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ARTICLE

The Other Container Revolution: How Businesses Influenced Environmental Politics and Thus the Recycling of Beverage Containers

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This paper demonstrates tensions between national environmental policies and international free trade rules and traces business reactions to environmentalism through a study of the Can War, a controversy over a Danish ban on beverage cans from 1970 to 2002. At its core was a conflict between Denmark and the European Economic Community (EEC, later the European Union, EU) over free trade versus environmental objectives. This study of the Can War demonstrates how environmental concerns were entangled with national and economic interests, but also how brewers, retailers, and packaging producers used environmental and economic arguments in pragmatic ways and adapted to changing political and economic environments. Thus, the paper adds to the literature on the formative years of environmental politics, with a focus on business interests and a conflict between a nation-state and the EEC in a period when environmental concerns gained political momentum yet remained contested in a system based on free trade. This study also adds to the literature on waste-handling by demonstrating how the Danish return system changed from one based on reuse to one based on recycling; it further shows how beverage cans went from banned to uncontested, everyday objects. Through a comparison with Sweden, the case shows how national businesses influenced the design of new deposit and return systems for single-use packaging, wherein refillable glass bottles became marginalized. Overall, the study offers an understanding of the intricate relationships between environmental policies, business interests, consumer habits, and competing container materials, with aluminum as the winner.

Keywords: recycling; environmental policy; waste management; European Economic Community (EEC)

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The distribution of goods, both locally and globally, is a fundamental aspect of contemporary everyday life that has changed profoundly during the last century, with significant environmental consequences. Packaging history is an important part of this change for retail organization and the environmental impact of consumption. Thus, single-use metal cans for beverages were central to early debates on waste, recycling, and limits to growth, and they were seen as both convenient for consumers and as a symbol of littering and disposable living. This paper explores what has been termed "the other container revolution"[1] by examining the history of the Danish recycling system for beverage containers. It emphasizes how this large technological system developed in a melting pot of different business interests, shaped by a debate about European free trade versus environmental concerns, as well as by existing infrastructures and the properties of different materials. The paper focuses on the period from 1970 to 2002, when the Danish return system changed from one based on the reuse of refillable glass bottles to recycling. In the latter system, container materials are melted and processed before being recycled back into the value chain, often at a lower quality. A key event was the Can War, a prolonged political conflict with the European Economic Community (EEC), which later became the European Union (EU), over a Danish ban on metal cans for beverages.

The paper contributes to the historical literature on the impact of business on environmental politics in three distinct ways. First, it adds an underexplored geography, focusing on the relationship between a nation-state and the EEC/EU during the decades when environmental concerns gained political momentum yet remained contested in a system based on free trade. Thus, it provides insights into the formative years of environmental politics and the challenges of balancing economic and environmental goals. In particular, it offers insights into how those goals were enmeshed with balancing European and national interests that were strongly influenced by the composition of national industries, as brewers were an important factor in Denmark. Second, the paper highlights differences between business interests within and across trades. Rather than a simple narrative of lobbyism and the protection of home industries, the Can War illustrates shifting and competing business interests and a predominantly pragmatic approach to environmentalism in a debate that shifted from being concerned with littering to a question of broader environmental concerns. However, economic arguments were always primary. Third, the paper supplements the history of business interests by emphasizing the importance of material factors, especially container material properties. In this way, it demonstrates how a textbook perception of aluminum as merely a chemical element overlooks how the material coevolved with the modern world to suit many purposes. Instead, aluminum must be viewed as a complex network of actors and connections.[2] Overall, the paper defamiliarizes the aluminum can and its role in the Danish recycling system by illustrating how it became perceived as normal despite previous opposition and a very different trajectory to the market than in other countries.[3]

1. Friedel, "American Bottles," 523.
2. Sheller, *Aluminum Dreams.*
3. Cf. Liboiron and Lepawsky, *Discard Studies.*

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The paper first introduces the literature on businesses' influence on environmental politics. Then, the historical case is presented with a focus on the arguments in the Can War, and it concludes by declaring aluminum the winner.

Businesses' Influence on Environmental Politics

Studying the International Chamber of Commerce, Ann-Kristin Bergquist and Thomas David have identified a profound transformation of global environmental governance during the 1970s and 1980s. They have argued for a better understanding of the role of business interests in the decades leading up to the Rio Conference in 1992,[4] a period in which the EEC developed an environmental policy.[5] Thus, these scholars, among others, have called for more research on the role of businesses in shaping international environmental governance before sustainability became a buzzword and before corporate strategy scholars began advocating for a positive role for business.[6] As studies of corporate environmentalism have shown, there was a shift from a predominantly negative view of business in publications such as *Limits to Growth* (1972) to a more positive view in *Our Common Future* (1987), the United Nations (UN) report that popularized the concept of sustainability.[7] The shift was followed by the development of international environmental management standards and triple bottom line ideas.[8]

Despite such developments, for a long period, there was only limited contact between business historians and environmental historians. When scholars did study the influence of business on environmental politics, they mainly focused on large multinationals or American companies, portraying a rather unified opposition to environmentalism.[9] For example, Alex Boynton has shown how opposition to environmentalism unified American conservatives in

4. Bergquist and David, "Beyond Limits to Growth."

5. Meyer, "The European Parliament and the Origins of Environmental Policy"; Jordan, *Environmental Policy in the European Union*.

6. Bergquist and David, "Beyond Limits to Growth"; Huf, Sluga, and Selchow, "Business and the Planetary History of International Environmental Governance in the 1970s."

7. Meadows et al., *The Limits to Growth*; World Commission on Environment and Development, *Our Common Future*. For developments in corporate environmentalism, see Hoffman, *From Heresy to Dogma*; Hoffman and Bansal, *Retrospective, Perspective, and Prospective*; Banerjee, "Corporate Environmentalism"; Banerjee, "Corporate Social Responsibility." It was, of course, not a unified change. In *The Wealth of Nature* (a reference to Adam Smith's *The Wealth of Nations*), Donald Worster is critical of the concept of sustainability because it muddles the waters compared with the limits to growth discourse. He discusses "lots of lobbyists coming together, lots of blurring going on." As a slogan, sustainability was "sacrificing real substance." He preferred to describe ethics and aesthetics rather than resources and economics, and in Smith's work, the only mention of nature he found was as a servant in the hunt for wealth. Unimproved nature was simply unworthy of interest (Worster, *The Wealth of Nature, 216*).

8. Murphy and Yates, *The International Organization for Standardization (ISO)*; Elkington, "Accounting for the Triple Bottom Line"; Elkington, *Cannibals with Forks*.

9. Berghoff, "Shades of Green"; Bergquist and Söderholm, "Business and Green Knowledge Production in Sweden 1960s-1980s." For more on business history's interest in the environment, see Rosen and Sellers, "The Nature of the Firm: Towards an Ecocultural History of Business"; Berghoff and Rome, *Green Capitalism?*

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the 1970s;[10] Naomi Oreskes's work on denying climate change has gained wide recognition;[11] and, more recently, Robert Brulle and Christian Downie have highlighted US trade associations as significant opponents of climate policies.[12] Others have explored the connection between anti-environmentalist movements and neoliberal free market ideologies.[13]

In her study of canned food, Anna Zeide has focused on consumer confidence rather than environmentalism,[14] and regarding the role of packaging in corporate environmentalism, few business historians studying individual companies have addressed the subject. In his history of Unilever, Geoffrey Jones briefly mentions the company's response to rising concerns in the 1960s over the environmental impact of packaging,[15] while Bartow J. Elmore was more thorough and critical in his study of Coca-Cola. He found that the soft drink producers switched from a system based on returnable glass bottles to throwaway containers in the 1960s due to profit motives. According to Elmore, the steel can was a "lightweight packaging [that] offered the corporate office a powerful weapon in its intracompany war with local bottlers." It allowed Coca-Cola to eliminate hundreds of distributors, thus achieving business goals at the expense of environmental problems and increased public waste management costs.[16]

Disposable containers generally gained prominence in the United States (US) over returnable ones, with few exceptions, such as the bottle-deposit legislation pioneered in Oregon in 1972. Some have emphasized convenience arguments, while for others, like Elmore, the change was mainly connected to the centralization of the beer and soft drink industries. Regardless, aluminum cans accounted for approximately ninety-seven percent of all beer and soft drinks in 1990. This did not mean that an effective recycling system was developed. The US return rate peaked in 1992, with around two-thirds of the aluminum cans collected for recycling, but the rate dropped to around half in 2018.[17] In Denmark, the 2018 return rate was eighty-nine percent and rising.[18]

This difference points to the importance of research covering a broader geography, and in the last decade, researchers have unpacked more nuanced responses to environmentalism.[19] Studying Sweden, Ann-Kristin Bergquist and Kristina Söderholm, for example, have found

10. Boynton, "Confronting the Environmental Crisis?"

11. Oreskes and Conway, *Merchants of Doubt.*

12. Brulle and Downie, "Following the Money." An example of a broader study emphasizing a negative relationship between capitalism and the environment and pointing to powerful factors that slow or block corporative environmental progress is Stoll, *Profit.*

13. Olsen and Andersen, "Shielding the Market from the Masses"; Ciplet and Roberts, "Climate Change and the Transition to Neoliberal Environmental Governance."

14. Zeide, *Canned.*

15. Jones, *Renewing Unilever. Transformation and Tradition*, 340.

16. Elmore, *Citizen Coke*; Elmore, "The American Beverage Industry and the Development of Curbside Recycling Programs, 1950–2000," quotation at pp. 229–230.

17. Simmons, "Aluminum Beverage Can"; MacBride, *Recycling Reconsidered*; Pollock, *Mining Urban Wastes*; Fraundorf, "The Social Costs of Packaging Competition in the Beer and Soft Drink Industries"; Jørgensen, *Recycling*; Petroski, *The Evolution of Useful Things*; Friedel, "American Bottles."

18. Platt and Row, "Reduce, Reuse, Refill!"; Dansk Retursystem A/S, "20 Years of Producer Responsibility across Sectors."

19. E.g., Jones and Lubinski, "Making 'Green Giants'"; Skyggebjerg, "Knowledge Making and Corporate Environmentalism from the Perspective of the Egg Tray."

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major variations between individuals, companies, and sectors in their reaction to environmentalism.[20] In another study, Bergquist, Magnus Lindmark, and Nadezda Petrusenko have found that Swedish recycling policies, in opposition to what this paper shows for Denmark, never presented controversy and instead developed in a dynamic interplay between scrap firms, manufacturing companies, and municipalities with government regulation as a driver. They have called for historical research to explore why the level of material recirculation differs between countries.[21]

This study of the Can War offers a historical explanation of the high Danish return rate and contributes to a broader geography by focusing on the clash between national and European interests and legal frameworks during the formative years of environmental politics. Additionally, the study adds to research emphasizing the polyphony of voices within and between trades. Robert Friedel has criticized Elmore for oversimplifying the role of large businesses. In his study of the American beverage container system, Friedel highlights a plurality of actors, conflicting concerns, a mix of motives and agendas, and uncertainty about outcomes. He points to the rise of self-service supermarkets and chain stores as changes that favored single-use packaging, as they "sought to avoid the labor, space, and administrative costs of refillables." Friedel interprets the shift to single-use containers as "a confluence of changing retail practices, promotions by materials and container manufacturers, and the construction of new ideas about so-called convenience among consumers." He contrasts this with "those who see the triumph of nonreturnables as the product simply of new technologies or the choices of large corporations."

The last sentence could be read as a critique of Elmore's emphasis on the interests of Coca-Cola and perhaps of Finn Arne Jørgensen, who centers the reverse vending machines produced at the Norwegian company Tomra in his study of beverage container recycling systems. According to Friedel, technology was relevant but not determinative.[22] However, Jørgensen convincingly shows the importance of technology when he notes that the reverse vending machines, despite their persuasive anonymity, were not merely simple technologies in grocery stores; rather, they were the front end of a large technological system that shaped the actions of billions of consumers.[23] In the same vein, Elizabeth Shove has shown that even a dustbin can be "a mediator of changing waste practices."[24] Furthermore, in the Can War, the reverse vending machines proved to be among the ordinary objects that Shove has deemed "extraordinarily important in sustaining and transforming the details and design of everyday life."[25] They became pivotal for changes in the Danish recycling system, enabling a return system with various types of beverage containers instead of a few standard bottles.

20. Bergquist and Söderholm, "Business and Green Knowledge Production in Sweden 1960s–1980s."

21. Bergquist, Lindmark, and Petrusenko, "Creating Value Out of Waste"; see also Stokes, Köster, and Sambrook, *The Business of Waste*; Denton and Weber, "Rethinking Waste within Business History."

22. Friedel, "American Bottles," quotations at pp. 522, 505; Jørgensen, *Making a Green Machine.*

23. Jørgensen, *Making a Green Machine.*

24. Chappells and Shove, "The Dustbin." For more on the development of recycling systems for household waste, see Köster, "Private Companies and the Recycling of Household Waste in West Germany, 1965–1990." For a history of American recycling, see Strasser, *Waste and Want.*

25. Shove, *The Design of Everyday Life*, 2.

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The above-mentioned authors all provide insightful and complex stories of recycling systems, with Friedel and Elmore focusing on the United States and Jørgensen on Norway. However, as the exceptional case with a can ban in action for decades, Denmark offers insight into a different political landscape and other possible choices with historical roots and long-term consequences. It offers particular insights into how recycling and, more broadly, environmentalism became a battleground in the EU system.

Case Presentation: The Can War

The historical case study of the Can War is based on sources from the Ministry of the Environment archives at the Danish National Archives, newspapers, parliamentary proceedings, and online EEC/EU material. It is not based on company archives, and thus it cannot cover how the companies involved argued internally and calculated the economics. It is a study of arguments used in public and correspondence with public authorities.

Although based on texts and focused on business interests, the study aims to take materials seriously, and thus, the case presentation begins with aluminum. Timothy LeCain has called modern humans a metallic species,[26] and aluminum was increasingly used during the twentieth century for construction, transportation, and packaging.[27] Thus, it went from being an undiscovered chemical element in the Earth's crust two centuries ago to becoming central to modern life. In nature, aluminum does not exist in pure form, but in 1825, H.C. Ørsted presented the first lump of slightly impure aluminum. In 1855, the material was showcased as a new wonder material at the world exhibition, but it remained too expensive for common use prior to the development of new production methods. Thereafter, it evolved from a material used for jewelry into one that was useful for single-use packaging.[28]

Steel beverage cans were marketed in the 1930s, while aluminum cans were introduced in Hawaii in 1958. Two years later, the first steel can with an aluminum lid was advertised as a soft-top container that was easy to open. In the United States, aluminum cans replaced steel cans for beer in the late 1960s, and generally, aluminum became a significant part of the waste stream, with its reputation connected to trash and littering.[29] Thus, by the beginning of the 1970s, the aluminum industry began to consider recycling essential for the long-term acceptance of cans and started feeding the debate about littering, shifting the responsibility for pollution to the consumer. In this way, used beverage containers became a vehicle for promoting recycling efforts.[30] Still, despite the recyclability of aluminum cans, the activist Annie Leonard has called their use absurd. In 2010, she suggested using the aluminum in circulation as cans for better purposes, for example, to replace some steel in transportation to reduce

26. LeCain, *The Matter of History.*
27. Government of Canada, "Aluminum Facts."
28. Christensen, *Naturens Tankelæser*; Skyggebjerg, "Aluminium – et Moderne Vidunder?"
29. Johnstone, "Centenary Review Beer Packaging in Can"; Hosford and Duncan, "The Aluminum Beverage Can"; Busch, "An Introduction to the Tin Can"; Priest and Stewart, *Handbook of Brewing*; Zimring, *Aluminum Upcycled.*
30. Petroski, *The Evolution of Useful Things*; Leonard, *The Story of Stuff*; Sheller, *Aluminum Dreams.*

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carbon emissions by lightening vehicles.[31] However, compared with plastic, another modern and environmentally problematic material used for single-use beverage containers, aluminum has been less debated.

This paper focuses on the aluminum can and not its plastic competitor, despite the latter's importance for environmental issues, because polyethylene terephthalate (PET) bottles were not prevalent in the can-ban debate. As beverage containers, they were simply not a serious competitor to glass bottles and metal cans before the 1980s, and even then, they were mostly used for soft drinks. In the Danish Environment Ministry, PET bottles were discussed starting around 1983.[32]

The 1970s Can Discussion

In Denmark, the major brewery Carlsberg experimented with steel cans starting in 1936 but stopped due to World War II. When the brewery began producing canned beer in 1954, it was only for export.[33] Instead, the small, provincial brewery Faxe, a nonmember of the Danish Brewers' Association, which Carlsberg dominated, introduced steel cans to the home market in 1970. At the time, Denmark had a well-functioning return system for refillable glass bottles; it was based on a standard beer bottle developed around 1890 and redesigned in 1949, and a deposit system that the brewers had introduced in 1942. In 1976, Faxe also disrupted the system by introducing a special glass bottle, and more special bottles followed, causing sorting problems that displeased retailers. However, in 1983, standard beer bottles produced at the Danish glasswork Holmegaard accounted for ninety-six percent of the Danish market for beer containers.[34] This situation was very different from the United States, where canned beer had surpassed the sale of beer in glass bottles by the end of the 1960s, and beer in returnable bottles mostly went to restaurants.[35]

A 1974 flow chart similar to the one in Figure 1 describes how the Danish deposit and return system worked. When customers returned empty bottles, in almost half of the shops, they simply reported the number of bottles to receive their deposit back. In the remaining shops, employees were involved in the counting. Brewers picked up the empty bottles from the

31. Leonard, *The Story of Stuff*.

32. "Journalsager 1981–1989: 813 16, box 2524–2529, Miljøministeriet, National Archives" For more on PET bottles, see Hawkins, Potter, and Race, *Plastic Water*. Danish brewers introduced a plastic beer bottle in 1999, and it was a fiasco (Nielsen, Mads Munch, "Ølemballage: 6 Ting, Der Er Værd at Vide." *Samvirke*, September 23, 2015.) One of its disadvantages was the sound it made when touching glasses.

33. Antonsen et al., *Bryggerne Og de Tre Store Udfordringer*. At the time, beer was infrequently transported between the European countries. In 1985, the Danish Environmental Protection Agency could point to the insignificance of beer imports in the EEC member states (four percent on average in 1983 but only 0.01 percent of the consumption in Denmark), but also to how transport costs were essential for the intra-Community trade. They had calculated that it cost almost three times as much to transport a refillable glass bottle from London or Rome to Denmark than to transport a can of steel or aluminum. It was a matter of both weight and how tightly the different containers could be packed. "Journalsager 1981–1989: 813 16, box 2524, Miljøministeriet, National Archives."

34. Skyggebjerg, "Aluminium – et Moderne Vidunder?"; Dansk Retursystem A/S, "20 Years of Producer Responsibility across Sectors"; Schlüter, *Danske Flasker*.

35. Fraundorf, "The Social Costs of Packaging Competition in the Beer and Soft Drink Industries"; Organisation for Economic Co-operation and Development, *Beverage Containers*; Priest and Stewart, *Handbook of Brewing*.

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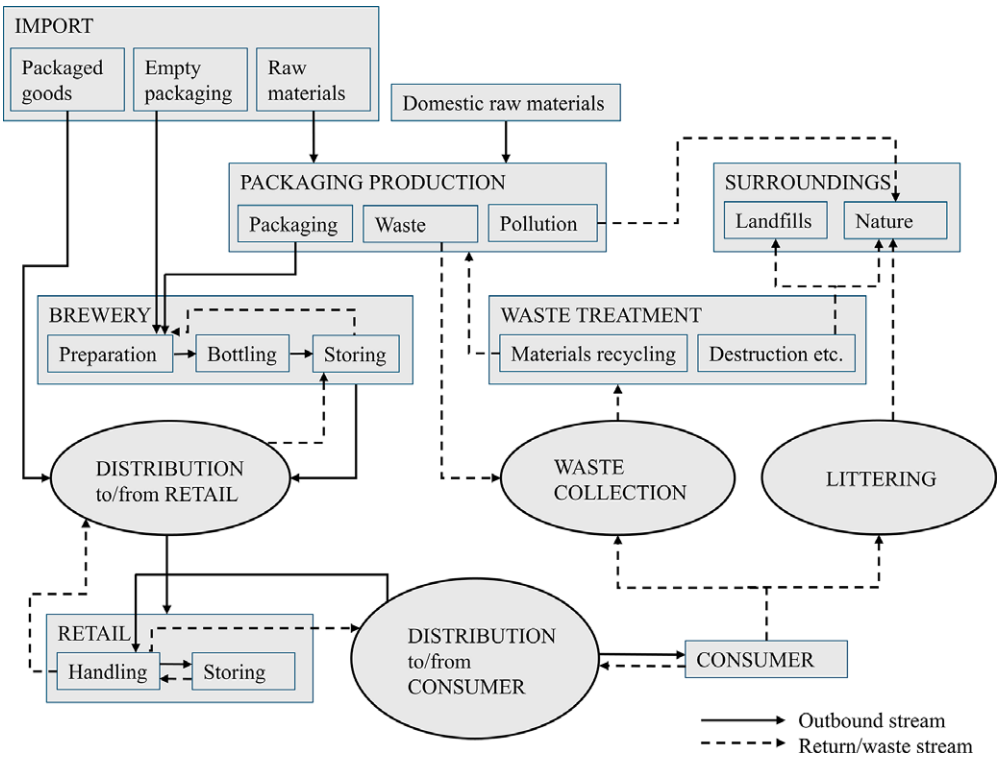

Figure 1. The Danish production and return system for beverage containers (glass bottles) in the early 1970s.

Source: Rasmussen et al.," Rapport over det indenlandske kredsløb for øl-og mineralvandsemballage."

retailers, transporting them back to the breweries to be cleaned and reused. The retailers paid a deposit to the brewers, but according to a small survey, one in ten retailers did not ask customers for a deposit, and one in ten only demanded a deposit from customers who were unknown to them.[36]

When Faxe introduced beer cans in 1970, a litter debate had gained momentum, and the same year, Coca-Cola was forced to stop using a single-use glass bottle in Denmark. This was because retailers had promised authorities that they would forgo single-use glass bottles in return for avoiding a ban.[37] Denmark has a long tradition of involving interest organizations in the political process, and the agreement mirrored this tradition.[38] The following year, the

36. "82 pct. Tager fuld pant 9 pct har en delvis pantordning og 9 pct. beregner slet ikke pant." *Frit Købmandskab*, 13, 1973: 9-15; Rasmussen et el., "Rapport over det indenlandske kredsløb for øl- og mineralvandsemballage." A copy is in: "Journalsager 1972–1975: 109–50, box 144, Miljøministeriet, National Archives."

37. Up, "Faxe Bryggeri Snart Klar Til at Producere Dåseøl." *Dagbladet*, July 3, 1970; Damm, "Faxe Bryggeri Med i Dåsekrigen Men Venter Sig Ikke Det Store Sus." *Næstved Tidende*, July 3, 1970.; "Derfor Har Faxe Bryggeri Besluttet Sig Til at Sælge Øl På Dåse - Også i Danmark!" *Berlingske Tidende*, August 6, 1970; "Journalsager 1972–1975: 109–20, box 134–135, Miljøministeriet, National Archives."

38. Viemose, *Lobbyisme.*

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parliament passed an enabling act, opening the possibility of later intervention against beverage cans to prevent health risks, pollution, and waste management disadvantages.[39] At the time, packaging waste constituted approximately one-third of common household waste, and the amount of packaging waste was expected to rise.[40] The new law was a consequence of a media debate in the summer of 1970, which was kick-started by an announcement from the Danish Brewers' Association that its members would soon sell canned beer in Denmark. The major brewers had discovered that Faxe had invested in a used Swedish canning unit and was preparing to introduce steel cans. The small brewer claimed that retailers wished to eliminate the work associated with handling empty bottles, and customers wanted cans due to the rising popularity of outdoor activities such as camping. Yet, it was not simply a matter of retailers and consumers craving convenience. For Faxe—as a small brewer in a market dominated by major players—it was a way to stand out and strengthen their brand, and consequently their sales and market position. However, such economic arguments were not aired in public. Instead, Faxe stated that they invested in canning facilities because they expected Denmark to become part of the common European market. Consequently, foreign brewers would start selling canned beer in Denmark, and Faxe wished to prepare for this competition. Moreover, Faxe claimed that they did not expect large sales of the more expensive packaging, hoping to downplay worries about litter. The Danish Brewers' Association explained that they could not stand idly by upon hearing rumors of nonmembers' canned beer plans and foreign brewers' export plans. Establishing production facilities took time, so the brewers decided to introduce canned beer domestically, despite current worries over single-use packaging.[41]

A newspaper framed the 1970 media debate as a race. Who would come in first? Are the major brewers placing orders at the only factory producing beer cans in Denmark? The tin can producer Haustrup, which has been Swedish-owned since 1969 as part of PLM (a Swedish packaging company named AB Plåtmanufaktur until the 1970s)?[42] Or politicians who wanted to limit single-use containers made of glass and metal? Haustrup pointed to Sweden, where canned beer already had a major market share, and claimed that glass bottles were becoming single-use containers, as well. In their eyes, the way to avoid increasing waste and litter was not a ban; it was to fight users' mentality.[43] Thus, they resembled the American can producers in blaming users for littering and saw it as a matter of educating consumers. The Danish Minister of the Interior announced that legislation would be proposed after the Parliament's summer break, but despite the prospect of a ban, Faxe proceeded. The other brewers prepared to follow, although they had previously found that Danes' drinking habits showed no need for

39. Folketinget, "Lov Om Beholdere Til Øl Og Læskedrikke."

40. "Journalsager 1972–1975; 13–112, box 162, Miljøministeriet, National Archives."

41. "Ønsker Forbud Mod Engangs-Emballage." *Vestkysten*, July 2, 1970; B-j, "Politisk Nej Til Dåseøl." *Berlingske Tidende*, July 2, 1970.; Bi, "Protest Mod Øl På Dåser." *Berlingske Aftenavis*, July 1, 1970; Berth, "Neptun Bryggeri Vil Lancere Øl På Dåser." *Silkeborg Avis*, July 1, 1970.

42. Only the part that, since 1960, had experimented with plastic and aluminum packaging remained Danish-owned (Haustrup, *Man Skal Gøre Noget…*). PLM was an old tin can manufacturer that had moved into the production of plastic and glass packaging and became involved in the recycling business around 1970. Thus, it had strong interests in this line of business, as well (Bergquist, Lindmark, and Petrusenko, "Creating Value Out of Waste").

43. Mann, "Flaskerne Til Øl Er Også Snart Engangsemballage." *Fyens Stiftstidende*, July 2, 1970; Mann, "Dansk Dåseøl i Fare." *Fyens Stiftstidende*, July 1, 1970.

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canned beer, and customers were unlikely to accept the higher price.[44] The trade minister asked the brewers to wait for a political decision, and the Danish Brewers' Association agreed, but their promise only lasted until Swedish brewers announced that they would start selling canned beer in Denmark.[45] Therefore, in November 1970, a newspaper reported that five Danish canned beers and one Swedish beer were for sale in Denmark.[46]

Canned beer on grocery store shelves did not stop the political discussions, nor did complaints over the possibility of a ban from the British Ministry of Commerce, the Swedish Industrial Association, the Danish metal packaging producers, and the retail trade council—thus, from bodies representing the interests of foreign brewers, the metal packaging industry, and retailers tired of handling empty bottles. Officially, the major Danish brewers did not argue for a ban, but others noted that it would help them avoid foreign competition in the home market, and they highlighted the brewers' economic interests in the glass industry.[47] However, in a later debate over soft drink packaging, the Danish Brewer's Association claimed that they did not fear foreign competition, but rather additional taxes on already heavily taxed beer and soft drinks.[48]

In the following years, the market share of canned beer increased to two percent, raising the consumption of canned beer to five per inhabitant per year in Denmark, compared with forty in Sweden and ninety in the United States. In 1973, Faxe had ninety-four percent of the domestic canned beer market, but only approximately four percent of the total beer sales. However, the sale of canned beer increased so rapidly that, in August 1973, the Danish Brewers' Association told a newspaper that they expected canned beer to comprise a considerable part of beer sales in a few years if nothing was done. Consumers had become interested, and the brewers foresaw that they would have to ration sales and thus benefit foreign competitors if they did not increase production.[49] This restarted the can-ban debate. As part of the renewed discussion, the environmental organization Miljø-forum (Environment-forum) argued for a ban. In their view, one problem was the aesthetic pollution from cans; another was the lack of reusability and poor recyclability because the coating of the steel cans lowered the quality of the melted steel. Thus, Miljø-forum claimed that the worth of a beer can fell to zero after one use, while the worth of refillable glass bottles fell only three to four percent. Miljø-forum also compared the use of energy and found that beer cans had significant disadvantages in terms of energy, and thus economically. According to their calculations, a shift from refillable glass bottles to steel cans would increase the price of the packaging from 0.6 to sixteen percent of the price of a beer.[50] Another calculation from 1975 showed that the

44. Pm, "En Dåseøl Ville Blive 30-35 Øre Dyrere End En Pilsner På Flaske." *Jyllands-Posten*, August 21, 1969.

45. "Hastemøde På Danske Bryggerier." *B.T.*, September 4, 1970; "Skal Sverige Også Vinde over Os i Kamp Om Dåseøl - Det Bliver Afgjort i Dag." *B.T.*, September 5, 1970.

46. Faxe Og Albani de Populæreste." *Jydske Tidende*, November 1, 1970.

47. "Carlsberg Og Tuborg Har Klare Fordele Af Forbud Mod Dåseøllet." *Aktuelt*, October 8, 1970; "Journalsager 1972–1975: 109–50, box 144, Miljøministeriet, National Archives."

48. "Journalsager 1972–1975: 109–24, box 162, Miljøministeriet, National Archives."

49. "Journalsager 1972–1975: 109–50, box 144, Miljøministeriet, National Archives"; "Journalsager 1972–1975: 109–20, box 134–135, Miljøministeriet, National Archives"; Haustrups Fabriker. "Realiteter om øldåsesalget." *Brygmesteren*, 10, 1973: 282–284.

50. Miljø-forum, "Øldåserapporten." A copy is in: "Journalsager 1972–1975: 109–50, box 144, Miljøministeriet, National Archives."

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production and distribution costs of beer cans were one and a half times those of refillable glass bottles. For the can, the material itself accounted for seventy-one percent of the total cost, while for the latter, it was only three percent.[51] This made the price of the material highly important, and while, overall, the price of steel had increased since the 1920s, the price of aluminum had stabilized at a relatively low point in the 1950s and 1960s.[52] This made the material more appealing for single-use containers.

Haustrup, which produced the steel cans that Faxe used, also engaged in lobbying. The Danish meat industry was their largest customer, but in 1973, beer cans comprised one-fourth of their total metal packaging production in Denmark. Haustrup argued that a can ban would negatively influence beer exports, that cans were good for users, that the litter problem was small in Denmark because ninety-five percent of all beer was consumed at home, that the Danish Brewers' Association's prognosis for the future sale of canned beer was exaggerated, and that renovation and recirculation problems would soon be solved. They also stated that a change from returnable glass bottles to disposable metal cans would make retailers less dependent on beer suppliers, reduce their time spent handling beverage containers by forty percent, and save half of their storage space. Retailers' time studies of bottle and can handling in supermarkets in 1970 indicated that retailers' costs related to handling and storage would decrease even more.

Haustrup also referred to an opinion poll from 1973 showing that thirty percent of consumers found the price difference between beer in bottles and cans fair. The same poll showed that their arguments for using cans were beer taste (Faxe sold draft beer in cans), size (forty-five instead of thirty-three cl of beer), convenience for outdoor activities (easy transport for excursions, camping, and boat trips), the lack of bottle accounts at retailers, fanciness and the charm of novelty, sturdiness, and their practicality in the refrigerator. In a brochure called *Facts about Littering Nature*, Haustrup claimed that humans, not objects, pollute. They referred to American surveys showing that the reasons for polluting were laziness and thoughtlessness, the lack of a sense of responsibility, a lack of trash cans, the ineffectual use of laws and regulations, and weak reactions from the public against those littering. Behind those matters was a new lifestyle. In accordance with this view, Haustrup, like PLM in Sweden, began promoting reuse and became involved in preventive education about littering, such as "keep clean" campaigns. In 1974, they were also involved in forming the company Gendan, whose purpose was to promote reuse. However, Haustrup soon stopped producing steel cans for beer. This was not because of the can-ban debate, but rather because PLM prioritized modern aluminum cans produced at a new Swedish production facility.[53]

The supermarket chain Irma, with three percent of the domestic canned beer market in 1973, also lobbied against a can ban. Irma sold Swedish canned beer and canned cola, and the retailer asked why beverage cans should be banned when no other kinds of packaging were. In advertisements, Irma claimed that empty bottles were a problem for customers

51. "Journalsager 1972–1975: 109–24, box 162, Miljøministeriet, National Archives."

52. National Minerals Information Center. "Historical Statistics for Mineral and Material Commodities in the United States."

53. Riksdagen, "Prop. 1981/82:131 Om Återvinning Av Dryckesförpackningar Av Aluminium."; "Journalsager 1972–1975: 109–24, box 162, Miljøministeriet, National Archives."; "Journalsager 1972–1975: 109–50, box 144, Miljøministeriet, National Archives."

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carrying them to the shop and for retailers handling their return. Irma preferred cans despite knowing they were "hardly in agreement with the nature conservation people and the minister of pollution control." They pointed to the problem with cuts from glass fragments and found bottles no more attractive than cans. They also claimed that the latter would disappear due to corrosion. Irma also pointed to Sweden and the United States, where customers could decide for themselves instead of being forced to use glass bottles. In addition, Irma asked for an independent expert survey questioning whether beverage cans were more environmentally problematic than food cans. Irma's advertisements sparked debate, and a few weeks later, the brewers voluntarily agreed to limit canned beer production if retailers promised to limit imports.[54]

What had happened was that a new environmental minister, using the 1971 legislation as a lever, had presented the brewers with a choice of a prohibitive tax like one planned in Norway, a ban on cans, or a voluntary agreement to ensure that the market share of canned beer stayed limited.[55] The brewers chose the last of these options, and when the agreement was renegotiated in 1975, the brewers agreed to phase out sales in five years.[56] Thus, in 1981, an executive order mandated that beer and soft drink containers should be returnable starting in 1982.[57] With a return system designed for refillable glass bottles, this was effectively a ban on metal cans, and thus, steel and aluminum cans had become matter out of place, not just as litter in natural environments, but also in the Danish return system. Canned beer was sold in Denmark from 1970 to 1981, but refillable glass bottles had a market share of ninety-seven percent for beer and ninety-nine percent for soft drinks.[58] In 1977, the sale of soft drinks in cans was stopped with an executive order that prompted can producers to complain to the EEC. In response, the commission only asked for further details.[59]

Faxe, having most of the canned beer home market, claimed that the complete ban forced them to lay off workers and that they would lose brand value connected to canned draft beer. They noted the possibility of recycling aluminum cans, even presenting a Swedish-inspired idea for a recycling system for the environmental ministry. In Sweden, steel cans had been on the market for more than a decade, and in 1982, aluminum cans were also accepted when new legislation introduced a compulsory return system. The system was run by a new company, Returpack AB (today, often called Pantamera), which was jointly owned by the Swedish

54. "Enighed Om Dåseøllet." *Aarhus Stifts-Tidende*, September 4, 1973; Irma, "Irma Advertisement." *Frederiksborg Amts Avis*, August 21, 1973; "Journalsager 1972–1975: 109–20, box 134–135, Miljøministeriet, National Archives"; "Journalsager 1981–1989: 813 16, box 2524–2529, Miljøministeriet, National Archives"; Schoen, Anne," Dåsekrigen." *Information*, August 21, 1981.

55. Antonsen et al., *Bryggerne Og de Tre Store Udfordringer*. In Sweden, the government introduced a tax on returnable bottles and disposable beverage containers in 1973, increasing the price of disposals and thus increasing the use of returnable bottles (Bergquist, Lindmark, and Petrusenko, "Creating Value Out of Waste"). This was another way of handling the problem. In the US, the Environmental Protection Agency (EPA) recommended a mandatory deposit system after having investigated the consequences of a litter tax, a ban on nonrefillable containers, or a mandatory deposit to address what is primarily considered a litter problem (U.S. Environmental Protection Agency, *Second Report to Congress).*

56. Rex, "Produktionen Af Faxe Fad Går Ned." *Næstved Tidende*, November 3, 1975.

57. Miljøministeriet, Bekendtgørelse om emballage til øl og læskedrikke.

58. Organisation for Economic Co-operation and Development, *Beverage Containers.*

59. Miljøministeriet, "Bekendtgørelse Nr. 136 Af 05/04/1977 Om Emballage Til Kulsyreholdige Læskedrikke"; Miljøministeriet, 2524–2529, "Journalsager 1981–1989: 813 16."

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Brewers' Association and PLM, which produced the beer cans. The Swedish goal was a seventy-five percent return rate, and a deposit system that extended to supermarkets, smaller retailers, and gasoline stations.[60] Sweden already had a voluntary deposit system for glass bottles, so with the new legislation, it had two systems. One was the compulsory deposit system in which Returpack handled metal, single-use beverage containers starting in 1984. In 1994, it was extended to include single-use plastic containers (PET bottles). With this system, Sweden became the first European country to introduce a compulsory deposit and recycling system including single-use aluminum beverage containers. The other system was an old, voluntary deposit system in which the Swedish Brewers' Association handled refillable bottles—initially only glass bottles, but later plastic bottles, as well. Just like in Denmark, this approach was originally based on a standard glass bottle from the late 1800s and an old deposit system that the brewers ran.[61]

The First Court Case

Denmark became an EEC member in 1973, and negotiations with the EEC commissioner about whether the Danish could ban violated the community's free trade rules started in 1980, even before the executive order formally introduced the ban.[62] In 1984, no agreement had emerged in the negotiations, and the commission took the opening step towards a court case for infringement on free trade. Specifically, the EEC criticized the ban on metal cans for beverages, the limitations on beer and soft drink sales in unauthorized containers, and recycling as a prerequisite for the marketing of beer and soft drinks. Thus, in 1986, the EEC Commission brought a case against Denmark at the Court of Justice of the European Communities for failing "to fulfill its obligations under Article 30 of the EEC Treaty."[63] The case material explained that foreign producers of beverages and containers and associations representing the retail trade had submitted complaints "on the grounds that in practice the legislation prevents the importation into Denmark of foreign beer and soft drinks in their original containers because of the associated administrative difficulties as well as the costs involved for importers in establishing a collection system as prescribed." A public relations company connected to Faxe initiated these complaints, sending a fax to foreign brewers and packaging producers to encourage them to complain to the EEC.[64]

Foreign competitors claimed that the ban was technically a trade barrier that helped the brewery Carlsberg, and it was found that the sincerity of Denmark's ecological concerns could

60. Riksdagen, "Prop. 1981/82:131 Om Återvinning Av Dryckesförpackningar Av Aluminium"; Riksdagen, "Lag (1982:349) Om Återvinning Av Dryckesförpackningar Av Aluminium"; "Svensk Retursystem for Øldåser Skal Hjælpe Faxe." *Børsen*, November 25, 1982; "Journalsager 1981–1989: 813 16, box 2524–2529, Miljøministeriet, National Archives"; Pantamera, "Historien om Returpack och världens bästa pantsystem."

61. The Swedish Brewers' Association was formed in 1885 to create a common packaging system. Nordic Council of Ministers, "The Use of Economic Instruments in Nordic Environmental Policy 1999–2001"; European Commission, "Reuse of Primary Packaging"; Pantamera, "Historien om Returpack och världens bästa pantsystem"; Återbrukshyttan, "Den Svenska Standardflaskans Historia."

62. "Journalsager 1981–1989: 813 16, box 2524–2529, Miljøministeriet, National Archives."

63. Court of Justice of the European Communities, "Judgment of the Court 20 September 1988 in Case 302/86."

64. "Journalsager 1981–1989: 813 16, box 2524–2529, Miljøministeriet, National Archives."

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be doubted because Denmark had "not considered it necessary to fix a maximum level of protection for the environment in relation to containers of products such as milk and wine"—products that were not subject to competition between domestic and foreign producers. The wine bottles were part of a voluntary collection system that, according to the EEC, ensured the satisfactory protection of the environment.[65] In addition, the EEC criticized Denmark's export of canned beer when the ban stopped imports. In 1985, this argument was supported by the Danish right-wing Progress Party, which claimed that Denmark had double standards when accepting exports but not domestic sales, and thus, they proposed a removal of the ban. They argued that it was comical to forbid canned beer while allowing canned food for dogs and cats.[66] However, even the retailers now considered cans a nuisance and defended the ban. As one explained, Denmark had implemented a recycling law so that cans would come with a deposit system and should be returned through the shops. If they were forced to receive empty beer cans, the retailers feared that they would also be forced to accept cans from canned food, and they had no interest in handling dirty packaging. If Denmark lost the EEC court case, the retailers wanted the municipalities to bear the burden and extra costs of collecting used beverage containers. Investment in reverse vending machines and implementing a deposit system was costly.[67]

For the Commission, this was a test case to establish "whether and to what extent the concern to protect the environment has precedence over the principle of a common market without frontiers." The Commission saw a risk of member states taking refuge behind ecological arguments. It questioned the proportionality of the Danish rules, but not whether environmental protection was an essential objective for the EEC.[68] The EEC found that "measures intended to achieve extremely high [environmental] aims must be regarded as a means of arbitrary discrimination or a disguised restriction on trade." That Denmark had a system in which ninety-nine percent of beverage containers were reused was "beyond the objective which the Community seeks." In opposition, Denmark found that the ban was "justified by legitimate concern to protect the environment in general and to conserve resources in particular as well as the desire to reduce the amount of waste." As Denmark argued, the Commission had already recognized that the "protection of the environment may have priority over the free movement of goods."[69] The commission was supported by the United Kingdom (UK), which argued that a ban on a certain type of waste from certain products constituted arbitrary discrimination. The British interest was to eliminate the imbalance in beer exports and imports between Denmark and the UK.

In 1988, the Court determined that the can ban did in fact violate the free movement of goods rules but found it acceptable for environmental reasons.[70] Denmark could keep both the

65. Court of Justice of the European Communities, "Report for the Hearing Delivered in Case 302/86."

66. Folketinget, "Forslag Til Folketingsbeslutning Om Salg Af Øl Og Læskedrikke i Metalemballage"; Folketinget, "Første Behandling Af Beslutningsforslag Nr. B 132: Forslag Til Folketingsbeslutning Om Salg Af Øl Og Læskedrikke i Metalemballage."

67. "Journalsager 1981–1989: 813 16, box 2524–2529, Miljøministeriet, National Archives."

68. Quoted in Koppen, "The Role of the European Court of Justice," 77–78.

69. Court of Justice of the European Communities, "Report for the Hearing Delivered in Case 302/86."

70. Court of Justice of the European Communities, "Judgment of the Court 20 September 1988 in Case 302/86."

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ban and the deposit and return system but was forced to include more types of glass bottles. While retailers only accepted the kinds of bottles they sold, the system became more bothersome and laborious for both consumers and retailers. The number of glass bottle types in the system had already risen to eighteen, and some were not collected to be refilled; instead, they were sold as glass fragments to the glassworks.

In the EEC, the verdict was an important decision regarding the scope of admissible exceptions to Article 30 in the Treaty. The Treaty allowed several acceptable reasons for infringements—for example, regarding public security and health (Article 36)—and, in different ways, member states had tried to use those exemptions to create obstacles to free trade. However, environmental protection had first become part of the Treaty in 1987, and the ruling in the Danish case was the first time that the Court accepted environmental protection as a legitimate exception and ruled based on the principle that both environmental protection and free trade were EEC objectives and should be treated as equally important.[71] At the same time, the verdict demonstrated that national environmental actions often de facto constituted trade barriers, and that the proportionality and balance between the two goals, environmental protection and free trade, were matters of interpretation and debate, with the Commission favoring a stricter interpretation than environmental progressive member states such as Denmark. The verdict revealed a definite limit regarding the extent to which a country could implement stricter environmental goals than those set by the EEC.[72]

The Second Court Case

The Can War did not end with the verdict because a packaging directive was on the horizon. The partial acquittal of Denmark—probably a surprise for the Commission—shifted the fight against the Danish ban. It became a matter of the new directive's wording. Generally, the packaging directive caused debate, and environmental organizations criticized it for not being extensive enough and for having poorly formulated objectives. The Danish environmental minister fought for formulations that allowed Denmark to keep the ban, but the European metal packaging industry lobbied against them. The minister lost, and Denmark, in vain, voted against the directive.[73] As its primary objective, the directive should prevent packaging waste, and secondarily, it should reduce waste by reuse, recycling, and other forms of recovering packaging waste. Its goal was "to harmonize national measures concerning the management of packaging and packaging waste in order, on the one hand, to prevent any impact thereof on the environment [...] or to reduce such impact, thus providing a high level of environmental protection, and, on the other hand, to ensure the functioning of the internal market."[74] The goals of harmonizing and avoiding obstacles to free trade meant that the member states could not employ stricter rules. Therefore, the ban became problematic when the packaging directive was enforced in 1996.[75]

71. Koppen, "The Role of the European Court of Justice," 77.

72. Jørgensen and Haffar, *EU Environmental Policy*, 31, 78.

73. Jørgensen and Haffar, *EU Environmental Policy*, 62; Drachmann, Hans, and Klaus Bundgård Povlsen. "Dåse-Krigen." *Politiken*, June 9, 1996; Antonsen et al., *Bryggerne Og de Tre Store Udfordringer*.

74. EU, "European Parliament and Council Directive 94/62/EC of 20 December 1994 on Packaging and Packaging Waste."

75. Antonsen et al., *Bryggerne Og de Tre Store Udfordringer*.

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The Danish environmental minister, the Social Democrat Svend Auken, argued that Denmark's well-developed deposit and return system for bottles was the most environmentally friendly in the world. Thus, the Danish government would not allow changes that increased the environmental impact and reduced the return rate.[76] Others emphasized that the Swedish recycling system already included cans,[77] and many Danes now found Auken too stubborn. Right-wing politicians fought the ban along with the retailers because the proliferation of bottle types in the deposit and return system, a consequence of the first court case, had made handling empty beverage containers a greater impediment.[78] Faced with strong opposition, Auken was ready to accept aluminum cans if steel cans could still be banned,[79] but nothing came from the continued negotiations with what had become the EU and its Commissioner for the Environment, another Danish Social Democrat.

In the discussion of the environmental superiority of the Danish return system, life-cycle assessments (LCA) became a central weapon to measure and compare the environmental impact of products from cradle to grave. Coca-Cola first employed this method in the late 1960s, but the company never shared the result.[80] However, in 1974, a US Environmental Protection Agency study comparing the environmental impact of different kinds of beverage containers showed that returnable glass bottles had lower resource and environmental effects than single-use containers of glass, steel, or aluminum,[81] and in the long run, LCA analyses of different types of packaging became boundary objects that engaged both sides in the environmental debate.[82] Today, LCA is a refined method based on extensive databases, but in the 1990s, it was a contested method in the making.[83] Still, an EU directive from 1994 stated that "life-cycle assessments should be completed as soon as possible to justify a clear hierarchy between reusable, recyclable and recoverable packaging."[84] In 1995, the Danish Environmental Protection Agency published an LCA report comparing the environmental impact of different kinds of beverage containers. The report emphasized the long tradition of refillable bottles with a return rate above ninety-eight percent, with each glass bottle refilled, on average, more than 30 times.[85] In reply, the European metal packaging industry pointed to defects in the report,[86] and acknowledging these deficiencies, the Danish Environmental Protection Agency published a new report in 1998. It concluded that "the differences in potential global

76. Folketinget, "Første Behandling Af Beslutningsforslag B 136."

77. Bundgaard, Bente, and John Jakobsen. "Auken Åbner Dåsekrig Mod EU." *Berlingske Tidende*, May 7, 1996.

78. Heimbürger, Philip. "Retursystemets Fallit." *Helsingør Dagblad*, June 13, 2003.

79. Drachmann, Hans, and Klaus Bundgård Povlsen, "Dåse-Krigen." *Politiken*, June 9, 1996.

80. Elmore, *Citizen Coke*, 248–249.

81. U.S. Environmental Protection Agency, *Resource and Environmental Profile Analysis of Nine Beverage Container Alternatives.*

82. Jørgensen, *Recycling.*

83. Skyggebjerg, "Knowledge Making and Corporate Environmentalism from the Perspective of the Egg Tray."

84. EU, "European Parliament and Council Directive 94/62/EC of 20 December 1994 on Packaging and Packaging Waste."

85. Wesnæs, "Miljøvurdering Af Emballager Til Øl Og Læskedrikke"; Pommer and Wesnæs, "Miljømæssig Kortlægning Af Emballager Til Øl Og Læskedrikke."

86. Knudsen, Frodi Holm, "Auken På Glidebane i Dåsekrigen." *B.T.*, August 22, 1997; Kragh, Nina, "Argument for Flasker Angribes." *Politiken*, March 27, 1996.

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warming, photochemical ozone formation, acidification, and nutrient enrichment […] are not significant" when comparing refillable glass bottles and aluminum cans. However, the electricity demand was higher for aluminum cans than for refillable glass bottles.[87]

The report made no difference to the EU, and a new court case soon began. This was never settled because a new environmental minister lifted the can ban in 2002, before a ruling was announced.[88] It was then broadly acknowledged that Denmark would lose, and the battle against metal cans had become closely linked to Auken as a progressive, but also stubborn, environmental minister. The long historical roots of the Can War had been forgotten, and many perceived it as more or less the increasingly isolated minister's personal fight. When the Social Democrats lost an election in November 2001, the liberal party Venstre and the Conservative Party formed a minority government based on the votes from a right-wing party. Thereby, the ban antagonists came into power.

As a final issue, a question was raised regarding whether a planned expansion of the deposit system would pay. This discussion was initiated by the Environmental Assessment Institute (Institut for Miljøvurdering), which the political scientist Bjørn Lomborg managed; he was famous for using economic arguments in a fierce fight against environmentalism.[89] The institute found that it was cheaper to treat aluminum cans as disposable packaging.[90] However, the environmental authorities and the incineration plants protested because aluminum cans thrown in the trash end up as slag, causing operating stops in incinerators.[91]

Meanwhile, for years, the brewers had prepared a modernized return system that could include cans. In 1996, along with retailers, they had initiated an analysis of bottle handling, and, based on this work, the brewers and retailers formed the nonprofit organization Danish Return System Ltd. (Dansk Retursystem A/S) in 2000, which operated voluntarily. Based on new legislation introducing a mandatory deposit and return system, the organization was granted a monopoly in 2001, and today, it is once again claimed that Denmark has a world-leading return system, with a ninety-two percent return rate for the single-use containers that dominate the system.[92] Compared with the 1970s, the new system could handle many kinds of beverage containers, including single-use containers, with a deposit. It also included modernized reverse vending machines paid for and installed by Danish Return System in the largest retail stores, and these handled around seventy-five percent of the returned containers.[93]

Since then, the brewers have owned and controlled the Danish Return System. Its first board members were a lawyer, three managers from the largest supermarket chains, three from Carlsberg, three from other Danish brewers, and one from a Danish Coca-Cola bottler. The stated goal was to protect the environment and uphold high return percentages, which

87. Ekvall et al., "Life Cycle Assessment of Packaging Systems for Beer and Soft Drinks."

88. Carstensen, Ivar, "Det Store Danske Dåse-Drama." *Berlingske Tidende*, September 20, 2002.

89. Vigsø et al., "Miljøets Pris."

90. Vigsø and Andersen, "Pant På Engangsemballage?"

91. See, e.g., Sønderriis, Ebbe, "En Afbrænder." *Information*, November 2, 2002; Wenzel, Henrik, "Dobbeltbundet Retorik." *Politiken*, June 8, 2003.

92. Dansk Retur System A/S, "Årsrapport 2000"; Dansk Retursystem A/S, "Årsrapport 2021."

93. Bryggeriforeningen, "Dåseintroduktionen forsinket." *Nyt fra Bryggeriforeningen*, June, 2002; Bryggeriforeningen, "Spørgsmål og svar om Dansk Retursystem." *Nyt fra Bryggeriforeningen*, March, 2002.

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would be achieved by minimizing the expenses connected to the retailers' handling of refillable bottles and by establishing a deposit and return system for single-use beverage containers. An important part of the new system was efficiency at the retailers, combined with a payment for their work sorting empty beverage containers. This payment was financed by a compulsory fee that all beverage producers paid. To encourage as many retailers as possible to join the system, it was marketed with the argument that they could now earn from their work with empty bottles. Customers returned the empty packaging to the shops, and from there, trucks from the Danish Return System collected it. The standard glass bottles were returned to the brewers to be rinsed and refilled, while the rest of the packaging materials were sorted and sold as scrap to be recycled to the greatest extent possible.[94]

In both Denmark and Sweden, refillable glass bottles slowly lost ground. According to an EU report, the Swedish reuse system for beer bottles had already reached a marginal market position with twenty-seven percent in 1997, while refillable bottles still held a market share of sixty percent for soft drinks due to the recent popularity of reusable 1.5-liter PET bottles. According to the report, the decline of the reuse system began in the mid-1970s, when cans entered the market. In 1979, reusable glass bottles had a market share of forty-six percent, which has steadily declined since.[95] Denmark saw the same development after the introduction of aluminum cans, and in 2022, the market share of refillable packaging for beer and soft drinks sold in retail had decreased to seven percent.[96]

A Plethora of Economic and Environmental Arguments

The Can War, as outlined above, was not a simple story of economic versus environmental arguments or a simple dichotomy with businesses in opposition to nature lovers. The Danish brewers' interests were of the utmost importance, but they shifted over time, and the brewers were not the only businesses to influence the turn of events. Thus, the story confirms Friedel's conclusion of shifting arguments, many uncertainties, and imagined futures. For example, guesses regarding future consumer habits and return rates were important for environmental impact comparisons.

Table 1 summarizes many of the arguments advanced during the long Can War. The table does not address the importance, truth value, proponents, or sincerity of the arguments; rather, it shows a plethora of environmental and economic arguments both for and against a ban.[97] Among the recurrent economic arguments were investment and domestic workplace arguments, international competitiveness, compliance with international free trade rules, production and transportation costs, time use and other expenses at retailers, and waste-handling

94. Dansk Retur System A/S, "Årsrapport 2000"; Folketinget, "Forslag til Lov Om Ændring Af Lov Om Miljøbeskyttelse (Betænkning)."

95. European Commission, "Reuse of Primary Packaging."

96. Bryggeriforeningen, "Fordeling af emballagetyper for øl og læskedrikke i dagligvarehandlen."

97. The arguments in the table could also have been categorized after, e.g., main proponent, policy area (e.g., consumer politics, trade politics, industrial politics, environmental politics, fiscal politics), or influence over time.

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Table 1. Arguments that businesses, interest organizations, and politicians advanced.[98]

	Arguments for a can ban	Arguments against a can ban
Economic arguments	• Hinders increased beer imports, thus avoiding job losses at Danish breweries. • Hinders job losses in the Danish glass industry. • Previous investments, e.g., brewers' investments in bottle-rinsing facilities and bottles. • The need for new investments if brewers produce canned beer for the home market. • Use of currency on metal imports; better exchange balance because glass, unlike metal cans, can be produced primarily from raw materials available in Denmark. • Hinders increased use of disposable packaging and thus hinders increased volumes of waste and municipal expenses in garbage collection. • Refillable glass bottles are cheaper than metal cans. • Incinerators must repeatedly and expensively be stopped and cleaned to clear aluminum slag. • If cans are allowed, retailers face new investments in reverse vending machines. • A system based on consumers returning bottles to retailers is cheaper than a public renovation system. • A return system with cans is less effective than a system based on refillable glass bottles alone. • Denmark is one of the largest exporters of beer, and the packaging should be made in Denmark. • Metal cans have high production costs.	• Infringement of EEC/EU free trade rules and perhaps other trade agreements (General Agreement on Tariffs and Trade [GATT], European Free Trade Association [EFTA]). A ban works against harmonizing efforts. • Fear of reprisals against other Danish products in foreign markets. • A ban risks weakening Denmark's position in other EEC/EU cases where a country claims an infringement of free trade. • Job losses in the Danish metal industry (Haustrup) and at the Faxe brewery. • If the ban is upheld, Faxe will have lost the marketing value of their previous can success if the EEC rules against Denmark. • A lack of Danish brewers in the can market during the court case could "invite" large foreign competitors to invade the Danish market as soon as cans are free, thus creating fierce competition. • Retailers' use of resources (time and space) to handle returned glass bottles, especially in supermarkets, bottle-handling represents costly wasted time. • Easier and thus cheaper transport of cans than of glass bottles. • Single-use packaging is more efficient, convenient, and less expensive. • Research and development (R&D) and other investments depend on a home market of sufficient size. • A national market is a prerequisite for a currency-profitable export of canned beer. • Faxe's investment in canning facilities. • A ban limits competition in retail and makes retailers more dependent on brewers. • A ban places reuse initiatives below the threshold value. • It is expensive for retailers to handle the increase in bottle types in the return system, which makes the return system less effective because different bottles cannot be returned to all retailers. • Rising salaries make it necessary to rationalize the sale of beverages by using cans.

(*Continued*)

98. Based on archives from the Environment Ministry, parliament proceedings and the newspaper articles in the bibliography.

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Table 1 (Continued)

	Arguments for a can ban	Arguments against a can ban
		• Due to rising wealth, customers will not be prepared to return beverage containers in the future to obtain a small deposit. • Predictability; knowledge of future rules makes it possible for businesses to invest accordingly.
Environmental arguments	• This environmental issue is understandable to the common man. • Prevents future environmental damage. • Denmark has a world-leading system of reuse, with an extremely high return rate for refillable glass bottles. • Prevents litter (aesthetic argument). • Hinders littering and thus avoids damage to animals and humans (health argument). • Hinders the increased use of disposable packaging and thus increases amounts of waste (unnecessary use of resources argument). • Resource problem (use of energy and raw materials); in terms of energy use, aluminum cans are an expensive form of packaging unless an adequate return system is established. • Metal cans (aluminum) do not degrade; they remain in nature almost indefinitely. • In 1975, an American comparison of ten beverage container alternatives showed the benefits of a system based on refillable glass bottles regarding return rate, amounts of waste, costs for waste-handling, pollution, energy use, and littering. • Foreign inquiries show single-use packaging further develops a mentality of disposability. • If consumers become accustomed to single-use packaging, they lose respect for returnable bottles. • The introduction of cans will lower the return rate (reference to Swedish data). • Consumers are used to not throwing glass bottles in the trash or natural environments (habits). • A tax on single-use packaging, as an alternative to a can ban, is not possible because a useful technical definition of single-use bottles cannot be found.	• Humans, not objects, pollute; it is a matter of educating consumers so that they do not litter. • The litter problem is a minor environmental issue; the focus on it is disproportionate. • Broken glass in nature hurts animals and humans. • A metal recycling system has the same environmental benefits as a glass bottle reuse system (reference to Swedish experiences). • Metal cans (steel), unlike glass bottles, will corrode and thus disappear from nature. • It is strange to ban metal containers for beverages when they are allowed for food and are thus not generally considered environmentally problematic. • People already recycle beverage containers outside the deposit system (wine bottles). This model could be copied for single-use cans and bottles. • If the metal is recycled, there is no significant difference from refillable glass bottles regarding energy use. • It is utopian to imagine canned beer sales as high as those claimed in the debate; thus, cans will never pose a significant problem in terms of litter. • We already have milk containers, sardine cans, etc.; therefore, beer cans will represent only a small increase in the amount of waste.
Other arguments		• Double standards: Danish brewers produce canned beer for export. • Glass bottles are heavy to transport for housewives (consumer convenience).

(*Continued*)

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Table 1 (Continued)

Arguments for a can ban	Arguments against a can ban
	• With many wives working outside the home, it is impossible to eliminate disposable packaging. • Cans are convenient for camping, excursions, and use in summer homes (i.e., they are light and can be thrown in trash cans). • Convenient disposal for the user (in the trash can). • Free consumer choice. • Liberalization; too many rules regulate behavior, and more should be left to the citizens without interference from politicians. • It would not be nice if everything—beer, oil, vinegar, soft drinks, red wine—were delivered in the same standard bottle. • Arbitrary discrimination against one product. • A court case helps EU opponents in parliamentary elections.

expenses. Such economic arguments had priority, but many could be adapted to either support or oppose a ban, and thus, they did not always oppose environmentalism. The environmental arguments addressed littering and resource issues, a fear of consumers developing a "throw-away mentality," and discussions of the environmental benefits of the current return system. There was also discussion regarding whether beverage cans should be perceived as an environmental problem at all and why they should be treated differently from food cans and wine bottles.

Brewers, packaging producers, and retailers had economic interests and were the most active lobbyists, but others were active debaters, as well: the EEC/EU, labor unions, environmentalist organizations, different ministries, local politicians from areas with affected industries, municipalities, and waste handlers. However, organizations representing consumers seemed rather uninterested, and both consumer convenience arguments and the liberal, "consumers must decide" arguments came from businesses such as Faxe and Irma. The convenience arguments mostly concerned weight lifting heavy glass bottles versus light cans, and the inconvenience of bringing empty beverage containers to retailers instead of depositing them in the trash.[99] Despite the rapid success of cans in other countries, there seems to have been no consumer desire for cans; rather, it was retailers who wanted to eliminate the inconvenient work of handling returned glass bottles and deposits.

Over time, there was a shift in the main arguments and themes in the debate. In the 1970s, the theme of littering was central. Littering and increased waste from packaging were the

99. The standard beer bottle weighed approximately 355 g in 1949 and approximately 330 g in 1961. "mio In comparison, a modern aluminum beer can weighs 15 g.

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Table 2. Ban proponents and antagonists.

	Can-ban proponents	Can-ban antagonists
1970s	• Nature conservation activists • Environmental minister • The Danish Brewers' Association • Broad political support	• Faxe brewery • Haustrup (steel can producer) • Retailers (especially Irma) • Foreign industry
1980s	• Environmental minister • The Danish Brewers' Association • Retailers • Broad political support	• Faxe brewery • The EEC • Foreign industry
1990s	• Environmental minister	• The EU • The Danish Brewers' Association • Retailers • Most politicians

main concerns, and arguments about changing lifestyles and rising wealth were advanced to explain the change, including a shift in gender roles. In the 1980s, the focus of the debate shifted and simplified into a dichotomy of free trade versus environmental concerns. Thus, the dominant argument became that the ban illegally protected Danish brewers, that is, that it was a trade barrier in disguise. However, in the 1990s, the major brewers' interests had shifted, broad political support had disappeared, and the environmental minister almost alone advocated for a ban, still viewing Denmark as a forerunner in environmental protection in the EU. Thus, while studies of businesses' influence on environmental politics generally claim that environmental concerns mattered more in the 1990s than in the 1980s, in this case, the opposite was true. The 1988 EEC verdict allowed for environmental concerns to infringe on free trade, while in the 1990s, the seemingly environmentally friendly packaging directive became an obstacle to the Danish can ban. In this way, this study demonstrates the benefit of a closer examination of the formative years of environmental politics.

The major ban proponents and antagonists also shifted over time, as shown in Table 2. Thus, compared with studies focusing on one company or on seeing a branch of business as unified, this study of the Can War complicates matters. Businesses certainly influenced environmental politics, and they certainly put economic arguments and profit motives before environmentalism. However, this did not mean that they acted in unison, aggressively fighting environmentalism. Generally, there was a mix of business interests. While unsurprisingly, the can producers consistently fought the can ban, both retailers and brewers changed their position and did not necessarily act in unison within their sectors. Faxe and Irma both introduced canned beer to position themselves inside their trade and gain market share, not as part of a fight against environmentalism like the one that Lomborg later represented. Interests across sectors and national borders were also mixed. The major brewers had shares in the glass industry and thus interests in the packaging industry, as well, and as the case of Haustrup showed, national interests could be blurred. The Swedish-owned company used jobs in Denmark as an argument against the can ban but soon moved their production of beer cans to Sweden.

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In sum, the Can War was more a story of businesses adjusting to political opportunities than of opposition to environmentalism. It was not a case of crusading libertarian ideology, obstructionism, misinformation, or other ways of protesting environmentalism. The businesses involved used their political influence to their advantage but were generally pragmatic in their approach to environmentalism. Knowing future rules mattered more than the possibility of a ban, so that businesses could invest accordingly. In the short run, the major brewers could gain financially from a can ban because it would protect their home market, their interests in the glass industry, and their investments in bottles and facilities for rinsing and bottling. However, in the long run, they shifted positions and prioritized designing and controlling a new return system that included single-use packaging so that it matched their needs. Previously, Carlsberg had owned eighty-three percent of Holmegaard Glassworks, but at the same time that the brewers began planning the new return system, Holmegaard was sold to PLM. Thus, the major aluminum can producer became the owner of the producer of the Danish standard beer bottle in 1998.[100]

If the brewers' aim throughout was to remain strong in their home market, they certainly succeeded. Regarding beer sales in Denmark, around 2020, Carlsberg was still the market leader with more than half of the home market, followed by Royal Unibrew, to which Faxe had long belonged, with a quarter of the domestic beer market. In addition, the Danish brewers remained competitive abroad, exporting half of the beer produced in Denmark to foreign markets.[101]

The Winner of the Can War: Aluminum

The beverage containers themselves also changed during the Can War. While the standardized beer bottle remained stable, steel cans mostly disappeared, PET bottles became a new competitor, and aluminum cans became ever thinner and lighter due to the continual development of aluminum. Thus, the aluminum cans became more environmentally friendly compared with heavy glass bottles.

The competition among glass, steel, and aluminum, as beverage container materials, was important for the return systems, and Friedel has found that this competition drove down container costs.[102] However, it was more than a matter of economics; although the price of steel and aluminum decreased during the long Can War,[103] and the energy crises of the 1970s increased the price of energy and thus the production price of glass bottles. It was also a matter of different material properties. Studying plastic objects in seawater, Max Liboiron has shown that the physical characteristics of different materials—density, molecular bonds, and other properties—are decisive for their role as pollutants.[104] Similarly, it mattered whether glass, steel, or aluminum ended up in the waste stream, whether as litter in nature, as feed for incinerators, or when collected for recycling.

100. PLM Holmegaard, "Beretning og Regnskab 1997-1998"; Royal Copenhagen, "Beretning og Regnskab 1996–1997."

101. Bryggeriforeningen, "Eksportandel af national ølproduktion i Europa"; Holmelund, "Verdens største bryggeri vil vokse sig frem gange så stor i Danmark."

102. Friedel, "American Bottles," 520.

103. Our World in Data, "Real Commodity Price Index, Metals."

104. Liboiron, "Redefining Pollution and Action."

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Table 3. Arguments related to materials in the Can War.[105]

	In favor of using the material for beverage containers	Against using the material for beverage containers
Steel	• Recyclable. • Biodegradable (corrosion); cans would slowly disappear from nature. • Magnetic (important for waste sorting). • Lighter than glass. • Opaqueness; no sunlight could spoil Faxe's draft beer.	• Limited recyclability when combined with other materials, such as tin plating, plastic coating, and/or aluminum lids. • Raw material unavailable in Denmark. • Single-use glass bottles are not easily defined based on weight, glass thickness, or other properties. However, it is easy to differentiate glass and metal containers. Thus, a metal containers ban prevents the increased use of disposable packaging.
Aluminum	• Recyclable (reusable as secondary aluminum). • Lightweight (i.e., environmentally friendly transport and less bothersome for consumers and retailers). • R&D made it possible to use even thinner plates, making the can even lighter and less resource-intensive. • Softer than steel. Thus, a can with an aluminum lid can be opened with a finger (no need for an opener).	• Nonflammable at temperatures used in incinerators, which leaves nonmagnetic slag that causes operational problems and lowers the heat utilization when burning waste. Thus, costs move from the polluter to the public (against the "polluter pays" principle). • Not biodegradable. • Resource-intensive and environmentally problematic mining and production. • Raw material unavailable in Denmark. • Easily bent out of shape, which can cause trouble in vending machines.
Glass	• Refillable and thus reusable. When broken, still recyclable. • Mostly made from raw materials available in Denmark. • A standard bottle exists. • Bottle-collecting-and-rinsing facilities exist. • Easily resists pressure from the liquid inside.	• Not biodegradable. • Easily broken into sharp fragments. • Occupies more space than metal cans. • Heavy weight (i.e., increased energy use during transport and inconvenience for retailers and consumers).

Friedel has claimed that the older practices of reusing glass bottles were "far kinder to the environment" than single-use cans,[106] but Table 3 shows how the different materials' properties were used as arguments both for and against their use as beverage containers. In the 1970s, when the litter problem was at the core of the beverage container discussion, the biodegradability (corrosion) of steel cans was claimed to be an environmental advantage compared with the permanence of glass bottles. When the more corrosion-resistant aluminum took over, biodegradability disappeared as an argument, and today, it seems strange to assert that steel cans are biodegradable, particularly because they were coated to resist the effect of the liquid, and aluminum lids were soon added for easy opening. Such mixes of materials complicate recycling procedures.

105. Based on archives from the Environment Ministry, parliamentary proceedings, and the newspaper articles in the bibliography.

106. Friedel, "American Bottles," 506.

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Other developments that influenced the beverage container return systems included changes in retail, with increased self-service, centralization, and rationalization. The first Danish hypermarket, Bilka, opened the same year that Faxe sold its first canned beer. Such changes made the old return system obsolete, as it was based on the high involvement of shop employees and a high level of trust in customers' self-reporting the number of returned bottles. However, in 1974, a Danish magazine for engineers informed readers about Tomra's reverse vending machines, which could automatically sort bottles and give customers a receipt.[107] Such advancements in recycling technologies made it possible to redesign the return system to efficiently include beverage containers of many shapes and materials. At the same time, the centralization of retail made investment in reverse vending machines more feasible. Thus, the other container revolution happened as part of immense changes in both shopping and waste practices at a time when waste-sorting systems became more advanced, and landfills, once a usual way of managing waste, became unacceptable.[108]

While those changes generally benefited the aluminum can in the competition between beverage container materials, a material factor that mattered in favor of a system without cans was the existing rinsing and bottling facilities, which had been designed for the standard bottle. Together with the bottle itself, those facilities were physical manifestations of a system optimized over a long period, and they represented significant investments. Thus, they demonstrated an important feature of the large technological systems that are key to modern recycling, namely, that they bring past decisions and habits into the present.[109] As Bjørnar Olsen has written, the "past is not left behind, but patiently gathers and folds into what we conveniently term the *present.*"[110]

In the end, neither the Danish standard bottle, used on average more than thirty times, nor Haustrup's steel container could beat the light aluminum container, which could transport some of its environmental costs to public and private clean-up efforts and incinerator operators. Retailers had hoped that cans would become single-use packaging thrown in the trash and thus be the municipalities' problem, but this did not happen in Denmark, where advanced vending machines that the brewers funded made it manageable to include aluminum cans in the return system. In the competition between container materials, the more advanced machines helped aluminum by compensating for its downsides: that thin aluminum is easily bent out of shape and is undesirable in household waste because it leaves nonmagnetic slag in incinerators. Thus, together with the EU packaging directive, the machines helped aluminum win the Can War regarding beer cans. Regarding soft drinks, the material shared the throne with PET bottles.

A Complex Network of Actors and Connections

This study of the Can War demonstrates how aluminum cans for beverages went from being a matter out of place to part of everyday life as a result of a complex network of actors and

107. Saw, "Flaskesortering." *Ingeniørens Ugeblad*, August 2, 1974; "Datastyret Flaskeindsamlingsmaskine." *Tidsskrift for Ingeniør- Og Bygningsvæsen*, May 3, 1974."

108. Jessen, "Lossepladsen Formodes at Være under Afvikling."; Jørgensen, *Making a Green Machine.*

109. See, e.g., Pollock, *Mining Urban Wastes*; Lindqvist, "Changes in the Technological Landscape"; Jørgensen, *Recycling.*

110. Olsen, *In Defense of Things*, 173.

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connections. This involved competing container materials, reverse vending machines, old return systems and habits, a common market built on free trade ideas, a strong brewing sector, packaging producers, retailers, and much more. Thus, the Can War was not simply a conflict over a trade barrier in disguise. It was also about material properties and about who should bear the waste management costs that accompanied the increased use of disposable packaging. Along with protecting investments and other economic interests, it was a practical matter and a question of defining environmental friendliness. When aluminum cans entered the Danish recycling system for beverage containers, it changed from a system based on reuse to one based on recycling. However, whether this made the system more or less environmentally friendly is less clear. It was difficult to measure environmental friendliness, as the debate over life cycle assessments showed. In addition, it could be difficult to determine whether a seemingly environmentally friendly initiative was sincere, as the aluminum industry's involvement in "keep clean" campaigns and the story of the EU packaging directive showed.

When we focus on businesses' influence on environmental politics in the zone between national and European legislation from 1970 to 2002, this study of the Can War shows how environmental concerns were entangled with other interests, predominantly national and economic ones. It also shows that both environmental and free trade arguments were used in pragmatic ways, demonstrating how businesses adapted to changing political and economic environments. The businesses involved in the Can War took positions for or against a can ban largely for practical or economic reasons rather than ideological ones, and they had no problem changing their positions. Thus, this study has illuminated different business reactions to environmentalism, and especially how the proportionality between the free movement of goods and the protection of the environment was up for debate in the EEC/EU system. A new European environmental politics challenged the idea of free trade at the core of the system, and the Danish case was used to test how far environmental protection should be allowed to infringe on free trade rules. In this way, it was a power struggle between a member state and the European Commission, and businesses took sides according to their interests.

With the comparison with Sweden, the study demonstrates how the composition of the domestic industry mattered for the design of the return system. The metal packaging producer PLM influenced the early Swedish adoption of aluminum cans, and Carlsberg similarly influenced the later Danish adoption. In both countries, old deposit systems run by the brewers had made customers accustomed to returning empty beverage containers, which retailers handled. These historical roots help explain why the two countries' return rates stayed among the highest in the world.[111] In the end, the new return systems were both a product of newer environmental concerns, established consumer practices, technological developments, differences in national industrial composition, and shifting and competing business interests.

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111. However, return rates are higher in Germany and Finland. See Millette, "Global Deposit Book 2024" for an international comparison of current deposit return systems.

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Competing interests

The author declares none.

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