
Letter to the Editor

Ehrenfeld, J. and N. Gertler. 1997. **Industrial Ecology Is More than Just Kalundborg.** Letter to the editor responding to A. Johansson's letter regarding Ehrenfeld and Gertler's (Winter 1997) "Industrial Ecology in Practice: The Evolution of Interdependence at Kalundborg," *Journal of Industrial Ecology* 1(1): 67–79.

Professor Johansson has raised a number of important points in his comments on our article (Ehrenfeld and Gertler, 1997), but several merit further discussion. We would separate our response into a few matters of clarification and then some broader issues. Johansson disagrees with our assertion that the product stream is only a small fraction of the total mass moving through an economy. The facts are on our side (see the article he cites (Ayres, 1989)). The issue he raises is, however, important. He notes that closing off the waste streams by converting them to useful inputs to other processes will not solve the environmental predicament in which we currently find ourselves. We could not agree more wholeheartedly. We present the industrial symbiosis at Kalundborg as an example of just one of the many consequences of looking at the world through the lens of industrial ecology. Our article and many others in the first few issues of this Journal point to the criticality of re-designing both the technological forms of products and the societal structures in which they exist, and offers industrial ecology as a framework for analysis and design.

Johansson mistakes our presentation at many places as representing Kalundborg as embodying the whole of industrial ecology. This reading was not intended by the authors. Industrial ecology is, as Johansson notes, a metaphor as well as an analytic framework that attempts to capture the ecological connectedness of our industrial systems. And as a metaphor, it can and does serve as a portal to a future that is desired by all the agents (perhaps everybody in a society) who design that future but who do not now have a clear road map to get us there. We note, as do others, that industrial ecology is suggestive of design principles at all levels from the mere artifacts that we use and consume to satisfy our needs and wants to the whole political economy out of which these artifacts flow. Yes, we would have to agree with Johansson that industrial ecology is as yet a vision -- not of the future itself (there the image is a sustainable world, itself a very fuzzy vision at this time) -- but of a roadmap that can take us in the right direction. And like all road maps, using them does not guarantee that one finds themselves at the desired destination. Many of us still get lost. But the chances of arriving at the intended end would seem to be much higher with a good map in hand. This is our argument; not that industrial ecology is 'good' and that everything else is 'bad'.

Such a roadmap is necessary only if the one we have is obsolete or dated. It should be obvious that we believe this is the case with respect to getting to a sustainable world. Others do as well. Robert Heilbroner, an American economic historian notes that 'a second familiar, but no less serious objection [to economic-driven behavior] is that a general subordination of action to market forces demotes progress itself from a consciously intended social aim to an unintended consequence of action, thereby robbing it of moral content' (Heilbroner, 1993).

Our point in showing the evolutionary path taken in the development of Kalundborg is to raise some caveats for those who would attempt to create such industrial symbioses in one fell swoop, as is the case in many places today. We believe that the coupling of 'normal' economic activities to an ecological metaphor will more likely emerge if the conditions are conducive to promote the closing of loops as they were in Kalundborg and other situations as pointed out by Professor Johansson. By properly designing the institutional context -- regulations, culture, topography -- and the characteristics of the firms -- versatility, flexibility and diversity -- the evolutionary process can, hopefully, be nudged along a path where the survival of the fittest [enterprises] creates a world that also fits the visions of those humans who populate the globe. Such is the nature of sustainability.

References

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