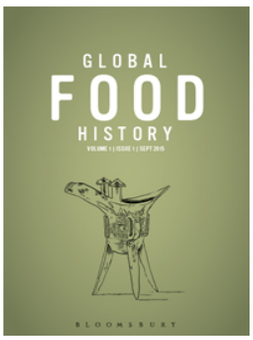

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Frozen Food and National Socialist Expansionism

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ABSTRACT

Fast freezing, developed from the 1920s, preserved food quality, taste, and appearance better than earlier techniques. After 1933, the National Socialists encouraged fast freezing in Germany because it promised to solve wartime supply problems and aligned with their ideas about modernity, efficiency, and centralization. During World War II, they used freezing to integrate the agricultural products of occupied and allied areas into a continental European economy (Grossraumwirtschaft) under German control. Although occupied populations might have been expected to reject the German-led spread of fast freezing, French responses to these initiatives suggest that some occupied people interpreted them more positively. French experts saw German fast freezing as a continuation of pre-war projects and an investment for the post-war, when they hoped to see France use new infrastructures to gain a pivotal position in a broader European food economy. After surveying alignments between National Socialist expansionism and fast freezing, this article examines reactions to German initiatives in the La Rochelle area on the western coast of France. The French case suggests that local reactions to German involvement in fast freezing were more complex than simple collaboration or, alternately, a juxtaposition of expansionist ambition and local resentment. Wartime formed part of longer patterns of transnational development, transfer, and exchange, and interactions during World War II may have opened the door for the spread of freezing in subsequent years.

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Frozen food, though commonplace today, was a seldom-used commodity in the early twentieth century. Especially meat and fish had been frozen since the later nineteenth century, but were considered poor-quality substitutes for fresh. Fast freezing, developed in the United States, replaced earlier methods in the 1920s. After 1933, the National Socialists in Germany found fast freezing attractive because it maintained food quality and texture. They supported domestic research in this area and in 1939, to make large-scale freezing feasible quickly, purchased the rights to the industrial process developed by American Charles Birdseye.[1]

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Although not the only European country interested in frozen food, Germany was the first to implement fast freezing extensively. Why? Fast freezing promised to solve problems and aligned well with National Socialist ideas about modernity, efficiency, and centralization. Initially, fast freezing supported the desire for autarchy stemming from the experience of blockade and hunger during World War I. With the renewed outbreak of war in 1939, the appeal of such freezing grew, for it seemed an ideal tool to exploit the agricultural resources of newly occupied lands. Fast freezing offered a way to bridge gaps between excess and shortage across time and space, making summer's vitamin-rich foods available in winter, and enabling the surplus products of one European region to be enjoyed in others where they were scarce.[2] By removing a bottleneck in the process of exploitation and domination, it opened up the possibility of supplying soldiers and civilians with limitless, year-round abundance.

Freezing was desirable to the Third Reich not only because of pre-war preparations and the conditions of war itself, including increased demand for collective meals and the risk of food shortages, but also due to the expansionist thrust of National Socialist war specifically. Its development was partly predicated on the fact that Germany now occupied vast swaths of European agricultural land. To realize the full potential of these areas, occupying authorities believed that intervention in food production and conservation was essential. Fast freezing would integrate agricultural products from far-flung occupied and allied areas into a continental European economy (Grossraumwirtschaft) under German control.

Given the connection between this new technology and National Socialist domination, one might have expected occupied populations to reject the introduction of fast freezing. Indeed, insofar as they have written about this subject, historians have suggested that local people resented German involvement in frozen food production and that wartime experiences contributed to giving such food a poor reputation. In Norway, for instance, Terje Finstad argues that poor wartime quality and negative associations with the occupation made it difficult for frozen fish to gain traction with consumers in the post-war years.[3] Alongside Norway, France was the foremost testing ground for German freezing outside the Reich.[4] Experts' reactions to new facilities there suggest that responses to German initiatives were complex, and that some occupied people saw them in a more positive light.

After surveying alignments between National Socialist expansionism and fast freezing, this article examines reactions to German initiatives in the La Rochelle area on the western coast of France. Prominent representatives of the French meat processing industry and the health and safety inspection were surprisingly open to German projects. These specialists tended to view German involvement in food preservation as a necessary evil, a way to ensure supplies for both occupying and occupied populations. As nationalists who subscribed at least partly to Maréchal Philippe Pétain's plans for national renewal along

Hitlerian lines, they viewed German innovations as potentially beneficial for France, embracing them as part of a longer drive to bring refrigeration to the French meat business, in particular.[5] At the same time, French observers sought recognition for French contributions to freezing. They interpreted the occupation as part of a longer continuum of scientific and technical interchange in which France played as important a role as its neighbor to the East. Finally, although they did not like the fact that the occupiers were expanding French freezing capacities to their own ends in wartime, French experts looked to the longer term. They viewed wartime growth as a continuation of pre-war projects and an investment for the post-war, when they hoped to see France use new infrastructures to gain a pivotal position in a broader European food economy.

The French case suggests that local reactions to German involvement in frozen food were more complex than simple collaboration or, alternately, a juxtaposition of expansionist ambition and local resentment. Food experts' attitudes underline the fact that wartime forms part of longer patterns of transnational development, transfer, and exchange. Even if associations with war and occupation gave specific frozen foods, like fish, a bad reputation, wartime interactions may have opened the door for the spread of freezing in the post-war years.

Historians have already begun to explore the connections between wartime and food innovations such as freezing. Like the history of food more generally, freezing may be approached from a variety of angles, including the history of science and technology, of consumerism, or of specific enterprises, individuals, or associations.[6] The foremost expert on war and freezing in Germany, Ulrike Thoms, has written a series of insightful essays that show how wartime furthered German food and nutrition science and the use of specific foods and processes such freezing, dehydration, and soybean cultivation.[7] In a global context, Lizzie Collingham has addressed freezing as one of a number of tools used to safeguard wartime food supplies. Like Thoms, she has pointed to the war as a key moment for the introduction of new technologies that became popularized after 1945.[8]

Other scholars have looked specifically at freezing in German-occupied territories. In Norway, they have shown how advances in freezing enabled the export of fish to address the perceived "protein gap" in German nutrition.[9] They have also traced the implications of German involvement for the post-war acceptance of frozen fish by Norwegians.[10] Although these works raise important questions, they are limited by their focus on fish, and on the Norwegian situation, specifically. In France, Kyri Claflin has examined meat processing and uncovered controversies over the use of refrigeration at the Paris abattoir La Villette in the late nineteenth and early twentieth centuries.[11] We also know a great deal about the overall food situation during the German occupation, and about the black market, but freezing has not yet drawn historians' attention nor has Franco–German interaction in this domain.[12] Looking

at freezing beyond occupied Norway brings to light both concrete connections between German expansionism and increased use of freezing, and "symbolic" links between this technology and the thorough-going exploitation of occupied lands. Moreover, freezing in the La Rochelle area offers insight into local responses to German initiatives, and helps fit wartime experiences into longer term patterns of exchange in Europe.

National Socialists took up fast freezing enthusiastically, for it aligned with their goals in important ways. Compared to earlier preservation techniques, like canning, fast freezing seemed practical, innovative, and modern. In the years before the war, it promised to make Germany less reliant on imported goods, fostering self-sufficiency. Once war began, it seemed a perfect tool to further the exploitation of occupied Europe.

Although industrial canning factories existed in Germany from the 1870s, Uwe Spiekermann points out that canned goods were slow to catch on.[13] Canned food became popular in the USA and Britain, but in Germany, it "symbolize[d] artificial and unhealthy fare."[14] Contemporaries worried about cans' nutritional value, and had doubts about additives used in production.[15] While canning, doubtless, accustomed Germans to industrially processed food, the bad reputation of canned goods may have helped encourage, or at least removed an impediment to, the adoption of frozen foods. In contrast to canned goods, frozen foods "were high in vitamins, contained no preservatives, and produced no poisoning incidents."[16] Whereas can-making required imported tinplate, which used up foreign currency and was difficult to obtain after 1939; frozen goods could be packed in paper, cardboard, or increasingly commonly in plastic film.[17] They were lighter to transport for the same amount of edible weight, and did not leave empty cans behind. Freezing and storing frozen foods required electricity, but such foods could be transported over long distances in insulated rather than actively cooled trains and trucks. Thawed products did, however, need to be cooked upon arrival, which was not the case with canned goods.

For the National Socialists, the potential to retain vitamins was another part of freezing's appeal. They believed that vitamins, "would improve the physical performance of workers and soldiers."[18] According to Thoms, the high vitamin content of frozen foods was the prerequisite for their use by the SS.[19] Contemporaries also understood that taste was important and saw frozen fruit, for example, as a way to add interest to a military diet. The introduction to the 1941 Field Cookbook reminded army cooks that, "You boost the mood and capabilities of your comrades if you provide them with food that tastes good."[20]

Military food expert Wilhelm Ziegelmayer emerged as a key proponent of frozen food.[21] In 1940, he argued that, "frozen foods offer considerable advantages for military provisioning," among which was the fact that such foods were "equivalent to fresh" (frischwertig), maintained vitamin content, and could be stored over long periods of time without alteration.[22] Properly warehoused, they were relatively impervious to rot, pests, and such war-specific threats as

"poison gases."[23] Moreover, freezing offered "the advantage of convenience, cleanliness and central waste processing."[24] Since most of the work preparing frozen food was undertaken at the production point, the packets were practical and easy to use. Cans had to be round because of pressure that arose during the heat preservation process, but frozen food could be made in any shape.[25] In contrast to earlier freezing efforts that used whole sides of beef, pork, or mutton, fast freezing introduced smaller rectangular blocks that were easy to transport and store. These frozen "bricks" of meat saved valuable time in field kitchens and other collective feeding establishments. Central preparation also meant that food waste was efficiently gathered for recycling, a particular advantage in wartime.[26]

Quite apart from the practical advantages and potential military applications of freezing, National Socialists were also drawn to it because it implied a broader kind of superiority. Access to cold in warm seasons had long been an elite privilege, and the ability to freeze goods and keep them frozen for transport over long distances was an impressive technological achievement.[27] Freezing added value to food not only because it limited spoilage, but also because frozen products demonstrated German industrial and technological strength. Through freezing, foods became imbued with an aura of modernity. If Europeans seemed a little behind Americans in food processing generally and the adoption of fast freezing specifically, Germany wanted to show itself to be the exception to this rule. Frozen foods were important "for the self-staging of the National Socialist state as a modern state that [was] able to solve its problems by techno-scientific solutions."[28] Moreover, Germany could not afford to be left behind if, as Ziegelmayer argued, "it is already clear today that the planned activation of the fast freezing process will play an outstanding role in the provisioning of modern armies."[29]

Along with its practicality, potential health benefits, and modernity, freezing also appealed to the National Socialists for political reasons. A technique that enabled summer's harvests to be used year round fostered self-sufficiency, an important priority of the pre-war and wartime years. Having no desire to repeat experiences of hunger during World War I, the National Socialists prepared for a possible blockade by exploiting existing agricultural land fully and finding substitutes for foreign goods. Refrigeration researcher Rudolf Plank had been commissioned to study meat and fish freezing in World War I, but Germany's blockaded situation did not allow for large facilities to be established.[30] Now, although demand for canned food also increased, the drawbacks of canned goods meant that the "four-year plan of 1936 incorporated the goal of establishing a new freezing industry."[31]

Freezing was developed despite objections from both canning and tinplate industries, which feared the potential loss of market share.[32] In 1937, researchers at the Reich Institute for Food Conservation (Reichsinstitut für Lebensmittelfrischhaltung) in Karlsruhe carried out fast freezing experiments

in cooperation with Nordsee, a fish processing company.[33] The state also helped found Solo-Feinfrost, which focused on freezing for the army.[34] Alongside meat and fish, state intervention added freezing capabilities to fruit and vegetable canning plants. Four-Year Plan proponent Hans Mosolff reported that, "the result of this work was that now a few preserving factories also found the courage to begin producing frozen products independently."[35] By 1940, some 22,000 tons of frozen food were being made, of which fish represented 7,000–8,000 tons and fruits and vegetables 14,000 tons.[36] The desire for autarchy fostered through the Four-Year Plan thus strongly motivated the development of freezing in Germany.

Notwithstanding National Socialist enthusiasm for freezing, it should be emphasized that freezers did not become standard household equipment in Germany until well after the war. The freezer's sibling, the home refrigerator, which sometimes included a compartment to make ice, had been advertised as a luxury product in the 1930s. National Socialists took up refrigeration, like freezing, because it aligned with notions of modernity and with their goal of exploiting food resources fully. They argued that home refrigerators would limit food wastage, and the Four-Year Plan included preparations for an affordable "People's Refrigerator" (Volkskühlschrank).[37] These plans never moved beyond the prototype stage, but a contemporary professional publication suggested that the number of refrigerators in Germany had nonetheless grown from 80,000 to 240,000 between 1936 and 1939.[38] By way of comparison, the American refrigeration industry produced some 850,000 refrigerators annually at this time, and nine million refrigerators had already been sold in the USA by 1936.[39] War and post-war shortages put a stop to the spread of home refrigerators in Germany, and refrigerators, let alone freezers, were owned by less than half of German households before the early 1960's.[40]

The fact that individual households rarely owned electric refrigerators, let alone freezers, did not prevent a remarkable expansion of freezing during the war years.[41] Military and civilian collective kitchens were the direct beneficiaries of most of this activity, for military supply lines and large-scale deliveries to factory canteens could be more easily adapted to frozen foodstuffs than the networks that supplied private households. Wartime helped accustom Germans to the idea of frozen food, and encouraged canteen chefs to learn how to cook it.

The long-term intention behind developing freezing was to improve German food supplies, a nationalist project that was intimately linked to war.[42] Ensuring better food supplies was an oft-cited justification for Hitler's expansionism. Four months before the invasion of Poland, the Führer informed his highest commanders that the problem was not Danzig, but rather, "For us it is a matter of expanding our living space in the East and making food supplies secure."[43] While overseas colonies might provide food for the British who, as Chris Otter has put it, "outsourced" their food production from the beginning of the industrial revolution, from Hitler's perspective colonies represented "no solution to

the food problem" due to the danger of "blockade."[44] Instead, occupied lands in Europe offered the best potential sources of plant and animal foods. Yet, even with canning and increasingly common dehydration technologies, the perishable nature of fresh foods had hitherto limited the extent to which they could be harvested and stored for later use. Freezing promised to furnish soldiers and civilians with "fresh" produce year round. As Dr. Wirz of the Reich Main office for People's Health (Hauptamt für Volksgesundheit) put it, through freezing,

> A people can become healthier and more physically capable than its living space [Lebensraum] would otherwise allow, because it has the opportunity of using more of the highest quality and most vitamin-rich fruit and vegetables from neighbouring lands with more favourable climates.[45]

To increase their freezing capacity, German innovators turned to mobile freezing equipment, which was attractive for several reasons. Mobile equipment could preserve the freshest produce by processing fruits and vegetables in the growing regions immediately after harvest. More flexible than conventional fixed freezing facilities, mobile freezers could be added as an accessory to existing fruit processing plants. Moreover, at least theoretically, mobile equipment could be stationed in one agricultural area in summer to preserve fruits and vegetables, then moved to the coast in winter to freeze fish. Refrigeration expert Plank explained that, "The cost effectiveness of these facilities is thereby significantly increased."[46] Plank did not mention perhaps the greatest advantage of mobile equipment – potentially it gave the German freezing industry a greater reach outside the Reich heartland. It could be deployed outside Germany during the growing season, and returned home for safekeeping at other times of the year. In a military emergency, such equipment was easily evacuated from endangered zones. Once the war had begun, the concept of German autarchy stretched to include the Reich's occupied territories. Although portable equipment was never built extensively, fast freezing became a key component of efforts to develop European "Grossraumwirtschaft," a tool to facilitate the exploitation of occupied Europe.

First, however, frozen food was used to support the military while campaigning. During the invasion of France in 1940, for example, blocks of frozen meat were sent to the Front in insulated containers. Even on a standard army supply train without special freezing equipment, the shipment arrived "without showing significant changes within 18 days."[47] Still, since most frozen foods needed to be cooked before they could be eaten, they were probably served mainly to men in fixed positions. The two-week standard menu for troops in Berlin in late June 1942 showed that they ate a frozen fish filet for lunch once in a two-week period.[48] The widely used 1941 military *Field Cookbook* (*Feldkochbuch*) included an appendix with "Guidelines for the handling of frozen meat and deep-frozen foods."[49] Readers learned that frozen halves of pork needed three to four days' refrigerated thawing and quarters of beef four to five. An extra day to hang thawed meat was recommended, after which it was to be used

"as soon as possible."[50] Chefs in a hurry were advised to saw frozen meat into manageable pieces, add it to boiling liquid, and wait until the liquid boiled again before proceeding with their recipes. The book also included information about fast-frozen "bricks" of meat that could be thawed at room temperature and added directly to recipes if time were short. Finally, there were instructions for dealing with cellophane-packed frozen fish, vegetables, and fruit.

It is difficult to tell how much cooking practices actually changed, but Germans learned about frozen foods on home as well as war fronts. The Reich's food authorities were at pains to connect military and civilian eating, insisting that recipes developed for military use could also be applied in home front kitchens. Linking domestic and military cooking was the specified objective of *Field Kitchen Recipes,* a cookbook for factory canteens and collective kitchens that reproduced the 1941 field cookbook with military references removed.[51] Sharing field kitchen-style food allowed Germans to perform the unity of home and front, and indeed the unity of the *Volksgemeinschaft* more broadly. Since connecting home and war fronts also meant sharing new frozen foods, *Field Kitchen Recipes* included precisely the same instructions about how to use them as its parent text.[52] In concrete ways, therefore, as well as rather abstract ones, war and National Socialist expansionism fostered the development and popularization of frozen food.[53]

As German-held territory grew, Hitler's planners increasingly viewed Europe as a single economic zone to be led and managed by the Reich. Initially, they had hoped to make Germany itself independent of outside imports. Now, with the help of freezing, Europe as a whole could develop "sustenance freedom."[54] Refrigeration engineer Eduard Emblik saw freezing as a way to even out disparities between European regions of shortage and abundance. Making more goods available in areas of scarcity would benefit producers, who could obtain higher prices for their wares, and consumers, who would enjoy a greater range of food choices. In the past, Emblik claimed, fish export prices had been so low that, for example, the Norwegian government had had to offer subsidies to fishermen. Now, the opening of the German market had solved this problem, and Norway produced some 60,000 tons of frozen fish fillets in 1940.[55]

Alongside fish, Emblik included examples of other "surplus" foods in German-allied or occupied areas that could be brought to broader markets through freezing. The wealth of Italian growing areas, for instance, was said to rival that of California, and there were important fruit and vegetable-growing regions in Bulgaria, France, Holland, Romania, Hungary, and Croatia. The Ukraine, "was already famous as a fruit-producing land; in the future it will be accorded an important role in fruit provisioning."[56] Freezing would be particularly beneficial for vitamin-rich foods like spinach or tomatoes, or tasty ones like berries, which fared poorly in conventional cold storage facilities.[57] German intervention was justified because "lands that are provided with fresh fruits and vegetables during a long growing season have little interest in

building freezing facilities for their own use."[58] For Emblik, opening up Europe's resources required the "involvement of the freezing industry in the right place, that is to say in production areas."[59] Since there was little point in developing frozen products without appropriate ways to distribute them, he also argued for German-sponsored expansion and coordination of railway networks and the development of freezer cars.[60]

The greater European economy that Emblik and his contemporaries envisioned was not an exchange of equals, but a hierarchy with Germany at the top. The strengths of different countries should complement each other "such that a turn away from excessive industrialization follows for the agrarian lands."[61] In these "agrarian lands," Germans might establish modern food preservation facilities while local people continued to work the farms.

These ideas were ambitious, but how did German initiatives actually play out in occupied lands? France was among the countries National Socialists believed had a strong future in agriculture, rather than industry. Within a few months of the armistice, in October 1940, German freezing experts were asked to study how the army might exploit French food.[62] Occupiers' projects in the La Rochelle area shed light on the installations they developed, and on how occupied countries responded to these initiatives. Rather than rejection, German ideas met with interest and even support from local specialists, who viewed them as technologically advanced compliments to their own plans. French experts interpreted German initiatives as potentially beneficial in the longer term, part of an ongoing Franco–German exchange that pre-dated and would outlast the war.

Since Germans were well aware of French farming potential, economic historian Alan Milward has argued, "Germany came increasingly to use French agriculture as a substitute for the great agricultural empire in the east of which she had dreamed."[63] To ensure that France continued to produce, Germany provided allotments of raw materials like fuel, seed, and fertilizer in exchange for agricultural products, including frozen foods. In 1941, an agreement with the French authorities allowed for an "annual delivery of 12,000 tons of vegetables frozen at low temperatures, the buyers according to French producers the necessary fertilizers and … seeds."[64]

German intervention in agriculture and food processing in France, like other occupied areas, rested on a strong conviction that the existing resources of these areas were not being exploited properly.[65] The French agricultural situation is illuminated by an early post-war study of occupiers' agricultural practices undertaken by German exile Karl Brandt for the Food Research Institute at Stanford University.[66] According to Brandt, at the beginning of the occupation, "yields per hectare of the most important crops, with the exception of sugar beets, were from 30 to 40 percent below comparable German yields."[67] French livestock density was 25 percent lower than in Germany, and average output per animal was also lower.[68] Failing to take manpower shortages

sufficiently into account, "German specialists believed … that it was possible to mobilize [French] resources quickly, particularly under German occupation."[69] Increasing production was simply a matter of putting more land into cultivation, and working the land and people harder.

Lest there be any misunderstanding, Brandt clarified that French resources were not intended for the French, but were "expected to feed a large part of the Wehrmacht … and to have enough left to feed French industrial workers employed in German armament factories and to improve the supply situation in Germany."[70] German authorities set about reforming French agriculture, including through the deployment of hundreds of *Landwirtschaftsführer*, agricultural specialists of whom there were 788 in France in early April 1944.[71]

Brandt pointed out that Hitler saw himself as having won the war in France, and this longer term perspective meant that, "The military government … emphasized all sorts of measures by which the French could … orient agriculture toward coordination with the unified Continental European economy and give French agriculture a secure position within it."[72] At first reading, the notion that occupation might "orient" agriculture in France toward "coordination" with a broader European economy seems redolent of the propaganda the occupiers themselves used to justify their actions on behalf of a greater European "good." Indeed, on one level, talk of unified European projects during the occupation was simply propagandistic sleight of hand intended to make a difficult situation palatable to subject populations. On another level, however, the notion of sharing in larger European projects was attractive to some occupied people, including those French who subscribed to Pétain's "Révolution nationale" and saw an important place for France in Europe's German-led future.[73] Brandt noted that the German view that "France had large dormant production resources in agriculture…. was shared by many French experts and statesmen."[74] A closer look at freezing capabilities, specifically, shows that French and Germans alike viewed expansion in this area as a key to bringing agricultural resources to market.

France had long looked to Germany alongside other countries, especially the United States, for inspiration in modernizing food preservation and distribution systems. The interwar drive for rationalization in the French fishing industry, for example, took developments in Germany, including the role of the Nordsee enterprise, as a model.[75] The French continued to watch their neighbor closely through the 1930s, growing increasingly anxious as the decade advanced.

With war looming in 1938, the French government initiated a program to develop reserves of frozen domestic meat for military use.[76] Seeking to avoid the supply problems of World War I, the Minister of Agriculture argued that it was essential even in peacetime "for the army supply corps to have at its disposal refrigeration facilities to produce frozen meat."[77] A year later, the departmental council of central French Allier wrote to the same Minister to say that the measure had had a positive effect on the price of meat, and to request that more

refrigeration and freezing facilities be built across France "as soon as possible."[78] After the German invasion, Allier's chief veterinarian noted that the opening of cooling facilities at the industrial abattoir at Villefranche-d'Allier was likely to be delayed because the equipment was being made in the zone now occupied by the Germans. He added that, "it would also be useful to provide all the public abattoirs with adequate refrigeration facilities including compartments specifically equipped for freezing."[79] Both before the war, and once it had begun, many in France argued in favor of expanding freezing capacity, particularly for meat.

One of the strongest proponents of freezing was Maurice Piettre, Chief veterinary health inspector for the Department of the Seine and a member of the French Agricultural Academy (Académie de l'Agriculture). Having served as veterinary liaison for the French army supply corps in Latin America from 1915–9, Piettre was an authority on meat production and war. Moreover, although he would not voluntarily have given the Germans the dominance they enjoyed in his country after 1940, he rather admired German methods, and saw a future for France as a major exporter of food to "central and northern Europe" in exchange for raw materials like coal.[80] Indeed, Piettre claimed to have suggested this very thing during a 1934 visit to Berlin, when, as director of the International Refrigeration Institute, he had attended the 25th anniversary celebrations of the German Refrigeration Association (Deutsche Kaelteverein).[81] Piettre not only argued in favor of refrigeration and freezing alongside his contemporaries; he saw food preservation by cooling as a way to bring French products to wider European and global markets.

A few weeks before the German invasion, Piettre had suggested that to avoid a diminution of its cattle reserves comparable to World War I, France should add another five or six refrigerator ships to its existing fleet of seven, and purchase frozen meat particularly from Argentina.[82] Rather than freezing more domestic meat following the program mentioned above, Piettre preferred to focus on importing, storing, and redistributing products from overseas.[83]

In early 1940, France had the capacity to store 75–80,000 tons of frozen food, which Piettre claimed was largely unused in peacetime. Space to store 40–45,000 tons could be turned over to the military without much difficulty, which he thought made it unnecessary to build new freezing facilities.[84] At the same time, Piettre conceded that if a new facility were to be built, it would make sense "to devote it most especially to the study of fast freezing, American 'quick freezing.'"[85] Fast freezing was important for the future of freezing in general and French freezing more specifically, and Piettre argued that "It was, in fact, French engineers who blazed the trail with regard to rapid freezing of large pieces of meat, quarters of beef, veal carcasses, pigs, sheep."[86] In 1937, Frenchman Charles Hovemann had used a salt solution to freeze quarters of beef vacuum-packed in latex, reducing their temperature to −26 °C within less than 20 h. Piettre reported that this technique had been adopted for smaller livestock and fowl in the United States as well.[87]

Prior to the German invasion, therefore, Piettre was conscious of France's connection to global frozen food networks and saw his country as a leader in this domain. He spoke against hasty expansion of facilities, and favored fast freezing using French technology. Once occupied, however, France was no longer a dominant player able to set agendas and import foods advantageously from less powerful parts of the world. Instead, it found itself weakened, open to such exploitation itself.

The impact of this change became apparent by 1941 at the latest. In June of that year, again representing the International Refrigeration Institute, Piettre was invited to attend the inauguration of a large freezer warehouse at the port of La Rochelle-La Pallice. He noted that this warehouse, which could stock 4,500 tons of food, was ideally situated for the import trade from the Americas, as well as for foods from La Rochelle's own rich hinterland, including the regions of Poitou and Vendée.[88] His eye firmly trained on French interests, Piettre failed to mention, if he knew, that the German 3rd U-boat flotilla was soon to be stationed at La Pallice, and that construction of a large protective bunker had already begun.[89] Instead of commenting on the potential convenience of a freezer warehouse for supplying submarines, Piettre noted that French plans for a cold storage facility at La Pallice actually dated from World War I. A Franco–Argentinian project started in 1916 had been completed the following year by the American forces fortuitously arriving under the leadership of a certain Colonel Evans, chief engineer of the Chicago meat-packing firm Armour & Company and an expert in refrigeration.[90] In the interwar years, the facility had fallen into disuse until restoration began in October 1940.[91] Now, in June 1941, the warehouse was again fully functional, dedicated to Pétain, and it was being inaugurated in the presence of local French dignitaries and "the commanding colonel of the occupying army, accompanied by his aides-de-camp."[92]

Whether Piettre admitted it or not, even at this early phase, when relations between occupiers and occupied people remained relatively cordial, the hierarchy of power between them was clear. Indeed, it was inscribed in the use of space and temperature inside the new freezer warehouse at La Pallice. Of the five floors visited, Piettre explained that the top three were used for meats from the municipal abattoir at La Rochelle, and the refrigerated industrial abattoirs at nearby Bressuire, Pouzauges, and La Roche-sur-Yon. These three floors were kept at −15 °C, while the next lowest floor, at −21 °C, was "reserved entirely for the Berlin Low Temperature Syndicate."[93] Though Piettre did not explain this to his French listeners, this organization, actually called the German Syndicate of Freezing Companies for France (Syndicat deutscher Tiefkühlgesellschaften für Frankreich), had been founded in 1940 to bring together German freezing concerns with an interest in exploiting French produce.[94] In an article for a German military administrators' magazine, food expert Ziegelmayer clarified that French companies provided the Syndicate with raw and processed foods in return for "suitable compensation" while "the freezing, storage and marketing

of the frozen products [remained] the exclusive affair of German industry."[95] The Syndicate's role was to facilitate the exploitation of French agriculture for the German war effort, and the goods on its floor of the La Pallice facility were French foods bound for Germany.

Like the floor above it, the ground floor of the La Pallice freezer warehouse was also reserved for German interests. Convenient for loading and unloading, it benefited from cooled air descending from above, and was likely to have been more consistently cold than other areas. Piettre described "a vast chamber at −21 °C containing 50 tons of butter and 150 tons of vegetables and fruit prepared according to the American technique of fast freezing."[96] Remarkably, these goods had been brought to La Pallice from Hamburg "in road trains composed of a tractor and three heavily insulated trailers…. During transportation, cold was obtained using solid carbonic acid."[97]

The new freezer warehouse made power relations between occupiers and occupied population clear. Not only were the less convenient top floors reserved for the French, but since these were also the warmest, they were not ideal for long-term stockpiling. Sensitive to his French audience, Piettre glossed over the activities of the German Syndicate on the floor below. On the ground floor, underlining the fact that cold equated with power, the German army stored foods from the Reich to supply occupying troops and the soon-to-arrive U-boats. Germans' ability to transfer frozen products over long distances surely impressed those French who knew of it. Over the longer term, this cost-intensive procedure was likely abandoned, and the ground floor of the La Pallice facility turned over to local fruits and vegetables, furnished willingly or less willingly by French producers for German use.

In 1943, after three years of occupation, Piettre again spoke to the French Agricultural Academy about freezing in the La Rochelle area. In 1941, he had welcomed the freezer warehouse at La Pallice with grudging admiration, focusing on its French origins, and turning a blind eye to its less palatable uses. Two years later, he was part of a mission sponsored by the French Ministry of Education and Scientific Research Center (Centre de la Recherche Scientifique) that visited several abattoirs and a new freezing center (Centre de Congélation) northwest of La Rochelle at La Roche-sur-Yon. Here, Piettre highlighted construction delays and a budget overrun of 5 million francs that meant the facility had cost 7 million francs for a capacity of just 200 tons of food.[98] Worse, the developers (who remained unnamed in the report) had failed to integrate the new freezing center into the city's preexisting industrial meat processing facility. Somewhat obliquely, Piettre criticized the constructors for having ignored French expertise, arguing that contracts for such an important edifice should have been "given to qualified French refrigeration engineers … following the usual administrative procedure but accelerated due to wartime.[99]" In early 1940, Piettre had insisted that any new freezing facility "be very closely inspired by the techniques and equipment" already developed in France, rather than

"venturing into the unknown with the pretext of originality."[100] His advice had not been heeded, and instead, the new center at La Roche-sur-Yon had been built without connection to French methods, or to the city's existing industrial meat processing and refrigeration plant.

How had this come to pass? Although Piettre did not point a finger specifically at the Germans, it is likely that they or their closest collaborators were behind the new construction. Piettre's complaints that French procedures and expertise had been ignored were likely a code his listeners would have understood as a reference to German involvement. A 1945 report by Henri Monthulet, scion of an important family of food entrepreneurs and the wartime director of the meat processing plant at La Roche-sur-Yon, confirms this suspicion.[101] Piettre recounted that Monthulet's plant had been taken over by the French army at the opening of hostilities, then handed on to the Germans in 1940 without any recognition of its status as a private company called *Les Eleveurs Vendéens*.[102] During the occupation, the Germans made full use of the *Les Eleveurs Vendéens* abattoir, and Monthulet stayed on as manager, insisting in his 1945 report that he had continued to work even without pay simply to fulfill his contract and to ensure the survival of the business.

Monthulet's report also discussed the new freezing center at La Roche-sur-Yon. In contrast to Piettre's 1943 view that the center had been built without connection to the industrial abattoir, in 1945, Monthulet described the two as intimately linked. He explained that he had approached the French government in the mid-1930s about building a freezing center. This made sense, given Monthulet's own training as a refrigeration engineer and his family's longstanding interest in supplying the military with meat and other foods.[103] Representatives of the French army and Ministry of Agriculture had visited, and decided "that the first big facility for fast freezing [in France] should be built at La Roche."[104] The decision to begin building the facility was made in November 1939, presumably as part of the larger development of frozen meat reserves for military use. After that, reported Monthulet, "its completion was due in large measure to my initiatives at the Majestic and with the [German] Chief Veterinarian at La Roche, without which it would probably never have come to fruition."[105] Monthulet claimed that his constant presence had kept the Germans from carrying off abattoir equipment for facilities in La Rochelle, and that, in late August 1944, he had not only prevented the abattoir from being dynamited as the Germans retreated, but also assisted an Allied representative in acquiring remaining German food stocks.[106]

Monthulet's report reveals both his post-war desire to justify his occupation-era actions, and the importance he saw in ensuring the ongoing function of *Les Eleveurs Vendéens*. Like Piettre with regard to the freezer storage facility at La Pallice in 1941, four years later, Monthulet chose to describe the center at La Roche as the completion of a longstanding French project. The variance between Monthulet's depiction of the center as closely related to his company's

abattoir and Piettre's depiction of its separation may have been the result of Piettre's desire not to paint Monthulet as a collaborator in 1943, and later, Monthulet's own desire to retain control over the new freezing infrastructure for his business in 1945. Monthulet also mentioned that he had been involved in construction at the abattoir in 1944, which may have had the goal of linking the two facilities more closely.[107]

Modern freezing and cold storage facilities outlasted the war, and both men were clearly making arguments not only about the past, but also the future. If Monthulet had worked so hard to save *Les Eleveurs Vendéens*, it was because like Piettre, he knew that wars might come and go, but France would maintain its place as a European agricultural producer. The question of who owned a freezer facility at the end of the occupation, like the question of who had built it a few years earlier, was not just about who controlled production and distribution of frozen foods during the war years. For both the French and their occupiers, these questions were also about who would emerge as the foremost post-war producer and distributor of frozen food in Europe. As early as the beginning of World War I, according to Piettre, the economist André Lebon, "had imagined that the creation of warehouses in French ports would give our country a monopoly on refrigerated storage for the whole of continental Europe, with very favourable consequences for our credit and our influence."[108] Thirty years later, both Piettre and Monthulet understood that France and Germany were still jockeying for position, military occupation causing a shift more than an interruption in longer patterns of exchange and trade. In the same speech in which Piettre criticized the new freezing center at La Roche-sur-Yon, he reiterated his view that France had much to contribute to Europe's economy, commenting that:

> if a common economic agreement were brought in in Europe following a doctrine circulating these last three years, there is no doubt that France would have a significant role to play. An essentially agricultural country, alone and with its colonies, it has the capacity … to supply its neighbours abundantly with both animal and vegetable foods.[109]

Piettre foresaw that if infrastructures were developed taking international norms and standards into account, France would be in an excellent position to provide for a hungry post-war Europe.

For both Piettre and Monthulet, the war and occupation years constituted a deviation, rather than a rupture, in longer term projects to modernize French food preservation through cold. For better or for worse, the development of freezing and refrigeration across France continued during this time. An Organisational Committee for Refrigeration Enterprises (Comité d'organisation des exploitations frigorifiques) was created in 1941, as part of the larger drive to centralize and manage French industry.[110] Its head, cold-chain transportation expert Jean Bernard Verlot reported that France's freezing capacity had risen from 90 tons per day in 1939 to 400 tons per day in 1942, while storage

capacities rose from 40,000 to 97,000 tons.[111] A journalist who interviewed him in 1943 described Verlot as a firm proponent of fast freezing, a "convinced partisan of the new method that is beginning to be applied in France."[112] Not only did fast freezing promise to improve the French diet in the short term, but, "above all," Verlot argued, "it is important think of post-war markets and there is no doubt that many possibilities will open up for French enterprises."[113] This prominent representative of the French refrigeration business, like Piettre and Monthlet, spoke in favor of fast freezing not only to solve present-day problems, but also as a key to developing export markets in the post-war era.

In the hungry years just after the war, material conditions were so poor in many parts of Europe that freezing did not offer a viable remedy for food shortages. By the 1950s, however, freezing was once again high on European and even global agendas. In Germany, Thoms has emphasized continuities across 1945, arguing that, "Though under very different political circumstances, the actors followed up the very same vision that had formerly been supported by the state for the sake of autarchy and *Volksgesundheit* [the people's health]."[114] She also argues that, "This view was shared by international institutions, which now stressed the role of deep freezing as a means to solve the problem of hunger in Europe."[115]

In France, it is difficult to know exactly how much the experience of occupation influenced the post-war development of freezing. Regarding agricultural products generally, Milward has suggested that Germany's failed war in the East and the occupation of France together "broke the established pattern of German trade and created a pattern much more akin to that which emerged after the war in western Europe."[116] Franco–German trade increased, and although "French agricultural exports to Germany … diminished in the immediate aftermath of the German collapse; by 1950 they were responsible for 41 percent of all French exports to Germany by value."[117] The war clearly led to an increase in French agricultural products being sent to Germany, though the exact role of frozen food in this trade remains to be explored.

A history of German wartime fast freezing that takes France into account suggests that National Socialist expansionism both fed the growth of freezing in Germany and had longer term impacts on food production and exchange Europe-wide. The potential to exploit occupied European food resources was clearly an important driver of National Socialist interest in freezing. Since frozen food did not go bad, was vitamin rich, and convenient, it overcame seasonality and removed a barrier to fuller exploitation of agricultural land. Collective feeding in the army, factory canteens, and other communal settings provided suitable frameworks within which to experiment with frozen foodstuffs, and occupied areas offered favorable conditions for testing new facilities.

For a short time, fast freezing supported occupiers' exploitation of the territories they controlled. The attitudes of Piettre, Monthlet, Verlot, and their contemporaries suggest that occupied populations saw advantages as well

as disadvantages in the German presence. In the longer term, the facilities Germans built may have given France and other occupied nations the infrastructures they required to bring food products to broader European markets.[118] Further research would be necessary to trace the post-war history of these facilities more fully, but at the very least, it is evident that occupied people saw such facilities as foundations for a European food economy in which frozen goods would play a central role.

On the face of it, wartime freezing reinforced longstanding patterns in which central, powerful regions exploit and preserve the food resources of peripheral, less powerful ones. French responses to German freezing initiatives in the La Rochelle area add complexity to the picture by underscoring the point that not everyone in the subject populations is hostile to such developments, particularly when they are expected to be short-lived and promise long-term gain. Recognition of the role freezing might play in long-distance supply chains was not new and the full potential of the technology was never realized in wartime; however, despite unequal and exploitative circumstances, both Germans and occupied populations like the French gained experience in freezing that fostered its spread in the post-war world.

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Notes

1. Such a purchase was somewhat surprising for Hitler's nationalist regime. Thoms, "The Innovative Power of War: The Army, Food Sciences and the Food Industry in Germany in the Twentieth Century," 256 and Thoms, "The Introduction of Frozen Foods in West Germany and Its Integration into the Daily Diet," 205–6.
2. Emblik, "Die Bedeutung der Gefrierkonserve", 89.
3. Finstad, "Familiarizing Food", 28–9.
4. Ziegelmayer, "Praktische Grossraumwirtschaft der deutschen Heeresverwaltung," 66–8.
5. See Claflin, "Les Halles and the Moral Market", 82–92.

6. Thoms, "Introduction," 201–2. On the historiography of food, see e.g. Claflin and Scholliers, *Writing Food History: A Global Perspective* and Pilcher, "Introduction," In *The Oxford Handbook of Food History*, xvii–xxviii.
7. Thoms, "'Ernährung ist so wichtig wie Munition.'", 207–30; Thoms, "Innovative Power"; Thoms, "Introduction" and Thoms, "Zum Konzept der Ernährung", 89–112.
8. Collingham, *The Taste of War*, 492. On National Socialist food policy beyond freezing, see Corni, *Hitler and the Peasants* and Gerhard, *Nazi Hunger Politics.*
9. Pelzer-Reith and Reith, "Fischkonsum und „Eiweisslücke" im Nationalsozialismus," 4–26.
10. Finstad, "Familiarizing Food," 22–45.
11. Claflin, "Les Halles" and Claflin, "La Villette, la viande" 53–79.
12. Milward, *The New Order and the French Economy*, chap. 11; Mouré, "Food Rationing and the Black Market, 262–82; Mouré and Schwartz, "On vit mal", 261–95 and Veillon, *Vivre et survivre en France*.
13. Spiekermann, "Twentieth-Century Product Innovations, 305.
14. Ibid., 306.
15. Ibid., 307.
16. Ibid., 311.
17. Ibid., 310 and Thoms, "Innovative Power," 256. Such film was called "Cellophan" (Oberkommando des Heeres, *Zubereitung der Kost*, iv.i.) or "Viskosefolie" (Verein Deutscher Ingenieure, *Gefrier-Taschenbuch*, 62).
18. Thoms, "Introduction," 204.
19. Ibid.
20. Oberkommando des Heeres, *Feldkochbuch*, 7. Cf. Thoms, "Ernährung," 210.
21. On Ziegelmayer, see Thoms, "Ernährung," 212 and Thoms, "Konzept," 90–1.
22. Ziegelmayer, *Unsere Lebensmittel und ihre Veränderungen*, 155.
23. Ibid.
24. Ziegelmayer, *Rohstoff-Fragen der deutschen Volksernährung*, 242.
25. The square box was part of the innovation. Kurlansky, *Birdseye: The Adventures of a Curious Man*, 145–6.
26. Ziegelmayer, *Lebensmittel*, 155.
27. Plank, "Die Frischhaltung von Lebensmitteln durch Kälte," 139–41 and Wilson, *Consider the Fork*, 224.
28. Thoms, "Introduction," 208.
29. Ziegelmayer, *Rohstoff-Fragen*, 242. Cf. Ziegelmayer, "Die Entwicklung industriell zubereiteter Lebensmittel", 1–4.
30. Thoms, "Introduction," 204.
31. Spiekermann, "Innovations," 310–11.
32. Mosolff, "Der Aufbau der deutschen Gefrierindustrie,": 596. Cf. Kurlansky, *Birdseye*, 161.
33. Pelzer-Reith and Reith, "Fischkonsum," 13.
34. Thoms, "Introduction," 205. Solo-Feinfrost was a German affiliate of Unilever. Pelzer-Reith and Reith, "Fischkonsum," 13. On Unilever in the Third Reich, see Forbes, "Multinational Enterprise, 'Corporate Responsibility'", 149–67 and Wubs, "Unilever's Struggle for Control", 57–84.
35. Mosolff, "Aufbau," 597.
36. Ibid.; Pelzer-Reith and Reith, "Fischkonsum," 13 and Thoms, "Introduction," 207.
37. Hellmann, *Künstliche Kälte*, 109–18 and Heßler, *"Mrs. Modern"*, 373–79.
38. *Werbeleiter*, vol. 4–5 (1939): 62 cited in Heßler, *Mrs. Modern*, 379.

39. Hellmann, *Künstliche*, 117.
40. Heßler, *Mrs. Modern*, 187, 366.
41. Hellmann notes that there was more freezing activity undertaken in this era than there would be again until the 1970s. *Künstliche*, 116.
42. On connections between food, hunger, war, and the Holocaust, see Gerhard, *Nazi Hunger Politics*.
43. Adolf Hitler, Speech of May 23 1939, document 539, Noakes and Pridham, eds., *Foreign Policy, War and Racial Extermination*, 737.
44. Ibid.; Chris Otter, "The British Nutrition Transition", 815.
45. Mosolff, ed., *Tiefkühl-ABC*, 4. Also cited in Thoms, "Introduction," 204.
46. Plank, "Frischhaltung," 161.
47. Ziegelmayer, *Rohstoff-Fragen*, 314.
48. "6. Tagungsbericht der Arbeitsgemeinschaft 'Ernährung der Wehrmacht'," August 21 1942 (Bundesarchiv-Militärchiv Freiburg, RH 9/11).
49. Oberkommando des Heeres, *Feldkochbuch*, 103.
50. Ibid., 104.
51. Ziegelmayer, *Die Feldküchengerichte*.
52. Ibid., 97.
53. Freezing information was also published in e.g. Verein Deutscher Ingenieure, *Gefrier-Taschenbuch*; Mosolff, *Tiefkühl-ABC*.
54. Emblik, "Gefrierkonserve," 89, 93.
55. Ibid., 89. Under German control, the frozen portion of Norwegian fish exports increased from 10 to 65 percent between 1940 and 1943. Pelzer-Reith and Reith, "Fischkonsum," 20.
56. Emblik, "Gefrierkonserve," 90.
57. Ibid.
58. Ibid., 92.
59. Ibid.
60. Ibid., 93. Developing refrigerated and frozen food transportation and distribution networks was a renewed priority after 1945. Thoms, "Introduction," 208–9.
61. Emblik, "Gefrierkonserve," 89.
62. Ziegelmayer, "Grossraumwirtschaft," 66.
63. Milward, *New Order*, 255.
64. Piettre, "Inauguration des entrepôts frigorifiques", 773.
65. A full account of German involvement in French agriculture is beyond the scope of this article. See Brandt, Schiller, and Ahlgrimm, *Management of Agriculture and Food* and Milward, *New Order*, chap. 9.
66. Brandt was a University of Berlin professor of agriculture who left for the USA in 1933. In 1945/46, he became the economic adviser to the Chief of Food and Agriculture of the US Military Government in Germany. Though he displayed keen insight into agricultural conditions, Brandt's report tended to view German policies in France as relatively benign or comprehensible. He based his conclusions on "eyewitnesses to the agricultural and food administration of the occupied territories willing to co-operate." Brandt, Schiller, and Ahlgrimm, *Management*, xxv.
67. Ibid., 514.
68. Ibid., 515.
69. Ibid., 520. On rural labour, see Milward, *New Order*, 259–60.
70. Brandt, Schiller, and Ahlgrimm, *Management*, 520.
71. Ibid., 521.
72. Ibid., 511.

73. Radtke-Delacor, "Produire pour le Reich", 112.
74. Brandt, Schiller, and Ahlgrimm, *Management*, 520.
75. Bloch, "La crise de la pêche maritime (I)", 234–59 and Bloch, "La crise de la pêche maritime (II)", 396–419.
76. "Décret relatif à l'encouragement de la congélation des viandes métropolitaines," 1 July 1938, *Journal officiel de l'état français*, 2 July 1938, 7739.
77. "Crise du troupeau national: organisation de l'élevage," *Journal officiel de la République française*, parliamentary debates, senate (1938): 631.
78. Maurice, "Mesures pour l'intensification", 214.
79. Jouve, "Services vétérinaires sanitaires", 152–3.
80. Piettre, "Organisation de la production agricole", 677.
81. Ibid., 678. Franco–German exchange in refrigeration and freezing also involved German Carl Linde, who had started a refrigeration equipment company in 1879. Founder of the German Refrigeration Association, he was a driving force behind the International Refrigeration Institute, founded in Paris in 1908. Thoms, "Introduction," 203.
82. Piettre, "Ravitaillement complémentaire" 335–6. Argentina provided meat to France from the later nineteenth century. See Arnoux, "Le rôle des Français", 92–3.
83. Piettre, "Ravitaillement," 335.
84. Ibid., 337–8.
85. Ibid., 338.
86. Ibid.
87. Ibid.
88. Piettre, "Inauguration," 765.
89. The first U-boat arrived in November 1941. Hellwinkel, *Hitlers Tor zum Atlantik*, 60–1.
90. Piettre, "Inauguration," 767.
91. Ibid., 766.
92. Ibid., 769.
93. Ibid., 771.
94. Ziegelmayer, "Grossraumwirtschaft," 66. Cf. Ziegelmayer, *Rohstoff-Fragen*, 314.
95. Ziegelmayer, "Grossraumwirtschaft," 67.
96. Piettre, "Inauguration," 771.
97. Ibid. Apparently, the absence of a ventilation system meant rather inconsistent shipment temperatures.
98. Piettre, "Technique et hygiène", 47.
99. Ibid.
100. Piettre, "Ravitaillement," note 1, 338.
101. "Rôle d'Henri Monthulet pour maintenir la société en activité pendant la guerre 1939–1945," report, [1945] (Archives de la Vendee [henceforth ADV]: 97J/182).
102. Piettre, "Technique," 46.
103. Monthulet represented the third generation of a family that began in grain and later provided refrigerated meat for the army during World War I. In the interwar, they developed fish and vegetable canning interests, and the company became *Les Eleveurs Vendéens* in 1937. See introduction to the Monthulet family papers (ADV, series 97J).
104. Monthulet, "Rôle d'Henri Monthulet," 2 (ADV: 97J/182).
105. Ibid., 1. The Majestic Hotel housed the German military administration headquarters in Paris.
106. Ibid., 2.

107. The previous year, Piettre had suggested that modifications would make the abattoir more efficient. Ibid., 1 and Piettre, "Technique," 46–7.
108. Piettre, "Ravitaillement," 337.
109. Piettre, "Technique," 54.
110. It should be noted that "frigorifique" could refer to either refrigeration or freezing, or both. The decree creating this committee on 15 July 1941 is cited in "Exploitations frigorifiques," *Journal official de l'Etat français* (1942): 1754.
111. Bouny, "Voyage au pays du froid artificiel".
112. Ibid.
113. Ibid., 3.
114. Thoms, "Introduction," 208.
115. Ibid.
116. Milward, *New Order*, 255–6.
117. Ibid., 256.
118. This process could be indirect. In Norway, for instance, large German plants were disassembled and the equipment spread among smaller freezing facilities. Finstad, "Familiarizing Food," 24.

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