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The True Revolution of 1968: Mineral Water Trade and the Early Proliferation of Plastic, 1960s–1970s

This article examines the 1968 decision by the French mineral water company Vittel to use PVC packaging for its main product. This was the first time this type of packaging had been used for a mainstream consumer product. By examining the causes, manifestations, and consequences of this business decision, it aims to show how this model has spread and contributed to the creation of an environmentally damaging waste regime by abandoning deposit systems. The article also seeks to show, through this case, the importance of identifying social and institutional contexts to understand the trajectory of consumer products.

Keywords: bottled water, PVC, plastic waste, environment, regulation, food and drink markets, Europe, packaging

In October 1968, only a few weeks after the strikes and protests of May and June 1968, the French bottled mineral water company Société Générale des Eaux Minérales de Vittel introduced PVC bottles to package mineral water on the French market for the first time. It was an instant success, quickly copied by its main competitors. The promoters of this combination of healthy drink and plastic packaging probably did not foresee how much it would contribute to one of the major shifts in the history of mass consumption. Indeed, the abandonment of deposit systems and the spread of glass and plastic disposable packaging now

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appear as symbols of the emergence of a wasteful society. There is no doubt that this is one of the fundamental points for explaining the implementation of our waste regime and its major environmental costs.¹ Initially used in Europe and then in the United States, this form of packaging for bottled water and other industrial beverages quickly spread across the globe within the framework of the recent phase of globalization and the general improvement in living conditions observed since the end of the 1980s.² Severe criticism arose as soon as researchers studied the full cost of products, from their production up to their recycling or their “handling” as waste in line with the principles of the life cycle assessment.³ Furthermore, the question of what to do with packaging—its reuse and/or recycling—is a major issue in contemporary societies and appears to be one of the key components of the environmental crisis. Geoscience researchers have found that plastic debris is omnipresent all over the earth, both in deserts and in aquatic environments, including rivers, lakes, bays, gulfs, and oceans. The impact of this plastic pollution affects the whole range of ecosystems.⁴ At the moment when civil society and political authorities are facing this major challenge, this article aims to investigate the first use of plastic for industrial drinks and its subsequent expansion, which contributed in large part to making this situation possible. The main goal is to understand how such a turning point was achieved in concrete terms: What are the underlying reasons for adopting this packaging and the sequence of events that allowed its adoption to have such an impact?

This case study is based on an in-depth analysis of the French market and the companies involved in the production of bottled water. However, the study also draws on a fairly broad European context, in connection with the United States, by asking the following question: Why did this innovation take place in France rather than in other countries? The period in question is the one that captures the dynamics at work, mainly from the 1960s to the very beginning of the 1980s.

¹ Zsuzsa Gille, “From Risk to Waste: Global Food Waste Regimes,” *Sociological Review* 60, no. S2 (2012): 27–46.

² Debora Spar and Krzysztof Bebenek, “Profitable Springs: The Rise, Sources, and Structure of the Bottled Water Business,” *Entreprises et histoire* 50 (2008): 100–18; “Bottled Water Consumption Worldwide, 2017,” Statista, accessed 3 Jan. 2018, <https://www.statista.com/statistics/387255/global-bottled-water-consumption/>.

³ Jeroen B. Guinée, Reinout Heijungs, Gjalt Huppes, Alessandra Zamagni, Paolo Masoni, Roberto Buonomi, Tomas Ekvall, and Tomas Rydberg, “Life Cycle Assessment: Past, Present, and Future,” *Environmental Science & Technology* 45, no. 1 (2011): 90–96.

⁴ See, for instance, Laurent Brach, Patrick Deixonne, Marie-France Bernard, Edmée Durand, Marie-Christine Desjean, Emile Perez, Erik van Sebille, and Alexandra Ter Halle, “Anticyclonic Eddies Increase Accumulation of Microplastic in the North Atlantic Subtropical Gyre,” *Marine Pollution Bulletin* 126 (Jan. 2018): 191–96.

Trying to understand and analyze the concrete conditions of the initial expansion of plastic packaging requires drawing on several research fields. The history of beverages falls partly within the framework of food studies, a significant multidisciplinary branch of the social sciences that has expanded quite rapidly over the past thirty years. The way in which products have been created, manufactured, distributed, and sold by the firms involved in these markets—and accepted, adopted, or rejected by consumers—is particularly relevant for understanding how the Western world embraced consumer society.⁵ More relevant to this article, a considerable amount of literature has been published on the history of bottled water. A typical approach in the field is to start by looking at the history of specific businesses. Some of these studies are very descriptive and tell a simple success story.⁶ Others use a more constructivist approach, attempting to understand the place a firm occupies in its sector and how it both contributes to the creation of a market and innovates in an attempt to expand the distribution of its products.⁷ Additional studies have been carried out with a view to the historical study of the branch as a whole, in various European countries and in the United States.⁸ However, none of them consider the question of packaging specifically.⁹ That research that does consider the question of packaging was carried out in another field: the history of technology and, more specifically, the history of materials and packaging. An important part of the current state of knowledge stems from work on the history of techniques and marketing, which remains strictly technical and generally very descriptive.¹⁰ Trust in products whose origin we are no longer aware of and that are sold in packaged form is

⁵ Carmen Sarasúa, Peter Scholliers, and Leen van Molle, eds., *Land, Shops and Kitchens: Technology and the Food Chain in Twentieth-Century Europe* (Turnhout, Belgium, 2005); Jean-Pierre Williot, ed., *Histoire des innovations alimentaires: XIX^e et XX^e siècles* (Paris, 2007); Shane Hamilton, "Introduction: A Special Issue on Food and Innovation Introduction," *Business History Review* 83, no. 2 (2009): 233–38.

⁶ See, for instance, Daniela Brignone, *Ferrarelle: A Sparkling Italian Story* (Milano, 2001).

⁷ Simonetta Sperandio, *Le sorgenti minerali Sangemini e Amerino* (Arrone, Italy, 2000); Nicolas Marty, *Perrier, c'est nous! Histoire de la Source Perrier et de son personnel* (Paris, 2005).

⁸ Richard Wilk, "Bottled Water: The Pure Commodity in the Age of Branding," *Journal of Consumer Culture* 6, no. 3 (2006): 303–25; Spar and Bebenek, "Profitable Springs"; Nicolas Marty, *L'invention de l'eau embouteillée: Qualités, normes et marchés de l'eau en bouteille en Europe, XIX^e–XX^e siècles* (Brussels, 2013).

⁹ Except in the field of economic sociology: see Gay Hawkins, Emily Potter, and Kane Race, *Plastic Water: The Social and Material Life of Bottled Water* (Cambridge, MA, 2015).

¹⁰ Diana Twede, "The Birth of Modern Packaging: Cartons, Cans and Bottles," *Journal of Historical Research in Marketing* 4, no. 2 (2012): 245–72; Kit L. Yam, ed., *The Wiley Encyclopedia of Packaging Technology* (Hoboken, NJ, 2009).

a key contributing factor to their success, as is food security with regards to certain packaging products, such as aluminum.¹¹

We now have a solid base of knowledge concerning the creation of different types of plastics products, production methods, and the use of these products as a necessary material for the development of many applications.¹² Significant academic papers also focus on the potential of this material for study within the social sciences.¹³ The issue of packaging is clearly linked to consumer society, material culture, wastage, and therefore environmental history. However, the above-mentioned studies have little relation to those dealing with the issue of waste, household garbage, and recycling. Significant contributions have also come from the fields of social history and the sociology of food and consumer practices.¹⁴ The deep relationship to objects—and the importance of the consumer culture—is fertile ground for understanding how consumers might become activists for new practices (or not).¹⁵ In this context, a number of historians have shown the merit of the concept of “waste regime,” which is closely linked to a “consumption regime,” which together must be thought of as related and intertwined systems that change over time.¹⁶ Extensive studies have been carried out on the more specific question of the proliferation of packaging waste and its recycling—and that of plastic in particular—in the life, environmental, and social sciences.¹⁷ Publications on recycling and long-term consumption habits show the power of cross-referencing techniques, cultural materials, and consumers in order to understand the successes or failures of recycling policies.¹⁸

¹¹ Karin Zachmann and Per Østby, “Food, Technology, and Trust: An Introduction,” *History and Technology* 27 no. 1 (2011): 1–10; Florence Hachez-Leroy, “Histoire de controverses: l’aluminium et le risque alimentaire, du XIX^e siècle à l’entre-deux-guerres,” *Entreprises et histoire* 89, no. 4 (2017): 58–77.

¹² J. Harry DuBois and Wayne I. Pribble, ed., *Plastics Mold Engineering Handbook* (New York, 1987); Robert Friedel, *Pioneer Plastic: The Making and Selling of Celluloid* (Madison, WI, 1983); Karel Mulder and Marjolijn Knot, “PVC Plastic: A History of Systems Development and Entrenchment,” *Technology in Society* 23, no. 2 (2001): 265–86.

¹³ Jennifer Gabrys, Gay Hawkins, and Mike Michael, eds., *Accumulation: The Material Politics of Plastic* (Abingdon, U.K., 2013).

¹⁴ David Evans, Hugh Campbell, and Anne Murcott, “A Brief Pre-History of Food Waste and the Social Sciences,” *Sociological Review* 60, no. 2 (2012): 5–26.

¹⁵ Sophie Dubuisson-Quellier, *La consommation engagée* (Paris, 2009); Susan Strasser, *Waste and Want: A Social History of Trash* (New York, 2014).

¹⁶ Gille, “From Risk to Waste,” 60–61; Carl A. Zimring and William L. Rathje, eds., *Encyclopedia of Consumption and Waste: The Social Science of Garbage*, vol. 2 (Thousand Oaks, CA, 2012).

¹⁷ Matthew Gandy, *Recycling and the Politics of Urban Waste* (New York, 1994).

¹⁸ Ruth Oldenziel and Heike Weber, “Introduction: Reconsidering Recycling,” *Contemporary European History* 22, no. 3 (2013): 347–70; Heike Weber, “Towards ‘Total’ Recycling: Women, Waste and Food Waste Recovery in Germany, 1914–1939,” *Contemporary European History* 22, no. 3 (2013): 371–97.

It is thus at the confluence of these various academic fields that it is possible to situate this case study. To do so, this article makes use of a specific theoretical framework and method. Studying business history is crucial to properly grasping the fundamental issues raised by the case of the adoption of the plastic bottle and its diffusion in our societies. This approach, which examines managerial decision making within the individual firm, has not really been implemented in the case of drink producers and the use of plastic material for packaging. It is necessary to retrace the innovation by Vittel to understand the economic rationality of the choices made in light of the technological options available to contemporaries and their frame of reference.¹⁹ But it is also necessary, in a framework very much concerned with the social construction of this phenomenon, to widen the point of view to encompass a variety of stakeholders in order to understand the social, political, and cultural context of the issue.²⁰ In this line of thinking, markets are viewed as complex social constructions in which institutions and networks play more than a minor role.²¹ The development of quality standards for food and drink products is fundamental to understanding the evolution of these markets.²² Any work done in this field must take into account the crucial question of the spatial organization of markets and the distribution of products.²³ This is the reason why, in addition to firm archives and expert documents from the French Ministry of Health, for instance, trade publications have also been used as sources.

The following section presents the underlying reasons for the use of PVC. The second section reviews the choices made by Vittel. The third section attempts to examine the immediate consequences of these decisions, namely, the spread of PVC in the beverage industry. Finally, the

¹⁹ Patrice Flichy, *L'innovation technique: Vers une nouvelle théorie de l'innovation* (Paris, 2003), 153; Margaret B. W. Graham, "Technology and Innovation," in *The Oxford Handbook of Business History*, ed. Geoffrey G. Jones and Jonathan Zeitlin (Oxford, UK, 2007), 347–73.

²⁰ Wiebe E. Bijker, Thomas Parke Hughes, and Trevor Pinch, eds., *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology* (Cambridge, MA, 2012); On food products, see Uwe Spiekermann, "Twentieth-Century Product Innovations in the German Food Industry," *Business History Review* 83, no. 2 (2009): 291–315.

²¹ Neil Fligstein, *The Architecture of Markets: An Economic Sociology of Twenty-First-Century Capitalist Societies* (Princeton, NJ, 2001); Mark Granovetter, "The Impact of Social Structure on Economic Outcomes," *Journal of Economic Perspectives* 19, no. 1 (2005): 33–50; Franck Cochoy, ed., *Du lien marchand, comment le marché fait société: Essai(s) de sociologie économique relationniste* (Toulouse, France, 2012).

²² David Smith and Jim Phillips, eds., *Food, Science, Policy, and Regulation in the Twentieth Century: International and Comparative Perspectives* (New York, 2000); Alessandro Stanziani, *Histoire de la qualité alimentaire: XIX^e -XX^e siècle* (Paris, 2005).

²³ Jean-Claude Daumas, "Distribution et consommation: Introduction," in *Faire de l'histoire économique aujourd'hui*, ed. Daumas (Dijon, France, 2013), 179–82.

last section discusses the first environmental considerations related to the use of this material.

The Underlying Reasons for the Use of Nonreturnable Packaging

In postwar Europe, during the period that could be called the “golden age of food processing,” the production capacities of mineral water and soft drink factories greatly increased.²⁴ Bottling machines were largely improved, and the handling, filling, and monitoring of production was automated. This type of system was developed in large factories in France, Belgium, and West Germany.²⁵ The improvements in production were greater than in other beverage industries, such as breweries, which was probably due to a significant drop in the consumption of alcoholic beverages and broader postwar social transformations.²⁶ On the other end, retailers had changed significantly. Supermarkets were beginning to take a significant lead over drinking establishments or pharmacies.

However, at the same time, packaging limited improvements to productivity because it slowed down the retail chain with consignment operations.²⁷ Glass, considered to be a precious material, is given away at each transaction and, in the end, returns to its starting point after a cascade of consignments. Returnable bottles generally change hands about twenty times. This practice was occasionally used by some operators even before World War I; it then became common practice in France following a 1938 law, the scope of which covered all nonalcoholic beverages and which was reaffirmed in 1941. In practice, the producing companies sell the water and the bottle to the wholesaler. The latter must have a significant cash flow to effectively pay an advance and wait in turn for the payment of the empty bottles. It then charges the equivalent of the cost of the bottle to retailers, who pass the cost on to customers. Customers are refunded if they return the empty bottle to the retailer,

²⁴ Harvey A. Levenstein uses the expression for the United States. Levenstein, *Paradox of Plenty: A Social History of Eating in Modern America* (Berkeley, CA, 2003), 101–18.

²⁵ Marty, *Perrier*, 145–46; Hans Jürgen Teuteberg, “Vom Gesundbrunnen in Kurbädern zur modernen Mineralwasserproduktion,” in *Geschichte des Konsums: Erträge der 20. Arbeitstagung der Gesellschaft für Sozial- und Wirtschaftsgeschichte*, ed. Walter Rolf (Stuttgart, 2004), 123–58.

²⁶ Jean-Pierre Pellegrin, *Les eaux minérales en Belgique, France et États-Unis* (Brussels, 1967), 31. In fact, the average production per establishment was higher for breweries than for water and soft drink plants. It is therefore more of a catch-up than a real overtaking.

²⁷ Technical services of Evian calculate that, this being a ton-kilometer consumable product, there were 2.4 ton-kilometers of packaging (bottles and cash) in view of return in the mid-1960s. Évia, Packaging survey to the General Directorate of Health (hereafter DGS), 1967, folder 31, box 2000 0113, French Historical Center for National Archives, Paris (hereafter CHAN).

who is paid by the wholesaler, who finally invoices the empty bottles back to the producer. The system entailed new handling, took up space at wholesalers and producers, and generated complex accounting.

The severity of these problems in Europe varied depending on the organization, the degree of standardization of bottles, and the size of the markets in which companies operated (local, regional, or national). In France, bottles were often standardized at the very least. Big firms were very attached to their bottle type, which was sold all around the country. The *Commission des instruments de mesure* sought to limit the types of bottles but did not want to impose a standard bottle. The only requirement was that a bottle's rated capacity had to be engraved on it so as not to mislead the public.²⁸ In Great Britain there was initially a large number of types of bottles, of varying capacities, but the Soft Drinks Industry (War Time) Association (SDI) made a major effort to limit glass waste between 1942 and 1948.²⁹ In West Germany, the limited area of regional producer markets reduced both the difficulties in returning bottles and transport costs. Firms provided an operating system for the collective recovery of bottles through a cooperative, the *Genossenschaft Deutscher Brunnen* (GDB), which was controlled by a professional organization, the *Verband Deutscher Mineralbrunnen* (VDM). In this context, the sorting of bottles was limited by standardization.³⁰ But this solution was strictly tied to the structure of the West German beverage market and was not widely used in the rest of Europe.

For several producers, "one-way" packaging appeared as a good solution during the 1950s and 1960s, despite its significantly higher cost. These packages, which are used only once, had been developed in the United States starting in the 1930s.³¹ The beer can was already being presented as an "American habit" by the European retail press in 1938.³² During the 1950s, U.S. producers partly turned to cardboard packaging (fruit juices, milk) or to a "one-way" glass bottle that was lighter than a returnable one.³³ Most of the impetus came not from the bottlers themselves but from the major supermarket chains, which, in the

²⁸ Minutes of the meeting of 15 June 1961, Department of Industry, folder 5, box 2003 0384, CHAN.

²⁹ SDI, 1942–1948, General Register House, box GD1/524 -19, National Archives of Scotland, Edinburgh; see also House of Commons Deb., vol. 673 cc1481 (1963).

³⁰ Ulrich Eisenbach, *Mineralwasser: Vom Ursprung Rein Bis Heute: Kultur- Und Wirtschaftsgeschichte Der Deutschen Mineralbrunnen*, (Bonn, 2004), 257–58; Konrad Jürgen Kraus, *Unternehmungsgrösse und Konzentration in der deutschen Erfrischungsgetränke und Mineralbrunnenindustrie* (Frankfurt, 1982), 319–24.

³¹ Twede, "Birth of Modern Packaging," 262.

³² "Note sur une habitude américaine, la bière en boîte," *Gazette de Jean Primus*, June 1938, 641. In 1958, approximately 40 percent of beer sold in the United States was packaged in this form.

³³ See the American Bottlers of Carbonated Beverages, report 3 (Washington, DC, 1959), 44.

1940s, reported that “handling and storage make the returnable bottle uneconomic.”³⁴ Nonreturnable glass was developed in Europe, particularly in the United Kingdom and Belgium at the beginning of the 1960s. According to a professional in the Belgian market, “the greatest incentive for the passage to non returnable glass packaging was undoubtedly the new forms of distribution, especially self-service, which owe their success to methods allowing to reduce the cost of storage and handling.”³⁵ In 1965, 10 to 15 percent of the total deliveries of beverages in Belgium were packaged in one-way packaging.³⁶

At the same time, it must be said that this need coincided with a major development in the use of plastics in very diverse fields. The post-World War II period saw the culmination of a process that had begun at the end of World War I: the massive growth of the oil industry provided major opportunities for the development of by-products.³⁷ During this period, in what scientists and manufacturers have called the “golden era of plastic,” the chemical industry manufactured artificial materials with more numerous and diverse characteristics. This is particularly the case for polyethylene. This material had been developed industrially since the 1940s in the United Kingdom and the United States, in particular by DuPont, Standard Oil, Imperial Chemistry Industry, and Philipps Petroleum Industry.³⁸ It began to emerge specifically for the manufacturing of films or light packaging and was used extensively by the American company Tupperware, whose products were widely distributed in the 1950s.³⁹ Plastic bottles made of polyethylene and polyvinyl chloride, or PVC, began to be used after the 1940s, thanks to blow-molding technology. Owens-Illinois Glass Co. and Plax Corp. (Hartford Empire Co.) were pioneers in the use of automatic glass-blowing machinery to make polystyrene bottles in the 1930s. However, it was Plax Corp. that created blow molding in the mid-1940s for deodorant bottles. At the very beginning of the 1960s, fifty-five builders were involved in the manufacturing of blow-molding equipment.⁴⁰ At this time, however, plastic packaging was mainly used

³⁴ “La bouteille consignée est-elle le conditionnement de l’ère de l’écologie?,” *Revue de l’emballage* (hereafter *RE*), 1971, 55.

³⁵ Jean Fénart, “L’emballage en verre en Belgique,” *RE*, 1967, 23.

³⁶ Fénart, 23. Most one-way glass bottles are used for beer.

³⁷ Jeffrey L. Meikle, *American Plastic: A Cultural History* (New Brunswick, NJ, 1995), 265–66.

³⁸ Christopher Irwin, “Blow Molding,” in Yam, *Wiley Encyclopedia*, 137–38; Vaseem Firdaus and Paul P. Tong, “Polyethylene, Linear and Very Low-Density,” in Yam, *Wiley Encyclopedia*, 983–84.

³⁹ Levenstein, *Paradox of Plenty*, 114–17, 136; Alison J. Clarke, *Tupperware: The Promise of Plastic in 1950s America* (Washington, DC, 1999).

⁴⁰ Irwin, “Blow Molding,” 138.

for detergents, cleaners, chemicals, toiletries, and cosmetics and not for foodstuffs or beverages.⁴¹

The interest of the French food processing industry was precocious. Manufacturers were impressed by the rapid growth in packaging needs, particularly for vials, jars, and bottles.⁴² In a 1950 article in the *Revue de l'Embouteillage* (journal of the French bottling industry), Roger Million, an engineer from the Arts et Métiers, presented polyethylene as “a promising material for bottling.” The engineer concluded with these words: “polyethylene is not yet widely used in France, but the *Revue de l'Embouteillage* had to point out the exceptional qualities of this product to enable its readers to consider its use for fear of being left behind.”⁴³ Lesieur, the leading French company for edible oil, was the first firm to use plastic for its products in the early 1960s. In France, producers had followed the American example by switching to plastic packaging for household products, including the Cotelle & Foucher firm’s leading product, “La Croix” bleach. In addition, several competitors in the edible-oil market were beginning to prepare for the switch to nonreturnable packaging, including the Anglo-Dutch firm Unilever and its French subsidiary Astra-Calvé. As early as 1960, Lesieur made the decision to switch to plastic. The firm finalized its own process utilizing the services of French engineer Antoine Di Settembrini, inventor of a technique to create plastic jars by extrusion blow molding using polystyrene.⁴⁴ The investments were heavy in terms of research and manufacturing. Lesieur chose to develop a subsidiary, named Dorlyl, jointly with the Compagnie Française des Produits Chimiques Shell. In 1963, Lesieur launched its edible oil on the market in a plastic bottle, which was very well received by consumers and distributors. By 1964, 80 percent of its production was distributed in this packaging. Another subsidiary, Sidel (Société Industrielle des Emballages Légers), was founded in 1963 with Pont-à-Mousson (90 percent owned by Lesieur) to create machinery to manufacture light packaging.⁴⁵

⁴¹ J. Harry DuBois, *Plastics History U.S.A.* (Boston, 1972), 14–16; W. V. Titow, *PVC Technology* (London, 1984), 5.

⁴² Denis Woronoff, *Histoire de l'emballage en France du XVIII^e siècle à nos jours* (Valenciennes, France, 2014).

⁴³ Roger Million, “Un matériau d’avenir pour l’embouteillage. Le Polyéthylène,” *RE*, 1950, 187.

⁴⁴ Tristan Gaston-Breton, *Lesieur: Une marque dans l’histoire* (Paris, 1998), 281–85.

⁴⁵ “Emballages plastiques: La société Sidel,” *RE*, 1971, 67. Pont-à-Mousson was initially a large metallurgical company interested in diversifying into packaging. It then merged with Saint-Gobain.

Vittel: The First Use of PVC in the Mineral Water Industry and Its Initial Consequences

In France, the period between the 1950s and the 1970s constitutes the second stage of the geographic expansion of bottled water markets. A limited range of products was available throughout the country, responding to a very high demand and enabling the growth of a dynamic market. This was a phase of consolidation of the national market around a few major brands. This situation initiated a very high market concentration from the mid-1950s onward.

This high concentration resulted from many converging factors related to the history of the French market. However, the most important reason probably stems from the regulatory model of the product: in France, and in several other countries (Italy, Belgium, Spain), mineral water could not be sold without specific authorization from the public authorities, which authorized products after consulting medical authorities (the Academy of Medicine in France). According to the authorities, mineral water should be considered a therapeutic product and thus should be authorized before being put on the market. The product in the bottle was supposed to be the same as at the source itself and, therefore, it was not possible to change it in any way. This resulted in a limited number of new entries in the market, as companies were required to obtain authorization and, above all, to perform a certain number of analyses and ensure compliance within a series of significant constraints. Small companies, which had represented a significant proportion of the operators in this market since the end of the nineteenth century, found it increasingly difficult to cope with these constraints and their number decreased, while large companies were able to find ways to sell their products throughout the country.⁴⁶ By the end of the 1950s, the main French firms had almost complete control over this growing market. Evian held 26 percent of the market share, Perrier 25 percent, Vittel 21 percent, and Vichy water 19 percent; together, these four companies controlled 91 percent of the market. In 1957, apart from the “Big 4,” only forty-five companies were left in the industry. Source Perrier SA, managed by Gustave Leven, had acquired a complete range of water between 1954 and 1961 to be distributed throughout the country with a view to controlling transport costs.⁴⁷ Vichy water (Compagnie Fermière de Vichy and Société Commerciale du Bassin de Vichy) was owned by Brasseries et Glacières d’Indochine (BGI), a large

⁴⁶ Prof. Bettiaux Report on bacteriological control of mineral waters, Nov. 1957, folder 5, box 2003 0384, CHAN.

⁴⁷ Nicolas Marty, “La consommation des eaux embouteillées,” *Vingtième Siècle. Revue d’histoire*, no. 91 (Sept. 2006): 33–35.

brewery. Evian was an important firm involved in thermal activities with the significant participation (25 percent) of a key glassmaker, Souchon Neuvesel. Relations with glass suppliers were very strong, as bottles represented a significant part of the final cost of the product. The mechanical hollow-glass sector was also becoming more concentrated. Starting in the late 1950s, Saint-Gobain, one of the oldest incumbent operators, brought together many formerly independent companies, and in 1966 the Souchon Neuvesel company, a manufacturer of hollow glass, approached Boussois (a flat-glass manufacturer) with a proposition to create the large company BSN. In 1968, the two companies dominated 85 percent of the hollow-glass packaging market. All of them were strongly affected by the release of the Lesieur plastic bottle, leading Arnaud de Vogüé, director of Saint-Gobain, to speak of the “war of materials.”⁴⁸

Vittel was still a family firm, owned by the Bouloumié family since its foundation in 1854. Germaine Bouloumié, chair of the board of directors since 1952, considered the firm’s position to be vulnerable and deemed it necessary to react to the risk of being overtaken.⁴⁹ The leaders of Vittel teamed up with other beverage companies: first with Brasseries de la Meuse to produce a soft drink called “Ricqlès,” and then with Lesieur out of fear of seeing their two main competitors—Perrier and Evian—take too much market share. It was in this shifting landscape in the industry, characterized by strong growth and pressure on distribution systems, that the company decided in 1963 to make every effort to create a new type of packaging for mineral water. It should be said that Air France was also looking for lighter products to supply its aircraft. This niche market segment was highly sought after for its prestige. Vittel focused its efforts in three areas: finding a compatible material and industrializing it, obtaining government permission to use this type of packaging, and convincing the stakeholders of the branch (retailers, wholesalers, etc.) and consumers to adopt the product in this new presentation. At first, its two main competitors were not interested in PVC packaging. Perrier already had a vast network of retailers and wholesalers, and its main product, Perrier, was a sparkling water impossible to package in PVC. Evian, as we have seen, counted BSN as one of its shareholders, with a 30 percent stake. Evian and Perrier forwarded a study to the French administration to demonstrate that the sector had no interest

⁴⁸ Saint-Gobain’s Archives, 1970, quoted in Alexandre Tessier, “Le verre à l’épreuve des emballages alimentaires dans les années 1960” (working paper, ANR–ECA, 2012), 1.

⁴⁹ Report on Vittel and Mineral Water Trade, box DEEF 59761/59 893-2, Crédit Lyonnais Archives, Paris (hereafter CLA); Guy de La Motte-Bouloumié, *Vittel 1882–1982: l’histoire d’un centenaire* (Vittel, France, 1982), 19.

in developing this type of packaging.⁵⁰ However, Vittel was convinced it should continue exploring the use of this material. Relations with Souchon and Neuvesel, who had been suppliers of Vittel bottles since the beginning of the twentieth century, became very difficult. Following an agreement signed in 1966 that gave Vittel complete freedom to develop its own nonreturnable packaging, Guy de la Motte-Bouloumié spoke, toward the end of the 1960s, of a real “guerilla war” with the glass-maker, on which he still depended for other products.⁵¹ It was thus necessary for Vittel to find a means of avoiding a price increase. The solution was to increase the capacity of the water bottle from 0.9 L to 1.5 L. The cost ratio of the larger packaging thus became profitable.⁵² Plastic bottles were manufactured locally, according to techniques made possible by the new material combined with the experience of Lesieur and Sidel. Using these new techniques, Vittel launched “Maxi Vittel” in October 1968.

If the decision took a long time to be implemented, it was because of the specific forms of regulation on mineral water that existed in France at this time. Legislation for health standards in France struggled to keep pace with technological innovations.⁵³ A wide range of experts were involved in the study of plastics to ensure that this new material would not endanger public health. In 1945, the Direction des Industries Chimiques of the Ministry of Industry created a research center on plastics, which conducted numerous studies demonstrating the safety of plastics in contact with food.⁵⁴ For this directorate, Vittel’s request conformed to the regulation for food products; however, mineral water was not considered a drink like any other. As mentioned above, mineral water could not be sold without specific authorization from the public authorities, supported by expert medical opinion. In this challenging context, the use of plastic posed a peculiar problem for medical experts. It had been authorized for drinking-water pipes in November 1953 by the Conseil Supérieur d’Hygiène Publique (CSHP), and then for mineral-water bottle caps by the Academy of Medicine in 1958. However, the transition to completely plastic packaging had not been envisaged. In 1964, all materials other than glass had to be authorized by the Ministry of Health. The principle was that a specific authorization (product material

⁵⁰ E. Frachon, Evian SA, to Dr. Boulenger, head director of DGS, report regarding the use of plastic packaging in the mineral water trade, 28 Sept. 1968, folder 31, box 2000 0113, CHAN.

⁵¹ La Motte-Bouloumié, *Vittel*, 17.

⁵² Vittel technical file: Economic impact of PVC packaging, 1968, folder 31, box 2000 0113, CHAN.

⁵³ List of French texts relating to the packaging of food products since 1912, folder 31, box 2000 0113, CHAN.

⁵⁴ Notes from the *Centre d’Études des matières plastiques*, 1958–1965, folder 31, box 200 113, CHAN.

used for the packaging) had to be obtained before placing the product on the market.

Starting in 1965, and inspired by CSHP requests regarding the packaging of oil, Vittel put together an application for approval with a number of checks on the safety of plastic used for packaging. Analyses were made to prove that putting the material in contact with water did not alter its organoleptic, physical, chemical, physicochemical, microbiological, or pharmacodynamic properties. Three laboratories involved in water management—the laboratory of the prefecture of the Seine, the Institute of Hydrology at the University of Clermont Ferrand, and the research laboratory of the Scientific Institute of Food Hygiene—intervened in 1965 and 1966 in the study of the safety of plastics to verify Vittel's data and that of plastic and packaging producer Sidel.⁵⁵ The conclusion was that the packaging did not modify the qualities of the water. The CSHP, responsible for providing its opinion prior to official authorization by the Ministry of Health, was satisfied. However, the initial recommendation of the Academy of Medicine, in October 1966, was unanimously unfavorable, not only because of “the possible harmfulness of the chemicals components in their compositions” but also because of the “concern that the walls of plastic bottles contained microcracks that could contaminate the contents of the bottle.”⁵⁶ This refusal led to a new series of analyses in 1967. At that time, the laboratory of the Scientific Institute of Food Hygiene (Paris) and the Koninklijke Shell Plastics Laboratorium (Delft) confirmed the existence of microcracks on a very small number of samples. However, they concluded that these cracks, when they occurred, could not be ignored by the manufacturer or consumers and that they did not represent a danger. They also said that the cracks were far too small to allow bacteria to contaminate the inside of the bottle.⁵⁷ After these clarifications, in April 1968, without the Academy of Medicine offering a new opinion, authorization was given by the Ministry of Health. The main reason behind the approval is linked to the fact that the type of packaging is never the subject of an authorization, but the specific authorizations for each mineral spring encompass the packaging, the composition of which must be specified. In fact, there was probably a balance of power between the CHSP and the Academy of Medicine. In 1973, Dr. Bernard Ninard, director of the National Public Health Laboratory, specified that the academy “obviously” did not have to be solicited

⁵⁵ Péchiney to the Ministry of Health, 8 Nov. 1965, folder 31, box 2000 0113, CHAN

⁵⁶ Pr. Merklen, From the Mineral Water Commission of the Academy of Medicine (report), 18 Oct. 1966, folder 5, box 2003 385, CHAN.

⁵⁷ Reports concerning the detection of unsightly cracks likely to be present in plastic bottles intended for conditioning Vittel Grande Source water, Feb. 1967, folder 31, box 2000 113, CHAN.

in matters of water conditioning.⁵⁸ Clearly, it retained its authority to authorize the exploitation of a new source but not its use of packaging.

The Expansion of Plastic Bottles during the 1970s: Successes and Failures

Vittel's bet was successful. The Maxi Vittel plastic bottle received the Oscar for packaging at the 1968 Packaging Exhibition, technical section. Retailers, particularly supermarkets, welcomed the product very favorably. *Libre Service Actualité* entitled its December 20, 1968 issue "Maxi Vittel: Star of the Packaging Exhibition," noting that "one of the fundamental hopes of modern distribution is coming true." Maxi Vittel products were systematically promoted at self-service retailers. The administrative operations related to paying deposits, storage areas for empty bottles, and the problems of bottle breakage were now behind them. This immediate success led to a very strong reaction from competitors. Most had already developed plans to respond. The procedure that Vittel had established for obtaining authorizations from the Ministry of Health was used as the model for all other applications.⁵⁹ Specific authorizations that included the precise composition of the packaging were required for each water source. Any modification to the bottle thus logically required a new authorization. This formula was voluntarily—and temporarily—adopted on the grounds that definitive methods of control were not possible to determine because of rapid developments in technology.⁶⁰ French operators found that the procedure agreement was too strict. Pr. Pierre Caron, who headed the Institut français de l'emouteillage in Nancy, did not hesitate to speak out about "administrative harassment," which, for him, was clearly "an obstacle to rapid switching to non returnable packaging."⁶¹

Despite these constraints, reactions were very rapid. The Clairvic Spring in Volvic (a small and independent spring at the time) was the first to follow Vittel, in June 1969. Next came Contrexéville (July 1969), an important spring owned by Perrier Group, and Evian (the Cachat Spring, October 1969). Evian, initially skeptical, completely converted to plastic packaging. Antoine Riboud, CEO of BSN, reacted quickly. Speaking in 1970, he remarked that one-way packaging was an element of "progress and profit. The problem is no longer discussing

⁵⁸ Dr. Bernard Ninard, medical director of the section of thermal studies of the National Laboratory of Public Health, to the Higher Council of Thermalism and Climatism, report, 1973, folder 24, box 1992 0441, CHAN

⁵⁹ *Journal officiel*, 12 Aug. 1969, 8076–77.

⁶⁰ Dr. Ninard's report, 1973, folder 24, box 1992 0441, CHAN.

⁶¹ Pierre Caron, "Dialogue sur les emballages perdus," *RE*, 1972, 30.

[sic] the philosophy of change, but its consequences. It is necessary to be a player in this change. We must dominate and lead this revolution.”⁶²

At the end of the 1960s and the beginning of the 1970s, the number of plastic producers for food packaging grew quickly. Sidel was one of the essential players, but many other competitors emerged: Astra Plastique (a subsidiary of Unilever), Solvic (a subsidiary of Solvay, Belgium), and Saint-Gobain Carnaud Interplastic were all present on the market.⁶³ In France, plastic represented more than 70 percent of all packaging for mineral water by the end of the 1970s.⁶⁴ Even some small operators were starting to use PVC bottles, including Arline spring water, produced in Franconville, which launched its 1.5 L plastic bottle in October 1969. Two years later, in 1972, Arline CEO Jacques Treherne congratulated himself: “we observed that the consumer has not only accepted this new packaging very well, but that, in addition, consumption has increased by 50%.”⁶⁵ Among retailers, only hotels, cafés, and restaurants retained returnable glass packaging, refusing to use plastic bottles in order to maintain both high-quality presentation and high prices.

These transformations took place in a highly mobile entrepreneurial landscape. Perrier had absorbed the Vichy springs and was closing in on the Société Européenne de Brasserie, which had a very large beverage distribution network. BSN, then in the process of transformation, was increasingly seeking to diversify into food products, under the policy of moving “from container to content” after a failed takeover bid for Saint-Gobain at the end of 1968. BSN would absorb Evian completely in 1971.⁶⁶ In April 1969, Vittel approached the food giant Nestlé, which acquired a 30 percent stake in the company. Germaine Bouloumié explained this decision as follows: “The competition is getting fiercer and fiercer. Groupings and mergers have considerably changed the face of the profession and Vittel is now in the presence of a real coalition whose hostility has increased even further since we launched our plastic packaging.”⁶⁷ The merger with Nestlé was also intended to open international doors and establish power relationships for Vittel products within the French distribution sector.⁶⁸

⁶² “Introduction d’Antoine Riboud Colloque BSN, Evian,” *RE*, 1970, 32.

⁶³ “Emballages plastiques,” *RE*, 1971, 67; “Restructurations dans l’emballage plastique,” *RE*, 1972, 59.

⁶⁴ Report 1978–1982, European Association of Mineral Water Spring (hereafter GESEM). This proportion has remained stable since the share of plastic packaging was 75 percent in 2000 (compared with 25 percent for glass).

⁶⁵ “L’eau de source Arline,” *RE*, 1972, 37.

⁶⁶ Mineral Water Trade Survey, 1972, box 79 413-1, CLA.

⁶⁷ Germaine Bouloumié to the Board of Directors, 28 April 1969, quoted in La Motte-Bouloumié, *Vittel*, 18.

⁶⁸ Finally, Vittel was completely incorporated by Nestlé in 1992.

In France, the introduction of plastic packaging led to a broadening of the market on two fronts. Innovation increased the number of consumers by at least 5 percent between 1968 and 1971 and the volume of mineral water each consumer drank by almost 25 percent. Starting in the early 1970s, there was a real increase in access to consumption. This is reflected in the household penetration rate, which passed from less than 50 percent in 1960 to more than 80 percent in 1990.⁶⁹ Not only did bottled water spread to many households, but it also became a much more regular, rather than occasional, purchase. The plastic bottle entered the home as a very visible part of everyday life. Much more than bottles of oil, the plastic bottle of mineral water was present at all times and transformed water into an everyday drink. This was a surprise to many observers, who thought consumers accustomed to glass would see plastic in a negative light and because of the “French spirit,” with its penchant for thriftiness and commitment to product recovery.⁷⁰ Germaine Bouloumié’s nephew Guy de la Motte-Bouloumié, who would later become Vittel’s CEO, stated, “Trembling at the idea of having run the risk of devaluing our mineral water for a long time by associating it with plastic, which the public still distrusts, I am delighted to see, on the contrary, the total success of the company.”⁷¹ This success was probably due to the fact that this product now considered “modern” was, at the same time, also associated with very reassuring elements related to the regulation of the product and the support of many experts known to consumers, such as doctors and pharmacists. Part of the success of this new packaging was also linked with the development of distribution patterns for self service and the use of the car. This convergence led to a very high level of confidence in bottled water, considered to be healthy and beneficial and, at the same time, modern.

Elsewhere in Europe, conditions were different and did not allow PVC to develop as early and widely as in France. In Belgium, Spa Monopole, the country’s largest mineral water company, introduced plastic packaging for some of the products in its Spa Reine range in 1970 after having carried out preparatory studies in 1968.⁷² Solvic, a subsidiary of Solvay, the primary chemical company in Belgium, manufactured the bottles. The procedure, performed by Spa Monopole and described by its chairman Guy du Bois, is interesting: “Although no legislation

⁶⁹ INSEE, *Annuaire rétrospectif 1948–1988* (Paris, 1990), 130.

⁷⁰ “The Frenchman, a thrifty creature and a good user of these resources, has not yet adopted, with regard to the use of things, this natural and slightly casual mentality of the American attic. He has a guilty conscience, such as a feeling of discomfort and guilt, in front of what seems to him to be a wastefulness.” *Saint-Gobain, Verre creux*, no. 15, June 1960.

⁷¹ La Motte-Bouloumié, *Vittel*, 17.

⁷² Spa Monopole to Belgian Minister of Public Health, 30 Nov. 1970, box 2000 0113, folder 32, CHAN.

on drink packaging material other than glass existed at that time, we have introduced our own record in the Ministry of Public Health of Belgium, basing ourselves on the French decrees on material. Permission was granted us by the Ministry of Public Health, following a favorable opinion of the Supreme Council of Hygiene in June 1971.”⁷³

The firm called on the Institut Belge de l’Emballage and the Center for Plastic Materials at the University of Liege. The royal order finalizing the legal procedure, which was published in July 1972, drew on elements that had been implemented in France some years earlier.⁷⁴ In 1982, the Fédération des Eaux de Boisson published a document claiming that the 1.5 L PVC bottle had captured only 15 percent of the market.⁷⁵ This contrast with France stems from the fact that an important part of the Belgian market was occupied by carbonated water and that the short distances within the kingdom reduced the need for further processing for packaging. In Spain, a survey conducted by the Asociación Nacional de Empresas de Aguas de Bebida Envasadas (ANEABE) in 1977 showed that PVC packaging already occupied 40 percent of the market, compared with 60 percent for glass.⁷⁶ This relatively high share of PVC packaging is explained by rapidly growing consumption in the country’s tourist areas and a low capacity to provide deposit or return systems for glass bottles in these areas, which were undergoing major transformations in a very short period of time. In Italy, despite the obvious advantage in terms of transport costs in a market where the main difficulties were caused by distance, the influence of plastic packaging was still limited in the mid-1970s, with only a 5 percent market share. The presence of a large number of small and medium-sized companies probably explains this low penetration.⁷⁷ From the 1980s onward, according to Federterme (the Federazione Italiana delle Industrie Termali e delle Acque Minerali Curative), the use of PVC developed in particular areas, especially the islands of Sardinia and Sicily.⁷⁸

⁷³ Guy du Bois to French Minister of Public Health, 4 Apr. 1973, box 2000 0113, folder 32, CHAN.

⁷⁴ Protocol of tests carried out on PVC bottles for the packaging of noncarbonated mineral water, 1971–1973, Belgian Packaging Institute, folder 32, box 2000 113, CHAN; *Le Moniteur belge*, 23 Aug. 1972, 9158–60.

⁷⁵ Belgium Report, 1953–1977, GESEM.

⁷⁶ Asociación Nacional de Empresas de Aguas y Bebidas Envasadas report, 1977–2007, Groupement Européen des Sources d’Eaux Minérales (Paris, 2007), 12; see also Elvira Lindoso Tato and Margarita Vilar Rodríguez, “Orígenes e historia empresarial de la industria del agua embotellada en Europa: El caso español” (working paper, Asociación Española de Historia Económica, 2014), 19–22.

⁷⁷ Mineral water in Italy, 1972–1982, GESEM; Paolo Raspadori, “Bollicine: Per una storia dell’industria delle acque minerali in Italia dalle origini agli anni Ottanta del Novecento,” *Annale di storia dell’impresa* 13 (2002): 357–96.

⁷⁸ Roberto Ravazzoni, *Profili di sviluppo di un settore: l’industria italiana delle acque minerali negli anni ’80* (Milan, 1993), 70–74; Giovanni Anceschi and Valeria Buccheti, “Il packag-

In Germany, plastic was used widely in a very large range of applications. It was used as *ersatz* during the Nazi period and had a good image related to modernity and development during the early years of West Germany.⁷⁹ In 1960, per capita consumption for all plastics was even higher in West Germany than in the United States.⁸⁰ Nevertheless, the material was not yet used in the beverage sector. The bottled water market was substantial in size, but economic and cultural aspects meant that it was organized very differently. Even the largest companies operated only on a regional level. One of the reasons for this was the overwhelming dominance of sparkling water in the market. At that time, it was difficult to adapt this type of water to a PVC bottle. However, in subsequent years, technical progress made it possible to bottle low-carbon waters with PVC, as was the case in France as early as 1971–1972, for example. In 1977, the VDM presented the bottled water market as being exclusively (98 percent) comprised of returnable glass bottles. There were other reasons for the continued consignment and massive use of the glass bottle. At the end of the 1960s, the VDM and the GDB continued their standardization policy, pushing it almost to its maximum. A standard glass bottle of mineral water, the *Perlenflasche*, was now circulating “universally” throughout the German market. Designed by the German designer Günter Kupetz in 1969, it was both a technical and commercial success; German consumers adopted it immediately. German glassmakers put more than four billion bottles of this model into circulation between 1969 and 1982.⁸¹ This greatly facilitated consignment and return operations.

In fact, in Germany, it was not a negative reaction to plastic but rather a combination of economic, cultural, civic, and political factors that led to the rejection of the PVC nonreturnable bottle. This early rejection became emblematic of the negative consequences of mass consumption.⁸² This vision was not restricted to Germany, but it did not have the same strength in other European countries, and particularly not in France.

ing alimentare,” in *Storia d'Italia, L'alimentazione-13*, ed. Ruggiero Romano (Torino, 1998), 864–65.

⁷⁹ Andrea Westermann, “The Material Politics of Vinyl: How the State, Industry and Citizens Created and Transformed West Germany’s Democracy,” in Gabrys, Hawkins, and Michael, *Accumulation*, 70–73.

⁸⁰ Andrea Westermann, “When Consumer Citizens Spoke Up: West Germany’s Early Dealings with Plastic Waste,” *Contemporary European History* 22, no. 3 (2013): 478.

⁸¹ Marcus Botsch, *Die Mineralwasserflasche von Günter Kupetz* (Frankfurt, 1999), 4–6; Petra Serly, “Mineralwasser und Verpackung—Von der Keramik zum Kunststoff,” *Bayerisches Jahrbuch für Volkskunde* 12 (2007): 110–12.

⁸² Westermann, “Consumer Citizens,” 479–80, 485–86.

Early Awareness of Environmental Difficulties

The vast movement by industrialists and consumers toward nonreturnable packaging immediately raises questions. Early on, U.S. consumers, who were becoming increasingly sensitive to environmental issues, confronted producers with questions about the merits of one-way glass bottles for soft drinks.⁸³ The public's largely negative response to the advertising campaign of glassworkers exemplifies this environmental awareness. At the end of the 1960s, the Glass Container Manufacturing Institute, funded by glassmakers, launched an "innovative" advertising campaign using a pop group called Soda Pop and the One-Way Bottles. The group's songs featured lyrics in favor of nonreturnable packaging: "My one-way bottle keeps me alive and fit, / Don't have to go back to town to return it." Individual citizens and consumer associations protested with an avalanche of mail. Public pressure resulted in the modification of the name of the group, which became The Glass Bottles, and of its repertoire, which from then on focused on littering in nature.⁸⁴ During the 1970s, U.S. opinion surveys highlighted the existence of an increasing environmental awareness among consumers in relation to the use of plastics in packing and packaging. On the one hand, certain themes, such as the harmfulness of materials in everyday use, were not of significant concern to the public, who did not associate any health risks with these issues. On the other hand, household waste treatment and individual behavior were seen as important issues. Public opinion also clearly identified the plastics industry as a source of problems in terms of air and environmental pollution.⁸⁵

In France, by contrast, the environmental issue appeared to be a concern for the water and packaging industry but not for the public. In a symposium on BSN, held in Evian in 1970, Riboud talked about the subject in clear and strong terms: it now appeared "impossible" to ignore the disposal of packaging.⁸⁶ Two questions arose in particular: the increase of waste and its corollary—the incineration of PVC and the littering of bottles. The combustion of PVC releases chlorinated compounds that pose a serious environmental problem. This pollution can be limited, but the process is expensive. In other words, professionals clearly identified the main problems related to development of the consumption of nonreturnable packaging and, more particularly, plastic

⁸³ "No-Return Bottles Show Sharp Increase," *New York Times*, 23 Oct. 1966.

⁸⁴ "La bouteille consignée est-elle le conditionnement de l'ère de l'écologie?," *RE*, 1971, 55; "The Rhythm of No Return," *Investor's Reader*, no. 54–55 (1970): 29.

⁸⁵ Florence Hachez-Leroy, *Menaces sur l'alimentation: Emballages, colorants et autres contaminants alimentaires, XIX^e–XXI^e siècles* (Tours, France, 2019), 225–38.

⁸⁶ "L'emballage perdu: Élément de progrès et de profit," *RE*, Dec. 1970, 33–34.

packaging less than two years after most of the plastic bottles on the French market were put into circulation.⁸⁷ Following the reflections made during the BSN conference on nonreturnable packaging, Riboud created the Association Progrès et Environnement, in January 1971, of which he was the first president. This association immediately intervened by launching the “Clean Holidays” operation in the summer of 1971, the objective of which was to help municipalities combat the pollution of tourist sites by making easily identifiable waste bins available to the public.⁸⁸ An intervention by Robert Poujade, minister delegate in charge of nature and environmental protection under the Chaban-Delmas government, showed that the government had taken note of the problem. At the September 1971 inauguration of the Tetrapack plant in Dijon, Poujade announced the creation of an interministerial group to study all the difficulties posed by consumer residues in their technical, administrative, and financial aspects and in terms of public education. However, the lack of power of the “Ministry of the Impossible,” to use Poujade’s own expression, did not allow this working group to put forward concrete proposals.⁸⁹ This reflection led to the dissemination of reports, such as that of senior official Claude Gruson in 1974, and the creation of the National Agency for Waste Recovery in 1976. At the local level, a few rare cities developed recovery programs. In France—unlike in Germany or the Netherlands, for example—neither companies, nor consumers, nor public authorities took a strong interest in the issue or sought solutions to the significant quantity of waste being generated.⁹⁰ It seems that the manufacturers—who in the early 1970s were already well aware of the public’s reservations in the United States concerning the use of nonreturnable packaging—had prepared to face opposition that, in the end, did not emerge until much later.

Supranational institutions have played a significant role in acknowledging the need to protect nature and in developing waste treatment policies. For instance, a European strategy, outlined in Council Directive 75/442/EEC of July 15, 1975, advises that the prevention of packaging waste be considered a priority. It recommends that manufacturers adopt the principle that reuse and recycling of this packaging is of the utmost importance. The final disposal of waste must be reduced as much as

⁸⁷ Pierre Labasse, *Antoine Riboud: Un patron dans la cité* (Paris, 2007), 49–53.

⁸⁸ Labasse, *Antoine Riboud*, 34; Lionel Obadia, “France,” in Zimring and Rathje, *Consumption and Waste*, 275.

⁸⁹ Mathieu Flonneau, “Entre morale et politique, l’invention du ministère de l’impossible,” in *The Modern Demon: Pollution in Urban and Industrial European Societies*, ed. Christoph Bernhardt and Geneviève Massard-Guilbaud (Clermont-Ferrand, France, 2002), 119.

⁹⁰ Ruth Oldenziel and Milena Veenis, “The Glass Recycling Container in the Netherlands: Symbol in Times of Scarcity and Abundance, 1939–1978,” *Contemporary European History* 22, no. 3 (2013): 470–76; Weber, “Towards ‘Total’ Recycling,” 397.

possible.⁹¹ In parallel, the Organisation for Economic Co-operation and Development (OECD) prepared a draft recommendation in the mid-1970s. A think tank on waste management policies recommended a comprehensive policy, with a particular focus on beverage containers.⁹² In this context, in 1974 and 1975 French glassmakers began to put systems in place to recover glass packaging from the public. However, neither plastic producers nor the French mineral water manufacturers took any action during the 1970s regarding plastic wastage; they considered that it was up to the public authorities to develop consumer education and waste recycling programs. Of course, plastics manufacturers were trying to manufacture more efficient products, but improvements in PVC did not eliminate the polluting nature of its combustion. It should be noted that French industrialists were not pioneers in the use of PET (polyethylene terephthalate). This material—first used for synthetic fiber (1941) and for films (1966)—was developed for beverages in 1973 by DuPont.⁹³ This new type of material made it possible to bottle carbonated products, and soft drink producers in the United States were manufacturing these bottles as early as 1976.⁹⁴ The investments made in and the place occupied by PVC delayed the adoption of PET in the bottling of still water both in France and in other European countries. This packaging material really only became widespread in these markets in the late 1980s and early 1990s.

Conclusion

The first aim of this article was to show the specific conditions and consequences of the first use of PVC in a common and widely used consumer product: bottled water. It appears to be clearly linked to the convergence, at the end of the 1960s, of very different factors: a growing demand for packaging, significant difficulties created by the consignment of consumer products in the national market, and important innovations in the field of plastics and food production processes. The “first mover,” Vittel, was very successful in the context of a growing market and major upheavals in the structuring of the sector. By going beyond its technical reference framework, Vittel adopted a technology that manufacturers were already using for detergents, household products, and edible oil. It therefore broke with the technical reference framework

⁹¹ Council directive 75/442/EEC of 15 July 1975 on waste (OJ L 194, 25.7.1975, 39–41).

⁹² Draft recommendation on the re-use and recycling of beverage containers, 1978, folder C (78)008, box OECD-001688.008-1978, Historical Archives of the EU, Firenze.

⁹³ Kit L. Yam, “Polyesters, Thermoplastic” in Yam, *Wiley Encyclopedia*, 975–76.

⁹⁴ Gay Hawkins, “Made to Be Waste: PET and Topology of Disposables,” in Gabrys, Hawkins, and Michael, *Accumulation*, 52–53.

then in effect in its sector, a choice made all the more difficult not only by the fact that several of the major operators were linked to glassmakers but also because product regulation was very restrictive. Vittel applied this PVC packaging to a consumer product that had been widely adopted in daily use and widely distributed, to a greater extent than other products. The product, mineral water, was highly trusted by consumers because of its strict and very specific regulation in several European countries. This unique situation led to a significant breakthrough for the use of this type of plastic packaging in the bottling of mineral water—an important moment in the diffusion of single-use plastics. In the early 1970s, bottled water, associated mainly with plastic bottles, hardly even showed up in statistics on beverage consumption. By the beginning of the twenty-first century, however, bottled water had become the second most popular commercial beverage in a wide range of countries.⁹⁵ Early awareness of the environmental problems that this choice could represent, particularly on the part of entrepreneurs and some politicians in France, was not followed up with action during the 1970s.

Following bottled water, the plastic bottle was used for soft drinks and many other beverages. Its acceptance has had a clear impact on the adoption by many Western societies of a waste regime that endorses an overconsumption of packaging and disposable products. Clearly, at least from an environmental point of view, this is probably a much more important consequence than the strikes and protests of 1968, which appear to have been the most important event of the year in France. It also hindered the adoption of PET in France and in some other countries. Vittel, for instance, first used PET packaging in 1992.

Second, the integration of plastic as the base material for the packaging of bottled water provides a good starting point from which to differentiate between the unavoidable nature of this development and the role played by social construction. Far from being inevitable, the expansion of the product is in fact linked to specific market conditions in which producers are far from being the only stakeholders. The reasons that drove Vittel's decision makers to choose this option depend on historical conditions and a variety of actors, including distributors and consumers, but also on experts such as doctors and pharmacists; government officials also played a major role.⁹⁶ This complex situation led to a specific trajectory that made it possible to distribute this product within the framework of a complex balance of power. Other Western societies,

⁹⁵ Finn Arne Jørgensen, "Beverages," in Zimring and Rathje, *Consumption and Waste*, 72.

⁹⁶ David Smith and Jim Phillips, "Food Policy and Regulation: A Multiplicity of Actors and Experts," in Smith and Phillips, *Food*, 1–7; Spiekermann, "Twentieth-Century Product Innovations," 293.

such as West Germany and the Netherlands, followed different trajectories—owing to differing social, economic, and cultural conditions—which were more virtuous in terms of their waste regime but poorly distributed in other countries. From this point of view, business history makes a vital contribution to understanding these divergences. It can enlighten us as to approaches that address many historiographical challenges, including those related to environmental history.⁹⁷

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⁹⁷ Jean-Claude Daumas and Philippe Mioche, "Histoire des entreprises et environnement: Une frontière pour la recherche," *Entreprises et histoire* 35 (2004): 69–88; Andrew Smith and Kirsten Greer, "Uniting Business History and Global Environmental History," *Business History* 59, no. 7 (2017): 987–1009; Ann-Kristin Bergquist, "Renewing Business History in the Era of the Anthropocene," *Business History Review* 93, no. 1 (2019): 3–24.