Journal of Cleaner Production 19 (2011) 566–570

Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

Book reviews

Book reviews for special issue

1. Introduction

As noted by Dr. Geiser and Dr. Ellenbecker in their introductory article in this Special Issue, context, motivation and leadership are essential in fostering social innovations such as toxics use reduction. The articles in this issue were compiled with the goal of providing insights into those factors and the complexities of reducing the use of toxic chemicals – the technical, political, financial, scientific and social forces that are integral to achieving change.

Similarly, the five books that are reviewed below explore many of the themes that recur in any discussion of toxics use reduction. They include the role of science in policy formulation; the challenge of understanding and regulating emerging technologies; the globalization of supply chains; impacts of toxic chemicals on workers' health; the concepts of risk and precaution; and the importance of considering the effects of chemical exposures on the health of children and families.

The first two works (***Shoes, glues and homework: dangerous work in the global footwear industry*** by Pia Markkanen, and ***Beyond child's play: sustainable product design in the global doll-making industry*** by Sally Edwards) are in-depth studies of specific industries – the manufacture of shoes and of dolls – that are representative of the challenges faced by workers in a global economy. The third book (***Poisoned profits: the toxic assault on our children*** by Philip Shabecoff and Alice Shabecoff), through a focus on the evidence that environmental contamination can damage the health of children, presents a compelling rationale for implementing toxics use reduction policies. The final two books (***Green intelligence: creating environments that protect human health*** by John Wargo, and ***Governing uncertainty: environmental regulation in the age of nanotechnology*** edited by Christopher J. Bosso) discuss policy, its relation to science, and government's role in regulating technology.

1. Shoes, glues and homework: dangerous work in the global footwear industry by Pia Markkanen (2009) Baywood Publishing Company, Amityville, NY. ISBN 978-0-89503-328-4. 120 pages.

Dr. Markkanen delves deeply into the workings of the home-based footwear industry in the Philippines and Indonesia. The book describes working conditions through the examination of both the health, safety and environmental hazards that affect this globalized industry as well as the issues around gender and age in the sector. Of particular concern are the organic solvents used in the shoemaking process, and how the complicated supply chain gets in the way of the introduction of safer adhesives, which are being used effectively in other parts of the world. Workplace policies in these countries are discussed, and while they often exist, they are typically weak and/or not enforced – the industry is decentralized and there is little if any worker organizing. Material Safety Data Sheets (MSDS) are non-existent or incomplete, preventing workers from knowing the hazards they were exposed to. The author maintains that the health, safety and environmental consequences of these practices will have serious global impacts. This argument also carries over to other home-based industries in other parts of the developing world. Anyone interested in the impact of home-based industries on worker health and safety, global workplace policy, or economic justice should read this book.

Much of the information in the book is based on personal visits to the various shoe workshops in 2002, and includes information from many in-depth interviews, helping the reader to more clearly understand the working conditions. Brief profiles are presented in table-form, making it easy to see the broad variety of experiences among workers and shop owners.

The poverty in the regions Dr. Markkanen writes about is a driving force behind the acceptance of extremely poor working conditions. Business owners and employees have no choice but to do this type of work, despite exposure to hazards known and unknown. Due to the contractual nature of the business, people work long hours and sometimes have no work at all. The work is by contract, with a very steep hierarchy, and those who are exposed to the dangers are at the bottom of the structure. Work is done in or just outside the home, resulting in exposures to families and neighbors. When businesses are small, the women often do the majority of the domestic and business work in the home, and adolescents leave school to work with the assumption that it will boost their earning potential more than studies. As the businesses grow, the men tend to leave the home to do the marketing, while the women and children remain doing the homework, and thus their exposure levels are higher.

This highly unbalanced social and political structure in these regions makes it extremely difficult for industrial hygienists, engineers, and medical professionals to help improve the situation. The development of trade unions and the improvement of government intervention are unlikely in this situation. Shareholders in some of the international companies have protested the use of toxics in consumer products, but have not addressed the unsafe working conditions in which these products are made. Dr. Markkanen suggests that rather than regulating the existing informal economy, the only solution would be to create a more formal economy. This seems an accurate solution, but one whose implementation is a long stretch from the current situation.

Though the book is fairly short, the subject matter is often dense and the relationships among the different parties confusing, often making it necessary to take the time to reread and digest the subject matter and its importance. The book has some editorial problems, including errant pagination (in TOC) beginning in Chapter 3, incongruent reference to figures (see Fig. 3, Chapter 2), and scattered grammatical and spelling errors.

doi:10.1016/j.jclepro.2010.10.015

This book was reviewed by:

Ms. Jodie Siegel
E-mail: dogler@comcast.net

2. Beyond child's play: sustainable product design in the global doll-making industry by Sally Edwards. (2010) Baywood Publishing Company, Amityville, NY. ISBN 978-0-89503-386-4. 180 pages.

Using three doll-making ventures as case studies, author Sally Edwards examines the impacts of product design and production on the environment, the workers and the surrounding communities, consumers, and the businesses economics in her book, "Beyond Child's Play." The author creates a conceptual framework for sustainable product design with five key elements, and then using a combination of interviews, site tours, literature research, interpretation and analysis, the author presents each case study in detail and concludes by comparing the case studies to one another and to the framework. The author finishes the book by addressing in broad terms the necessary links between product design, production and consumption in the quest for a sustainable society.

Based in Middleton, Wisconsin, the American Girl Doll Company markets their high-quality dolls, made of hard vinyl and cloth with synthetic hair, and numerous accessories and services, including a doll hospital, to the "thinking" girl. Now owned by Mattel, the American Girl Dolls are mass-produced in Southern China in Mattel-owned factories and in Chinese-owned outsourcing companies, all with varying controls on health, safety, working hours and ensuring fair pay. The American Girl Doll Company chapter concludes: "The company's marketing strategies imply that this product can "save girlhood"; meanwhile young Asian women face daily health hazards as they produce these dolls."

Located in Donauworth, Germany the Kathe Kruse Doll Company's five types of dolls are craft produced in Germany and Latvia using high-quality, natural materials, such as wool and reindeer hair in some models, and some synthetic materials, such as vinyl, polypropylene pellets and polyurethane foam, in other models. The dolls are marketed primarily to adult collectors, the German and American Waldorf communities and very young children. Workers are trained semi-annually about the safe use of chemicals and machinery due to the presence of some hazardous chemicals and sharp-bladed machinery. Much attention is paid to worker satisfaction resulting in a flexible workplace where employees are cross-trained and not "tied to an assembly line doing one repetitive task after another."

In Andahuaylillas, Peru the Q'ewar Project's intent is to "build a shared cultural and social community that benefits everyone" and produces dolls. According to the founder, Julio Herrera Burgos, "human dignity is the most important consideration, above and beyond the product itself." Mostly "through handwork done in community," the Q'ewar Project produces four types of dolls, all soft and made of natural (e.g., cotton fabric, alpaca fiber and thread, sheep's wool) and, to a very large extent, local materials. Childcare, education and healthcare are provided for workers; job rotation helps to prevent repetitive motion stress. Workers also enjoy a garden and banking services.

The American Girl Doll Company and the Kathe Kruse Company case studies present the major benefits and drawbacks of globalization in a concrete and easily accessible fashion. The lessons of these two companies are especially dramatic when compared side-by-side to the Q'ewar Project, which began with very different intention. The book also offers a glimpse into the difficult material choices facing all three ventures, needing to consider function, hazardousness, availability and price among other things.

Scholarly yet readable, if occasionally repetitive, the book offered many lessons for me as a cleaner production professional and as a parent/concerned citizen of the world. For a cleaner production professional the book provides a qualitative assessment of the risks and benefits along these three doll-making supply chains as well as a sustainable product design framework against which endless products can be evaluated. For the parent/concerned citizen of the world, the book offers a thought-provoking look at globalization. Due to the calculated choice of subject matters, the reader cannot help but view the globalization risks and benefits through the eyes of the child and its doll, which serves to simplify the exceedingly complex issues. (Unfortunately the book is not intended or able to make simple the parent's choice of a doll for their child!)

Ms. Edwards chose an in-depth product study in order to help the reader understand the "complex constellation of factors that impact product design and the globalization of production and consumption." The author chose dolls as the product in order to "engage a new audience – that of women and girls – in a vital conversation about sustainable production and consumption." While I would have welcomed additional information on the consumption choices and final disposal issues of dolls, the end result is a valuable and effective addition to the body of work on sustainable production.

This book was reviewed by:

Ms. Karen Thomas
KBT Environmental Consulting
E-mail: Karen.thomas@mindspring.com

3. Poisoned profits: the toxic assault on our children by Philip Shabecoff and Alice Shabecoff (2008) Random House, New York, NY. ISBN 978-1400064304. 368 pages.

This book presents evidence that "a vast and largely uncontrolled array of hazardous, human-created substances" have contributed to chronic, disabling, and sometimes life-threatening diseases in children. The authors assert that this constitutes a "toxic assault" and much of the book describes the elements of the "crime", including victims, evidence, forensics, perpetrators, co-conspirators, and witnesses for the defense. It is an indictment of a system that at its base does not see the protection of children's health as one of our society's highest priorities.

Philip Shabecoff a former environmental reporter for the New York Times and his wife Alice Shabecoff, journalist and former executive director of the National Consumers League, wrote this book to chronicle the tragic stories of too many children and families and to call for a social movement that can restore a sense of community and protect the health of American children.

It was not widely recognized until quite recently children's immature bodies react differently to chemicals than adults, especially their increased susceptibility at specific developmental stages. Not until the 1990s did a major scientific study examine the special vulnerabilities of children. It was only in 1995 that the EPA stared to require that assessment of environmental risks take the special vulnerabilities of children into account.

In addition, emerging research is showing associations between children's chemical exposures and various behavioral and learning disorders such as lowered IQ, autism, or ADHD. Research is also showing that contrary to what had been thought for many years, low doses of a chemical may have a more harmful effect than higher doses. All of this means that some chemicals may have far more powerful effects on children than adults.

The damage from children's exposure over the last 50 years may be devastating: increased rates of diseases such as childhood cancer, asthma, learning disabilities, autism, and genital abnormalities in boys are among the concerns.

The authors identify the "perpetrators" as industries that produced, used, and disposed of chemicals in ways that expose communities and consumers. Toxic exposures are a side effect of the need to operate at the lowest cost and make the most profit. For example, the DuPont Corporation did not disclose for decades

that PFOA, a highly persistent chemical in Teflon, was being released into the water, air, and soil from its plants. Even after its own scientists came to realize the potential harms of the chemical, the company continued to produce and distribute it.

Story after story is presented of unwitting parents or communities being exposed to toxic chemical pollution, radiation, or even hazardous chemicals in consumer products. Families suffering from cancer or birth defects in places such as Pittsfield, Massachusetts or Toms River, New Jersey or Dickson, Tennessee are angered that such things can happen and no one held responsible. They are also frustrated that institutions that are supposed to protect their health turn a deaf ear or even deny that there is a problem.

The "co-conspirators" are the "legislators and government officials and institutions that impose lax laws and rules to regulate pollution and then laxly enforce those rules and seldom even bother to keep track of illness patterns of children." The uncertainties inherent in linking illness and toxic exposures are exploited to deny blame, to prevent regulation, and to deny justice for the victims.

It is not only regulators and other government officials who are called to task. The authors describe how "much of the nation's scientific community remains reluctant to demand action to stem the flow of these hazards in the absence of definitive proof of harm." Noted researchers Dr. Philip Landrigan and Dr. Herbert Needleman have said: "We are by default conducting a massive clinical toxicological trial. And our children and their children are the experimental animals." As described in the book, Landrigan, Needleman, and other researchers who have raised these concerns have themselves been harassed and threatened.

The underlying problem is the inherent difficulty or even impossibility of conclusively demonstrating the causal relationship between a specific exposure and a specific disease occurrence. In the absence of such definitive proof, our current health, legal, political, and scientific systems often do not mandate the need for action, even when there is strong evidence of a problem. This enables the "perpetrators" to deny any harm or continue producing a hazard.

While most of the book focuses on what the authors see as enablers of a crime, a central tenet of the book is that the toxic exposures that cause such harms can be prevented. They highlight the "posse comitatus": physicians, scientists, community organizers, academics, journalists, lawyers, and others who are committed to finding ways "to heal our children and to protect them from the consequences of a degrading environment." This includes people such as Hilton Kelley of Port Arthur, Texas, who organizes to reduce the pollution of numerous refineries and petrochemical plants, without the support of either local churches or the NAACP. Or Ed Masry, whose firm hired Erin Brockovich, and who started "bucket brigades" that collect air samples near factories. Or Betty Mekdeci and her family who started the National Birth Defect Registry. There are others all around the world.

In addition to the people who can help change the system, there are emerging tools and disciplines that can help prevent more toxic exposures. Applying the precautionary principle would demand that when potential harm cannot be proved, hazardous substances can be regulated or banned. The growing green chemistry field can lead to more effective chemicals that are less harmful.

The last part of the book is a powerful plea for citizens to become active in making significant changes to our system. They call for a "responsive, nonideological politics that puts partisanship in a backseat in order to deal with the real, pressing needs of the American people, including and especially taking care of its children. We urgently need decent, intelligent people to run this country."

It has been the authors' hope that the book will lead to a national movement for protecting children's health. With an information-rich but readable narrative backed up by 259 footnotes, this book provides ammunition, if not the spark, for such a movement.

This book was reviewed by:
Ms. Cathy Crumbley
Program Director
Lowell Center for Sustainable Production
University of Massachusetts Lowell
E-mail: cathy_crumbley@uml.edu

4. Green intelligence: creating environments that protect human health by John Wargo. (2009) Yale University Press, New Haven, CT. ISBN 978-0300110371. 400 pages.

This careful presentation of fifty years of our nation's experience with the presumed-safe-but-toxic materials in our lives makes very compelling reading. John Wargo is deeply expert as professor and advisor to several Environmental Protection Agency (EPA) administrations, the National Academy of Sciences, the U.S. Congress, the U.N. World Health Organization and Vice President Al Gore. In this book, he builds on previous work concerning the toxic legacy this nation has left its children, who he demonstrates are particularly vulnerable.

The stories of ideation, experiment, discovery, policy formation, use in products and processes, and appalling realization of impacts and hazard are told with commanding detail. The lessons from strontium-90 releases from weapons testing reveal much about persistence, atmospheric distribution by weather systems and uptake by our food systems. Equally dire to read about are the inaccurate assumptions, covert sampling of human tissue and the cavalier policy decisions related to risks involved in nuclear weapons testing from Bikini Atoll to Nevada and also Vieques. Wargo uses these stories to identify lessons which he carries across the broader topic of toxic substances in the environment as fugitives from our technologies, slipping under our policies and through our science. From heavy metals and diesel fuel to pesticides, plastics and formaldehyde, the patterns of persistence, distribution, exposures, and cumulative effects are grounded with stories of children and farmers and others with heartbreaking exposures.

The author's unique perspective offers rare insights. Why was the Atomic Energy Commission (AEC) able to understand risks from certain atomic testing activities, and adjust its policies within 10 years while the EPA stumbled on achieving effective pesticide policies for much of its first 35 years? Wargo suggests that in part this is because the AEC began as a highly centralized science program whereas "the EPA effort depended on highly decentralized and incrementally produced corporate science." Other interesting questions are posed: Why tolerate pesticide accumulations in humans after choosing not to tolerate the presence of radionuclides? How have changes in threshold limits and safety factors weakened corporate arguments to limit but not ban marketplace hazards? What has been the health cost of focusing regulation on outdoor pollution rather than indoor hazards?

Wargo's conclusions that "environmental risks are usually poorly understood by society at large and neglected by states, corporations and individuals" does not – remarkably – leave the reader in despair. He has presented such a dynamic story of our civic debate and few hard won advancements in science and effective policies that there is hope as well as a call to develop a "second wave of environmental law" and "environmentally intelligent society". At this point he offers principles for intelligence gathering and then for managing hazards. These fifteen wise suggestions include improving transparency, especially of knowledge of hazardous condition for those exposed; use of precaution when data are uncertain and the correlative burden of proof on those who control the technology; and the development of healthier alternatives. Wargo finishes his book with guidance for taking personal control, a reminder that we must teach our children how to live here and now.

Green Intelligence might have been organized differently to good effect. Chronologic elements might be easier for the reader to track if the groupings and conclusions more obviously tied to the principles of green intelligence identified in the last chapters. It is not that the case is not well made. This is a terrific book that connects the reader's mind with more visceral urgency, and brings a sense of order and control of our next steps toward a healthier environment.

This book was reviewed by:

Ms. Janet Clark
Senior Associate Director
Toxics Use Reduction Institute
University of Massachusetts Lowell
E-mail: Janet_clark@uml.edu

5. Governing uncertainty: environmental regulation in the age of nanotechnology edited by Christopher J. Bosso (2010) RFF Press, Washington, DC. ISBN 978-1933115801. 160 pages.

This book frames the complex and confusing question of how to regulate nanotechnology in an extremely useful way. Each contributor brings clarity to key aspects of the issue within an overall structure that artfully brings the reader to understand crucially important points about what should be done. It should be used as a guide to future policy development.

Sean O'Donnell of Harvard and Jacqueline Isaacs of Northeastern University note that nanotechnology's potential includes more efficient solar energy capture, higher performing fuel cells, better batteries, highly sensitive sensors, new catalysts, new structural materials, and advances in computing and medicine. However, more than 1000 products using nanomaterials are already on the market and we know very little about what is in them, or what impacts they might already be having.

Editor Christopher Bosso of Northeastern describes the "wow to yuck trajectory" (a term coined by Rice University's Kristen Kulinowski) of new technologies that first spawn predictions of revolutionary impacts, but then raise such concerns that "some applications are constrained or rejected outright because of public anxiety about potential risk. Government and scientific elites are first reflexively boosterish…and then concerned when some uses or mishaps spark public debate and resistance". Nuclear physics, synthetic chemical pesticides and genetic modification of organisms have followed this path. "Technology boosters and free-market advocates have always been slow to admit a need for some anticipatory government attention to these potential effects – even when they are strongly suspected – with subsequent impacts on available resources and room to maneuver…" Might we "handle the potential side effects of nanotechnology even before they are made manifest"?

Wesleyan's Marc Eisner observes that "New regulatory capacity largely is created after the damage is done, and often in haphazard, incremental, and incomplete spasms of governmental response." He states that "it would be unfortunate if the eventual regulation of nanotechnology were grafted on to existing regulatory capacity", because our current risk assessment process "presumes a causal relationship between material volume and exposure, on the one hand, and toxicity, on the other. But given the novel properties of nanotechnology, we cannot simply infer toxicity of a nanomaterial from what is known about its macro-scale counterpart." He and others envision a system of "regulatory pluralism, combining mandatory controls and elements of firm- or association-based self-regulation," and notes that agency officials have had little discretion in the past to create such flexible regimes.

Cary Coglianese of the University of Pennsylvania discusses engaging businesses in the act of regulation as a way of addressing the "comparative informational disadvantage" in which regulators find themselves. This approach has the potential to achieve results but requires assurances that businesses don't take advantage of regulators "and, by extension, the public". Reviewing experience with voluntary programs, planning requirements that provide flexibility to regulated entities, and requirements for information disclosure, he concludes that "Engaging business in regulatory governance can be successful when firms use their flexibility within an overarching system of oversight by their industry peers, third parties, or the government."

How government could provide that overarching system is described by Terry Davies, (one of the original organizers of the U.S. Environmental Protection Agency), who notes that "many of the changes needed to deal with nanotechnology are the same as those needed to remake the currently dysfunctional regulatory system." He advocates creating a new Department of Environmental and Consumer Protection to foster an integrated approach that bases strong oversight on science and monitoring. "The future context for dealing with risk will be unlike anything we have known," he writes, and "the policies of the past will not provide the protection we need".

Marc Landy of Boston College argues for a "hypothesis testing/weight of the evidence" approach to change the deliberation from our current adversarial contest toward "what is most observable and testable", and notes that adopting such a change in approach is not impossible but is impeded by the inertial forces of our political history. However, the possibility for a positive evolution in policy is enhanced by the fact that "Nanotechnology puts both environmentalists and industry off their accustomed game", and a great bargain is possible in which environmentalists can accept such validation of safety "in exchange for industry willingness to take on a far greater amount of preproduction environmental testing and data-sharing."

Barry Rabe of the University of Michigan introduces the idea that regulation of nanotechnology can also grow from the bottom up, as states have in recent years expanded their authority in environmental areas, with some states acting on the idea that aggressive environmental protection is not contrary to economic self-interest. While at least twenty states have made some commitment to invest in nanotechnology infrastructure, California, Massachusetts, Wisconsin, and Minnesota have articulated the concept that strong environmental health and safety protection must be a part of any program for fostering nanotechnology. Rabe envisions a "network" approach to governance that "defies conventional hierarchical patterns", breaks through agency rivalries, and secures collaboration.

Bosso and W.D. Kay of Northeastern note that the city of Cambridge, MA created capacity for assessing the complex informational problem that intelligent nanotechnology policy demands by establishing a citizens' advisory committee. They point out that if "the asymmetries in information possessed by business compel government to afford greater discretion to the regulated," (as noted by Eisner and Coglianese), "it should also compel greater formal representation of non-business interests in decision making." Their version of Landy's "grand bargain" would combine informed self-regulation by business with "more expansive and formal inclusion of advocacy groups, science advisory panels, and expert citizens in oversight and regulatory deliberations… expanding the narrowly configured relationship between regulators and the regulated into a broader discursive network of interests." If we are to learn from our experience with nuclear energy and other modern industries, more, not less, participation in deliberations about risk could avoid citizen resistance to the development of new technology. To these analysts, the root question is whether government can act as a fair arbiter of conflicts.

They apply the term "capacity," so often referring to technical and informational resources, to the quality of the interaction of the agencies with their public. Their stressing of the importance of democratic capacity is extremely valuable. It provides the strongest foundation for a legitimate system of oversight, that "can lead

us away from the limited discourse of technocratic elites about public fear (and fear of the public)", rationally prevent harm, and stimulate the development of desirable products at the same time. Let us hope that this book will be widely read.

This book was reviewed by:

Mr. Rick Reibstein
Manager, Outreach and Policy,
Massachusetts Office of Technical Assistance
E-mail: rick.reibstein@state.ma.us

Janet G. Hutchins*
Toxics Use Reduction Institute,
University of Massachusetts Lowell,
600 Suffolk St., Lowell, MA 01854, USA
* Tel.: +1 978 934 3390; fax: +1 978 934 3050.
E-mail address: janet_hutchins@uml.edu.

30 October 2010
Available online 31 December 2010