article discusses three sites that disrupt accustomed expectations and roles for technical communication. These sites include an agricultural processing site that is requesting tax abatements in exchange for decreased emissions so that it can remain competitive in the global market. The second is also an agricultural manufacturing site that remains globally competitive by increasing efficiencies and expanding the range of products made at the site. Finally, the essay discusses a manufacturing facility that takes finished products – automobiles – and remanufactures them for a niche market of users. Each of these Midwestern sites is globally competitive and challenges expectations for high technology work. Taken together, they gesture toward new definitions of work, in new postindustrial context, and offer insight for defining technical communication in the postindustrial age. The remaining challenge, for scholars and teachers, is to articulate emerging literacy practices supporting postindustrial manufacturing, and to participate in the knowledge management that supports innovation. Here, each site takes something that would have previously been considered either finished product or waste and rearticulates it as an ingredient in a new product. At the least, technical communicators will need to learn to document such organization's innovation and change. At best, such change invites technical communicators, acting as knowledge managers, to articulate opportunities for innovation. Research, a traditional strength of technical writing preparation, allows organizations to better prepare and understand change, turning disruption into opportunity.

Postindustrial business practices are no longer the work of futurists, but the reality and structure of the workplace today. Each work site described in this article presents opportunities for basic research into emerging workplaces in need of the expertise of technical and professional writers; each is an example and potential model for knowledge work, which teachers of technical and professional writing should be aware. These sites present opportunities for research which technical communication students will be well prepared to accomplish. As software and hardware documentation mature as fields of research and study, they offer fewer dependable career paths for graduates of technical writing programs. Simultaneously, needs are emerging in some seemingly unlikely places, and represent new sites for technical communication work. The technical communicator's ability to read situations and institutions, analyze problems, invent novel solutions, and integrate existing processes will continue to serve technical communication well in the postindustrial age, an age of knowledge work that is no longer in our distant future but categorizes and describes our workplaces and communities right now. As Gerald Savage offers in "Tricksters, Fools and Sophists" (2004) we are not searching for a modernist position from which to reliably and consistently ply our trade, but instead longevity and further opportunities lie in accepting the fluidity of opportunities we will encounter amid postindustrial change. In Savage's argument, the technical communicator must follow the sophists into the ocean of discourse and learn to sail amid changing flows of work culture, articulating an ethic of metis, or of learning to sail the seas of change. The article describes some emerging sites for the technical communication work in the postindustrial workplace, and describes worksites and organizations located in the American Midwest competing in the global marketplace. The essay concludes with advice for teaching professional and technical writing with attention to opportunities presented in a global, postindustrial age.

Scene One: Lafayette, Indiana

I opened the local newspaper one morning not long ago to find the following quote from our barrel-chested, locally-grown Lafayette Mayor, Tony Roswarski, "We're no longer competing against the state and the nation, but we're competing against the world."

The Mayor is highly regarded if not beloved, seen as business-friendly but locally driven and

undeniably allied to local concerns and the citizens of Lafayette, Indiana. He seems uniquely able to keep internationally competitive corporations happily located in this mid-sized Midwestern town an hour northwest of Indianapolis and two hours southeast of Chicago. Even the mayor's name reflects the tides of international migration, emigration, immigration and integration, that have brought first eastern and then southern European migrants, now Central, South, and Mexican American immigrants into the smaller farming communities surrounding Lafayette. Roswarski was talking about Tate and Lyle, based in London, manufacturers of, primarily, modified food starch from Midwestern-grown grain, shipping these ingredients around the world to be incorporated into food produced and distributed globally.

Tate and Lyle's Lafayette manufacturing facility has recently been granted a tax abatement for a multi-million dollar expansion and upgrade that, according to the local newspaper, the Journal and Courier (Voravong, 2005), will "increase production by about 25 percent and reduce overall emissions by 15 percent." The number of jobs at Tate and Lyle would remain largely unchanged. Local residents, including myself, despise the site's more pungent wastes, and a 15 per cent reduction in odiferous emissions while increasing production is a tantalizing promise, and is clearly the real carrot the corporation offers Lafayette: improved quality of life through improving its waste treatment. And Tate has signed an agreement that binds them to the community: if the corporation leaves the area, they would be required to pay all the taxes that were suspended in the abatement agreement.

This is the context in which the mayor is explaining his tax incentives: The city of Lafayette, which is financially strapped, has cut local services and laid off city workers who have only received a 2% raise after two years of frozen salaries. Homeowners have recently received their updated property tax statements, and Lafayette is raising property taxes while giving tax relief to a multinational corporation. And that corporation is not promising to create new high-wage jobs that would add tax revenues; indeed, the company has been forthright in its assessment of jobs: there will be few if any new jobs available at Tate and Lyle in Lafayette.

Scene Two: Decatur, Illinois

Tate and Lyle's main global competitor is ADM, once marketed as the supermarket to the world, based one hundred and fifty miles southwest in Decatur, Illinois. Their main plant, playfully called "Gotham" by local students at nearby Milliken University, now captures its excess heat emissions to heat a hydroponic vegetable and aquaculture farm, from which they ship organic cucumbers, lettuce, herbs, fish and shrimp all over the heartland of the United States from the Appalachians in the east to the Rockies in the west. To understand the size and financial power of ADM, it is important to state that although the hydroponics and aquaculture farm is a multi-million dollar investment, ADM calls it an experiment, and at most it is a sideline business; it is most accurately described as research and development. I took the tour, and the Purdue and the University of Illinois agriculture graduates were proud to tell me all about the invention, application and construction of the hydroponics farm that replaced the need for another cooling tower. Let me return to the cooling tower below.

ADM's plant in Decatur turns corn and soybeans into a variety of products including vitamin E and Estrogen-like soy-based compounds. The plant produces fish and animal feed. Cooking and industrial oils to ethanol and industrial gasses like carbon dioxide and liquefied nitrogen are also produced at the site. The ADM corporate website describes their US-produced goods as ranging "from amino acids to sweeteners, from nutraceuticals to chocolate." I return to ADM's corporate image as well as to this neologism "neutraceuticals" in the conclusion. The Decatur plant also grinds up tons of used tires, mixes them with ethanol and spent grain on-site, and produces electricity that both powers the ADM production campus and supplies electricity to the city of Decatur. The power plant mixes crushed locally-mined limestone into the furnaces which drastically reduces the amount of sulfur dioxide released into the atmosphere.[2]

One major byproduct of this process is heat, massive amounts of heat, in the form of hot water used to turn gigantic turbines. Steam-produced electricity is a nineteenth century technology, offspring of what we might assume is the long-gone coal and steam age, but the process has been developed and refined through many iterative generations of design and development, made more efficient and effective through the application of mechanical and digital technology, space-age materials, and post-industrial linking of what had been thought to be separate and independent physical, biological and chemical processes.

ADM produces dozens of products, foodstuffs, energy, industrial and building materials, chemicals, compounds, gasses and vitamins, fish, shrimp and organic vegetables, because it does not see itself as an agricultural business, but as the site of a range of agricultural, industrial, pharmacological, and human and animal nutritional processes that begin with corn and soybeans as raw products.

I've left the cooling tower for a few paragraphs to make a list of what else is produced at ADM, but the cooling tower that was never built is perhaps the most striking example of ADM's inventiveness. In the mid-1990s, the small city of production facilities in Decatur was ready for expansion. Local communities were demanding more electricity, farmers were producing more grain, and the world was demanding more and more ADM products. The company began preparing for expansion.

One element of that planned expansion was the addition of a second cooling tower. The current Plant and Operations Manager first suggested that ADM use the heat produced through the steam-powered generation of electricity rather than waste it through dissipation in the cooling tower. He used an economic argument with ADM's management: if the experiment failed, all ADM had done was defer construction of the cooling tower. Accountants like to defer construction, and so the plan was approved.

The greenhouse design redirected the flow of the heated water away from the cooling tower and pumped it through a large greenhouse, heating it. The greenhouse contains a space-aged farming experiment that produces herbs, cucumbers, lettuce, and other vegetables and heats the largest aquaculture facility in the Midwest. Faculty and graduates of numerous Midwestern Universities participated in designing and continue to consult with ADM on this aquaculture enterprise, which ADM still regards as an experiment. Tilapia, an African fresh-water fish, is raised organically—yes, organically and without chemicals or hormones or genetic modification—and shipped throughout the Midwest. It is likely that if you have eaten farm-raised tilapia, you have eaten fish grown in Decatur at the Archer Daniels Midland facility. They are expanding their aquaculture facility to raise shrimp, and are beginning to ship what are marketed as organic fresh-water tiger shrimp. I suspect I have eaten some, but have not been able to verify this. If I have, they are good.

I was surprised by two things at the greenhouse. First, the entire "farm" is soil-less and takes place on an industrial-age conveyor belt three and a half feet off the ground. But the combination of industrial technology and a decidedly non-industrial product—organic vegetables—indicate that this is not industrial but post-industrial. The modern separation of industrial products from agricultural products is gone, and ADM has created a farm-factory, a postmodern hybrid consistent with the forecasts of Haraway (1997) and Latour (1993), consistent with the kind of technoscientific hybrid discussed in Hård and Jamison's *Hubris and Hybrids: A Cultural History of Technology and Science* (2005). Plants grow hydroponically, that is, in a nutrient-rich flow of water, and when the plants are mature, harvest takes place ergonomically: workers stand at tables, harvesting, washing and packaging produce. Even though this is a farm, there is no back-breaking bending, squatting, and reaching by workers. ADM is less dependent on the weather, as water is available from wells rather than in the form of capricious rainshowers. Sunshine is still necessary to ensure photosynthesis—although nutrients can be adjusted to lessen the effects of cloudy days on the growth of the crops. And there are full-time workers on this farm, hired to work a conveyor-driven landscape that operates year-round, even in the dead of winter, both providing employment and fresh produce during the darkest and coldest months of the Midwestern winter.

So ADM grows organic fish and vegetables. The multinational concern that has legions of agricultural scientists working on the next breakthrough in genetically modified organisms, creating trademarked and copyrighted hybrid beings for our consumption, is also producing and marketing organic vegetables. There's a great post-industrial irony here, and I do not want to come across as Pollyanna-ish, or as an ADM cheerleader: there are real problems, both ethical and cultural, represented by these agribusiness technologies and the business models that support them. Yet it is important to state that ADM's research and development investment is beginning to pay off both economically and environmentally: rather than choose between efficiency and environmental responsibility, ADM is creating efficient, environmentally friendly processes. One major way they are realizing efficiencies is by linking once-separate processes, using the by-products and waste of one process as the raw materials of another. The process might be called wholesale recycling, but it is specifically post-industrial in its boundary-crossing, mixing production of agricultural and industrial products, pharmaceuticals and neutraceuticals, of recycling cast-off waste products such as car and truck tires and using them as fuel, and mixing limestone into coal-burning furnaces to remove harmful sulfur dioxide from the air. ADM isn't guiltless, however, and I return to ADM, neutircueticals, and market manipulation in the conclusion.

However, from Tate and Lyle's position, it's a demanding job competing with ADM, and I have come to understand my relationship with global organizations, both as a technical communicator and a citizen, quite differently than I had before this city kid understood how corn becomes corn syrup, corn oil, corn starch, corn flour, and even fuel for electrical generation.

Scene Three: Winamac, Indiana

In 2004 I had the privilege of working with the Braun Corporation of Winamac, Indiana. The Braun Corporation of Winimac, Indiana, is not to be confused with the Frankfort-based German Braun Corporation. The American Braun Corporation designs, manufactures and markets accessibility products used around the world. Public busses, vans and a variety of vehicles have Braun accessibility lifts, ramps and accessories installed. In the 1970s, Ralph Braun was modifying stock Chrysler vans into user-controlled accessible vehicles. As the company history states:

> In early 1970, Chrysler released its new full-sized van, which provided enough space up front to accommodate a wheelchair user in the driver's position. …. While vehicles already existed that could transport disabled people, these new vans—when properly modified and equipped—were the first vehicles that enabled wheelchair users to transport themselves. http://www.braunlift.com/about/history.asp?pg=1 [65]

In the 1990s, the company created the Entervan, built on the chassis of a minivan, which enabled the use of smaller vehicles and were easier to drive and maintain, as well as more affordable than existing accessibility vehicles. The Entervan is economical, both to purchase and for gas mileage efficiency. But it also allowed something that had not quite been possible before: these new vans "enabled wheelchair users to transport themselves," resulting in increasing independence for people with physical barriers that kept them from driving standard automobiles. Today, Braun designs mobile chair transportation systems that are integrated into vehicles which allow drivers to go from curbside to steering wheel without leaving their mobility devices. These are user-centered technology systems that accept differently-abled users as they see themselves, allowing chair and person to move together. This integrated, technologically-integrated self is how many of Braun's users see themselves: not as people in wheelchairs, but as a person requiring accommodations, to move this self into the control position of the vehicle rather than as a passive passenger being moved through space by the able-bodied.

Braun had considered designing and creating accessible vehicles for consumer use from the ground up, and continues to build some commercial vehicles on standard commercial truck chassis. However, Braun finds it more economical to purchase fleets of minivans from Chrysler, General Motors and (more recently) Toyota. In effect, Braun plays the role of after-market customization, a role of post-industrial adaptation of a mass-produced product for specific customers, specific needs, and unique circumstances. That is, this is a post-industrial firm which takes the products of industrial production and re-designs and reengineers them to fit specific customer needs. Like ADM, the post-industrial context defines finished products as potential raw materials and connects once-independent processes into long chains of manufacturing, remanufacturing and post-production processing, a layering and agglomeration of processes in which finished products become the fodder for other manufacturing processes. And technical communicators are needed as agents of articulation, writing about the links between processes and the relationships between by-products—once dumped as waste—to other processes, creating ever-longer chains where the products and by-products are recycled as the raw material input of new processes.

Braun is a global competitor and producer of accessibility products from wheelchair lifts for both private and public transportation vehicles to user-driven accessibility vans. They lead the global market in designing, manufacturing, marketing and installing mobile accessibility products and ship products to six continents.

Braun is also an accessibility company that seeks to empower its customers. Issues of accessibility raised by the Americans with Disabilities Act are part of the history of the company, and politics and discourse of accessibility are reflected in the architecture of the worksite, in the design and manufacturing of products created there, and in the processes of documenting and advertising these products. I have written about these issues with a team of researchers (Salvo, Zoetewey & Agena, 2007).

Braun's manufacturing plant symbolizes the changes brought by postindustrial manufacturing. Vans manufactured elsewhere are disassembled, customized, and reassembled to meet the needs of Braun's customers who have difficulty both with entering and exiting standard automobiles and/or with the standard foot-pedal controlled accelerator and brake mechanisms, and standard two-hand controlled steering wheels. Braun takes finished industrial products—vans—and converts them into customized post-industrial products for a niche market of consumers with specialized needs. These needs became most visible after passage of the Americans with Disabilities Act, opening a new era of civil rights legislation (see Wilson & Lewiecki-Wilson, 2001; Tremain, 2001; Colker, 2005; Mezey, 2005) as well as an accompanying cultural awareness of accessibility issues emerging from physical limitations. Braun is post-

industrial in its re-manufacturing of a mass-produced industrial product into a customized product, and it relies on the ability of its knowledge workers to, first, re-engineer GM, Chrysler-Daimler and Toyota products into Braun products that its customers can use for increased freedom and mobility. Second, these knowledge workers have to document their products so they can be effectively installed and used by geographically dispersed, independent professional and home users. This shift from specialized installation and maintenance to generalized end-user maintenance parallels the move from specialist to general use of digital computing equipment, continuing the trend that empowers effective user-centered communication and writing.

Braun's major competitors are Honda and, ironically because they supply one of the models Braun re-manufactures, Toyota. These are unlikely multinational competitors for a homegrown, small-town company that started in the corner of a farm field. Braun now has global reach, but many of its challenges remain local.

During my consultancy, in talking with management, there were two labor problems that grew out of their location in rural Indiana. First, most of their workers were part-time factory workers and part-time farmers. Production slipped and injuries increased during peak planting and harvest times as people stayed in their fields planting and harvesting, trading sleep for work hours. And workers were poorly educated, locally rooted, and resistant to change of any kind both within the community and at work. Second, it remains difficult to attract skilled and educated workers to rural Winamac. Recently, having hired four engineers from a small in-state engineering college, the number of formally educated engineers quadrupled. This change put a strain on both the local community and institutions like the schools, libraries and churches. These newcomers represented change to a variety of Winimac's institutions, like its schools, churches and social fabric. These new families put pressure on the local infrastructure to accommodate not just increasing numbers but also a diversity of experience, expectation and viewpoint. As much as Braun ships products out to the rest of the globalizing world, the globalizing world is trying to get in to Winamac through Braun. And Winamac's schools, institutions, cultures—its stakeholders—may have to face some startling realities. Like their children really are competing with the best minds, managers, and workers in the world, at rates that would make their once strongly pro-union parents blanch.

Post-industrial technical communication

The future predicted first by Daniel Bell, Shosanah Zuboff, Robert Reich, articulated for the field of technical communication by Marilyn Cooper (1996), and developed by Johndan Johnson-Eilola (1996) is here. There is already a need for analysis that links related post-industrial processes, linking appropriate byproducts to the input of the next manufacturing process. Johnson-Eilola articulated this as a critique of Shannon and Weaver's (1940) cybernetic model of communication, in which noise is a problem to be eliminated. Through so much of industrial history, byproducts were dumped, destroying the environment and inefficiently wasting materials that could be rearticulated not as waste, or noise, but as new input streams. Recognizing by-products not as waste but as new raw material is a task for knowledge workers, capable of locating processes that require the once-discarded industrial noise as necessary for manufacture. Throughout this article, I have called this post-industrial processing, a name which seems appropriate because industrial or modern industrial thinking took virgin materials, mined or harvested, created a product and dumped the refuse. Post-industrial processes utilize these once-discarded outputs as inputs into other seemingly unrelated production processes, recycling on a scale unimagined during the industrial age but normalized as best practice for the post-industrial age.

Like previous arguments made for technical communicators to participate earlier and continuously through design processes of the product and documentation of technology—as in usability (see Sullivan, 1989; Brady, 2004)—this argument asserts that technical and professional communicators have a professional responsibility if not an ethical responsibility to participate earlier in the development of each of these emerging technologies as well as the discourses that surround their development and cultural dispersal. In so doing, we model and provide opportunities for future technical and professional communicators to play a role in invention, design, dispersal, and maintenance of these technologies in culture. These research sites provide additional models of human-centered technological development that invite rhetorical participation and engagement, a position Jason Palmieri (2006) develops as a critical cultural practice for technical communication. This role is articulated most specifically by Robert Johnson in "Deeply Sustainable Programs, Sustainable Cultures, Sustainable Selves" (Kynell-Hunt & Savage, 2004) and represents an alternative path to becoming a technical communication expert, a role in keeping with the role Carolyn Rude describes for engaging in policy discourse (ibid) which is an emerging concern with policy demonstrated by Herrington (1995), Cargile-Cook (2000), and more recently James E. Porter's "The Chilling of Digital

Information: Technical Communicators as Public Advocates" (Day & Lipson, 2005 and Anne Surma's textbook *Public and Professional Writing* (2005).

This mode of technical communication defines sites for participation and intervention for technical rhetors. It does not define technological tools nor does it limit the definition of the field of practice to software and hardware development. These digital tools and environments, so important to establishing the field and focus of technical communication through the 1990s and into the 21st century, can no longer be depended upon to reliably foster growth and expand opportunity for technical communication practitioners, nor sites for research. I am not arguing that we abandon software and hardware documentation as an important site of technical communication practice and research. However, my research articulated here, and related research investigating emerging scientific fields of inquiry like Brenton Faber's work on nanoscience[3], articulate opportunities for expansion and growth. It identifies and investigates new sites to make contributions based on expertise in user-centered design, technological stewardship, and active citizen participation. These core competencies are represented in a number of ways by a variety of technical communication researchers.

Patricia Sullivan, as early as 1989, argues for an expanded understanding of usability studies, while Robert Johnson articulates a rhetorically-based user-centered theory of technology and has recently articulated the idea of technological stewardship. Most recently, Carolyn Rude (2004) and Anne Surma (2005), building on earlier work in environmental rhetoric, have argued for public policy as a new means of articulating the work of technical rhetors. Each of these sites seeks to articulate new opportunities for technical communicators to put their hard-won expertise in cultural and textual analysis, rhetorical invention, style and delivery, as well as attention to cultural and discursive structure, to work at new sites.

However, there is no natural advantage for technical communicators in these fields: competition is fierce, which we are finding out just like many others who are accepting the realities of the global marketplace. Rather than compete for the jobs at the bottom of the information economy, I am concerned with developing expertise at the top of the knowledge work organization, for shifting attention away from training professional writers to document and write instructions, to preparing educated professional and technical rhetors to analyze and respond sophistically and sophisticatedly to the global and post-industrial conditions of their working world. And this is also a shift away from defining ourselves as a humanistic concern and of coming to terms with the post-humanism of the postmodern.

Teaching Post-Industrial Technical Communication

Throughout this essay, I have been primarily concerned with the intellectual and cultural content with which I challenge majors in the professional and technical writing program in which I teach, future writing professionals, for whom a long and wide view of the context of professionalization will help students make informed decisions about their and their organizations' futures. But in our service courses, this long and wide view is particularly important for the future professionals preparing for work in other fields. Narrow attention on professional issues sometimes minimizes concern with ethical, social, and cultural issues. It is especially important for students for whom writing is secondary to disciplinary knowledge to have a place in which they can engage in cross-disciplinary discussion, to find those with whom they might build the temporary coalitions like those Jim Porter (1993) describes.

Globalization is often seen as happening elsewhere. By narrating three globally competitive organizations in the American Midwest, this article has traced three expressions of globalization, concentrating on the face presented "here," specifically where students are located and where many of them will be seeking employment after graduation. These students are preparing for their roles as workers, and many express understandable interest and anxiety regarding their employability. Yet many demonstrate interest and commitment to becoming active citizens and want to work in organizations that are responsible community partners. Preparation for engaged participation in global organizations is not a capitulation to global capital but recognition of a shift in the responsibilities of individuals in these organizations. As traditional industrial structures, and the steady employment, community structures, and power relationships that came with them shift, students often find themselves wondering what their professional and community lives might look like. They are interested in forecasts of technical and professional writing lives, but are just as interested in knowing how they can shape opportunities and participate in creation of the future. And it is important to remember that they will be working in a postindustrial reality that is not located in a far-off fantastical future but in the American now. These local faces of global organizations define the professional context in which they will work after graduation.

Two narratives, Braun and ADM, involve organizations worthy of emulation and even imitation. Braun provides tools that allow differently-abled citizens to access transportation and the

freedoms enjoyed by others in automotive culture. Braun provides a compelling narrative of inclusion and participation: in the classroom, students recognize the value of Braun's narrative of inclusion and full participation. Citizens who have physical limitations may be unable to utilize the common interface of automotive transportation: foot pedals for acceleration and braking coupled with a wheel for directional control. Thinking, as a professional writer, from a user-centered perspective reveals that this is exclusion based not on inability but on failure of the interface to adapt to each user's abilities. Braun revises and invents new interfaces for differently-abled users, increasing mobility and daily independence for their clients and improving their everyday lives. Students' interest and concern with this organizational narrative is cross-disciplinary, indeed, even trans-disciplinary, and offers opportunities for students to engage in discussion and informed planning for re-imagining professional participation for both future writing professionals as well as future professionals (in other fields) learning to write.

Another such opportunity is, as Thomas Friedman argues, green. Friedman calls his perspective global-green, or geo-green, and he in concerned with dependence on imported oil, the effects of India and China joining global economic and trading networks, and the ensuing effects of widespread development of consumer culture. Perhaps the planet can sustain the energy and resource consumption of 300 million Americans and another 200 million in the European Union. But the 2 billion plus people who will likely become consumers in the twenty-first century will not only outstrip current per-capita consumption, but will also far outpace the ability of the planet to neutralize pollutants. Manufacturing organizations across the globe are seeking ways to cut emissions, and re-using and re-thinking their use of fuel and material. The geo-green perspective has an environmental ideology at its base, but it is not driven by ideology or concerned with purity of motives. Friedman's articulation of geo-green is moderate and iterative – searching for better solutions to move from current practices to better environmental stewardship. And students respond to Friedman's perspective:

> I am not proposing that we radically alter our lifestyles. We are who we are - including a car culture. But if we want to continue to be who we are, enjoy the benefits and be able to pass them on to our children, we do need to fuel our future in a cleaner, greener way. *New York Times Magazine*, April 15, 2007

The appeal of Friedman's argument is stated in his first sentence above. The very tools of capitalism, scientific research, and global trade that have created the rapacious consumption of resources will also result in solutions that rely on more effective use of resources and lower emissions. While the debate on whether this is the best or most effective way to achieve these results is beyond the argument of this essay. However, it is a prime mover in each of the three narratives presented above. And the role most clearly available for professional and technical writers to play is one they (we) are accustomed to playing: that of articulating organizations' knowledge.

This role is most recently articulated as knowledge management, and defined by Corey Wick (2000), it is the process of making an organization's knowledge available to itself. Let us return to ADM for a moment. Archer Daniels Midland had knowledgeable engineers, managers, and executives, but it was a single agricultural engineer, the current Plant and Operations Manager, who suggested change (remember that this individual was promoted to this position after the proposed greenhouse design was a success).

Coming on the heels of a public relations problem related to the Lycene market fixing convictions, ADM as a public company was most probably interested in improving public relations. They had personnel interested both in pushing efficiency and in innovation in agriculture. And there was interest in diversifying the activities at the Decatur plant as evidenced by the value-added manufacturing activities being developed. Similarly, and perhaps most compelling to decision-makers at ADM, they had economic concerns in creating the most efficient method of dissipating heat from its electric production. These issues were linked to ongoing discussions of building an additional cooling tower—and the millions in construction costs this tower represented.

Just as these employees were asked to innovate across boundaries of job function and expertise, students in professional and technical writing programs will be asked to re-think accustomed procedures in order to make their organizations more efficient stewards of limited natural resources. These innovations, developed and deployed in Decatur, Illinois, are now being integrated and ported across the globe to locations in northern Europe, elsewhere in the US, and Japan. Similarly, innovations in use-interface design for automobiles designed in Winamac, Indiana, are enabling people across the globe to join legions hitting the road and enjoying mobility through automotive travel.

As examples of communicative intervention, these narratives are located in places and organizations where students can imagine themselves working after graduation. These are

locally engaged organizations with global concerns. The situations they describe are challenges to which students respond and in which students feel implicated. And perhaps more importantly, these are post-critically immersive: students skeptical to geo-green ideology are not inspired to resist but rather can be encouraged to compare the experience working in older industrial-age organizations to emergent post-industrial organizations. And while global organizations, especially information-age organizations, resist organization of labor into unions, there is important activity related to change from industrial/local to post-industrial/global organization.

Carolyn Miller (2004), reflecting on her often-cited 1979 "A Humanistic Rationale for Technical Writing," forecasts the future of assessing the contributions of technical communication and technical communicators to the intellectual life of the postmodern University. According to Miller, the circumstances of her rationale for technical writing have changed:

> …such a rationale seems superfluous now. If a successful field needs a rationale, it will be found in its intellectual contributions and its practical improvements to our lives…..Strengthening intellectual relationships with both humanistic and scientific disciplines—rhetorical, philosophical, and historical studies on the one hand and ethnographic, experimental and computational on the other—will provide the best rationale for technical writing. (Miller, 48)

Miller is concerned that we are no longer engaging the discussion where decisions are made, either those regarding the establishment and rationale for technical communication as a field and discipline of study, or for the integration of skills into meaningful careers for practitioners. Why rationalize technical communication as a humanistic concern? Perhaps in the waning 70s and emerging 80s, this was the best strategy available for legitimating the field. But no more.

Robert Johnson (2000) worries, too, about the contributions technical communicators make to the ongoing justification and intellectual establishment of the field as a valid mode and field of inquiry, and it is important to recognize that technical communicators are not making primary knowledge here in my description of post-industrial manufacturing. They are linking existing processes, finding (and negotiating) interfaces between the representatives and proponents of separate processes, advocating for the value and efficiencies to be gained by demonstrating how the end of one process provides many of the ingredients necessary at the beginning of another process—a mode not strictly of recycling but of articulating the internetworked webs of scientific, industrial and manufacturing processes. This article describes three sites, Tate and Lyle in Lafayette, Indiana, ADM in Decatur Illinois, and The Braun Corporation in Winimac, Indiana, as sites in the American Midwest where local people compete globally by turning their expertise and resources to globally competitive advantage.

ADM's production of goods for human and animal consumption, as well as industrial and manufactured goods, presents a striking example of globalization. Under a strict modernist rhetorical regime the industrial would be separated from the agricultural. Such separation would leave invisible innovation like soy-based plastics and tires recycled as fuel. These postindustrial hybrids exist outside accustomed categories—and would be unseen, unarticulated, homeless concepts—that would not be integrated into the network of meta-manufacturing that does not recognize difference based on who or what consumed the output of the production cycle.

While the categories of output do not matter, ethics remain a concern. After presenting my preliminary findings on Tate & Lyle and ADM at the Council of Programs in Scientific and Technical Communication, members of the organization approached me, asking me about ADM's pricefixing convictions, fines, and the continuing legal investigations into the multinational corporate powerhouse. As someone interested in ethics in technical and professional communication, I am certainly concerned with ADM's activities, and have found Greg Palast's work in the Guardian[4] as well as two books to be instructive, Eichenwald's *The Informant: A True Story* (2000) and Lieber's *Rats in the Grain: The Dirty Tricks and Trials of Archer Daniels Midland* (2000).

More interesting than demonizing the entire organization is how these very public scandals have been leveraged by insiders to change the corporate culture of ADM. I quip above that the accountants were probably swayed by the economic advantages for delaying construction of the cooling tower than any environmental considerations, but it was as likely that savvy public relations professionals within the multinational organization realized that green programs within ADM could help improve the its public image damaged by these price-fixing scandals. Neither of these arguments, the economic argument of deferring construction or the public relations argument for establishing a "green" corporate image, would have been sufficient to change the practices of a huge complex organization like ADM. But a solution would have to work on many levels, addressing innovation, shareholder value, public relations, ethics, and legal concerns. That is, change became possible because a green solution addressed concerns in public perception of the company, cost accounting and profitability, as well as environmental concerns:

a solution for a complex organization needs to work on many levels. In this complex context of shifting allegiance—of a multinational corporation looking to burnish its public image and economize and innovate—that is, the challenge is to invent solutions palatable to numerous competing stakeholders with contradictory goals. This is the situation Porter describes when he argues for postmodern solidarity, a temporary stability amid shifting values and ideals among stakeholders (Porter, 1998, p.162).

And like any large organization, change comes slowly and at great cost, as argued by Faber (2002). Rather than seeing the changes within ADM cynically, as a façade constructed over a core of corruption, I suggest that individuals within the organization took an opportunity presented by the arrest, removal and jailing of guilty executives to construct new narratives of the organization's identity and practices. And this is a particularly instructive moment for technical communicators who are faced with the challenge of re-articulating complex institutions, of changing organizations with communication. Few opportunities are as dramatic as the convictions at ADM, or the corporate accounting and governance scandals at Enron (see Kientzler & David, 2003), but they provide striking teachable moments.

International scandals can become public and when they do are often quite dramatic, providing opportunities to investigate and build analyses of behavior, both that to be modeled and that to be avoided and/or prosecuted. It is also valuable to articulate what can be accomplished in the wake of scandal, in the aftermath when business as usual will no longer be tolerated. As I describe ADM, there is much promise in these different farming and aquaculture experiments, processes that save millions of dollars as well as tons of resources and reduce pollutants and emissions. And technical communicators are well positioned within multinational corporations to champion both ethical values and promote advanced efficient technologies, a strategy many corporations including Toyota, General Electric, and even Ford have integrated, perhaps not surprisingly, into their advertising and public relations communications, but also into corporate governance and decision-making processes.

Perhaps I would not be as likely to praise ADM if I lived in Decatur or worked at Milliken University rather than living in Lafayette and working at Purdue. Perhaps I would find praise for Tate & Lyle and would minimize my criticism if I were not trying to make a point with the English management of the Lafayette, Indiana processing plants. Besides producing odors, Tate & Lyle refuse to follow ADM's example by reducing emissions by mixing crushed limestone into the coal mixture used to power the facility. Sulfur dioxide, the main cause of acid rain, continues to pour out of the Lafayette facility's smokestacks. There are no plans to recycle tires at Tate & Lyle, nor are there, as far as I know, any plans to construct greenhouses or aquaculture facilities here, even though the same experts are available for consultation. And so ADM may have been guilty of price fixing in the 1990s (and who knows what secrets lurk awaiting the light of investigative reporting), but in other ways—particularly in applying innovation to recycling, reducing emissions, diversifying and networking its production processes, it is a postindustrial organization worthy of emulation.

Like many large institutions, like those our students will join and work for, as well as the Universities that house programs in rhetoric and technical and professional communication, ADM is not perfect—nor should those shortcomings be overlooked or forgiven. It cannot be assumed that because some executives are criminals that ADM continues to be an outlaw organization.

Although the two multinational corporations compete in the marketplace, there are opportunities for professionals such as technical communicators to cross organizational boundaries. Organizations can and should learn from each other, share best practices, and reform their practices to become more sustainable in the model of *Interface* CEO Ray Anderson (1999), who has developed a robust corporate recycling program and has insisted on reaching stringent goals for dramatic environmental sustainability standards. ADM is not a model company in the mode Anderson champions, as Interface has made far-reaching progress towards becoming environmentally sustainable for the long term. However, in building the greenhouse and aquaculture facility, ADM indicates its potential acceptance of sustainable practices, should they prove economically as well as environmentally sustainable. In the long run, ADM's business depends upon stable agricultural production, and the corporation depends upon effective use of soil and farming resources, as well as stable climactic conditions. At the very least, technical communicators can remind short-term minded organizations about the long-term consequences of environmental damage.

As I write descriptions of these technologically-driven post-industrial manufacturing processes, I am struck by its similarity to the notion of articulation asserted by Slack, Miller, and Doak in "The Technical Communicator as Author: Meaning, Power Authority." The development of the metaphor quite literally applies to the ways a variety of technologies and processes are articulated in the three scenes narrated here, in both the literal meaning of putting into words as well as the metaphorical meaning developed by Slack, Miller and Doak: articulation as linking

ideas together in longer and longer interwoven elements. And perhaps the reader will be less surprised to learn that I believe that there are numerous similarities to both definitions of technical communication expertise to Knowledge Management (Wick, 2000), Single Sourcing (Applen, 2002), Information Architecture (Salvo, 2004), Content Aggregators (Porter, 2004), as different modes of articulating the core competencies of technical communicators (see especially Hart-Davidson, 2001).

If, as Carolyn Miller (2004) asserts, the measure of the future of technical communication will be in its contribution to knowledge, then there are worse legacies than learning to navigate complex global institutions and articulating values and ethics for effective communication. That is, our expertise is in locating and publicizing what organizations do well, as well as learning how to effectively blow the whistle on illegal, unethical, destructive practices, and to suggest alternative practices to reform institutional dysfunction. To advocate for how we envision a world in which we can comfortably and sustainably live, developing methods of articulating and measuring the advantages of some means of production over others, and articulating the strengths of some processes over others. No matter what you think of ADM's business practices, their Decatur plant is superior in its generation of electricity, reduction of harmful emissions to the environment, and innovative uses of excess heat. A challenge remains in effectively communicating these strengths, to celebrate successful innovation, within such complex organizations as well as outside of them. Our postindustrial emplacements require that technical communicators learn to call attention to broken or dysfunctional processes so that culture effectively reforms what is broken while effective practices get more widely disseminated and used. Particularly in the American Midwest, stakeholders will not tolerate environmental degradation or price fixing to remain globally competitive, and so organizations must learn to leverage local advantages.

Notes

1 An earlier version of part of this paper was presented at the plenary session of the Council of Programs in Scientific and Technical Communication Conference, Lubbock, Texas, October 21, 2005. Thanks to Brenton Faber and Meredith Zoetewey for their help and advice on earlier drafts.

2 For more on the technical process of using limestone to reduce sulfur dioxide emissions, see the EPA's introductory materials on the environmental sciences, especially the unit on the use of scrubbers to reduce air pollution: [http://www.epa.gov/eogapti1/module6/sulfur/control/control.htm [66]].

3 Brenton Faber and I coauthored a 2005 CPTSC plenary paper, where I described my ADM research and Brent described his research in nanotechnology. Faber has published his preliminary findings in Nanotechnology Law and Business, and also maintains a website describing his team's continuing research into nanotechnology and opportunities it presents for technical and professional communicators: [http://www.nano.eserver.org/ [67]].

4 Palast's work reported the illegal activities of ADM executives and is available both as part of the UK Guardian's web-based archive as well as on Palast's own blog: [http://www.guardian.co.uk/Archive/Article/0,4273,3846395,00.html [68]], [http://www.gregpalast.com/ [69]].

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