THE PROBLEM OF POLLUTION HOTSPOTS: POLLUTION MARKETS, COASE, AND COMMON LAW

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INTRODUCTION

Across multiple spheres of environmental policy, the U.S. Environmental Protection Agency (EPA or agency) is presently seeking to replace prescriptive regulatory regimes with ones based on tradable permits.[1] Tradable-permit regimes allocate limited pollution rights to in-

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[1] David M. Driesen, *Trading and Its Limits*, 14 PENN ST. ENVTL. L. REV. 169, 169 (2006) ("These days, the Environmental Protection Agency (EPA) rarely develops any pollution control program without including some form of environmental trading within it."). *See generally* Tom Tietenberg, *Tradable Permits in Principle and Practice*, 14 PENN ST. ENVTL. L. REV. 251, 251 (2006) (commenting on the prominence and diversity of tradable permit

dustrial sources and allow companies to trade in these entitlements. Buyers within such a pollution market may acquire legal rights to emit pollution in excess of the initial allocation by purchasing these rights from other companies who are willing to sell them. In exchange, sellers undertake the obligation to control pollution to a specified degree below their initial entitlement.[2]

The flagship emissions-trading program in the United States is the cap-and-trade system governing sulfur dioxide (SO_2) and nitrogen oxide (NO_2) emissions from power plants under Title IV of the 1990 Clean Air Act Amendments.[3] In March 2005, the agency finalized a rule that added mercury from coal-fired power plants to the list of pollutants subject to the cap-and-trade regime.[4] Mercury is a toxic air pollutant that accumulates in the food chain[5] and is linked to a variety of neurological impairments.[6] Mercury is listed as a hazardous air pollutant (HAP) under section 112 of the Clean Air Act.[7] The EPA's choice to restrict mercury emissions through the cap-and-trade program reversed the agency's earlier commitment to subject these emissions to uniform technology-based standards.[8] Critics of the EPA's new mercury rule have highlighted the potential for dangerous localized concentrations of mercury in the vicinity of power plants that, in lieu of controlling their emissions, opt to purchase permits under the cap-and-trade regime.[9] A

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regimes); NAT'L CTR. FOR ENVTL. ECON. & NAT'L CTR. FOR ENVTL. RESEARCH, EPA, MARKET MECHANISMS AND INCENTIVES: APPLICATIONS TO ENVIRONMENTAL POLICY (2003), *available at* http://yosemite.epa.gov/ee/epa/eerm.nsf/0/6F9B7804FB5058DE85256D5500673C57 (follow "Session I: Water Trading" hyperlink) (reporting on a variety of current and potential applications of tradable permits regimes within the EPA).

[2] EPA, Definition of Tradable Permit, http://iaspub.epa.gov/trs/trs_proc_qry.navigate_term?p_term_cd=TERMDIS&p_term_id=6022 (last visited Nov. 13, 2007).

[3] Clean Air Act Amendments of 1990, Pub. L. No. 101-549, § 106, 104 Stat. 2399, 2584–2626 (codified as amended at 42 U.S.C. §§ 7651–7651o (2000)).

[4] Standards of Performance for New and Existing Stationary Sources: Electric Utility Steam Generating Units, 70 Fed. Reg. 28606 (proposed May 18, 2005) (to be codified at 40 C.F.R. pts. 60, 72, & 75).

[5] EPA's basic information on mercury includes the following statement: "Americans are exposed to methylmercury primarily by eating contaminated fish. Because the developing fetus is the most sensitive to the toxic effects of methylmercury, women of childbearing age are regarded as the population of greatest concern. Children who are exposed to methylmercury before birth may be at increased risk of poor performance on neurobehavioral tasks, such as those measuring attention, fine motor function, language skills, visual-spatial abilities and verbal memory." U.S. Environmental Protection Agency, Clean Air Mercury Rule, http://epa.gov/camr/basic.htm (last visited Nov. 13, 2007).

[6] *See id.*

[7] *See* 42 U.S.C. § 7412(b)(1) (2006) (listing pollutants to be regulated).

[8] *See* Lisa Heinzerling & Rena I. Steinzor, *A Perfect Storm: Mercury and the Bush Administration, Part II*, 34 ENVTL. L. REP 10485, 10488 (detailing the EPA's "about face" regarding the regulation of mercury under section 112).

[9] *See* Nikhil Swaminathan, *Mercury "Hot Spots" Found in North America*, SCIENTIFIC AMERICAN.COM, Jan. 3, 2007, http://www.sciam.com/article.cfm?articleID=EA19F960-E7F2-99DF-32460084B295C9EA.

coalition of states filed suit in the U.S. Court of Appeals for the D.C. Circuit in 2005 to overturn the mercury rules.[10] In exposing the distributive downside of mercury emissions markets, the dispute has cast a pall on the future of a host of other emissions-trading regimes.

Unlike direct regulatory demands for uniform reductions by all pollution sources, emissions trading allows for varied responses by different polluters. Working from a specified aggregate pollution control target, this regime relies on market exchanges to place pollution rights in the hands of companies that face the highest pollution control costs. Discretion regarding the timing, location, and in some cases extent of mitigation remains with regulated entities. As long as the total reduction is achieved, this regime is indifferent to the particular location of cuts or excess emissions.[11] However, it is on account of this very indifference that some commentators and environmental activists have seriously questioned the equity of such market-based regimes.[12]

Central to this critique is the potential contribution of emissions trading to pollution hotspots. By allowing buyers of emission credits to acquire the right to pollute in exchange for surplus reductions taken by sellers elsewhere, pollution markets allow disparate levels of pollution mitigation by differently situated firms. The likely result is greater levels of emissions in the vicinity of credit-buying firms compared to a regime in which all firms are required to control their emissions. The significance of the hotspot phenomenon varies with the nature of the relevant pollution problem. Where the pertinent threat is global—such as greenhouse gas emissions—the location at which reductions take place is of marginal importance.[13] Where emissions are not locally fungible, however, the potential for pollution hotspots transforms emissions trading from a win-win situation into something closer to a zero-sum game.[14]

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[10] New Jersey v. EPA, No. 05-1097 (D.C. Cir. filed Mar. 29, 2005). The 2005 lawsuit was put on hold after the EPA agreed to a formal reconsideration of the rules. In June 2006, the states renewed the lawsuit after the EPA adopted final rules that failed to address their concerns. Press release, Office of the New York State Attorney General, Coalition of 16 States File Lawsuit Challenging Final EPA Rules That Will Perpetuate Dangerous Mercury Hot Spots (June 19, 2006), *available at* http://www.oag.state.ny.us/press/2006/jun/jun19a_06.html.

[11] T.H. TIETENBERG, EMISSIONS TRADING 27 (2d ed. 2006).

[12] *See* David M. Driesen, *Is Emissions Trading an Economic Incentive Program?: Replacing the Command and Control/Economic Incentive Dichotomy*, 55 WASH. & LEE L. REV. 289, 310 (1998); Richard Toshiyuki Drury et al., *Pollution Trading and Environmental Injustice: Los Angeles' Failed Experiment in Air Quality Policy*, 9 DUKE ENVTL. L. AND POL'Y F. 231, 251–58 (1999); Stephen M. Johnson, *Economics v. Equity: Do Market-Based Environmental Reforms Exacerbate Environmental Injustice?*, 56 WASH. & LEE L. REV. 111, 129 (1999).

[13] Driesen, *supra* note 1, at 170-71.

[14] On the centrality of assumptions of fungibility within environmental trading markets, see generally James Salzman & J.B. Ruhl, *Currencies and the Commodification of Environmental Law*, 53 STAN. L. REV. 607 (2000).

This is not to suggest, however, that conventional direct regulation is likely to eliminate variations in levels of pollution concentrations across locales. Emission reductions within such uniform regimes are typically set according to available, or achievable, technological means.[15] Most often, the result is incremental pollution mitigation, leaving sometimes significant residual emissions uncontrolled.[16] This residual pollution is capable of producing significant local impacts, especially in areas where multiple industrial sources exist in close proximity.[17] The difference between the two methods is that under technology standards, the hotspot is an artifact of feasible pollution control technology or locational clustering, while under emissions trading, varying levels of air quality are hardwired into the design of the regulatory instrument. Locally uncontrolled air pollution at a given location is a plausible outcome under emissions trading, in contrast to uniform standards, where, by definition, some control is required everywhere.

Ultimately, it is over the *ideal* of feasible mitigation across *all* sources of pollution that the direct regulation and emissions-trading approaches fundamentally diverge. Under the former approach, sometimes termed command and control, unvarying compliance is expected irrespective of the facility's location or pollution control costs relative to those of similar pollution sources elsewhere.[18] The very quality that direct regulation construes as a virtue—across-the-board implementation of state-of-the-art controls—is targeted by market-based instruments as an inefficient rule in need of relaxation.

Awareness of the "hotspot problem" is evident in the literature on emissions trading since its inception in the 1960s.[19] But attention to the issue increased during the 1990s, together with the emergence of heightened environmental justice concerns.[20] One mode of response to this

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15 *See* Bruce A. Ackerman & Richard B. Stewart, *Reforming Environmental Law*, 37 STAN. L. REV. 1333, 1334-35 (1985); Troyen A. Brennan, *Environmental Torts*, 46 VAND. L. REV. 1, 28 (1993).

16 For a critique of the propensity of technology standards to allow for toxic hotspots, see Brennan, *supra* note 15, at 35. For an argument equating the potential of both emissions trading and Best Available Technology Regimes to create pollution "hotspots," see Ackerman & Stewart, *supra* note 15, at 1350-51.

17 *See* Brennan, *supra* note 15, at 35.

18 Thomas W. Merrill, *Explaining Market Mechanisms*, 2000 U. Ill. L. Rev. 275, 275 (2000) ("Command-and-control regulation refers to a system of pollution control based on uniform standards of performance for sources of pollution. Most typically, regulators adopt standards that specify for a particular category of sources how much of a given pollutant a source is permitted to emit over a given unit of time.").

19 *See* discussion *infra* Part V.

20 The environmental justice movement called attention to the correlation between low socio-demographic status and increased exposure to various forms of environmental risk. *See* U.S. GEN. ACCOUNTING OFFICE, SITING OF HAZARDOUS WASTE LANDFILLS AND THEIR CORRELATION WITH RACIAL AND ECONOMIC STATUS OF SURROUNDING COMMUNITIES 1-2 (1983); COMM'N FOR RACIAL JUSTICE, UNITED CHURCH OF CHRIST, TOXIC WASTES AND RACE IN THE

critique proposed a layer of spatial limitations and/or monitoring and pre-approval requirements as means of alleviating attendant distributional inequities.[21] Technology and ingenuity may one day provide means of mitigating some of the distributive impacts of pollution markets, but the significant complications that any such adjustments entail are liable to undercut the efficiency gains that pollution markets offer in the first place. Steps to mitigate pollution markets' distributional impacts will need to limit the geographic range over which trades of pollutants with local impact are permissible, moving these interventions in the direction of uniform regulation. But such steps will reintroduce the ostensible inefficiencies of uniformity, which were the reason behind the growth in market-based alternatives in the first place.[22]

This article argues that in offering an alternative to uniform regulatory controls, pollution markets align with a defining feature of common law responses to pollution under private and public nuisance doctrines. Historically, the conditions constituting a legally actionable nuisance varied with the socio-demographic characteristics of affected communities.[23] Poor air quality in the vicinity of industrial sources did not necessarily merit regulatory intervention. Rather, plaintiffs' right to a remedy hinged on prevailing land uses and the value of the property in the areas that the pollution impacted. Within this framework, pollution hotspots were an inevitable, and ultimately acceptable, consequence of air pollution regulation under nuisance law. Notwithstanding this systemic preference for varying levels of pollution control, judges needed to justify their refusal to intervene in the face of evident pollution in industrial locales. Frequently cited in this connection is the plaintiffs' failure to prove that the pollution was injurious to health. Absent such proof, the harm associated with pollution assumed an aesthetic, almost trivial,

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UNITED STATES 15–23 (1987). Greater awareness of environmental justice concerns led, in turn, to increased emphasis in the literature of the 1990s on the potential of pollution markets to exacerbate localized pollution concentrations in poor and minority communities. *See* U.S. ENVTL. PROT. AGENCY, ENVIRONMENTAL EQUITY: REDUCING RISK FOR ALL COMMUNITIES 21–25 (1992).

[21] *See* Richard B. Stewart, ENVIRONMENTAL QUALITY AS A NATIONAL GOOD in a Federal State, 1997 U. CHI. LEGAL F. 199, 222 (noting that "[t]he 'hot spot' issue can be addressed . . . by framing the trading entitlement in terms of ambient impacts or other measures of environmental degradation rather than emissions"). Some commentators have proposed a system under which "a prospective buyer and seller would have to receive approval before they could consummate their trade. This approval could be accomplished with a database, accessed through a website administered by the government, which would contain emissions data for all sources in the region. When a proposed trade is submitted for approval, the website would temporarily update its saved data to reflect the change in the geographic distribution of emissions that would result from the proposed trade." Jonathan Remy Nash & Richard L. Revesz, *Markets and Geography: Designing Marketable Permit Schemes to Control Local and Regional Pollutants*, 28 ECOLOGY L. Q. 569, 573 (2001).

[22] *See* discussion *infra* Part V

[23] *See* discussion *infra* Part III.

meaning. The absence of legal obligations on the part of industrial sources to mitigate the emissions was grounded, in turn, in a presumption of local community consent to "trifling inconveniences" of this type.[24]

Dissatisfaction with the common law's response to air pollution, particularly where the property interests of the gentry were at stake, prompted a series of legislative reforms in England beginning with the Alkali Act of 1863.[25] In its emphasis on proactive technological solutions, rather than reactive proof of injury, the Alkali Act resembled continental regulatory approaches that were gaining hold during that time. Variants of technology-based regimes had existed in Prussia at least since 1845.[26] By 1895, German law enabled pollution control authorities to issue technical instructions and to require operators to conform with "*Stand der Technik*" in meeting emission limits.[27] But whereas in Germany technology standards accorded with prevailing regulatory practices and became a standard operating procedure across multiple spheres of environmental law, English technology standards existed in tension with a countervailing policy discourse.[28] The same would remain true in the United States, where technology standards were an important element of the federal environmental regime enacted by Congress during the 1970s.[29]

In stark contrast to the common law's locally differentiated environmental standards, the 1970 Clean Air Act called for nationally uniform air quality standards.[30] Congress's goal in theory, even if not in practice, was equal environmental protection irrespective of socio-economic status or economic conditions.[31] The Act's shift towards greater uniformity, especially its partial reliance on technology standards, soon met with sharp criticism from economists and legal academics, primarily on effi-

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[24] *See* discussion *infra* Part III.

[25] *See* discussion *infra* Part IV.

[26] *See* Albert Weale, *Vorsprung durch Technik?*, *in* THE POLITICS OF GERMAN ENVIRONMENTAL REGULATION 159, 161–62 (Kenneth Dyson ed., 1992).

[27] *See id*

[28] Charles Lees, *Environmental Policy in the United Kingdom and Germany*, 16 GERMAN POL. 164, 167 (2007) (contrasting the German reliance on *a priori* requirements guided by abstract norms of *Stand der Technik* with the English preference for "focusing on specific problems as and when they emerged and/or were identified as such" and tracing this divergence back to the nineteenth century).

[29] *See* Ackerman & Stewart, *supra* note 15, at 1334–35.

[30] 42 U.S.C. § 7409 (2000).

[31] The Clean Air Act's chief architect, Senator Edmund Muskie, proclaimed that the Act "intends that all Americans in all parts of the country shall have clean air to breathe within the 1970s." 116 CONG. REC. 42, 381 (1970). For the argument that where *localized* pollution is concerned, the Clean Air Act did little to alter the preexisting common law regime, see NOGA MORAG-LEVINE, CHASING THE WIND: REGULATING AIR POLLUTION IN THE COMMON LAW STATE 103–42 (2003).

ciency grounds.[32] It was within this context that reformers began to argue for the superiority of market-exchange-based regulatory instruments over "command and control."[33] In the process, they swung the regulatory pendulum back in the direction of the common law.

On their face, pollution markets bear little resemblance to nuisance law's reactive and court-based model of air pollution regulation. For their operation, they depend on an extensive administrative apparatus to set the overall targets, oversee the trades, and ensure compliance.[34] What these markets nonetheless share with the common law is the core concept of a "right to pollute." In rejecting the ideal of uniform pollution reductions in favor of greater flexibility in the location and scope of pollution mitigation, pollution markets are consistent with a central tenet of nuisance law. And as has been the case under common law, the economic gains that this flexibility confers entail a tradeoff: Those in the vicinity of sources who opt to buy pollution credits are generally left worse off than they would have been under regimes that impose more uniform controls. This distinction marks the central divide between the common law and pollution markets, on the one hand, and technology-based environmental standards, on the other.

Common law nuisance cases figured prominently in Ronald Coase's article, *The Problem of Social Cost*.[35] Coase's work is frequently credited, in turn, as the inspiration behind proposals for tradable pollution permits from the late 1960s onward.[36] Unlike Coase, however, neither the economic architects of these proposals, nor their many advo-

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[32] *See* BRUCE ACKERMAN & WILLIAM HASSLER, CLEAN COAL/DIRTY AIR 122–23 (1981); ROBERT CRANDALL, Controlling Industrial Pollution: The Economics and Politics of Clean Air 5–16 (1983); James E. KRIER, *The Irrational* National Air Quality Standards: Macro- and Micro-Mistakes, 22 UCLA L. REV. 323, 324–35 (1974) (arguing that the Clean Air Act's uniform standards are inefficient because they fail to take into account differences in local conditions and preferences); Richard B. Stewart, *Controlling Environmental Risk Through Economic Incentives*, 13 COLUM. J. ENVTL. L. 153, 153 (1988).

[33] *See, e.g.*, Stewart, *supra* note 32, at 153–54.

[34] *See* TERRY L. ANDERSON & DONALD R. LEAL, FREE MARKET ENVIRONMENTALISM 150 (1991) ("Tradeable discharge permits offer an effective way of introducing the discipline of the market into pollution abatement, but they require political control and do not provide for a complete market in pollution."); DAVID M. DRIESEN, THE ECONOMIC DYNAMICS OF ENVIRONMENTAL LAW 59 (2003).

[35] *See* Ronald Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 8–15 (1960).

[36] Works linking the idea of emissions trading with Coase's influence include the following: TIETENBERG, *supra* note 11, at 3; Steve Sorrell & Jim Skea, *Introduction* to EMISSIONS TRADING FOR CLIMATE POLICY 1, 5 (Bernd Hansjürgens ed., 2005) ("The idea of emissions trading can be traced back to Herman Dales (1968), who elaborated the idea on the basis of Ronald Coase's (1960) seminal paper."); Nathaniel O. Keohane, Richard L. Revesz & Robert N. Stavins, *The Choice of Regulatory Instruments in Environmental Policy*, 22 HARV. ENVTL. L. REV. 313, 314 n.3 (1998) ("John Dales initially proposed a system of tradable permits to control pollution. . . However, much of the literature can be traced back to Ronald Coase."). For analysis of the connection between Coase's argument and emissions trading, see *infra* Part II.

cates within the legal academy, have tended to frame their arguments in reference to the common law. Yet the core concept that early writers on emissions trading such as Thomas D. Crocker and J.H. Dales appeared to borrow from Coase—the potential for legally protected rights to pollute and an attendant expectation that levels of pollution control would vary by locale[37]—was the central insight Coase took from the common law. The common law's longstanding preference for locally tailored definitions of the pollution thresholds necessitating legal intervention was consistent with Coase's own policy prescription on the inefficiency of legal rules requiring across-the-board internalization of negative externalities, such as pollution.[38] Coase found evidence of an (implicit) symmetrical construction of the competing rights at play in the common law's propensity to balance opposing economic interests in the course of adjudicating nuisance disputes. On the one hand was the right of property owners to put their resources to productive use even when that use imposed harm on others; on the other was the right of neighboring residents not to be subjected to such harms.[39] Neither right enjoyed *a priori* protection under a common law regime that varied the outcome of pollution and other nuisance disputes in accordance with the circumstances of each case. By highlighting the continuity with common law, Coase was able to show that his argument—while novel in the context of the economic theory of his day—came with a respectable legal pedigree.

Constructions of the harm associated with localized pollution as "aesthetic" in nature played a pivotal role in the justification of the common law's locally differentiated regime.[40] In similar fashion, as the article discusses, Coase restricted his treatment of the harm associated with pollution to instances of injury to property and comfort and did not explicitly acknowledge the implications of a right to pollute for public health. A similar pattern is evident in the rhetoric surrounding the distributive effects of pollution markets. Rarely, if ever, does one find explicit, efficiency-based, justifications for the added risk that such markets may impose on some. Instead, two lines of response predominate. The first, reminiscent of nuisance law, interprets scientific uncertainty on the actual impact of trading as evidence of the absence of health effects.[41]

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[37] *See* discussion *infra* Part V.

[38] *See* discussion *infra* Part II.

[39] *See* discussion *infra* Part II.

[40] *See* discussion *infra* Part III.

[41] A report published by the EPA's Office of Inspector General took issue with the Agency's methodology and conclusions regarding the impact of the Clean Air Mercury Rule on potential hotspots. The Inspector General's report concluded that "[s]everal uncertainties associated with key variables in the analysis could affect the accuracy of the Agency's conclusion that the Clean Air Mercury Rule (CAMR) will not result in 'utility-attributable' hotspots." ENVIRONMENTAL PROTECTION AGENCY OFFICE OF INSPECTOR GENERAL, Report No. 2006-P-00025, MONITORING NEEDED TO ASSESS IMPACT OF EPA'S CLEAN AIR MERCURY RULE ON

The second, as mentioned before, views the hotspot problem as amenable to resolution through proper program design and monitoring. The various proposals currently on the table in this regard are yet to be tested in practice.[42] But the possibility, if only in theory, of a workable solution to the hotspot problem helps to postpone discussion of how, if forced to choose, we ought to balance the competing interests at stake. At issue, in the final analysis, is the state's obligation to protect the neighbors of industrial sources against pollution's harmful effects. The historic fact that the common law has frequently found no such obligation can potentially serve both sides in this debate.[43] Some, following Coase, may find support for the economic and moral logic of different regulatory responses to pollution in the precedent offered by common law. Others will view the neglect of preventable pollution "hotspots" under common law nuisance doctrines—and their contemporary market-based progeny—as their tragic flaw.

The family resemblance between pollution markets and the common law is likewise relevant to current discussions of the fit between environmental trading instruments and regulatory regimes outside of the United States, most importantly in Europe. The enthusiasm with which American policy elites have greeted pollution markets has few parallels elsewhere. Until quite recently, the United States was the only country to implement large scale pollution markets.[44] The European Union's participation in a cap-and-trade regime under the Kyoto Protocol as well as a number of additional emission trading programs marked a notable change in this respect.[45] Notwithstanding, there remains significant re-

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POTENTIAL HOTSPOTS (May 15, 2006), *available at* www.epa.gov/oig/reports/2006/20060515-2006-P-00025.pdf. The EPA Office of Inspector General is an independent office within EPA created by Congress in 1978 for the purpose of auditing EPA's activities and providing semi-annual reports to Congress. EPA, Officer of Inspector General, http://www.epa.gov/oig/about_epa_oig.htm (last visited Nov. 14, 2007).

42 *See* discussion *infra* Part V.

43 *See* discussion *infra* Part III.

44 *See* ENVIRONMENT DIRECTORATE, ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, ECONOMIC INSTRUMENTS FOR POLLUTION CONTROL AND NATURAL RESOURCE MANAGEMENT IN OECD COUNTRIES: A SURVEY 36 (1999).

45 Under the Kyoto protocol the EU has agreed to establish a cap-and-trade system to limit CO_2 emissions from large industrial sources. Known as the European Union Greenhouse Gas Emissions Trading System (EU ETS), this regime came into effect on January 1, 2005. Emission Trading Scheme (EU ETS), http://ec.europa.eu/environment/climat/emission.htm (last visited Nov. 14, 2007). *See also* Sorrell & Skea, *supra* note 36, at 6 (noting that "[b]efore the Kyoto Protocol was signed, Europe had almost no experience of emissions trading. . . . It was the Kyoto Conference which finally brought about a change in instrument choice in some European countries and which led to several programs and pilot studies in emissions trading."). This development is in large part due to the efforts of American officials and scholars who have pushed for the introduction of this market-based instrument into international treaties and domestic legal systems outside of the U.S. *See* Jonathan B. Wiener, *Something Borrowed for Something Blue: Legal Transplants and the Evolution of Global Environmental Law*, 27 ECOLOGY L.Q. 1295, 1312–14 (2001) (discussing the U.S. role in the promotion of

sistance to the implementation of pollution markets in some European Union member states, such as Germany.[46]

The divergence between American and continental attitudes towards pollution markets has predominantly been attributed to broad ideological and cultural differences.[47] The suggested affinity between the common law and tradable permit regimes sheds light on the specific source and meaning of these differences. The resonance of pollution markets with common law principles may well have enhanced their appeal in the United States. At the same time, however, tension between these principles and a countervailing continental regulatory tradition may help explain cross-national differences in the enthusiasm with which the concept of tradable pollution rights was embraced. A number of recent authors have noted a potential incompatibility between emissions trading, on the one hand, and the centrality of technology standards under the contemporary European precautionary and "polluter pays" principles, on the other.[48] This article points to a complementary line of argument on the origin of cross-national differences in this respect by highlighting the continuity between the common law and pollution markets.[49]

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emissions trading during the negotiations leading to the Framework Convention on Climate Change and the Kyoto Protocol).

[46] *See* Lees, *supra* note 28, at 176–77; Bernd Schärer, *Tradable Emission Permits in German Clean Air Policy: Considerations on the Efficiency of Environmental Policy Instruments*, *in* POLLUTION FOR SALE: EMISSIONS TRADING AND JOINT IMPLEMENTATION 141, 141 (Steve Sorrell & Jim Skea eds., 1998) (reporting on the failure in Germany of proposals to introduce economic instruments as a substitute, or supplement, to technology standards. Concerns over the potential of such instruments to create harmful concentrations of pollutants, and the greater stringency (relative to the U.S.) of Germany's pollution control standards are among the reasons cited for the proposals' failure).

[47] *See* Katrina Miriam Wyman, *Why Regulators Turn to Tradable Permits: A Canadian Case Study*, 52 U. Toronto L.J. 419, 420–421 (2002) (reporting on the prevalence of cultural explanations for the skepticism towards pollution markets outside of the United States). Wyman's article, however, posits an economic, rather than cultural, explanation for Canada's slow pace in this respect. *See id.*

[48] *See* Michael Bothe, *Economic Instruments for Environmental Protection: Introduction to the European Experience*, *in* ENVIRONMENTAL JUSTICE AND MARKET MECHANISMS 251, 255 (Klaus Bosselmann & Benjamin J. Richardson eds., 1999) (identifying a potential incompatibility between tradable permits and "technology-related emission standards based on the precautionary principle" as that principle is understood in European Community law); Isabel Rauch, *Developing a German and an International Emissions Trading System—Lessons from U.S Experiences with the Acid Rain Program*, 11 FORDHAM ENVTL. L. REV. 307, 382–84 (2000) (noting that the introduction of emissions trading could lead to a violation of the precautionary principle and, as a consequence, violation of domestic German air pollution legislation). *See generally* Jonathan Remy Nash, *Too Much Market? Conflict Between Tradable Pollution Allowances and the "Polluter Pays" Principle*, 24 HARV. ENVIL. L. REV. 465 (2000) (pointing to a potential conflict between tradable pollution allowances and the "polluter pays" principle).

[49] Additional support for the potential influence of common law principles on a country's receptivity to pollution markets may be found in the leadership role that England has played in the promotion of emissions trading within the European Union. *See* Lees, *supra* note 28, at 174.

Viewed in this fashion, efforts to transplant[50] pollution markets can be seen in reference to a historical dialectic between common law and civil law regulatory instruments.[51] Whereas technology standards entered England and the United States in response to dissatisfaction with the common law's failure to force the implementation of feasible pollution controls, emission trading evolved as a corrective response to the perceived deficiencies of uniform pollution control standards.[52] In sanctioning variation in pollution-reduction levels across sources, this reform effort aligned with the historical treatment of pollution under nuisance law. Thus, recognition of the divergent legal traditions from which technology standards and emissions trading have evolved can enhance our understanding of the origins of cross-national differences and the prospects for convergence in choice between these regulatory instruments.

Part I of this article examines Coase's argument on the proper regulatory response to pollution. The section divides into two subparts. The first focuses on the role of reciprocal constructions of pollution problems in Coase's reframing of such problems in reference to the competing rights of polluters and their neighbors. The second discusses the parallels that Coase identified between his approach and that of nuisance doctrine under common law. Part II offers a brief account of the origins and evolution of the common law doctrines allowing for differentiated levels of pollution reduction in accordance with the circumstances and conditions of the relevant communities. Highlighted in this section is the role of scientific uncertainty over the health effects of pollution in the common law's locality-based distinction between levels of pollution justifying legal intervention. Part III discusses the emergence of uniform, technology-based regimes in response to the perceived failures of the common law from the nineteenth century onward. The deficiencies associated with such uniform regimes generated, in turn, proposals for market-based reforms as Part IV relates. Building on Coase's arguments, advocates of pollution markets offered an alternative to across-the-board mitigation of all pollution sources. But in the face of accumulating evidence on the health effects of pollution, the policy imperative of preventing localized hotspots has become far more evident. As a result, proponents of emissions trading labor under the contradiction between the logic of differentiated responses to pollution, on the one hand, and the commitments of a regulatory regime pledged in principle to the pro-

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50 For analysis of international diffusion of emissions trading through the lens of legal transplantation, see Wiener, *supra* note 45, at 1312–14 (discussing the U.S. role in the promotion of emissions trading during the negotiations leading to the Framework Convention on Climate Change and the Kyoto Protocol).

51 Noga Morag-Levine, *Civil Law, Common Law, and the Administrative State: From Early-Modern England to the Lochner Era*, CONST. COMMENT. (forthcoming 2007).

52 *See* discussion *infra* Parts IV and V.

tection of all citizens everywhere, on the other. Tracing this dilemma to the core assumptions of the common law, Part V argues in conclusion, can better illuminate the tradeoffs inherent to the choice between the competing regulatory paradigms.

I. COASE, POLLUTION RIGHTS AND THE COMMON LAW

The post-World War II era brought increased public concern with air pollution and growing dissatisfaction with the common law's response to the problem, both in England and the United States.[53] The political processes in both countries that would result in comprehensive environmental regulation by the 1970s were already gaining force during the 1950s.[54] Coase's article was conceived against this backdrop.

A. COASE ON POLLUTION AS A RECIPROCAL HARM

Coase's *The Problem of Social Cost* began as follows: "This paper is concerned with those actions of business firms which have harmful effects on others. The standard example is that of a factory the smoke from which has harmful effects on those occupying neighboring properties."[55] Towards the conclusion of the article, he, once again, offered smoke as a paradigmatic illustration of the type of harm at issue.[56] The regulation of pollution, specifically air pollution, was seemingly the problem to which Coase's article spoke most directly, even though it was in reference to the political economy of broadcasting that Coase first developed the central elements of his theory.[57]

In 1959, Coase published an article in which he advocated a market-based alternative to the allocation of broadcasting licenses by the Federal Communications Commission (FCC).[58] Within that context, Coase argued that the scope of government oversight of the distribution of licenses would be greatly reduced with the establishment of property rights in scarce frequencies.[59] A legal system was necessary to define such property rights and arbitrate disputes, but the price mechanism,

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53 *See* discussion *infra* Part IV.

54 For efforts geared at the control of air pollution in the United States during the 1950s, see generally SCOTT HAMILTON DEWEY, DON'T BREATHE THE AIR: AIR POLLUTION AND U.S. ENVIRONMENTAL POLITICS, 1945–1970 (2000); AIR POLLUTION: PROCEEDINGS OF THE UNITED STATES TECHNICAL CONFERENCE ON AIR POLLUTION (Louis C. McCabe eds., 1952). Regarding developments in England during this period, see ERIC ASHBY & MARY ANDERSON, THE POLITICS OF CLEAN AIR 104–30 (1981).

55 Coase, *supra* note 35, at 1.

56 *Id.* at 41–42.

57 *See id* at 1 n.1.

58 R. H. Coase, *The Federal Communications Commission*, 2 J. L. & ECON. 1 (1959) [hereinafter Coase, *The Federal Communications Commission*].

59 *See id* at 14–18.

rather than the FCC, could allocate these rights.[60] Coase anticipated the objection that tradable rights of this type ought not to extend to actions that inflict direct harm on others, such as the right to interfere with the signals of other operators.[61] In response, he offered the 1879 English case of *Sturges* v. *Bridgman* to illustrate the absence of an "analytical difference between the right to use a resource without direct harm to others and the right to conduct operations in such a way as to produce direct harm to others."[62]

At issue in *Sturges* was a dispute between neighbors over noise coming out of a confectioner's kitchen.[63] The plaintiff, a doctor, contended that the noise from the confectioner's machinery interfered with his ability to care for patients.[64] Finding that the doctor had a right to be free of noise that interfered with the practice of his profession, the court granted an injunction.[65] Coase, however, went on to argue that the court, in upholding the doctor's right to practice his profession free of noise, denied the confectioner the right to utilize machinery necessary for the practice of his trade.[66] "In each case something is denied to others: in one case, use of a resource; in the other, use of a mode of operation."[67] Since the infliction of harm as such cannot be avoided, the goal is "to avoid the more serious harm."[68] This outcome, in some instances, may be achieved through negotiation between the parties once property rights are specified. In other instances, government regulation may be a more appropriate instrument.[69]

In his article on the FCC, Coase offered air pollution, where there exist multiple emitters and multiple receptors, as the paradigmatic example of a harm that may not be amenable to a market solution.[70] In the face of such pollution, Coase noted, it may well be preferable for the state to dictate "the location of economic activities, methods of production, and so on."[71] The elimination of air pollution was not, however, the proper goal of such regulation, according to Coase.[72] Instead, the goal

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60 *Id.* at 14. As Coase noted, the idea of using the price mechanism to allocate broadcasting frequencies was advanced earlier by Leo Hetzel. *See* Leo Herzel, *"Public Interest" and the Market in Color Television Regulation*, 18 U. CHI. L. REV. 802, 809 (1951).

61 Coase, *The Federal Communications Commission*, *supra* note 58, at 26.

62 *Id.* (discussing Sturges v. Bridgman, (1879) 11 Ch. D. 852).

63 Sturges v. Bridgman, (1879) 11 Ch. D. 852, 853.

64 *Id.*

65 *See id.* at 857–59.

66 *See* Coase, *The Federal Communications Commission*, *supra* note 58, at 26–27.

67 *Id.* at 26.

68 *Id*

69 *See id* at 29.

70 *See id*

71 *Id*

72 *Id.*

was to "bring about the optimum amount of smoke pollution."[73] This meant, in turn, that "[t]he gains from reducing [smoke pollution] have to be matched with the loss in production due to the restrictions in choice of methods of production, etc."[74] Here as elsewhere, "the solution to be sought is that which would have been achieved if the institution of private property and the pricing mechanism were working well."[75] Whether this solution was the product of actual market transactions or regulatory instruments was of secondary significance for Coase. Moving the problem of pollution to center stage, Coase reiterated the same line of argument in his 1960 article.[76]

Both articles addressed the same core issue: the proper regulatory response to instances where the price mechanism fails to function effectively. In the case of radio transmission, the failure followed from the absence of clearly specified property rights. In the case of pollution and other harms inflicted in the course of economic activity, the ability of producers to pass some of the costs of production to third parties undercut the price mechanism. In *The Problem of Social Cost*, Coase sought to expose what he perceived to be a fundamental error in the prevailing economic theory regarding harmful business activity. Economists, Coase argued, have followed A.C. Pigou in analyzing such harmful effects "in terms of a divergence between the private and social product of the factory."[77] Working within this framework, they have tended to recommend three categories of regulatory responses to harms such as pollution. The first imposed legal liability on the owner of the factory for the damage he caused.[78] The second placed "tax on the factory owner . . . equivalent in money terms to the damage it would cause."[79] The third excluded factories from residential districts and other areas where "the emission of smoke would have harmful effects on others."[80] The denominator linking all three was a demand that industrial sources, irrespective of circumstances, either take precautions not to harm others or pay for any harm they inflict. This result, Coase argued, was based on faulty reasoning because it failed to recognize that the harm in question was reciprocal, rather than unidirectional.[81]

Rather than perceiving a situation in which "A inflicts harm on B" as the conventional wisdom would have it, Coase blamed the unfortunate

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[73] *Id.*
[74] *Id.*
[75] *Id*
[76] *See* Coase, *supra* note 35, at 1.
[77] *Id.* at 1.
[78] *See id*
[79] *Id.*
[80] *Id.* at 2.
[81] *See id.*

proximity between incompatible land uses—rather than the actions of any one side—for the creation of harm.[82] Wandering cattle where there were no farmers and pollution sources devoid of neighbors would not impose a social cost. And because no one party bore responsibility for the harm thus suffered, neither merited *a priori* protection.[83] Framed in this fashion, the pertinent question was not "how should we restrain A from injuring B." Instead, "[t]he real question that has to be decided is: should A be allowed to harm B or should B be allowed to harm A?"[84] Since one or another will inevitably be harmed, "[t]he problem is to avoid the more serious harm."[85]

Avoiding the more serious harm required a shift away from the prevention of externalized harms to the prevention only of those harms that inflict greater losses than benefits. Balancing of this sort is what Coase meant when he called for a regulatory regime focused on "total effect."[86] Properly functioning markets maximized the relevant total effect through free exchange. In the absence of such markets, the role of government was to replicate, as far as possible, the outcome that well-functioning markets would have produced. Coase's frequently cited scenario involving cattle straying onto cropland was designed to show that the results obtained through the market indeed tend to maximize total effect.[87] Under this scenario, ranchers stood in for polluting industries and farmers for these industries' neighbors. Coase's insight was to show that, in the absence of transaction costs, the efficient solution to a dispute between these parties would come through bargaining between them, irrespective of whether the law's initial grant of rights favored the interests of farmers or ranchers. Regardless of the starting legal position, ranchers and farmers, where free to negotiate, would settle on the result that best "maximises the value of production" in the aggregate.[88]

The challenge, hence, was to forge regulatory instruments capable of replicating this outcome in the presence of transaction costs. It was a mistake, however, to deduce, following Pigou, that regulatory intervention was justified wherever economic activity inflicted harm. Rather, the criterion that ought to govern economic policy here, as elsewhere, is a comparison of "the total product yielded by alternative social arrangements."[89] Some business-inflicted harms may justify corrective action

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[82] *Id*

[83] *Id.*

[84] *Id.*

[85] *Id*

[86] *Id.* at 44.

[87] *See id.* at 2–8.

[88] *Id.* at 8.

[89] *Id* at 43. Coase explains in this connection that notwithstanding his reliance on conventional economic terminology on the aggregation of the value of production, "it is, of

under this criterion. In other cases, however, corrective measures "may well produce more harm than the original deficiency."[90] In the latter case, there existed no economic rationale for controlling pollution, irrespective of the availability of feasible means of mitigation. The conclusion cut against prevailing economic prescriptions, but, as Coase went on to show, was compatible with the historical practice under common law.

B. COASE ON THE ECONOMIC LOGIC OF NUISANCE LAW

In the longstanding propensity of common law judges to balance the interests of nuisance plaintiffs and defendants, Coase found evidence that these judges were "aware (as many economists are not) of the reciprocal nature of the problem."[91] Coase acknowledged that the necessity of ruling on liability hindered explicit recognition of this reciprocity under common law.[92] But the tendency of judges to balance the respective economic rights was inconsistent with unidirectional causal constructions.

Coase distinguished in this connection between trends in American and English nuisance doctrines. Quoting Prosser and the Second Restatement on Torts, Coase noted that American writers on the topic engage in explicit comparison between the utility and harm created by a defendant's economic activity in assessing the existence of a nuisance.[93] English writers tend to be less explicit on the subject, but lean in the same direction nonetheless.[94] Moreover, "in the reports of individual cases, it is clear that the judges have had in mind what would be lost as well as what would be gained in deciding whether to grant an injunction or award damages."[95]

As evidence, Coase once again turned to *Sturges* v. *Bridgman*, the doctor/confectioner case that served to illustrate the principle of reciprocal causation in his FCC article.[96] On the face of it, the outcome of the case was consistent with unidirectional constructions of harm, since the

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course, desirable that the choice between different social arrangements for the solution of economic problems should be carried out in broader terms than this and that the total effect of these arrangements in all spheres of life should be taken into account." *Id.* In this fashion, Coase allowed for the inclusion of a host of aesthetic and moral preferences in the aggregation of total effect for the purpose of economic policy.

90 *Id.*

91 *Id.* at 19.

92 *See id.* at 13.

93 Coase offers the following quote from Prosser: "The world must have factories, smelters, oil refineries, noisy machinery and blasting, even at the expense of some inconvenience to those in the vicinity and the plaintiff may be required to accept some not unreasonable discomfort for the general good." *Id.* at 20 (quoting W.L. PROSSER, THE LAW OF TORTS 398–99 (2d ed. 1955)).

94 *See id.*

95 *Id.*

96 *See id.* at 8–9 (discussing Sturges v. Bridgman, (1879) 11 Ch. D. 865).

plaintiff-doctor enjoined the confectioner. But the result, Coase argued elsewhere in the article, was indeed consistent with a reciprocal construction of the harm since the court's reasoning made it clear that the upscale residential nature of the neighborhood in question was highly material to the case's result.[97] The same complaint, if brought in an industrial locale would likely have met with failure since the pertinent economic balance would cut the other way. This followed from the rule that what constituted an actionable nuisance was contingent on time and place:

> [W]hether anything is a nuisance or not is a question to be determined, not merely by an abstract consideration of the thing itself, but in reference to the circumstances; What would be a nuisance in *Belgrave Square* would not necessarily be so in *Bermondsey*; and where a locality is devoted to a particular trade or manufacture carried on by the traders or manufacturers in a particular and established manner not constituting a public nuisance. Judges and juries would be justified in finding, and may be trusted to find, that the trade or manufacture so carried on in that locality is not a private or actionable wrong.[98]

The doctrine encapsulated in this case distinguished between two categories of plaintiffs: the first were located in residential neighborhoods where there was little if any industrial and business activity; the second were in industrial and commercial locales. Whereas the first category of plaintiffs was entitled to protection against harmful effects inflicted by the neighbors in the course of business activity, the second was not. The law's refusal to compensate plaintiffs in industrial locales was justified, in turn, by the latter's voluntary decision to reside within such an area. On this point, Coase quoted *Salmond on the Law of Torts* in support: "He who dislikes the noise of traffic must not set up his abode in the heart of a great city. He who loves peace and quiet must not live in a locality devoted to the business of making boilers or steamships."[99]

Functional distinctions between types of land uses did not exhaust the considerations that courts took into account in the assessment of relevant neighborhood characteristics. Differences in socio-demographic status were likewise incorporated into the analysis as Coase's discussion of *Adams v. Ursell* went on to show.[100] This case concerned odors and other interferences caused by a fried fish shop.[101] The neighborhood in

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97 *See id.* at 19.

98 *Id.* at 21 (quoting Sturges v. Bridgman, (1879) 11 Ch. D. 865).

99 *Id.* (quoting SIR JOHN WILLIAM SALMOND, SALMOND ON THE LAW OF TORTS 182 (London: Sweet & Maxwell, 12th ed., 1957)).

100 *See id.* (discussing Adams v. Ursell, (1913) 1 Ch. 269).

101 Adams v. Ursell, (1913) 1 Ch. 269, 269.

question was predominantly working-class, but the defendant located his shop near houses of "a much better character."[102] The court granted an injunction notwithstanding the defendant's contention that "an injunction would cause great hardship to [him] and to the poor people who get food at his shop."[103] In rejecting the argument, the court explained that "it does not follow that the defendant cannot carry on his business in another more suitable place somewhere in the neighbourhood. It by no means follows that because a fried fish shop is a nuisance in one place it is a nuisance in another."[104] In accordance with this logic, the court granted the injunction but refused to extend it to the entire street as requested.[105] The defendant was thus free to relocate to a less distinguished area of the same neighborhood. The opinion did not address the relevance of the value of affected property to the question of whether fried fish smells amounted to an actionable nuisance. But Coase offered an explanation of his own. The proper place for the store was in proximity to less wealthy residents in the area since they "would no doubt consider the availability of fish-and-chips to out-weigh the pervading odour and 'fog or mist' so graphically described by the plaintiff."[106] The neighborhood's poor residents, in other words, were presumed to consent to interferences of this type whereas the same assumption did not apply to richer folks living in the same area.

Across these and the other cases he discusses, Coase highlighted the contextual nature of common law decision making in disputes of this type.[107] Depending on the characteristics of the location, the costs of mitigation, and other circumstances, common law judges fashioned remedies to pollution and similar interferences on a case-by-case basis. Whereas some plaintiffs were seen deserving of damages or injunctive relief, others exposed to similar harms were not. Unmitigated pollution, noise, or other harmful effects were deemed, in such instances, consistent with common law principles. Coase argued that the common law accorded with economic precepts in this regard.[108] Eschewing uniform demands for across-the-board mitigation of harmful effects such as pollution, the common law hinged its intervention on cost-benefit calculations specifically tailored to the circumstances at hand. Where the pertinent balance favored the status quo, the proper legal response was to

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102 *Id* at 270.

103 *Id.* at 271.

104 *Id.* at 271–72.

105 *See id* at 272.

106 *See* Coase, *supra* note 35, at 22.

107 *See id. passim* (citing numerous cases from both England and America, many of which are discussed at some length).

108 *See id.* at 27–28.

leave things alone. The existence of localized pollution hotspots was intrinsic to this outcome.

The following section provides a brief historical overview of the origins and evolution of common law responses to pollution and similar harms under nuisance law. Consistent with Coase's account, the common law often denied plaintiffs a remedy against industrial pollution, notwithstanding ample evidence of injury to physical wellbeing and/or property. In such cases, it may be said that the law's refusal to intervene implicitly recognized defendants' rights to engage in the activities in question, notwithstanding the consequences suffered by others.

II. THE COMMON LAW'S LOCALITY DOCTRINE: A BRIEF HISTORY

The common law's reliance on community characteristics in differentiating between pollution levels that constitute a nuisance is sometimes known as the locality doctrine.[109] Robert Bone distinguishes between two versions of the doctrine. The first sets "a higher interference threshold for urban than for nonurban areas."[110] The second makes "more refined distinctions among types of neighborhoods within an urban area," parallel to the function that zoning ordinances later came to assume.[111] Writing in reference to dominant jurisprudential trends between 1850 and 1920, Bone notes that courts most often relied on the locality doctrine when deciding not to impose liability.[112] When judges provided normative justification for this action and the plaintiff's subsequent loss, they frequently invoked the utilitarian line of argument reasoning that "residence owners ought to bear a certain amount of interference for the gain in social utility that the interfering uses made possible."[113] As Bone observes, this line of reasoning existed in tension with concurrent conceptions of property rights as both natural and absolute.[114] This conflict accounted in large part for the lack of "internally consistent normative theory" in late nineteenth-century nuisance doctrine.[115] This tension, however, was not novel to the nineteenth century. Early seventeenth-

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109 Robert G. Bone, *Normative Theory and Legal Doctrine in American Nuisance Law: 1850 to 1920*, 59 S. CAL. L. REV. 1101, 1150 (1986).

110 *Id.* at 1151.

111 *Id.* ("Once a particular locality was taken over by interfering uses, a residence-owner remaining in that area was able to obtain relief only against a use that substantially increased the level of interference above that normally prevailing in the area. If an interfering use were to locate in a primarily residential area, however, the use could be enjoined.").

112 *Id.* at 1153.

113 *Id.*

114 *See id.* at 1153–54.

115 *Id* at 1224.

century nuisance cases reveal that courts had struggled with this dilemma at least since then.

A. *SIC UTERE* AND LOCALITY DISTINCTIONS IN THE SEVENTEENTH CENTURY

For centuries, in adjudicating air pollution disputes, common law judges have worked under the guide of a Latin maxim invoked by Lord Coke in *William Aldred's Case*:[116] *sic utere tuo ut alienum non laedas*[117] or "use your own [property] so as not to harm another."[118] The principle behind these words seems unambiguous. Land should not be used so as to inflict injury on one's neighbors. In other words, regardless of the benefit to the landowner or his community at large, the landowner's neighbors have a seemingly absolute right to enjoy their property free from harm by the landowner. Yet, a closer reading of *Aldred's Case* reveals that for Coke, *sic utere* was derivative of the existence of alternative, more appropriate locations for undertaking particular economic activities.

The case concerned a conflict between William Aldred and his pig-farming neighbor, Thomas Benton.[119] The pigs' "fetid and unwholesome stink" moved Aldred to bring suit, alleging that he and his servants could not stay in his house "without danger of infection."[120] A jury found for Aldred and awarded him damages.[121] Benton appealed arguing that "the building of the house for hogs was necessary for the sustenance of man: and one ought not to have so delicate a nose, that he cannot bear the smell of hogs."[122] The judges, however, upheld the jury's award.[123] Lord Coke explained the decision in reference to the *sic utere* maxim.[124] The lesson imputed was that the importance of pig farming did not confer on its practitioners a right to pollute the property of their neighbors. It would be incorrect, however, to read *sic utere* in this context as a cost-oblivious doctrine exclusively committed to the

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116 William Aldred's Case, (1611) 9 Co. Rep. 57b, 77 Eng. Rep. 816 (K.B.). *William Aldred's Case* is Coke's report of the decision rendered in Aldred v. Benton, (1610) 9 Co. Rep. 57.

117 *Id.* at 821.

118 MORAG-LEVINE, *supra* note 31, 39–62. The remainder of this Section draws heavily upon chapter 3.

119 William Aldred's Case, 77 Eng. Rep. 816, 816 (K.B.).

120 Coke's report incorporates the quotation from the lower court's decision in Law French. The English translation of the quoted language is from Aldred v. Benton, (1610), *in* J.H. BAKER & S.F.C. MILSOM, SOURCES OF ENGLISH LEGAL HISTORY: PRIVATE LAW TO 1750, at 599,600 (1986).

121 William Aldred's Case, 77 Eng. Rep. at 817.

122 *Id*

123 *Id*

124 *Id* at 821.

protection of plaintiffs' property rights. Rather than being indifferent to Benton's claim on the necessity of pigs to the "sustenance of man," Lord Coke's opinion seems to find that argument immaterial. The issue was not the need for pigs but the need for a proper location for the pigs. Lord Coke offered two further examples to illustrate this point:

> [T]he building of a lime-kiln is good and profitable; but if it be built so *near* a house, that when it burns the smoke thereof enters into the house, so that none can dwell there, an action lies for it. So if a man has a water-course running in a ditch from the river to his house, for his necessary use; if a glover sets up a lime-pit for calve skins and sheep skins so *near* the said water course that the corruption of the lime-pit has corrupted it, for which cause his tenants leave the said house, an action on the case lies for it.[125]

In other words, Benton was liable for nuisance not because he raised malodorous pigs, but because he did so in an inappropriate locale.

The backdrop to *Aldred's Case* was an era of marked growth in land-use disputes of this type. The sixteenth and seventeenth centuries were a time of increased migration from the countryside to towns and cities.[126] In turn, this influx contributed to the change in land-use patterns within urban centers, marked by greater differentiation among land uses and social classes.[127] The protection that *Aldred's Case* conferred on residential areas accorded with this trend by helping to direct manufacturing and other interfering land uses to the outskirts of towns and cities. At the same time, this doctrine seemed to impose no requirement that pig farmers (or other sources of pollution) take feasible precautions to mitigate their impact when properly located. The connection between the location of sources and applicable control requirements was made perhaps even more evident in *Jones* v. *Powell*,[128] another early air pollution case.

The plaintiff in *Jones v. Powell*, a registrar to the court of the bishop of Gloucester, complained that because of the coal smoke from the defendant's brewhouse, the air in his own house was "corrupted so that he and all the inhabitants of his house [were] deprived of their health and by

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125 *Id.* (emphasis added).

126 PETER CLARK & PAUL SLACK, CRISIS AND ORDER IN ENGLISH TOWNS 1500–1700, at 17 (Peter Clark & Paul Slack eds., 1972) (attributing urban population increase in the sixteenth century to both growth in the indigenous urban population and immigration from the countryside).

127 SYBIL M. JACK, TOWNS IN TUDOR AND STUART BRITAIN 13–18 (1996) (describing changes in the social organization of urban areas between 1500 and 1700).

128 Jones v. Powell, [1628] Palm 536, 81 Eng. Rep. 1208.

the said continual smoking his records and papers [were] putrefied and spoiled."[129] A jury found for the plaintiff.[130] On appeal, the defendant (echoing Benton's argument above) moved that an "action does not lie in general for building a brewhouse, for it is a thing necessary for the common wealth inasmuch as man cannot live without drink."[131] The plaintiff responded that the injury could be avoided through the burning of wood or charcoal, rather than coal.[132] The defendant answered with the argument that "sea-coal is the ordinary fuel of the realm and is necessarily to be used because wood in recent times has become so scarce that there is no sufficient stock of it in the realm."[133]

The backdrop to the case, as hinted by the defendant's argument, was the growing scarcity of wood in the wake of massive logging.[134] An attendant switch to coal aggravated smoke problems in urban centers.[135] The dispute at issue in the case was paradigmatic of a major, and relatively novel, environmental problem in need of regulatory redress. As one of the judges in *Jones* stated, "the chief question in the case seems to be whether the burning of sea-coal causes the action to lie."[136] In formulating the applicable rule, the judges faced a choice between three theoretical alternatives. First, by answering the question in the affirmative, the judges would have imposed an across-the-board liability on all users of coal, encouraging reliance on alternative fuels. Second, by taking the opposite view, the judges would have exempted all coal-burners from liability for the smoke. The third choice would have been to make liability contingent on the characteristics of the neighborhood in question.

The four judges who reviewed the case on appeal divided over the choice between the latter two options.[137] None, however, endorsed the view that coal smoke gave rise to liability in all circumstances.[138] Two of the judges held that there was no action against burning coal. The argument offered was that "this is the common and principal fuel of the realm; and if subjects were to be compelled to brew with any other fuel, then on account of the scarcity and expense thereof no one would do it, and then great prejudice would accrue to the common wealth."[139] The

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129 Jones v. Powell (1629), *in* BAKER & MILSOM, *supra* note 120, at 601,601 (1986). The quotes from Jones v. Powell refer to an English translation of the decision from Law French.

130 *Id.*

131 *Id.*

132 *Id.* at 601–02.

133 *Id.* at 602.

134 BARBARA FREESE, COAL: A HUMAN HISTORY 30 (2003).

135 *Id.* at 34–37.

136 Jones v. Powell (1629), *in* BAKER & MILSOM, *supra* note 120, at 601, 602.

137 *Id.* at 602–05. Presumably because the judges were evenly divided, the jury verdict in favor of the plaintiff was undisturbed.

138 *Id.*

139 *Id.* at 602.

other two judges ruled that the brewery ought to be liable, with one specifically invoking the locality doctrine in support:

> But one may use a trade that is lawful in itself in such a way that it shall be noxious and unlawful. Thus, if a butcher (which is a trade lawful and necessary for the public good) uses his trade in Cheapside, certainly an action lies against him by those who live there. There is a lawful place for such noisome trades, such as the Shambles at Newgate, and therefore not action lies against a butcher who occupies his trade there, since it is a proper place for it.[140]

Consistent with Coase's analysis, properly located noxious businesses—for example, butchers at the Shambles at Newgate—may be said to have possessed, under this doctrine, a right to practice their trade irrespective of associated harms. This right existed, however, in tension with the *sic utere* doctrine's apparently absolutist proscription. In response, common law judges turned to two, often interrelated tools. The first minimized the relevant injury as justification for why it failed to qualify as a legally actionable harm, and the second imputed consent to prevailing conditions in polluted locales by virtue of the decision to reside within them. The foundation for this rhetorical move was already put in place by Coke in *Aldred's Case.*

B. "TRIFLING INCONVENIENCES": AIR POLLUTION, SCIENTIFIC UNCERTAINTY, AND THE CONSTRUCTION OF HARM

Sic utere, Coke was careful to explain, was not a categorical prohibition against any kind of harm brought by interfering land uses. Aldred prevailed *not only* because defendant was located in the wrong place but because his complaint also concerned "matters of necessity," such as "wholesome air."[141] He would, however, have failed had his complaint regarded "matter[s] of delight".[142] Coke's report on the case did not explain why "matter[s] of delight" fell outside *sic utere*'s domain.[143] The implicit rationale, however, seems to hark back to another ancient maxim: *de minimis non curat lex*, or "the law does not concern itself with trifles."[144] The *de minimis* principle is understood conventionally as a barrier against frivolous litigation—an instrument for keeping minor annoyances out of court.[145] But this interpretation overlooks the capacity

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140 *Id* at 603.
141 William Aldred's Case, (1610) 9 Co. Rep. 57b, 77 Eng. Rep. 816, 821 (K.B.).
142 *Id*
143 *Id*
144 BLACK'S LAW DICTIONARY 464 (8th ed. 2004).
145 27A Am. Jur. 2d Equity 118, at 599 (1996).

of *de minimis* to function as an instrument for balancing competing interests. In the absence of a preexisting definition of what constitutes "a trifle," *de minimis* leaves it up to judges to make the call. In the process, the boundaries between objective assessment of the relevant injury and considerations of public policy are easily blurred.[146]

Two and a half centuries after *Aldred's Case*, the House of Lords built on the *de minimis* principle in the landmark case of *St. Helen's* v. *Tipping*.[147] *St. Helen's*, like *Aldred's Case*, concerned air pollution.[148] But whereas the complaint in *Aldred's* was over the smells of a single pigsty,[149] at issue in *St. Helen's* were "noxious vapours" from a large copper smelter, one of a number in that locale.[150] Emissions from copper smelters were a recurrent source of concern throughout the nineteenth century.[151] Complaints associated with such smelters focused on two categories of harm: injury to land as manifested by denuded forests, wilted vegetation, and failed crops; and injury to human health, including both immediate physical discomfort and worry about long-term disease.[152] Tipping, the plaintiff in *St. Helen's*, included both sets of concerns in his complaint in the case.[153] The owner of a 1,300-acre estate outside the industrial town of St. Helens, Tipping blamed the smelter's emissions for direct damage to property in the form of destroyed vegetation and "the very unpleasant nature of the vapour, which . . . affected persons as well as plants in his grounds."[154]

St. Helens was an industrial area and as such, constituted a "proper" location for copper smelting.[155] Notwithstanding this fact, the plaintiff sought relief under the *sic utere* doctrine.[156] Mellor, the trial judge, responded through jury instructions that made recovery for injury from noxious vapours contingent on proof of visible diminishment in "the value of the property and the comfort and enjoyment of it."[157] Under this instruction, Tipping could easily recover for damage to his lands and

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146 As Coke made clear, "matters of delight" was not intended as a synonym for minor concerns. He offered interference with a pleasant view from a dwelling ("prospect" in the language of the case) as the type of harm that would fail to qualify as a "matter of necessity." This, notwithstanding the fact that "it is a great commendation of a house if it has a long and large prospect." *See William Aldred's Case*, 77 Eng. Rep. at 821.

147 St. Helen's Smelting Co. v. Tipping, (1865) 11 Eng. Rep. 1483 (H.L.).

148 *See id.* at 1483.

149 *See William Aldred's Case*, 77 Eng. Rep. at 821.

150 *See St. Helen's Smelting Co.*, 11 Eng. Rep. at 1483.

151 Edmund Newell, *Atmospheric Pollution and the British Copper Industry, 1690–1920*, 38 TECH. & CULTURE 655, 656 (1997).

152 *Id.* at 660–667.

153 *St. Helen's Smelting Co.*, 11 Eng. Rep. at 1483–84.

154 *Id.* at 1484.

155 *See id* at 1497.

156 *See id.*

157 *Id.* at 1484.

vegetation. But Judge Mellor added, paraphrasing the *de minimis* principle, "[t]he law did not regard trifling inconveniences."[158] The inconveniences in question were the amalgam of physical symptoms and health concerns associated with exposure to the pollution, which were deemed trivial in the absence of scientific proof linking such exposure with tangible physical or property injury.

The jury awarded Tipping damages for injury to his estate but not for comfort and enjoyment.[159] On appeal, the House of Lords upheld the award and the jury instructions.[160] Lord Westbury, the Lord Chancellor, distinguished in his opinion between two categories of injury from noxious vapors: the first, where "sensible injury to the value of the property" existed; the second, where it did not.[161] In the first instance plaintiffs could recover, irrespective of the nature of the locale.[162] However, where the alleged injury was to comfort and enjoyment of life, rather than the value of property, the meaning of legal injury varied with the characteristics of the place:

> [W]ith regard to . . . the personal inconvenience and interference with one's enjoyment, one's quiet, one's personal freedom, anything that discomposes or injuriously affects the senses or the nerves, whether that may or may not be denominated a nuisance, must undoubtedly depend greatly on the circumstances of the place where the thing complained of actually occurs. If a man lives in a town, it is necessary that he subject himself to the consequences of those operations of trade which may be carried on in his immediate locality, which are actually necessary for trade and commerce . . . and of the public at large.[163]

Lord Westbury's logic echoed Coke's distinction between "matters of necessity" and "matters of delight." But whereas in *Aldred's Case*, "unwholesome air" associated with pigs' odors qualified as a remediable legal injury,[164] in *St. Helen's*, the denuding of trees for miles around by copper smelting emissions was dismissed as a "trifling inconvenience," simply an aesthetic injury.[165] Having trivialized the relevant injury in this fashion, Lord Westbury offered the following admonition: "Where great

158 *Id.*
159 *Id.*
160 *Id.*
161 *Id.* at 1486.
162 *Id*
163 *Id*
164 *See* William Aldred's Case, (1611) 9 Co. Rep. 57b, 77 Eng. Rep. 816, 821–22 (K.B.).
165 *St. Helen's Smelting Co.*, 11 Eng. Rep. at 1483.

works had been erected, and carried on, persons must not stand on their extreme rights, and bring actions in respect of every matter of annoyance."[166] Within a decade, the Pennsylvania Supreme Court would cite *St. Helen's* on this point in explanation of why smoke and gas generated by a brick manufacturer in the vicinity of Pittsburgh did not constitute a nuisance: "The people who live in such a city or within its sphere of influence do so of choice, and they voluntarily subject themselves to its peculiarities and its discomforts, for the greater benefit they think they derive from their residence or their business there."[167]

Under this framework, the decision to reside in the vicinity of industrial sources suggested acceptance of the environmental conditions characteristic of such areas, and equity concerns were thus inapplicable to pollution concentrations. A bargain was struck implicitly between industrial sources and their neighbors under the view that the area would be polluted and neighbors would receive compensating benefits of cheap housing or easy access to jobs. Pollution under this doctrine was usually presumed to be an aesthetic annoyance rather than a serious health concern. Nuisance plaintiffs repeatedly challenged both the presumption of local consent to pollution exposure and the aesthetically based problem definition.

In nuisance cases spanning the nineteenth and twentieth centuries, plaintiffs and defendants battled over the proper characterization of pollution problems. Plaintiffs testified to a long list of physiological and emotional symptoms such as headaches, sore throats, burning eyes, nausea, and depression as evidence of the immediate impact of pollution on their health.[168] Injury to vegetation and animals was cited as further evidence of potential harmful effects on humans.[169] The burden of proof belonged to the plaintiffs, and they could rarely offer scientific evidence sufficient to establish the requisite causal link between pollution exposure and disease. Absent such proof, clean air was framed as an aesthetic amenity, a luxury of sorts. As such, there was nothing to distinguish variation in air quality from the host of other material inequalities separating poor and wealthy communities. Assumption of consent, therefore, remained a viable justification.

Versailles Borough v. McKeesport Coal & Coke Co., a Pittsburgh County Court decision, vividly demonstrates the import of plaintiffs' failure to meet, well into the twentieth century, evidentiary burdens re-

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166 *Id.*

167 Huckenstine's Appeal, 70 Pa. 102, 107 (1872).

168 MORAG-LEVINE, *supra* note 31, 39–62, 86–102; *see also id* at 124–78 (discussing the complaints put forth in contemporary nuisance disputes involving exposure to industrial pollution).

169 *Id.*

garding the existence of injury to health from pollution.[170] At issue were fumes and smoke from burning piles of coal-mining waste, known as gob, a common byproduct of coal mining until the late 1950s.[171] The suit was brought by the city and borough in which one such mine was located.[172] In an effort to establish that the pollution caused injury to health, the plaintiffs introduced fifty-one witnesses, who collectively spoke of suffering irritated throats, hay fever, asthma, coughs and other symptoms as a result of the fumes.[173] For their part, the defendants produced seventy-one witnesses who insisted that the pollution caused them no ill effects.[174] Measurements of potentially dangerous chemicals showed concentrations significantly lower than those considered harmful to health, and the plaintiffs' case was further weakened by the absence of local doctors willing to testify to the existence of a link between the pollution and disease.[175] The court concluded it had no evidence "to warrant the assumption that the health of anyone is being imperiled"[176] and proceeded to define the pertinent injury in terms of the annoyance posed by "dust," "smoke," and "odors," an annoyance "trivial in comparison to the positive harm and damage that would be done to the community, were the injunction asked for granted."[177]

The opinion left no doubt about the relevance of the plaintiffs' decision to reside in a coal mining area to this result. As the judge explained:

> The plaintiffs are subject to an annoyance. This we accept, but it is an annoyance they have freely assumed. Because they desired and needed a residential proximity to their places of employment, they chose to found their abode here. It is not for them to repine; and it is probable that upon reflection they will, in spite of the annoyance which they suffer, still conclude that, after all, one's bread is more important than landscape or clear skies.[178]

Elsewhere in the opinion the judge summed up the above sentiment in the following phrase: "[o]ne who voluntarily goes to war should not complain about cannon smoke."[179]

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170 Versailles Borough v. McKeesport Coal & Coke Co., 83 PITTSB. LEG. J. 379, 379 (1935).

171 *Id.* at 379–80.

172 *Id* at 379.

173 *Id.* at 379, 383.

174 *Id.*

175 *Id.* at 382.

176 *Id.*

177 *Id.* at 383.

178 *Id.* at 385.

179 *Id* at 384.

Across these and numerous other examples, courts offered plaintiffs in industrial locales little, if any, recourse against pollution.[180] In such instances it may well be said that the common law conferred on industrial sources a right to pollute, to borrow Coase's formulation. Yet the meaning and even existence of that right depended on the absence of clear scientific evidence regarding pollution's health effects. The claim that the right to pollute extended beyond harm to property or comfort, to the infliction sickness or death was not one that judges were willing to make at least not outright.

Apparently the same can be said of Coase, since none of the four air pollution cases mentioned in Coase's 1960 article concerned claims regarding health effects. The first (*Cooke v. Forbes*) involved fumes from a manufacturer of sulphat ammonia that blackened cocoa-nut fibre matting produced by an adjoining company;[181] the second (*Bryant v. Lefever*) involved smoke from a private dwelling;[182] the third (*Bass v. Gregory*) stemmed from a dispute over the smell of a brewery;[183] and the fourth was *Adams v. Ursell*, the earlier-discussed conflict over the odors of a fried fish store.[184] Conspicuously missing from this list was litigation over large scale pollution of significant toxicological concern of the type that was at issue in *St. Helen's* or *Versailles Borrough*. For Coase, as in the common law, notions of reciprocal causation and attendant rights to pollute, or otherwise inflict harm, derived their intuitive appeal from a symmetrical construction of the competing interests at stake. This symmetry was called into question, however, where pollution was defined as a threat to life, rather than property.

The construction of pollution as a harm to property rather than health was thus intrinsic to the right to pollute, which the common law implicitly granted to industrial sources under the locality doctrine. Importantly, this right did not depend on the lack of feasible means of pollution reduction. On the contrary, the common law approach was distinguished by the absence of an across-the-board requirement that pol-

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[180] *See, e.g.*, Tuttle v. Church, 53 F. 422, 426 (C.C.R.I. Cir. 1892); *Bove v. Donner-Hanna Coke Corp.* 258 N.Y.S. 229, 231–32 (N.Y. App. Div. 1932). For a much more recent example of the impact of locale characteristics on nuisance claims, see Wells Mfg. Co v. Pollution Control Bd., 73 Ill. 3d 337, 339–40 (1977). On the barriers that courts put before plaintiffs who challenged pollution in industrial locales in England during the 19th century, see Joel Franklin Brenner, *Nuisance Law and the Industrial Revolution*, 3 J. LEGAL STUD. 403, 414–20 (1974).

[181] Coase, *supra* note 35, at 10 (describing Cooke v. Forbes, (1867) 5 L.R. Eq. 166 (V.C.)).

[182] *Id* at 11 (describing Bryant v. Lefever, (1878) 4 C.P.D. 172).

[183] *Id* at 14 (describing Bass v. Gregory, (1890) 25 Q.B.D. 481).

[184] *Id* at 21 (describing Adams v. Ursell, (1879) 11 Ch.D. 865).

lution sources at all locales invest in pollution control.[185] The burden of proof in each instance fell to the plaintiffs to show that the injury they suffered was sufficient to justify intervention. Absent such proof, industrial sources faced no obligation to reduce their emissions, notwithstanding the availability of economically and technologically feasible controls. That was as true in the case of odors from a fish store, as it was where the pertinent pollution was noxious fumes from smelters, chemical manufacturers, or burning gob piles. As the evidence on the injury that pollution posed to health accumulated, pressures for reform mounted. These efforts promoted requirements for across-the-board implementation of practicable means of pollution control, though with varying degrees of success.

III. REGULATORY TRANSITIONS: TOWARDS ACROSS-THE-BOARD POLLUTION REGULATION

The first legislative reforms directed at air quality improvement were enacted in England in the early decades of the nineteenth century.[186] These efforts initially focused on the abatement of coal smoke.[187] But in 1863, under the aforementioned Alkali Act, the Parliament passed a law restricting hydrochloric acid emissions from alkali works, the first of a long list of noxious vapors that would in time come under the umbrella of the Alkali Act's administrative regime.[188] Passed in response to pressure from affected land owners, the Alkali Act imposed a demand for 95% reduction in hydrochloric acid emissions.[189] Technology capable of achieving this goal at reasonable cost seemingly had existed since the 1830s.[190] But few manufacturers put that technology to use in the absence of legal incentives to do so under the common law.[191] The deployment of that under-utilized pollution control technology was the primary objective, if not the sole purpose, of the 1863 Act.

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185 This is not to suggest the absence of judicial decrees requiring the implementation of available control under nuisance law. From the mid-nineteenth century onward courts, on occasion, found sources liable for pollution, even in industrial areas, and required the implementation of feasible means of control through injunctive relief. Where courts relied on this strategy, they rejected the existence of a right to pollute under the circumstances. The right in question was a right to inflict harm in the course of one's business activity, not withstanding one's ability to avoid that harm through feasible means For a discussion of injunctions geared at the implementation of "Best Available Technology." *See* MORAG-LEVINE, *supra* note 31, at 98–102.

186 PETER BRIMBLECOMBE, THE BIG SMOKE 101-03 (1987).

187 *Id.*

188 ASHBY & ANDERSON, *supra* note 54, at 23.

189 *Id.*

190 *Id* at 20.

191 On some of the difficulties that plaintiffs faced in nuisance suits against Alkali works see the absence of common law incentive. *See* Roy M. MacLeod, *The Alkali Acts Administration, 1863–84: The Emergence of the Civil Scientist*, 9 VICTORIAN STUD. 85, 89 (1965).

Importantly, the Act granted enforcement powers to a specially created centralized Alkali Inspectorate, rather than the courts where enforcement authority traditionally belonged under nuisance law.[192] From this modest beginning, a series of legislative amendments during the late nineteenth and early twentieth centuries extended the Alkali Inspectorate's reach to the control of numerous other gasses and industrial processes.[193] At times, the pertinent legislation imposed specific emission standards on regulated industries.[194] More commonly, the Act conferred on the Inspectorate discretion to determine the "best practicable means" for reducing emissions.[195] Such a formula was chosen over the alternative of the "best known method" with the goal of allowing greater regulatory flexibility and attention to economic, as well as technological, considerations.[196]

The centralization of noxious-vapor regulation within the Alkali Inspectorate had its origins in a larger set of sanitary reforms in England during the mid-nineteenth century. During the 1840s, Edwin Chadwick, a public health reformer, led the efforts to shift primary responsibility for the abatement of sanitary nuisances, such as running sewers and open garbage, from the courts to administrative boards.[197] Where local authorities failed to act, Chadwick sought to transfer responsibility to the central government through the national board of health.[198] The Public Health Act of 1848 marked an important move in this direction.[199] But influential opponents disparaged the centralizing tendencies of the regime that the Act sought to instate as an affront to two key English constitutional principles: absolute local autonomy and regulation through common law.[200] The delegation of enforcement powers to continental-styled "boards and commissions" armed with power of inspection was a chief point of contention.[201] The fact that the national board of health was dissolved by 1854 speaks to the political resonance of this line of argument.[202] The Alkali Act regime that came into being less than a

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192 ASHBY & ANDERSON, *supra* note 54, at 23.

193 *Id.* at 65–66, 78–81, 95–103.

194 MacLoed, *supra* note 191, at 107.

195 *See* ASHBY & ANDERSON, *supra* note 54, at 50.

196 *Id.* at 49.

197 *See generally* M. W. Flinn, *Introduction* to EDWIN CHADWICK, REPORT ON THE SANITARY CONDITION OF THE LABOURING POPULATION OF GREAT BRITAIN 52, 71 (M.W. Flinn ed., 1964).

198 *See id.* at 66–73; JOSEF REDLICH, 1 LOCAL GOVERNMENT IN ENGLAND 138 (1903).

199 The Act established a national board of health with limited supervisory authority over the local boards in whose hands the Act placed primary enforcement powers. REDLICH, *supra* note 195, at 140-44.

200 *Id.* at 145.

201 J. TOULMIN SMITH, LOCAL SELF-GOVERNMENT AND CENTRALIZATION 126 (1851).

202 REDLICH, *supra* note 198, at 147.

decade later likewise faced the challenge of reconciling its centralizing regulatory mission with English localist traditions.[203]

For decades, the leaders of the Alkali Inspectorate battled to expand their jurisdiction against the defenders of local regulation.[204] The Inspectorate's greatest defeat in this respect was its failure to bring coal smoke under its control.[205] Well into the twentieth century, the result was a dual regulatory regime where air pollution was concerned. Many gases and processes were subject to regulation under the Alkali Act. But smoke was subject to local, and generally weak, controls.[206] The Alkali Act's own enforcement policies themselves acquired, in time, a degree of localist sensibility. The Chief Alkali Inspector in 1871 wrote:

> [ ]It would be very unfair[ ] . . . [ ]to make a general law fixing the meaning of a nuisance to be the same in all conditions. Why should a manufacturer established in a desert part of the country be treated like one in a crowded thoroughfare? Or when no one complains, or, rather, when no one is hurt, why should the mere formality of keeping a law be observed?[ ][207]

Under this principle, the Inspectorate came to eschew uniform control requirements in favor of policies that tailored required reductions to the sources' environmental impact.[208] The approach bore resemblance to the common law's locality doctrine even if it did not allow for explicit consideration of socio-demographic factors in the same fashion that the common law did.[209]

English ambivalence over the central government's proper role in the regulation of pollution at the end of the nineteenth century accorded with larger political debates on the constitutionality of governmental interference in market ordering. The common law, on one side in this argument, defined the limits of state authority to intervene in economic relations. Into this debate Pigou's conceptualization of the conditions necessitating governmental intervention introduced a transformative line of argument. Contrary to the assumptions of classical economists, Pigou argued, state interference "with normal economic processes may be expected, not to diminish, but to increase the dividend" under certain con-

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203 ASHBY & ANDERSON, *supra* note 54, at 42.

204 *See id.* at 44–53.

205 *See id.* at 54–64.

206 *Id* at 54–64, 92–103. It was only after the 1952 London Smog episode that Parliament began to regulate coal smoke in earnest. *See id.* at 104–19.

207 Annual Report of the Alkali Inspectorate for 1871, at 5 (1872), *cited in* ASHBY & ANDERSON, *supra* note 54, at 51.

208 ASHBY & ANDERSON, *supra* note 54, at 51–52.

209 *Id.* at 51.

ditions.[210] Divergence between private and net product—private and social cost in contemporary terminology—led to situations where government action could improve upon the performance of the unfettered market. Ordinarily, producers' self-interest led them to restrict industrial production to the level at which marginal costs equaled marginal benefit. This tendency was absent where marginal social cost exceeded marginal private cost, and too much of the good (and too much harm) would be produced. Pigou offered smoke among a list of examples of the type of situations in which social and private net products will tend to diverge.

"[S]moke in large towns," Pigou wrote, "inflicts a heavy uncharged loss on the community, in injury to buildings and vegetables, expenses for washing clothes and cleaning rooms, expenses for the provision of extra artificial light, and in many other ways."[211] Furthermore, Pigou suggested that, "mere ignorance and enertia [sic]," rather than the absence of feasible means of smoke control, were to blame for the smoke's persistence because, "[t]here seems no doubt that, by means of mechanical stokers, hot-air blasts and other arrangements, factory chimneys can be made practically smokeless."[212] Factory owners have little interest in implementing these mechanisms since the benefits from doing so would accrue to others, rather than themselves. Pigou noted in passing, but with seeming approval, that "[n]oxious fumes from alkali works are suppressed by the law more vigorously than smoke."[213] The smoke problem was of marginal interest to Pigou, who devoted a total of one paragraph to it in *The Economics of Welfare*.[214] That, however, sufficed to provide advocates of across-the-board pollution regulation with a powerful economic rationale.

Public concern with air pollution increased in the post-World War II era both in England and the United States. Two severe air pollution episodes contributed to the political salience of air quality problems in both countries: the first took place in Donora, Pennsylvania in 1948, and the second was the London "killer fog."[215] Increased mortality and illnesses in the wake of these episodes offered proof, to those who still needed it, that air pollution endangered health. In 1955, Congress took the first step towards federal regulation of air pollution in the Air Pollution Con-

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210 A.C. PIGOU, THE ECONOMICS OF WELFARE 172 (4th ed. 1962).

211 *See id.* at 184 (construing J.W. GRAHAM, THE DESTRUCTION OF DAYLIGHT (1907)).

212 *Id.* at 184 n.3.

213 *Id.*

214 *Id* at 184.

215 The 1952 London fog was said to have resulted in 4,000 deaths. A U.S. Public Health Service Survey put the Donora episode's toll on life and health at twenty deaths and approximately three thousand severely and moderately affected individuals. CHARLES O. JONES, CLEAN AIR: THE POLICIES AND POLITICS OF POLLUTION CONTROL 27 (1975).

trol Act.[216] By the end of the 1960s, the environmental movement would drastically expand the state's regulatory authority across the Western world. In England and the United States, this transformation cut against the decentralized and reactive presuppositions of a centuries-old common law regime. For opponents of the rapidly expanding administrative state, Coase's *The Problem of Social Cost* would become a foundational document.

IV. THE RIGHT TO POLLUTE AND THE PROBLEM OF HOTSPOTS

The idea of tradable pollution rights was conceived during a time of growing political pressure for the enactment of comprehensive federal environmental legislation in the United States. In works published during the late 1960s, two economists, independently of each other, presented variants of market-based alternatives to direct regulation. In a 1966 article, Thomas D. Crocker envisioned a system whereby an air pollution control authority supplies emission rights that can then be bought and traded among emitters and receptors of pollution.[217] Two years later, J. H. Dales drafted the outline of a market for water pollution rights in a book titled *Pollution, Property and Prices*.[218] Dales specifically acknowledged Coase's influence,[219] however, Crocker's line of reasoning resonated more closely with Coase's.

Similarly to Coase, Crocker insisted that the economic interests of *both* emitters and receptors of pollution must be taken into account in the formulation of pollution control policy.[220] This was because it was a mistake to view air solely in reference to its life- and property-sustaining capacity, as "pure-air advocates" tended to do.[221] What these advocates failed to recognize was that air also served a waste disposal capacity. Policies that allowed polluters to dispose waste into the air free of charge yielded less pollution control than would be economically desirable. Simultaneously, Crocker argued that policies that treated clean air as a free good would lead to excessive levels of pollution control.[222] Crocker stated that the solution was to be found in a regulatory method that

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216 *See* Air Pollution Control Act, Pub. L. No. 84-159, § 1, 69 Stat. 322, 322 (2000).

217 Thomas D. Crocker, *The Structuring of Atmospheric Pollution Control Systems, in* THE ECONOMICS OF AIR POLLUTION 61, 80–84 (Harold Wolozin ed., 1966).

218 J.H. DALES, POLLUTION, PROPERTY AND PRICES, 105 (1968).

219 *Id.* at 111.

220 Crocker, *supra* note 217, at 62–63 ("We are no more justified in making the would-be emitter endure all the costs of 'pure' air while the would-be receptor receives all the benefits than we are in burdening the receptor with all the costs of 'dirty' air while the emitter collects all the benefits.").

221 *Id.* at 62.

222 *See id.*

would "cause the relative value of each dimension to be reflected in the joint production decisions of receptors and emitters."[223] Toward this end, he proposed the use of tradable pollution rights as an alternative to fixed standards.[224] Under this system, emission rights (defined in reference to amount, rate, location, and meteorological conditions) would be made available for purchase to both emitters and receptors on a competitive basis.[225] Although individual receptors would lack incentive to pay for clean air that they could not exclude others from enjoying, this collective-action problem could be overcome through the organization of groups of receptors that are large enough to appropriate the benefits from purchases of emission rights.[226] Crocker assigned the task of delineating the geographical boundaries encompassing discrete receptor groups as well as overseeing cost-sharing arrangements to air pollution control agencies but left the details of such a program to be determined at a later date.[227]

Crocker's scheme implicitly endorsed the existence, and perhaps even the desirability, of local variation in levels of pollution control. Since the price of pollution rights is a function in part of the amount that receptors would be willing to pay for such rights, these rights in poorer areas would likely fetch a lower price than in wealthier locales. As a consequence, polluters would be more inclined to control pollution in affluent areas (rather than buy rights), or to relocate. Crocker highlighted the potential of pollution markets to optimize "*interspatial* allocation of the air's two value dimensions," but did not address any attendant equity concerns.[228] In aiming at interspatial differentiation in levels of pollution, Crocker's model accorded with a key feature of the common law's locality doctrine. Rather than judges and juries, however, it was the "individual preference functions of receptors and emitters" that were expected to determine the spatial allocation of pollution under Crocker's version of tradable rights.[229]

Dales's model of pollution markets differed from that of Crocker in one key respect. Crocker looked to pollution markets to determine the optimal amount of atmospheric pollution. Dales, by contrast, left the determination of relevant environmental goals to political and administrative bodies. The purpose of pollution markets for Dales was not to set the ends of environmental policy, but to allow for efficient implementa-

223 *Id.* at 66.

224 *Id.* at 79.

225 *See id.* at 81.

226 *See id.* at 84.

227 *Id*

228 *Id* at 81 (emphasis added).

229 *Id* at 80.

tion of the policy decided upon.[230] Consequently, under his model, Dales assigned the task of determining applicable environmental quality levels to governing administrative bodies.[231] Within this framework, pollution rights serve to reduce the costs of compliance with this goal, rather than determine levels of pollution. The benefit such a system of pollution rights confers in this context is the flexibility it accords regulated sources. Whereas some firms would find it profitable to treat their wastes, others might opt to purchase rights instead. The total amount of pollution, however, would be the same as that which across-the-board regulation would have produced. Nevertheless, what would vary is the concentration of pollutants in the immediate vicinity of sources that controlled their effluents or purchased rights. Dales did not address the potential contribution of pollution markets to such intra-regional variation. Elsewhere, however, he made clear that intra-regional variation in levels of pollution is often a proper policy objective to be preferred over that of uniform environmental quality standards.[232]

Dales relied in this connection on Ezra J. Mishan, a prominent economist, who argued in a 1967 book in favor of a "separate facilities" approach to environmental problems.[233] Offering the separation of smokers from non-smokers on train cars as an example, Mishan argued for the superiority of policies that allow for diverse environmental conditions across locales over policies that aim to achieve uniform levels of environmental quality.[234] Adopting this principle, Dales argued that in some instances it may be practicable for policy to aim at the provision of "different air and water qualities in different regions."[235] The benefits of this approach lay in its capacity to designate different areas for different uses, such as industrial production and recreation. "[T]here is no necessity for the quality of water at Belleville to be the same as the quality of water along the Toronto beaches. There is every reason, it seems to me, to try to keep it different."[236] One way of securing this type of policy outcome, Dales stated, was through a differential assignment of property

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230 Dales was highly skeptical of the capacity of individuals to properly value the injury suffered from different amounts of pollution. He offered this skepticism in reference to the capacity of cost benefit analysis methods to determine optimum pollution levels. *See* DALES, *supra* note 218, at 42–43. But the discussion suggests that he would have been similarly dubious of reliance on market exchanges to determine air, or water, quality goals. *See id.* By contrast Dales considered economic analysis highly useful in deciding "on the best way of implementing a policy once it has been chosen. The criterion is simply that the best way of implementing a policy is the least costly way, counting all costs." *Id.* at 99.

231 *See id* at 77, 93.

232 *Id.* at 72.

233 Dales relates Mishan's example of the separation of trains into smoking and non-smoking cars as a solution to differing preferences among passengers. *See id.*

234 *See* EZRA MISHAN, THE COSTS OF ECONOMIC GROWTH 80–86 (1967).

235 DALES, *supra* note 218, at 72.

236 *Id.* at 91.

rights. Under that approach, "[i]nstead of giving property rights in water use to polluters *or* fishermen, it may be thought desirable to assign the rights to fishermen in one area and to polluters in another."[237] In this argument, more than anywhere else in Dales's book, Coase's influence seems evident.[238]

The principle that Dales, following Mishan, termed "separate facilities,"[239] was essentially identical to that which the common law pursued under the locality doctrine. Within that context, uncertainty regarding health effects served to justify non-abatement of pollution where judges deemed it to be consistent with the standards of a particular locale.[240] Similarly, Dales highlighted the absence of conclusive evidence that pollution injured health. As he wrote in this connection:

> The health danger resulting from water pollution is minimal, in my opinion. The existing technology of water treatment seems adequate to provide good-quality drinking water from the most polluted of natural waters, and the prohibition of swimming in polluted areas reduces the public health hazard of water-borne disease to small proportions.[241]

Regarding the danger from air pollution, however, Dales showed significant ambivalence. Acknowledging that "[t]here can be little doubt that some types of pollutants, in certain concentrations, are detrimental to health," Dales went on to state that, "[t]he human respiratory system seems able to cope satisfactorily with a great deal of air pollution, and recent studies suggest that it is mainly when the system is burdened with both pollution and smoking that a high risk situation is created."[242] Ultimately, Dales concluded that, "[t]he only wholly tenable argument against pollution at the present time is the aesthetic one."[243] Overall, Dales was vague on the significance of the distinction between health

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237 *Id.* at 73.

238 Coase suggested that courts take the economic consequences of their decisions into account "[e]ven when it is possible to change the legal delimitation of rights through market transactions." Coase, *supra* note 35, at 19. He then went on to argue that courts in fact have tended to recognize "the economic implications of their decisions" and offered the locality doctrine as a prime example. *Id.* at 19. Dales included Coase in a list of three authors whose work on property rights "may yet serve to promote a creative fusion of economics, law, and political science" (the other authors he referenced in this connection were H.S. Gordon and Charles A. Reich). DALES, *supra* note 218, at 110–11. Dales acknowledged the influence of these three authors on this thinking on the interface between pollution and property and the concept of property rights, but was not more specific regarding the nature of Coase's influence. *Id.*

239 DALES, *supra* note 218, at 72.

240 *See* discussion *infra* Part III.

241 DALES, *supra* note 218, at 102.

242 *Id.* at 102–03.

243 *Id.* at 103.

and aesthetics and did not directly link it with the concepts of "separate facilities" or pollution rights.[244] It is instructive, however, that in illustrating the type of pollution problems best suited for the "separate facilities" approach, Dales restricted his examples to ones that pertained to water pollution.[245] In similar fashion, he selected water—rather than air—to introduce the concept of transferable rights to pollute.[246] Finally, the affinity between aesthetic constructions of pollution and separate facilities approaches of the type Dales endorsed may help explain why he chose to treat the causal link between pollution and disease as an open question even as late as 1968.

Within two years the 1970 Clean Air Act advanced a clear-cut mandate for national air quality standards protective of public health.[247] The law conferred a seemingly absolute right to clean air and was incompatible with the type of pollution hotspots implicit to the separate facilities approach.[248] Rights to pollute could find a place in this regime only to the extent that their distributive impact could be neutralized. In a 1972 article, David Montgomery took up this challenge.[249] Montgomery's proposed solution substituted tradable "pollution licenses" for "emission licenses."[250] The difference between the two types of permits is that emission licenses lack sensitivity to the problem of local concentrations, while pollution licenses are calculated in reference to a specified air quality standard to be monitored at various points across an air quality region.[251] Using sulfur oxide emissions as an example, Montgomery claimed to establish "the possibility of achieving environmental goals at a *number* of geographic points while maintaining the advantages of a market system."[252] He concluded that "one important objection to the use of economic incentives, that they could lead to change in the pattern of emissions such that although air quality improvements at one point are achieved, it is at the expense of deteriorating air quality elsewhere, is laid to rest."[253]

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244 Dales introduced the paragraphs dealing with available evidence regarding health effects with the statement linking "[t]he emotional heat generated by popular discussion of pollution" to the suspicion that pollution threatened health. *Id.* at 102.

245 *See id.* at 73, 91.

246 *See id.* at 77–84.

247 *See* David Schoenbrod, *Goals Statutes or Rules Statutes: The Case of the Clean Air Act*, 30 UCLA L. REV. 740, 743, 746 (1983).

248 *Id.* at 743.

249 W. David Montgomery, *Markets in Licenses and Efficient Pollution Control Programs*, 5 J. ECON. THEORY 395, 396 (1972).

250 *Id*

251 *Id*

252 *Id* at 410.

253 *Id*

Montgomery's optimistic assessment proved less sound in practice than in theory. Notwithstanding various attempts to build upon and refine the ambient permit model that he posited as a solution to the hotspot problem, "no single operating air pollution emissions-trading program" had followed that model by 2006.[254] The difficulty stems from the restricted opportunities for trade and added transaction costs that are integral to the imposition of a layer of spatial limitations upon pollution markets. As a result of these concerns, Congress rejected proposals to incorporate geographical restrictions into the SO_2 cap-and-trade program it instituted under the 1990 Clean Air Act.[255] In similar fashion, the South Coast Air Quality Management District (the regional agency in charge of regulating air quality in the Los Angeles Basin) did not restrict the location of nitrogen oxide and sulfur oxide trades in pollution rights under the Regional Clean Air Incentive Market (RECLAIM) program instituted in 1992.[256] The current controversy over mercury trades similarly attests to the intractability of the conflict between pollution rights and the desirability of reducing emissions everywhere.

CONCLUSION

The goal of reducing pollution everywhere should not be confused with the goal of equalizing the levels of pollution across all locales. Geographical variation in environmental quality is an unavoidable product of concentrations of economic activity, irrespective of the choice of regulatory instrument. The policy question at hand is not whether variations in environmental quality are desirable; they are. Instead, the question is whether a pollution regime should aim at variations in environmental *control*. Should residents in more industrial areas or in areas where pollution is more expensive to clean up, nonetheless benefit from the incremental reductions that available technology can offer? Or alternatively, should law and policy accept uncontrolled pollution in some areas in exchange for compensating reductions elsewhere?

Technology standards' answer to these questions are that feasible reductions in levels of pollution across all sources—with the benefits that mitigation confers on neighbors of industrial concentrations—is desirable. As their critics have often noted, the result can be both overregulation (where mitigation exceeds what would be necessary to protect public health) and insufficient regulation (where the standards are insufficient to protect against health effects).[257] In the latter case, technology standards

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254 TIETENBERG, *supra* note 11, at 75.

255 Nash & Revesz, *supra* note 21, at 587.

256 Drury et al., *supra* note 12, at 256.

257 Richard H. Pildes & Cass R. Sunstein, *Reinventing the Regulatory State*, 62 U. Chi. L. Rev. 1, 97 (1995).

may well leave in place dangerous levels of localized pollution.[258] However, this pollution would be residual to the implementation of feasible pollution controls, not the result of a license to avoid the implementation of feasible mitigation in the first place. Pollution markets grant just such a license because they are capable of leaving some concentrations entirely uncontrolled, an outcome impossible by definition under uniform standards.

The common law's locality doctrine often denied those living in industrial sources the incremental improvement that available pollution control technology would have yielded. The perceived deficiencies of that system propelled the emergence of centralized administrative regimes and the attendant deployment of technology standards. In turn, critics pushed for market-based alternatives to regulatory demands for pollution reduction across *all* sources. Under one version, pollution markets are the innovation of late twentieth-century economists, reacting to an overly rigid environmental regime. The history described here suggests a longer pedigree. Over several centuries, English and American pollution control policy was characterized by a back-and-forth swing between two regulatory paradigms: one tolerant of variations in levels of control as it geared at regulation tailored to the circumstances of differing pollution sources and locales; and the other committed to feasible mitigation of pollution across all sources.

Uncertainty regarding the health effects of air pollution helped to legitimize the common law's locality-based distinctions. As the evidence regarding the existence of such health effects mounted, the countervailing paradigm gained ground. Pigovian constructions of unregulated pollution as a market failure reinforced this trend. In response, Coase disputed the existence of an efficiency-based rationale for the internalization of pollution and other social costs—invoking the common law in support.

He offered no guidance, besides reciprocal causation, on the ethical dilemmas at stake. The imperative of addressing objections to pollution markets based in local pollution effects was recognized by these markets' advocates from the start. Tracing emissions trading to its common law roots underscores the tradeoffs that this policy approach entails. The question on the table today—as it was during the nineteenth century—revolves around the benefits and drawbacks of regulatory regimes that insist that neighbors of pollution sources across all facilities and locales benefit from the deployment of feasible means of mitigation.

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[258] In such instances additional, risk-based standards may impose further pollution abatement measures beyond those that applicable technology standards would dictate.