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Convergence, Divergence, and Complexity

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National comparisons, whether of cuisine, driving habits, or law, are apt to provoke hurt feelings. The renewed interest of late in comparing US and European environmental policies has been spurred in part by a series of transatlantic conflicts -- often rather acrimonious -- over trade restrictions and international treaty language. The comparative studies themselves sometimes manifest unkind stereotyping. But there is much to be gained from comparative analyses, if they can be serious, respectful, and open-minded. Differences in regulatory policies can be the source of insight rather than discord. Our goal should be constructive dialogue and mutual learning.

The current conventional wisdom is that US and European environmental policies have been diverging since the 1980s, with Europe adopting stringent regulations under the banner of the precautionary principle while the US focuses on regulatory reform. Evidence for this proposition includes more stringent European restrictions on hormones in beef and genetically modified foods, the adoption of the precautionary principle in the EU Treaty, the US withdrawal from the Kyoto Protocol on climate change, the emphasis by US Presidents on cost-benefit analysis of new regulations, the increasing influence of environmental organizations and parties in European regulatory politics, and the growing role of European institutions borne of European integration. These are clearly important developments, and European environmental policy is clearly evolving.

I argue, however, that this picture is incomplete, and that the reality is much more dynamic and complex. Both the US and Europe have quite active environmental regulatory systems; the US has hardly ceased regulating. Both the US and Europe are often highly precautionary -- and on several prominent examples, including particulate air pollution and mad cow disease in blood, it is the US that is regulating in the more precautionary manner. The US and Europe do not diverge as much as is claimed on the general use of precaution in regulation, but they often do diverge on the particular question of which risks to worry about and regulate most. This particularized divergence can give rise to visible conflicts. Moreover, convergence and divergence are both

concepts too simple to capture the interactive reality of transatlantic relations. Although there is divergence on some issues, there is much convergence on others, including the basic criteria for regulation (with Europe also moving to adopt cost-benefit analysis), the choice of policy instruments, and the hierarchical level of governmental authority. The reality is a process of “hybridization,” in which both systems are borrowing legal concepts from each other in a complex and continuous mutual evolution.

I. Hazards of Hasty Comparisons

Quick and broad comparisons of national regulatory policies are fraught with peril. Recent efforts to compare US and European environmental policies illustrate these pitfalls. First, these comparisons frequently leap to macro-scale conclusions from just one or a few highly visible examples of conflict, such as the recent controversies over genetically modified (GMO) foods and climate change, thereby succumbing to the availability heuristic (exaggerated attention to recent crises) while failing to undertake the more serious study of a broad array of comparative data.

Second, comparisons written from one side or the other frequently commit the comparativist’s cardinal sins of ignorance and even disrespect of foreign law (Reitz 1998), claiming for example that so much has happened over here while so little has happened over there, when the reality is hardly so one-sided. It is not helpful to serious analysis to assert, for example, that Europe has enacted many important environmental measures since the 1980s while the US has done little or has retrenched. The reality is that in the last two decades, while Europe was indeed adopting many important measures, the US was enacting the 1984 Hazardous and Solid Waste Amendments, the 1986 Superfund Amendments (including tough cleanup standards and the pathbreaking Toxics Release Inventory), the 1990 Oil Pollution Act, the 1990 Clean Air Act Amendments (including tight technology controls on air toxics, and the very successful national SO₂ allowance trading system for sharply reducing acid rain), the 1996 Safe Drinking Water Act amendments, the 1996 Food Quality Protection Act, and numerous stringent agency regulations (including the 1987 Top-Down BACT policy, the 1997 Ozone and PM_{2.5} national ambient air quality standards recently upheld by the US Supreme Court [Whitman v. ATA 2001], the 2001 standard on arsenic in drinking water, and the 2002 standard on diesel engine emissions). This is not to say that all of these policies have been desirable; it is just to say that comparative American inactivity is not the reality.

Third, comparisons along one dimension, such as whether a particular principle (say, precaution) has been adopted in each legal system, frequently neglect the surrounding context of other principles, rules, institutions, and equivalent doctrines under other names, as well as the distinction between the law on the books and the law in action (Reitz 1998), so that the comparison falsely finds divergence when the reality in toto is functional similarity. For example, the claim that American regulation is governed by cost-benefit analysis, while European regulation is not, neglects several contextual facts: that despite requirements for such analysis issued by every President since Jimmy Carter, including both Ronald Reagan and Bill Clinton, important areas of American regulation

(such as the ambient air quality provisions of the Clean Air Act) remain statutorily immune to cost considerations (*Whitman v. ATA* 2001); that European regulatory policy often also officially espouses cost-benefit or economic analysis, as it does in the European Commission's Communication on the Precautionary Principle (CEC 2000), and often in member state law (Sand 2000); and that the principle of proportionality applied in European law (Emiliou 1996) amounts to a weighing benefits and costs that cabins the reach of the precautionary principle.

Fourth, broad comparisons often neglect great variation within each legal system, such as among the EU Member States and among the States of the US; in some cases that internal variation exceeds the claimed differences across the two aggregated systems. Fifth, broad comparisons sometimes take a snapshot of current events but overlook dynamic changes through time, not only in the past but also into the future. Current events may seem to represent a climax or ending when in fact they are part of an ongoing transition which is difficult to perceive from within.

Compounding the above may be the tendency, observed by social psychologists, of group members to assert judgmental distinctions between one's own group and other groups, even when the members were arbitrarily sorted into the groups (Tajfel 1972; Horowitz 2001: 144-147). The US and Europe may be citing contrasts that would be nearly indistinguishable to outside observers, or far less salient than the similarities between US and European regulatory policies.

To be sure, all of these shortcomings in comparative legal analysis may be unintended. But they may also be consciously or unconsciously committed, so that the comparative description becomes less an exercise in dispassionate social science than a vehicle for the author's normative argument about what kind of law is desirable (Chodosh 1999).

In short, the fundamental fact of comparative legal analysis is that things are "more complicated than you thought" (Kennedy 1997: 605). Broad and catchy depictions miss the true complexity and dynamism of vast and interactive social and legal systems. The same is true of regulatory policy itself: seductively simple prescriptions tend to fail when tested against the complexity of real-world systems (Wiener 2002). Universal principles of regulation, and coarse comparisons of national regulatory policies, should both be approached with caution. We need precaution about precaution, and about comparisons of precaution. That does not mean, however, that we should look only at the details and never step back to see the bigger picture; on the contrary, we must look at both details and whole systems. A main problem with the claimed distinctions between US and European environmental policies is that they focus narrowly on one issue (such as the precautionary principle, or GMO foods) and neglect the broader systems (such as the proportionality principle, tort law, and a broader sample of risks).

II. Convergence, Divergence, and Hybridization

Thus, to the question whether US and EU environmental policies are “converging or diverging,” my answer is both and neither. US and EU environmental policies are *both* converging and diverging, because the reality differs in different strata of policy development and implementation. And US and EU environmental policies are *neither* converging nor diverging (nor proceeding in parallel, nor “flip-flopping”), because a better model is one of hybridization: iterative exchange of legal ideas, tools and approaches through a process not dissimilar to interbreeding among populations in nature. Hybridization involves “legal borrowing” or “legal transplantation” (Watson 1993), earlier called “mimesis” (Toynbee 1961: 343), and more generally the diffusion of social concepts (Hagerstrand 1968). The social, cultural or legal concepts exchanged are sometimes called “memes” (Dawkins 1976; Aunger 2002), as an analogy to the genes or traits exchanged in hybridization among populations. Hybridization in nature was long thought to be of minor evolutionary significance, but careful empirical investigations in the last few decades have revealed its widespread and often crucial role in survival, reproduction, and the emergence of new species (Grant 1999; Schluter 2000). In comparative regulatory policy, we are both observing and participating in the exchange of legal traits; we can both document and shape the process.

Hybridization of law (or species) might look like convergence – the generation of a new approach shared by both systems -- but it need not. Hybridization can imply a complex web of borrowings of particular features applied to different problems, institutions, and levels of government – a hodgepodge of “bricolage” (Tushnet 1999) -- that yields a diffuse and cloudy pattern rather than a tight convergence to a new line. One might observe divergence as to one example, convergence as to another, many aspects heading in different directions all at once. Or hybridization might give rise to a new version that is quite different from both parental approaches, and that appears during the transitional process to be divergent from both original systems. Whereas convergence can be envisioned as curves heading toward a single point (or line) on a plane, and divergence as curves heading away from a single point (or line) on a plane, hybridization can be seen as the interactive interface between two large miasma which are continuously exchanging components across one or many planes, thereby reaching and even creating new points on an unfolding multidimensional frontier. Rather than two lines converging or diverging, one can envision two fractals interacting at many junctures as they both evolve.

In order to understand US and European environmental policies in this context of complexity, the Duke Center for Environmental Solutions and the European Commission’s Group of Policy Advisers have been conducting a project on “The Reality of Precaution” (Duke Center 2002). The project emphasizes collaboration and dialogue among participants from both the US and Europe, in order to overcome the problems of ignorance of foreign legal systems and foreign cultures. Initial products of this effort include a series of transatlantic dialogue meetings (see Duke Center 2002), and a jointly authored research paper (Wiener & Rogers 2002). A central finding from this work is that the US and Europe are not diverging or flip-flopping, with Europe becoming “more precautionary” than the US across the board. Rather, both the US and Europe are taking a precautionary approach to the regulation of many risks, but they differ in which risks they choose to worry about and regulate most. Examples are discussed below.

III. Comparisons at Several Strata

The complexity of both convergence and divergence between US and European environmental policies is apparent from a disaggregated analysis of several strata of the regulatory system. By dividing the analysis into component parts of the regulatory process -- conceptual rhetoric, risk assessment methods, risk management standards, choice of risks to regulate, choice of policy instruments, degree of integration across hazards and media, enforcement mechanisms, and hierarchical level of government -- one can appreciate the more multifaceted relations between US and European environmental policies. There is both convergence and divergence, depending on the component being examined.

Conceptual rhetoric. The EU has repeatedly advocated the precautionary principle in international fora, and the US (under both George W. Bush and Bill Clinton) has expressed reservations. This divergence at the level of high rhetoric has led to frequent claims that Europe has become “more precautionary” than the US. The notion of precautionary regulation is not new; prominent endorsements have appeared in both Europe and the US since at least the 1970s (Boehmer-Christiansen 1994; EEA 2001; Ethyl Corp. v. EPA 1976; TVA v. Hill 1978). But while US law continues to express an informal “precautionary preference” (Applegate 2000), European law has formally adopted precaution as an overarching “principle” to govern risk regulation (EU Treaty 1993, article 174; CEC 2000), and the European Environment Agency has published a book on the advantages of precaution (EEA 2001).

Today, the conventional wisdom is that Europe endorses the Precautionary Principle and seeks proactively to regulate risks, while the US opposes the Precautionary Principle and waits more circumspectly for evidence of actual harm before regulating (Daley 2000; McNeil 2000; Richter 2000; Levy & Newell 2000; Kempton & Craig 1993). In 1999 the then-Trade Commissioner of the European Union, Pascal Lamy, asserted that “in the US they believe that if no risks have been proven about a product, it should be allowed. In the EU we believe something should not be authorized if there is a chance of risk” (quoted in Charnovitz 2000: 295 n.181). As early as 1992, a senior environmental official of the European Commission had said that the US “was definitely leading European policy back in the 1970s and early 1980s” but now “Europe has certainly managed to catch up” and on some issues “has taken over the role as world leader” (Henningsen 1992 at 25-26). Fifteen years ago, comparisons of US and European regulation found different procedural approaches but similar degrees of regulatory stringency (Brickman, Jasanoff & Ilgen 1986; Jasanoff 1986; Vogel 1985). Nowadays leading scholars of comparative regulation are describing a “flip-flop”: on this view, the US used to be more precautionary than Europe in the 1970s, but Europe has become more precautionary than the US since the 1990s (Lofstedt & Vogel 2001; Vogel 2001a; Vogel 2001b). Vogel writes: “From the 1960s through the mid 1980s, the regulation of health, safety and environmental risks was generally stricter in the United States than Europe. Since the mid 1980s, the obverse has often been the case” (Vogel 2001b: 1). He emphasizes that

these trends “have not produced policy convergence. On the contrary, European and American regulatory policies are now as divergent as they were three decades ago. What has changed is the direction of this divergence. In a number of areas, Europe has become more risk-averse, America less so” (Vogel 2001b: 31). Normative evaluations of this situation vary. Some observers see a civilized, careful Europe confronting a risky, reckless and violent America (e.g., Richter 2000). Others see a statist, technophobic, protectionist Europe challenging a market-based, scientific, entrepreneurial America (e.g., Redwood 2000). But clearly there is a divergence in the rhetorical objectives of environmental regulation.

This divergence may reflect real differences in regulatory policy. Or it may reflect conclusions drawn from a few visible risk cases (such as GMO foods), but not fully characterizing the broad array of actual regulatory policies (Wiener & Rogers 2002). It may also reflect a new terrain of international rivalry after the end of the Cold War (Daalder 2001; Kagan 2002). Given that the US and Europe must both be at the highly precautionary end of the *global* spectrum, and given the finding of simultaneous actual precaution when viewed across a broader set of risks (below), the stark claimed divergence between European precaution and US policy seems overdrawn, and the international rivalry hypothesis seems worth taking seriously.

Risk assessment. It has long been observed that the US takes a more formal scientific and quantitative approach to risk assessment, while the European approach is more qualitative. The US Supreme Court’s *Benzene* decision requiring OSHA to conduct a risk assessment before regulating (Industrial Union Dept., AFL-CIO v. API 1980), and a 1983 guidebook from the National Academy of Sciences, spurred widespread adoption of scientific risk assessment as the basis for American risk regulation over the past two decades, while European regulation has remained more qualitative and informal (Jasanoff 1986; Jasanoff 1998). Yet there are signs of convergence. The European Commission has espoused scientific risk assessment as a predicate to any invocation of the precautionary principle (CEC 2000), and the European Court of Justice has held, in a case on mad cow disease (BSE) quite reminiscent of *Benzene*, that member state governments may not invoke precaution to regulate risks that the Commission has deemed insignificant (CEC v. French Republic 2001).

Risk management: standard-setting. When actual regulatory policy decisions are made, the trend is toward convergence. As noted, both the US and the European Commission have now adopted risk assessment and benefit-cost-analysis as basic criteria for new regulations (Clinton 1993, CEC 2000), and European law adds the principle of proportionality (Emiliou 1996). To be sure, these criteria are not universally applied: for example, as noted above, some areas of US environmental law are exempt from cost considerations; and the European Commission has invested far less in the institutional capacity needed to review regulations on cost-benefit criteria than has the US Executive branch. But the trend is toward convergence. Both systems also now involve substantial public participation in standard-setting (Vogel 2002). Both have adopted major environmental legislation over the past two decades, as detailed above; the claim that Europe has done so while the US has retrenched since the 1980s is not accurate. David

Vogel, who described the transatlantic posture as a reversal of divergent approaches (Vogel 2001b), has more recently written of convergence in US and European regulatory approaches (Vogel 2002). Similarly, Robert Kagan argues that broadly speaking, the substantive environmental standards in the US and Europe are convergent (Kagan in Kagan & Axelrad 2000: 2-3, 376-77).

Thus the conceptual rhetoric of greater precaution in Europe, based largely on the visible examples of food safety and climate change, does not capture the full reality of actual regulatory policies. Disaggregating the overall convergence in regulatory criteria, one can see differences as to particular risks, but no simple divergence in which Europe or the US is more stringent than the other across the board. The picture is more complex. Europe is more precautionary than the US on some risks, such as GMO foods, hormones in beef, climate change, toxic substances, phthalates, and guns; but the US is more precautionary than Europe on other risks, such as mad cow disease (especially in blood donations), fine particulate matter air pollution, nuclear power, teenage drinking, cigarette smoking, hazardous waste disposal, “right to know” information disclosure requirements, and youth violence (Wiener & Rogers 2002; see also Dialogues at Duke Center 2002). In the past the US had also been more precautionary regarding new drug approval, the 1978 ban on CFCs in aerosol spray cans and the 1970s ban on supersonic transport to protect the stratospheric ozone layer, and the phaseout of lead in gasoline (petrol), but Europe has now converged on most of those policies.

These examples tend to rebut the contention that US environmental policy has been weakened by economic considerations such as cost-benefit analysis, while European policy has become more stringent by avoiding such considerations. In reality, both systems have been quite active. And sometimes the cost-benefit shoe is on the other foot. For example, one recent study finds that the US legal regime for air pollution control is more strict and precautionary than the German regime, in part because US law requires standards to be set without considering cost, whereas the German approach applies consideration of benefits and costs under the principle of proportionality and arrives at more moderate standards (Dwyer et al. 2000: 206-08). Another study finds that European regulation is less susceptible to the problems of tunnel vision (excessive regulation of minor risks) and random agenda selection that have plagued US regulation (Breyer & Heyvaert 2000: 308-09). Moreover, it is not the case that cost-benefit analysis necessitates weaker regulation; several of the examples of *greater* US precaution, including the phaseout of CFCs and the phaseout of lead in gasoline (both in the 1980s), were based on and substantially motivated by cost-benefit analyses. Recently the US Office of Management and Budget has initiated a series of “prompt letters” that use cost-benefit analysis to identify and recommend promising new regulations that the agencies ought to consider adopting but have not yet – using economics to spur smart regulation, not just to retard bad regulation. Meanwhile, more precautionary regulation is not always a triumph over industry influence (nor is economic analysis always a capitulation to industry); sometimes industry seeks greater regulation for parochial gain, such as to impose costs on its trade rivals. And, if the contention were true that the use of cost-benefit analysis had led to moderating (or strengthening) some regulations, whether in the US or in Europe, that would not necessarily be unwise – indeed it might be quite sensible.

Further, more precautionary policies are not always superior. Apart from the costs and inhibitions to innovation that they may engender, more precautionary policies can also yield increases rather than decreases in risk. Precaution against a target risk can induce increases in other countervailing risks (Graham & Wiener 1995). The ideal is not maximum precaution but an optimal precaution that takes into account the tradeoffs among multiple risks (Wiener 2002).

Choice of risks. The picture that emerges is of precaution on both sides of the Atlantic, but regarding different risks. In one example from the list of divergent risk regulations above, the US and Europe are simultaneously precautionary about the same technology, but in opposite directions: the US tightly regulates diesel engines to reduce human exposure to fine particulate matter (Seelye 2002), while Europe promotes diesel engines to reduce carbon dioxide emissions and global warming (Diesel Technology Forum 2001). Both policies are precautionary, but against different (and countervailing) risks.

To note another example, the US has been highly precautionary about mad cow disease (Wiener & Rogers 2002). It banned the import of British beef in 1989, several years before the EU adopted such a ban. The EU has since lifted its ban – and sued France in the ECJ to force France to lift its ban (CEC v. French Republic 2001) -- while the US ban remains in place. (Meanwhile, Europe has adopted somewhat more stringent policies than the US regarding the kinds of protein matter that can be fed to cattle and sheep.) In addition, in 1999 the US FDA adopted a “precautionary measure” that prohibits blood banks from collecting blood from donors who have spent six months or more in the UK. This regulation is especially precautionary given that there is no evidence of transmission of the disease via blood donations, and that the regulation is estimated to reduce the supply of blood in American hospitals by a substantial amount (roughly 2 to 3 percent), raising the specter of a serious countervailing risk. Europe has adopted no such restrictions on blood donations, though it has undertaken leukodepletion on the theory that the disease agent (the prion) is more likely to be carried by certain blood cells. In short, the US has been more precautionary regarding a risk of much greater impact and public concern in Europe.

What is interesting about this complex pattern is not whether one society is more environmentalist or morally upstanding than the other (as sometimes implied by claims of greater precaution), but why the societies choose to worry about different risks. The answer may derive from real differences in the seriousness of different risks in different places, or risk perceptions and culture (Renn & Rohrmann 2000; Douglas & Wildavsky 1982), or domestic politics, or changing positions in global strategy (Kagan 2002: the US and Europe "disagree about what constitutes a threat ... [they] differ most these days in their evaluation of what constitutes a tolerable versus an intolerable threat"), or other considerations. This should be a question for further research.

The same complexity can be seen from the vantage of concern about countervailing risks. After years of experience with precautionary risk regulations, the US has become somewhat more attentive to the prospect of the countervailing risks that may arise from

efforts to reduce target risks (Graham & Wiener 1995, Wiener 2002). Countervailing risk appears to be a lesser concern in Europe, at least in terms of the official literature (EEA 2001, reviewing false negatives but neglecting false positives). But on another domain – the wars against terrorism, and against drugs – there is a parallel but opposite concern: the EU fears the countervailing risks of intervention, while the US presses ahead notwithstanding (or perhaps neglecting) those risks (Kagan 2002: 9, 12). This again illustrates the complex pattern of simultaneous precaution but concern about different risks.

Choice of policy instruments. In the past there had been some divergence between the US and Europe in the choice of policy instruments, but the future portends increasing convergence (at least temporarily). Both the US and Europe have employed best available technology (BAT) approaches for many years. But the US has made increasing use of emissions trading (tradable permit) policies to deal with problems including lead in gasoline, CFCs, acid rain, land development, and water pollution, while Europe had not; and Europe had made greater use of emissions taxes (charges) than had the US (Golub 1998: 4-24; Delbeke & Bergmann 1998; Stewart 1992: 75-80). Of late there appears to have been some convergence, especially as the EU has made greater use of emissions trading – in particular to control greenhouse gas emissions under the Kyoto Protocol (CEC 2001). But the US has not yet begun to make widespread use of emissions taxes.

It should be noted here that the use of “economic incentives” is not a move to favor “economic interests” over environmental interests. In fact, industry often resists the use of taxes or emissions trading because those instruments (unlike technology standards) force industry to pay for every residual unit of emissions (either as a tax levy or as the foregone earnings from not selling a permit). Nor is the advocacy of “market-based instruments” based on the premise that “the market” can solve all environmental problems; it is rather an effort to correct what are recognized to be market failures by adopting government policies that reconstitute incentives in environmentally desirable directions. Moreover, the choice of instruments, such as economic / market-based incentives, is distinct from the choice of the level of environmental protection to be achieved. One can employ economic incentives to achieve quite stringent goals.

Another instrument that has been used more frequently in the US than in Europe is information disclosure (Sand 2000; Sand 2002). On top of its powerful system of discovery in civil litigation, the US has enacted several powerful information policies, including the 1966 Freedom of Information Act, the environmental impact statement requirements of NEPA in 1969, the 1986 enactment of the national Toxics Release Inventory and of California’s Proposition 65, and the facility accident scenario requirements of Clean Air Act section 112r adopted in 1990. Europe has recently been moving to bolster its information disclosure policies through CEC Directive 1990/313/EEC on access to information from member states, the 1998 Aarhus Convention, Regulation (EC) 1049/2001 of 30 May 2001 on access to information from EU institutions, the new European Pollutant Emissions Registry created in 2000 to be operational by 2003, and the pending Draft Protocol on Pollutant Release and Transfer

Registers to be finalized at the UN/ECE Ministerial Environmental Conference in Kiev in 2003 (Sand 2002).

Degree of integration across hazards and media. US environmental regulation is highly fragmented, with many different agencies implementing many different statutes to address different risks. Even within the EPA, there are separate fiefdoms for air, water, and waste (Marcus 1991). This fragmentation contributes to cross-media and cross-pollutant shifts, frustrating effective regulation (Wiener & Graham 1995). “Integrated pollution control” (IPC) is the effort to deal with multiple risks more holistically, to ensure actual environmental improvement (Guruswamy 1991; Haigh & Irwin 1990). Since the early 1990s, the UK has made significant efforts to adopt integrated pollution control, especially in its 1990 and 1995 Environmental Protection Acts and its creation of an integrated pollution control agency (Weale 1996; Purdue 1991; Carter & Lowe 1995). The UK approach has since been borrowed by other countries in Europe and by EU institutions (Backes & Betlem 1999; Zottl 2000).

Enforcement mechanisms. The “style” of US and European regulation has long been said to diverge. The US regulatory system is seen as highly legalistic and adversarial, with a strong role for decentralized decisionmaking in courts (both in the review of regulation, and in the application of tort law) (Kagan & Axelrad 2000). US regulatory authority is more fragmented than European regulatory authority, with multiple agencies, courts, committees, and levels of government all having a hand in (and offering opportunities for public input into) policy development (Kagan & Axelrad 2000: 12-13). The European regulatory style is seen as more cooperative, hierarchical, and centralized (Vogel 1986; Jasanoff 1986; Kagan & Axelrad 2000: 11-13). Even when substantive standards are equivalent, the procedural approaches diverge significantly (Kagan & Axelrad 2000: 3, 23; Horowitz 1994). American adversarial legalism yields greater opportunities for formal public input and transparency, but also greater delay and antagonism; the European approach invites more negotiation of policy development between government and regulated businesses (Kagan & Axelrad 2000: 23, 404-405). The American approach reflects greater public mistrust of concentrated power (in both government and business) (Kagan & Axelrad 2000: 10, 13; Reitz 2002: 457; Stewart 2001: 85-86).

The American reliance on courts, both to enforce regulations at the behest of citizen suits and to award compensation to tort victims, may help explain the disagreement between US and European officials over adoption of an overarching “precautionary principle.” Knowing that the adversarial US legal system would enforce such a principle more rigorously than European law, US officials may resist agreeing to a principle that would seem more stringent in the US than elsewhere. And knowing that the US tort system is there to address injuries when they occur (and thereby deter future injuries), US officials may feel less urgency to adopt highly precautionary ex ante regulation. By contrast, European officials may worry less about rigorous and rigid enforcement of precaution, while they may feel they need it more because they lack as robust a tort system.

There are some signs of convergence regarding the style of enforcement. Europe is becoming more formal and legalistic, inviting greater participation by interest groups in

policy formulation, in part as a consequence of the integration of European institutions and rise of power in Brussels (Vogel 2002; Kagan & Axelrad 2000: 14-15). European public trust in government and scientists has declined in the wake of several food safety crises, including mad cow disease, thereby prompting greater demands for regulatory transparency and accountability (Lofstedt & Vogel 2001). Meanwhile, American regulation is becoming less adversarial and more cooperative through the use of regulatory negotiation, alternative compliance agreements, habitat conservation plans, and Dutch-style environmental covenants (Golub 1998; but see Stewart 2001: 85-86, doubting how far the US will go in this direction).

Hierarchical level of government. There had been divergence between the US and Europe on the hierarchical or vertical level of government responsible for environmental regulation: US policy had moved toward a strong role for the federal government, while in Europe the competency of the European Commission to address environmental issues took time to establish, and the principle of subsidiarity still left most decisions in the hands of member state and provincial governments. But now there may be signs of some convergence, as the EU centralizes toward a stronger role for the Commission in Brussels and as the US decentralizes toward a greater role for the states (Breyer & Heyvaert 2000).

IV. Hybridization

The foregoing analysis suggests that one cannot characterize the entirety of US and European environmental policies by either convergence or divergence; both are occurring, but differently in different strata of policy development and implementation. A better model to depict current dynamics, as argued above, is hybridization: the exchange of legal concepts across systems. Examples of such borrowing in environmental policy abound. From the US, Europe has borrowed approaches to judicial review and notice & comment rulemaking (Shapiro 1992; Bignami 1999), emissions trading (Golub 1998; CEC 2001), benefit-cost analysis (CEC 2000), products liability law (Reiman 1996: 62), increasingly “federal” oversight of environmental policy (Rehbinder & Stewart 1985; Breyer & Heyvaert 2000), information disclosure instruments (Sand 2002), and other measures. Meanwhile, from Europe, the US has borrowed the Dutch method of environmental covenants and related approaches to voluntary negotiated agreements (Golub 1998, Stewart 2001: 85-86), and the concept of precaution itself (which originated as *vorsorgeprinzip* in German law, see Boehmer-Christiansen 1994; Sand 2000; and was later relied on in US law, see Ethyl Corp. EPA 1976). Additional examples of transatlantic borrowing are undoubtedly underway.

Hybridization is spurred by several factors. The integrating world economy offers greater opportunities for exchange of ideas and counterpart experiences, and at the same time it puts pressure on national regulators to harmonize standards (Kagan & Axelrad 2000: 2-3). Transnational networks of environmental NGOs and policy experts spread legal ideas (Pollack & Shaffer 2001; Robinson 1997), and multinational corporations spread environmental management practices to their foreign operations (Levy & Newell 2000: 17-18; Garcia-Johnson 2001). Further, government officials, academics,

nongovernmental actors, and businesses are all engaged in a process of learning by doing, in which successful innovations in one place can be observed and imitated (or at least lobbied for) in other places.

As discussed above, hybridization is not the same as convergence. Hybridization involves exchange, but it is more complex and dynamic than convergence or divergence. And it may be difficult to discern when one is in the midst of its unfolding. Yet it offers both sides an opportunity to reduce acrimony, to study the complex reality, and to learn from each other. Moreover, we are both observing and shaping the unfolding evolution of our regulatory policies; we can participate in the process of hybridization.

V. Conclusion

Claims that US and European environmental policies are converging or diverging miss the more complex -- and more interesting -- reality. Viewed across strata of policy development and implementation, there are areas of divergence (such as the rhetoric of precaution, the formality of risk assessment, the choice of particular risks to regulate, and the style of legal enforcement), and areas of convergence (such as the substantive criteria for standard setting, the choice of policy instruments, and the hierarchical level of authority). Viewed across the array of risks, both the US and Europe are precautionary about many risks, but they differ on which risks to worry about and regulate most. Contrary to the conventional wisdom, neither Europe nor the US can claim to be categorically more precautionary than the other across the board. The reality is a complex pattern of diverse relative precaution across risks; the interesting question is why different societies are choosing different risks to worry about and regulate most. And the reality is a dynamic pattern of legal hybridization, with interactive exchange of legal concepts occurring continuously. These patterns indicate a process of mutual legal borrowing or hybridization, from which we can learn a great deal, and to which we can contribute -- if we undertake our comparative analyses with seriousness and mutual respect.

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