

Preprint

Familiarizing Food

Frozen Food Chains, Technology and Consumer Trust, Norway 1940–1970

The connections between food and technology are an important theme in historical studies of food production and consumption, particularly in so-called food chain studies championed by for instance Warren Belasco and Roger Horowitz.¹ In this framing of food studies, various technologies used in transportation, conservation, packaging, quality control systems, retail and so forth are viewed as central for achieving a better understanding of modern food production, distribution and consumption.² Others, like Ann Vileisis, have shown how these modern technological food chains increased the distance between field and fork to the point that consumers no longer knew where their food came from, sometimes producing problems relating to consumer trust in food.³

A new line of studies at the intersection of the history of technology and the history of food has tried to tackle the uneasy connections between modern food chains and consumer trust in food. Historians of technology, such as Karin Zachmann, have shown that even though technologies have enabled a greater distance between field and fork, an increased distrust in food does not necessarily follow.⁴ Food industries do a lot of work to avoid crises in consumer trust and to affect consumers' interpretations of products, for example through marketing, the setting up of quality control systems, and an increasing importance of scientific expertise in modern food chains. Thus the making of consumer perceptions of, and trust in, food needs to be understood as an on-going process. In this framing, changing cultures of trust production then become a central

issue.⁵ As such, this line of study has a lot to say about transformations in food production and consumption.

However, it is still necessary to look into the role of technology in the mediation of trust. Sophisticated understandings of the complex relationship between food and trust have been developed, but technology is often framed as a cause for the material transformations of food chains, and not as an issue in the making of consumer trust in food.⁶ This is problematic because technology can have multiple uses and meanings, and should not be reduced to simple infrastructure any more than food should be framed as just being energy. For example, bicycles in the late 19th century were not just tools for transportation, but also used by young men to signal bravery and masculinity. Consequently, bicycles were not only vehicles, but also tools in the production of identity.⁷

In line with this reasoning, this article investigates attempts at producing consumer trust in a new kind of food and the role of technology in this effort. Has technology been utilized as a tool for shaping consumers' perceptions of food, and subsequently, in the making of consumer trust in food? And in extension of this, can it be used as a lens for studying the making of food chains, as well as how food producers attempt to facilitate transformations in local food cultures? By investigating these questions and framing technology as something with multiple uses and meanings, the article is intended to add to our understanding of how industrial actors try to shape attitudes to food products by using technology as a means to "familiarize" consumers with new foods.

In order to further investigate these questions, I will examine the introduction of frozen fish fillets in Norway.⁸ I will give examples of how the frozen fish industry in Norway has worked to create consumer trust in their products as it built a frozen food chain that increased the distance between the site of production and the site of consumption. Conventional ways of building trust such as quality control systems and branding will be present, though I will problematize these as trust-producing mechanisms in themselves. Instead, my claim is that they should be seen in connection to more mundane technologies such as cookbooks, self-service stores, frozen goods counters and household freezer chests.⁹ However, we first need an introduction to the Norwegian frozen fish industry.

The Making of a Frozen Fish Industry

Early attempts at producing frozen fish in Norway took place in the 1920s, but most of it ended up as baitfish due to poor quality.¹⁰ It was during WWII and the German occupation of Norway that Norwegians had their first experience with frozen fish fillets, as the Germans built four state-of-the-art freezing plants along the Norwegian coast with the goal of turning the country and its abundant fish into the main supplier of protein for the future German empire. The fish produced at these plants were distributed to the troops, although Norwegian civilians also got to taste this new fish product.¹¹

At the end of the war, the Norwegian government seized the German freezing plants and decided that they were too large to be profitable in peacetime. The plants were disassembled and the equipment given to some of the many smaller freezing plants under construction along the coast. This was applauded by the social democratic government, which had laid extensive plans during

the war to modernize Norway through industrialization. The traditional Norwegian fisheries had relied on small vessels and the local production of salted, smoked and dried fish, which further relied on minimal capital investments. With the end of the war, the country was in need of foreign currency; therefore the exporting of fish became important. The new politics were aimed at creating a fish product that could bring in more cash than the traditional exporting of fish, so vessels and freezing plants were built and ships, rails and cars equipped in order to transport frozen fillets to European and American consumers.¹²

By 1949, more than 20 plants capable of producing frozen fish fillets had been built along the Norwegian coast, while several others were in the making. The state was heavily involved in this effort by providing expertise and capital to private interests that wanted to build fish freezing plants, although the pace of the development was a problem.¹³ It became clear that the production, export and marketing of the new product needed to be centrally coordinated for Norwegian actors to compete in foreign markets. Or rather, the products needed to have a certain quality, and a market for frozen fillets needed to be created. None of the Norwegian plants had the capital for a marketing effort, so they instead joined forces. The sales cooperative, Norwegian Frozen Fish, was established in 1946 in order to secure the quality, export and marketing of frozen fish fillets, and almost all Norwegian freezing plants bought shares in order to help finance it.¹⁴

The frozen fish industry grew rapidly, and by 1955, more than 40 000 tons of frozen fish fillets were exported from Norway to foreign markets. But even before this, Norwegian Frozen Fish had also set its sights on the Norwegian market, and in 1949, the secretary of the National

Association of Freezing Plants claimed that there was no market for frozen foods in Norway. Two years later, Norwegian Frozen Fish started its first real effort to sell frozen fillets to Norwegian consumers.¹⁵

Whatever the motivation for the decision to expand into the home market, it is clear that Norwegian consumers were being approached by a strong alliance that wanted to sell frozen fish fillets. Norwegian Frozen Fish represented many freezing plants, though the organization enabled the plants to act in unison to create a market for the new product in Norway. It is therefore appropriate to talk about “the frozen fish industry.” At the same time, it is also important to stress that the frozen fish industry had to create a market for its product since frozen fish fillets represented something new to Norwegian consumers after WWII. And as we shall see, frozen fillets were something quite different from the fish consumers had traditionally encountered in their everyday lives.

Distanced Food

Traditionally, Norwegians have always included a lot of fish in their diet. Having a long coastline and rich fishing resources encouraged people to eat fish while it was fresh. The fresh fish came from nearby, and the people who ate the fish were often the same people who caught it. Another way of getting fresh fish was at the harbor, where fishermen would sell their catch from their boats or from the fish dealers at the marketplace. In this way, people would purchase their fish from the same person every time. Of course, fresh fish was not the only option, with Norwegians also regularly consuming salted and dried fish as part of their diet. Both salting and drying are means of preservation that allow the distance between the site of production and the

site of consumption to increase, though consumers would still have a sense of proximity to the fish because they could inspect it before purchase, since these types of fish were not enclosed in a package.¹⁶

The introduction of frozen fish fillets represented a distinct departure from more traditional fish items for consumption, and the fish used in the production of frozen fillets were caught by either small fishing vessels or large trawlers in the northern parts of Norway, which is where the richest fishing grounds and largest freezing plants were. It was then transported to the southern and eastern parts of Norway where most of the population lived. Hence, we can say that most of the frozen fish fillets made in Norway were produced in areas of the country up to 2000 kilometres from the most central markets in the most densely populated areas surrounding Oslo.¹⁷

This distinction illustrates one important difference between frozen fillets and fresh fish: Frozen fillets are food that is not caught or produced in the vicinity of the consumer. Therefore, the consumer cannot know exactly where the fish comes from and how it is made. From this, it is clear that it is also impossible for the consumer to base his/her judgment of the fish's quality on the production process or the face-to-face interaction with the producer. Frozen fillets are a long-distance food, thereby creating a gap between producer and consumer. However, this did not necessarily represent something new for Norwegian consumers, as we must remember that dried cod also comes from the far north. For this reason, the geographical distance between consumer and producer is nothing new in itself.¹⁸

The new aspect about frozen fish fillets becomes visible if we follow the fishing vessels into the harbor where the freezing plant is located. Once taken out of the ocean, the fish would enter a factory-like environment. Here, fish would be placed on a disassembly line flanked by women with sharp knives, who removed not only the inedible parts of the fish, but also everything that is typical of a fish such as its head, tail, bones and skin. Even the parts of meat that contained the fish's blood would be cut off so that only the white meat was left. The women also weighed the fish so that the fillets sizes were of a uniform size and at the end of the disassembly line, the fish did not look at all like the fish taken from the ocean. What was left was a standardized square lump of white organic material that was placed inside small, standardized cardboard containers whose shape and color were decided by designers and marketers at the head office of Norwegian Frozen Fish.¹⁹

At its essence, processing provided another kind of “distancing” that was different than simply a purely geographical distance. While fresh, dried, smoked and salted fish had signs that clearly showed that it was fish, frozen fillets did not have such traits. The production process also distanced the fillets from traditional varieties of fish in other ways in that the fish normally encountered by Norwegian consumers had some individuality left because of a variety in their size and looks, frozen fillets all looked the same because their size was adjusted to fit standardized packages. This meant that the consumers' encounters with the fish in retail stores would be quite different from what they were used to.²⁰

I say retail stores because the frozen fish industry sold their fillets in regular grocery stores rather than through fish dealers, while merchants were encouraged to create a standardized

environment for the sale of frozen fillets. In addition to placing the frozen fillets in the same spot in every store, they received standardized advertising materials from Norwegian Frozen Fish, and the frozen goods counters where the fish was stored were also supplied by the sales organization; as a result the 6,000 frozen goods counters that existed in Norway by 1955 were mostly the same from store to store. Norwegian Frozen Fish even encouraged merchants to transfer from old counter service stores to self-service stores. This of course led to a minimization of the role played by the merchant as a seller because the consumers would serve themselves.²¹

The very place where consumers would encounter the new food would therefore differ from where they normally bought their fish, as not only were the fish of a standardized size and packed in standardized packages, but even the stores where the fish was sold were standardized. As such, the making and selling of frozen fillets represented a break with the traditional purchasing of fish. Because they no longer bought fish from the fishermen at the harbor or from the fish dealer, consumers encountered an entirely new environment for buying fish that provided no hint about the product's origins in the sea. The fish was no longer sold from a boat or from trays filled with ice so that consumers could see the very fish they bought; in fact, this new product and sales environment did not allow them to see the fish at all. Placed inside frozen goods counters and packed in cardboard containers, the actual fish had become invisible.

This invisibility represented a problem. If we look at a housewives' encyclopaedia from 1947, this becomes clear. This book told housewives everything they needed to know about fish as a raw material for food, including the biology of the fish, its nutritional value, different species,

preparation and so on. The book was a guide intended to turn housewives into responsible, critical and well-informed consumers, so it should be no surprise that the book also instructed housewives how to evaluate the quality of fish at the marketplace. The authors explained that fish is a perishable product that will be destroyed by bacteria and enzymes shortly after death, thus making it important to evaluate the freshness of the fish. After stating this, the authors explained how housewives can recognize fresh fish: “Fresh fish has a stiff body, clear colour, red gills, grey or white and hard roe, and a good smell of fish.”²²

This illustrates how housewives evaluated fish when they went down to the harbor or to the fish dealer. They used their senses to check the fish for certain traits that could reveal the true quality of the fish. The new frozen fillets and new sales locations made these methods useless. Not only was the bond between consumer and seller broken, but the consumers could no longer judge the quality of the fish for themselves because it was hidden. Thus, the production and sale of frozen fillets can be seen as having created a distance between the product and consumer that went far beyond that of the geographical. Frozen fish fillets therefore needed to be evaluated differently than traditional fish.²³ But before we go on to interpret this process in another way, we must first take a look at how consumers perceived this new product.

Distrust in Fillets

How did consumers react to the new frozen fish fillets that started appearing in grocery stores during the 1950s? A meeting at the Department of Fisheries in 1951 provides some insights, as the theme of the meeting was an increasing lack of fish in the eastern parts of Norway. All of the major actors from the fishing industry attended the meeting in which cabinet minister Reidar

Carlsen claimed that the lack of fresh fish had to be compensated for “with stored fish – frozen fish and dried fish.”²⁴ Carlsen maintained that frozen fillets could solve the fresh fish crisis because they could be stored for a long time, and he also attacked those who did not want frozen fish: “Those who don’t eat frozen fillets can blame themselves. It’s snobbish not to think it is good enough.”²⁵

Carlsen’s attack on people who did not want to eat frozen fish in times of scarcity illustrates that frozen fish was regarded as something inferior to fresh fish. Even in times when fish was in short supply, consumers did not want to eat the new fish fillets. The Minister of Supply had similar concerns as early as in 1948 when he claimed that: “We have frozen fish fillets in storage, but it seems that people in Oslo do not want this high quality product.”²⁶ Perhaps the clearest statement of consumer scepticism towards frozen fillets came from Tordis Undersrud from Norges Husmorforbund (the Norwegian Housewives Association), which had approximately 30,000 members at this time. In a meeting at the Department of Fisheries, she said: “Housewives prefer fresh fish if it’s available, and in any case we want fresh fish for our children.”²⁷

So we see that frozen fillets were not considered a proper substitute for fresh fish, even though fish was hard to come by.²⁸ This of course can be interpreted as Carlsen did, as a sign of snobbishness, although this does not seem as if it fully explains consumer reaction. After all, it seems highly unlikely that people would be picky about food right after a war when they had to endure food rationing and food substitutes.²⁹ If we are to understand why consumers rejected frozen fillets even in times of scarcity, we have to look more closely at how they evaluated the

quality of this fish. A look at the pre-history of the frozen fish fillet in Norway can offer some insights into the scepticism.

Norwegian consumers got their first taste of frozen fish fillets during WWII, which was produced at the state-of-the-art freezing plants built by the German occupiers. There was one problem, however, with the German idea of using frozen fillets as a source of protein. Even though they had built these state-of-the-art freezing plants, their distribution chains were no match for the plants. It could take days before fish arrived at the plants for freezing, which meant that the fish could decay quite a bit. Additionally, the distribution system from the freezing plant to the market was poor, as the fact is that they could simply not keep the fish frozen all the way from the plants to the consumers. Therefore, the frozen fillets that Norwegian consumers had access to during the war were of very low quality.³⁰

We can see that this was a problem for the frozen fish industry in a quote from Lillemor Erken, a famous cookbook author, after a meeting in which she attempted to tell housewives about the high quality fish produced by Norwegian Frozen Fish: “It will be a Sisyphean task to convince housewives who still have the taste of frozen fish from the war in their mouths.”³¹ The first-ever frozen fillet advertisement in the national Housewives Magazine also acknowledged the consumer’s unhappy memories of the wartime frozen fillets: “We think with horror on the war and the so-called frozen fish we were given back then. It’s no wonder many housewives still get a bad taste in their mouths when they think of frozen fish.”³²

This shows us that consumer scepticism towards the frozen fillets was grounded in memories from the war, with the memory of rotten frozen fillets lingering on even after the war was over, thereby shaping the way the “new” frozen fillets were perceived by the consumers. In conjunction with the fact that the consumers could not evaluate the frozen fillets with their physical senses and that the fish had been distributed by the “enemy”, we can see that they used memory or history as a tool for evaluating the fillets. Using this tool for the evaluation of the fillets did not give them any reason to trust the authorities and the frozen fish industry’s claims that frozen fillets were good food. For this reason, consumer distrust should not be seen as a form of irrational snobbishness, but rather as a consequence of the war and the new packaging of the frozen fillets.

Whatever the reasons for why consumers did not want frozen fillets, we see that the frozen fish industry faced a challenge as it tried to market its frozen fillets to Norwegian homemakers. Something had to be done to convince the consumers that frozen fillets were high quality food, and the industry needed to simultaneously produce fish fillets, establish an infrastructure for distribution of the products and get consumers to trust them. There is evidence that it succeeded. By 1970, frozen fish had been accompanied by more than 100 different products, and the Norwegian consumption of frozen foods was higher than 15 000 tons. Within a period of 20 years, Norwegians had turned into one of the largest consumers of frozen foods in Europe, so it seems as if the industrial actors had indeed transformed the consumer’s attitude towards frozen foods.³³ The remainder of this paper examines how this was accomplished and how the “distanced food” became “familiar food.”

Quality Control Systems and Time

A major theme in the literature about consumer trust in food is the establishment of quality control systems and the like.³⁴ Right from the very beginning, the frozen fish industry stressed that every single package of frozen fillets had to be of high quality, which in this case meant that each frozen fillet would have a taste, consistency and smell that resembled that of fresh fish.³⁵ The frozen fish industry therefore knew that consumers would judge the new product against fresh fish. It's essential nature as a fish was removed via the production process, yet the product was still supposed to taste like fresh fish when consumed. However, much could go wrong in the production and distribution of frozen fillets because many people were involved in the process. It then became imperative for Norwegian Frozen Fish to find a way to ensure that only high quality products entered the market and consumer households.

This was accomplished in two ways. First, the state checked the production of frozen fillets, with government inspectors visiting freezing plants and testing samples from the production run. If inspectors found products that were of a low quality, they would send them to the National Institute for Fisheries Research for further analysis.³⁶ Unfortunately, this state-run quality control system did not have the resources to check the daily production from every plant in the country, so Norwegian Frozen Fish also established its own technical department in 1947, which was designed to check the production and distribution of frozen fillets. Norwegian Frozen Fish also established a home market department that served some of the same functions. The technical department was closely linked to the National Institute for Fisheries Research, thus making it possible to view this as an alliance between the industry and the state.³⁷

These organizations, as well as the alliance between them, worked to make sure that consumers who actually bought the new frozen fillets were not reminded of the wartime frozen fish. At the same time, we can say that these organizations were part of an effort to limit variation, with their job being to ensure that all products that entered the marketplace were of the same quality no matter when or where they were produced and purchased.³⁸ However, this type of measure can only create trust over time. In other words, the effort would only work if the frozen fish industry could persuade consumers to try the fillets in the first place. Consequently, we have to investigate the marketing of frozen fish fillets and see how this together with the system of quality control contributed to the creation of consumer trust.

Rhetorical Relations

The creation of the common brand “Frionor” in 1947 for all frozen fish fillets produced in freezing plants along the Norwegian coast can be seen as Norwegian Frozen Fish’s first marketing effort.³⁹ Nevertheless, the brand cannot be separated from the perceived importance of quality. After all, the brand name was supposed to serve as a guarantee of the food’s high quality. The quality controls were therefore designed to ensure that the brand name always kept its promise, as brand and quality controls were two phenomena that co-produced each other.⁴⁰

But, the brand also served another purpose. While the packaging of frozen fillets in cardboard containers created a distance between the consumer and the product, the brand was intended to reproduce this relationship. The branding produced a sense of familiarity between consumers and products by transforming every single package of frozen fillet into standardized Frionor fish fillets, thus all individual packages became the same, while any doubt about what the package

might contain was removed. In theory at least, having tried one package, the consumer would be familiar with all of them. The role of the trusted fisherman or fish dealer was therefore delegated to the brand, as this was a kind of familiarity between producer and consumer that did not build on proximity in space, but on a standardization and large system for quality control.⁴¹

It is hard to know if the brand worked as a guarantee for the quality of the products in this specific case, although an investigation by the Norwegian Productivity Agency, established in 1953 in order to promote rationalization in economic life to the advantage of consumers, employers and employees, suggests that it did. The investigation asked housewives if they thought branded products were of better, worse or the same quality as non-branded products. A total of 58% of the housewives thought that branded products were of a better quality, so in the eyes of many housewives, branding seems to have acted as a guarantee of quality.⁴²

The first ad for Frionor fillets to appear in Norway was a full page in the national Housewives Magazine that carefully explained the production process from which the fillet originated and followed the fish all the way from the fishing boat to consumption. This explanation of the production process was framed to show that the system for quality control acted as a guarantee for quality, thereby distancing the new frozen fillets from the wartime fillets.⁴³ The fillets' journey from the ocean to the household and the system that monitored this process were also central in the "propaganda" movie "Fisken uten grenser" ("The fish without borders") that Norwegian Frozen Fish premiered in Oslo in 1949.⁴⁴

As we can see, both the ads and the movie used the origins of the fish as their story line, which is interesting in connection to the distance created between production and consumption by the non-local nature of frozen fillets. By telling stories that show where the fillets came from and how they were produced and distributed, Norwegian Frozen Fish was attempting to bridge this gap. The stories situated the fillets so that consumers could get a feeling of familiarity, not only with the product, but also with the process that created it. Norwegian Frozen Fish also used the quality control system, as rhetorical resource in order to reassure consumers that all possible measures had been taken to make high quality frozen fillets.⁴⁵

Words were also important tools in this effort to distance the new frozen fillets from the wartime frozen fish. The first company to use the Norwegian word “dypfryst” (deep frozen) about its food was not Norwegian Frozen Fish, but its competitor Findus. Findus chose to stand outside the sales organization in order to promote its own brand, and maintained that the new word would disassociate the new and modern frozen foods from the low quality food from the war. This new concept sparked a small controversy in the early 1950s with language experts nibbling at what they saw as “new speak”, though it became more and more commonly used by actors from the industry during the 1950s.⁴⁶

By adding the adjective “dyp” (deep), both Findus, and later other companies, hoped to underscore that the new fillets were different than those produced during the war. This new word was thought to make it harder to associate the new fillets with the fillets from the war, which shows that the frozen fish industry attempted to create new associations. The ads attempted to transform something that was distant and unknown into something familiar and trusted. Quality

controls, brands and marketing were tools for the distribution of products and the production of sales, but we also see that they were used for producing consumer trust by forging new relationships between consumer and the product. Yet, these are only a few of the techniques that the frozen fish industry used to create trust among consumers and not necessarily the most interesting ones.

Freezers as New Signs

As we have seen, quality control, branding and marketing were used to create a new relationship between consumer producer and product. However, if we examine the physical space where consumers would buy their frozen fish fillets, it is clear that there were also much more subtle ways to create trust. The frozen fish industry was involved in the standardization of grocery retailing, which altered the old relationship between the consumer and fish dealer or the fisherman from whom consumers had traditionally bought fish. This standardization of retail can also be seen as having been a technique for the creation of trust.

During the 1950s and 1960s, retail grocery stores were gradually transformed into self-service stores in Norway.⁴⁷ In this process, the old counter service stores were increasingly replaced by new stores in which customers could roam around freely and choose their own products from shelves and display cases, and at the end, consumers would pay for what they had selected. Central actors in the Norwegian retail sector saw self-service as a system that would rationalize retail by decreasing the amount of staff needed and by allowing the introduction of modern marketing techniques to the grocery store. Because of this, the transition to self-service in Norway was heavily supported by governmental institutions such as the Norwegian Productivity

Agency, along with industrial actors.⁴⁸ One industrial actor in favor of such a development was Norwegian Frozen Fish, which together with other industrial actors invested in an organization to finance and support merchants who wanted to adopt the self-service system.⁴⁹

The display of products was seen as very important in a self-service store because products competed with every other product for consumers' attention.⁵⁰ In accordance with this, Nils W. Pettersen-Hagh, head manager of Norwegian Frozen Fish's main storage facility and somewhat of a strategist in the building of the Norwegian frozen fish industry, said that the frozen goods display case should be able to sell products. "Order is of the utmost importance," he said, "and the cabinets should be filled with goods."⁵¹ The frozen fish industry had regular checks of the frozen goods display cases in retail stores to ensure that merchants displayed the frozen fillets in the most effective way. The industry even instructed the merchants in how the display case should be set up and how products should be ordered according to type and brand inside the frozen goods display. The aim was to create a clean, standardized, and well-structured presentation of the products.⁵²

This effort to "help" merchants with the transition to self-service stores and to control the display of frozen fillets inside grocery stores can be seen as an attempt to standardize stores and the product display. However, the standardization of stores and the display of food served a purpose other than to just create sales. Since it was impossible for the consumer to evaluate the quality of frozen fish fillets by the color, smell and consistency because the fillets were packed in cardboard containers, it seems as if the display of frozen fillets became a marker of quality in itself. The frozen fish industry told housewives how the frozen goods display case should look,

and said that the condition of the display case could be used as a sign of the fillets' quality. It was regularly stated that consumers should never buy frozen fish fillets from merchants that did not take care of their frozen goods display cases, and housewives were instructed to look for a well-ordered, frost-free display case that only contained industrially frozen products and had a visible thermometer. If these signs were in place, she could be sure that the products inside were of a high quality. This strategy was also used to pressure merchants into following the instructions from the industry, since at the end of the day, housewives would evaluate the merchant by his frozen goods display case, which had replaced him as the salesman.⁵³

Because of the packaging, the smell, color and consistency derived from the fish itself could no longer serve as signifiers of quality, thus the frozen fish industry had to find new ways for consumers to evaluate quality. Here, we see how the store and frozen goods display cases became surrogates for product evaluation, thereby shifting the consumer's attention from the fish and towards the environment in which it was sold. What the industry did was to create an ideal type environment and to invite consumers to use this ideal type as a tool for evaluating the quality of the frozen fillets.⁵⁴ In this way, it became possible to evaluate the quality of frozen fillets no matter where they were bought, though this could have been a risky strategy.⁵⁵ After all, how could the industry know that merchants would sufficiently maintain the sales environment so that it became a positive signifier of the product's quality?

After initial problems in the 1950s with frozen goods display cases and frozen fillets in retail stores, the frozen fish industry started developing standards for the handling of frozen foods. The Deep Freezing Office, which was an office created by the industry to promote the consumption

and proper usage of frozen foods and freezing equipment, contacted the Directorate of Health within the Department of Social Affairs in order to create national standards to be monitored by the state for the use and maintenance of frozen goods display cases. As these rules became reality in the early 1960s, merchants who did not handle their frozen goods display cases properly would lose the right to sell frozen food. Even though the Department of Social Affairs had the responsibility for making sure that the standards were followed, there is no doubt that they were heavily influenced by the industry and served the industry's interests.⁵⁶

Using these standards, the frozen fish industry actually made sure that stores would follow their recommendations. If merchants wanted to sell frozen food they would have to maintain an ordered display, therefore minimizing the risk associated with using the store as a signifier of quality. In reality, the store was of minimal value when consumers evaluated the quality of frozen fillets because problems could arise at any stage within the frozen food chain, while the signs given to the consumers were restricted to the space of the shop. However, this does not mean that the standardized space did not work to produce consumer trust. As part of the larger system of state and industrial quality control, this measure could work because consumers would still get the impression of being able to evaluate the frozen fillets.

Hence, we see that branding and marketing created new relationships between producer and consumer, and that retail stores and frozen goods counters became signifiers of the food's quality. This illustrates how quality control systems set up to ensure the quality of the food were supplemented by these technologies, which gave consumers a feeling of making quality judgements on their own as they had done with traditional fish. This is all well and good, but it

does not explain how the consumers' experience of wartime frozen fillets was negated. What was perhaps the most effective technology for breaking down the negative experience and building trust in the new fillets was also the one that was most hidden. The next section shows how learning by doing and household freezer chests became important in the production of consumer trust in frozen fish fillets.

Co-opting the Technologies of Learning

The standardization of the retailing of frozen fillets can be seen as a way of giving consumers a new tool for the evaluation of the quality of fillets. Yet, the main problem facing the frozen fish industry was that consumers had bad memories of the frozen fillets they ate during WWII, which led to doubts about the ability to use freezing to conserve food at all. For this reason, these memories made it difficult to trust the industry's repeated assurances that freezing was the best way to preserve fish. The industry had to counter bad memories and produce new and positive experiences with freezing, and hence frozen fillets.

In cooperation with Findus and several manufacturers producing freezing equipment, Norwegian Frozen Fish took part in the creation of the Deep Freezing Office in 1959, whose goal was to promote the increased use and procurement of frozen foods and freezing equipment. As such, the office was an alliance working to promote the interests of a united Norwegian frozen fish industry, and a famous radio star, Rolf Kirkvaag, was hired as the office's director in a move that clearly illustrated that the office was supposed to be what the industries that supported it called, a "sales promotion office." The hiring of Bjørg Eliassen, who was educated to be a home

economics teacher, further illustrates the fact that the promotional activities of the office were to be framed as being “neutral” scientific information.⁵⁷

Together, Kirkvaag and Eliassen toured the country and held exhibitions at fairs and in women’s organizations on how to cook frozen fillets and use a freezing technologies. During 1960 alone, they claimed to have held lectures and demonstrations for more than 60,000 housewives across the country. They arranged courses in their office in Oslo, as well as writing manuals on how to freeze food. Kirkvaag and Eliassen presented themselves as neutral, even though they were paid by the industry. The neutrality of their “information” was always repeated in their presentations, but, as we shall see, they were undoubtedly promoting the use of frozen food and home freezers in a way that served the interests of the frozen fish industry.⁵⁸

If we look at the activities of the Deep Freezing Office, particularly including a book written by Eliassen, it becomes clear that the household freezing was a central part of the promotional work of the office, which actually spent more time teaching housewives how to use freezing technologies such as freezer locker plants and household freezers than it did talking about frozen fillets. In addition, it linked the technologies to the user’s own production of frozen foods.⁵⁹ Household freezing technologies was not only a place for the storage of industrially frozen foods, but also a place for the storage of food that had been prepared by the housewives themselves, therefore making it easier to avoid buying frozen fillets from the industry. Housewives could simply buy fresh fish when available, freeze it themselves, and then use it whenever they wanted.⁶⁰

Books like these became an important part of the cooperation between manufacturers of freezing technologies and the frozen fish industry. From about 1955 there was a veritable outpour of so called freezing books.⁶¹ These books stood in a long tradition. In 1936 the Norwegian government established a home economics institute to do research in matters concerning the households. After WW II this institute experimented with the freezing of food. The building of collective freezer locker plants in connection with dairies had started just after the war, and the institute was eager to promote these as a way to maintain the nutritional value of stored foods. Several manuals were published on how to freeze food and even though there seem to have been no contact between the institute and the frozen food industry, these manuals set the standard for the later freezing books.⁶²

We could say that the frozen fish industry was co-opting the strategy of the home economics institute and transformed its nutritional project into an effort to create trust in industrially frozen food. In this way the frozen fish industry propaganda office could take over some of the legitimacy and recognition the home economics institute had built up through its work. This made it possible for the Deep Freezing Office to approach the consumers with a certain kind of authority and trustworthiness. The instruction books published by the home economics institute and the fish freezing industry were technologies made to ensure that people had positive experiences with freezing as a method of conservation. Only by ensuring that people's own freezing were successful, could home freezing be a means of creating confidence in the industrial frozen food.

In his study of how the French learned to eat canned food, Martin Bruegel shows how institutions such as schools and the military played a major part in countering the initial consumer skepticism and how learning was an essential aspect in the trust building process.⁶³ Bruegel is right in highlighting the institutions that facilitated this learning, but in the case of frozen fillets we must add that technology was important in the learning process. The process of teaching Norwegian consumers to eat frozen fish fillets did involve the establishment of institutions such as the Deep Freezing Office, but also learning technologies such as written manuals that could bring the message into the home as consumers learned to freeze their own food. We can say that the instruction manuals points toward a technologically mediated learning process. Let us therefore follow this idea of a technologically mediated learning process further and investigate home freezing as a means to create consumer trust in industrially frozen filets.

A Highway into the Home

Household freezing of vegetables, berries, game and fish procured outside of the industrial food chain became very popular during the 1950s at least partly due to the informational effort of the researchers at the home economics institute, not to forget the fact that the Norwegian population would be used to conserve food using other techniques due to the short summers and long winters in the country. The popularity of home freezing could be seen to pose a threat to the industry's attempt to sell frozen fish since it enabled people to become their own producers of frozen foods circumventing the industrial food chain. Why, then, would an office that was supposed to promote the interests of frozen fillet producers promote this type of household freezing?

In order to understand this, we have to investigate how the frozen fish industry viewed the home freezing, with one way of accomplishing this being to look at a quote from the secretary of the National Association of Freezing Plants, who claimed that the freezer locker plants should not be feared by the frozen fish industry even though they enabled consumers to circumvent the industrial frozen food chain because: “Household freezing contributes more than anything to breaking the traditional resistance against a new way of preserving food.”⁶⁴ This was repeated by Nils W. Pettersen-Hagh in his report from a study trip to the US, where he examined the American cold chain and claimed that consumers needed to learn that freezing was a good method for conserving food.⁶⁵ In the eyes of the industrial actors consumers were not “frozen food minded” because they were unacquainted with freezing as a way of preserving food.⁶⁶

Here, we have claims made by central actors in the industry that illustrate that the home freezing was seen as an important way to counter consumer scepticism, which make it clear why the Deep Freezing Office promoted the home freezing through an argument that consumers could use it to produce frozen food themselves. While it was true that home freezing made it possible for consumers to produce their own frozen fish, this would not necessarily lead to a decrease in the sale of frozen fillets. The experience from the war had so tainted freezing as a way of conserving food that consumers did not believe the industry’s claim that it had any validity as a reliable food preservation method, though using home freezers and freezing food on their own would change this perception. When consumers found that freezing worked for preserving their home produce, they would then also start believing that industrially frozen products were of good quality. The industry thought that this was to produce new associations that did not link frozen fillets to experiences from the war, but rather to the daily activities of the kitchen.⁶⁷ The frozen fish

industry was convinced that household freezing would ensure consumers that frozen fish fillets, and other frozen foods, were excellent products.

From the middle of the 1950s household freezer chests started to replace the collective freezer locker plants as the preferred technology for household freezing. Even though the household freezer chest was an exclusive technology at the end of the 1950s, it had become one of the most sought after household technologies by Norwegian consumers, which is illustrated by the rapid increase of freezers in Norwegian households. While almost nobody owned a home freezer in 1950, more than 37% of Norwegian households had a freezer in 1967, whereas during the 1970s that number increased to over 70%.⁶⁸ With this, the belief in the potential of freezing technologies became even more optimistic.

Pettersen-Hagh believed that the low spread of household freezer chests could explain the low consumption of frozen fish in the first half of the 1950s. He therefore urged the promotion of household freezer chests as a means to sell frozen fish seeing the two as symbiotic products that reinforced each other. This was repeated by the general manager of Norwegian Frozen Fish, Otto Hanssen, who claimed that the lack of home freezers explained the underdevelopment of the frozen food industry in Europe. The household freezer chest was the technology that brought out the rational properties of frozen food by making it possible to buy large quantities and storing it in the household, thus transforming the wartime fish into rational food. Without it, consumers would have no reason to connect their household freezing to the produce of the frozen fish industry.⁶⁹

The director of the Deep Freezing Office, Kirkvaag, took his fate in the household freezers as tools for embedding the consumers in the industrial food chain one step further claiming that the home freezer was to be for the frozen fish industry what the highway was for the automobile. The idea being that once consumers had procured a home freezer, they would inevitably be linked to the industrial frozen food chain. In the end they would be embedded to such an extent that the freezer would become a place for storing industrially produced frozen food rather than self-produced foods such as berries, fish and game.⁷⁰ In this way, the home freezer became a medium for letting consumers experience what Kirkvaag called the “miracle of deep freezing,”⁷¹ which was promoted in order to disassociate frozen fillets from the war, while helping to create more positive associations in connection to fillets just as the word “dypfryst” was supposed to do.

There can be no doubt that the actors in the frozen fish industry had a belief in what we could call the technological facilitation of learning by doing as a way to shape of consumption.⁷² What was a seemingly simple technology was also a learning technology with the potential to transform the perceptions of frozen food. In this case, the technology was probably more effective than the branding of frozen fish, as it was through the home freezer that people would acquire first-hand experience with freezing as a method of preserving food and frozen foods. And further, it was through the freezer that the consumer would discover that industrially frozen food was a rational, time saving choice compared to the foods frozen in the household. Thus, the home freezer was more than a technology for the conservation of foods. It was also a technology for the production of experience and the shaping of food consumption. The technology might be mundane, but it probably spoke more than words and quality control systems in this connection.

Food Chains, Technology and Consumer Trust

So, did the frozen fish industry manage to produce consumer trust in frozen fillets? There is some evidence that supports such an argument. In 1975/76, the average Norwegian ate approximately 2.6 kilos of frozen fish a year, although the total amount of fish consumed was 24.3 kilos, which means that frozen fish accounted for roughly 10% of total consumption of fish.⁷³ There also seems to have been a change in the presentation of frozen fish during the 1960s, as it was no longer linked to wartime fish or the early controversies, but rather to the household of tomorrow. When linked to home freezers and other technologies, frozen fish had become the “savior” for overworked housewives and single men.⁷⁴ From not eating frozen fish in the late 1940s, Norwegians had become more frozen fish minded.

What caused this transformation is hard to know, though there is little doubt that the initial consumer distrust of frozen fish had eased. In the common narrative, the industry’s setting up of quality control systems, marketing and consumer demonstrations would be framed as the explanation of the prevailing trust. These were indeed essential for understanding how Norwegian consumers became *returning* consumers of frozen fish, but they alone cannot explain how they became familiar with, and came to trust, industrially frozen fish in the first place. By focusing on various technologies, it has become clear that the making of a frozen food minded consumer did not just involve scientific expertise and marketing agents, but also the architecture of self-service stores, frozen goods counters, instruction manuals and household freezer chests.

These technologies were not just infrastructure, but also tools in the shaping of consumers' perceptions of frozen food. It was through the use of home freezers that consumers would familiarize themselves with freezing as a way of conserving food, and it was through evaluating the order and cleanliness within retail stores and its freezer chest that they would become able to evaluate the probable quality of frozen fish. As a result, these technologies were crucial for the creation of familiarity and a feeling of independent decision making, which advertising and promotional campaigns could never manage. Thus, this article has similarities to studies, such as Bruegels, which highlight learning and familiarization as important aspects of trust production in that it puts weight on learning by doing.⁷⁵ The technologies were closer to home and could be experienced as more immediate than the quality control systems set up by industry. Consequently, it is the mundane character of these technologies that makes them interesting as a lens into the introduction of frozen foods.

That technologies such as instruction books, retail stores and freezer chests were important in the shaping of consumer perceptions of frozen fish also suggests that there does not have to be a gap between food studies that focus on cultures of trust and the technologies of the food chain. Both aspects are part of the complex work that goes into the introduction of new food products. Infrastructure is important in the creation of new food chains and the distribution of foods, though at the same time it is necessary to get consumers to trust the food distributed through the chain. A food chain does not really work unless it has consumers at the end of the chain, and as shown in this article, it is not obvious that technology is important in the former and not the latter. We can therefore say that the technologies investigated served as both infrastructure and as tools in the cultural shaping of frozen food consumption.

If the questions of trust and technology are key for understanding the food chains of modernity, then technology at the interface between producer and consumer is a possible lens for understanding the process of trust production. Technology should not only be considered when explaining material transformations in food production, it should also be taken seriously when considering transformations in the consumption and the cultural integration of foods. In this way, technologically oriented food chain studies could begin to relate more to the cultural studies of food and vice versa. By taking food chain technologies more firmly into our considerations, we could start to write about what can be called the material culture of food ways.

Notes

¹ Warren Belasco and Roger Horowitz (eds.), *Food Chains. From Farmyard to Shopping Cart* (Philadelphia: University of Pennsylvania Press, 2009);

² For instance: Carmen Sarasúa, Peter Scholliers and Leen Van Molle (eds.), *Land, shops and kitchens. Technology and the food chain in 20 century Europe*, CORN Publication Series 7 (Turnhout: Brepols Publishers, 2005). A theoretical overview of food chains literature is provided in: Shane Hamilton, "Analyzing commodity chains: Linkages or restraints?", in *Food Chains. From Farmyard to Shopping Cart*, 16- 25.

³ Ann Vileisis, *Kitchen literacy. How we lost knowledge of where food comes from and why we need to get it back* (Washington D.C.: Island Press, 2008); Michael Pollan, *The Omnivore's Dilemma. A Natural History of Four Meals* (New York: Penguin Books, 2006; Marianne E. Lien and Brigitte Nerlich (eds.), *The politics of food* (Oxford: Berg, 2004); Lynn McIntyre, Patricia Thille and Krista Rondau, "Farmwomen's discourses on family food provisioning: Gender, healthism, and risk avoidance" in *Food and Foodways* 17, no. 2 (2009): 80-103.

⁴ Karin Zachmann, «Atoms for peace and radiation for safety - how to build trust in irradiated foods in Cold War Europe and beyond», *History and Technology* 27, no. 1 (2011)

⁵ See for instance: Karin Zachmann and Per Østby, «Food, technology and trust: An introduction», *History and Technology* 27, no. 1 (2011): 1-10; Uwe Spiekermann, «Redefining food: the standardization of products and production in Europe and the United States, 1880-1914», *History and Technology* 27, no. 1 (2011): 11-36; Gabriella M. Petrick, «Purity as life: H.J. Heinz, religious sentiment, and the beginning of the industrial diet», *History and Technology* 27, no. 1 (2011): 37-64; Stig Kvaal and Per Østby, «Sweet danger - negotiating trust in the Norwegian chocolate industry 1930-1990», *History and Technology* 27, no. 1 (2011): 91-111.

⁶ Similar arguments are also put forward in: Carolyn De la Peña and Benjamin N. Lawrance, “Introduction: Traversing the Local/Global and Food/Culture Divides,” *Food and Foodways* 19, nos. 1-2 (2011): 1-10. While not specifically considering trust, Daniel Block has crafted a good example of how science was utilized to transform milk from a dangerous, yet healthy, feminine substance to a masculine and controllable substance. While he shows how science is utilized in this shift, he does not consider technology as more than infrastructure. See: Daniel Block, “Saving milk through masculinity: Public health officers and pure milk, 1880-1930,” *Food and Foodways* 13, nos. 1-2 (2005): 115-134.

⁷ Some of the basic approaches to understanding technology as a sociocultural phenomenon are presented in: Wiebe E. Bijker, Thomas P. Hughes and Trevor Pinch (eds.), *The social construction of technological systems. New directions in the history and sociology of technology* (Cambridge MA: The MIT Press, 1989).

⁸ Several authors have written about parts in cold chains. Some examples are: Mikael Hård, *Machines are Frozen Spirit. The Scientification of Refrigeration and Brewing in the 19th Century – A Weberian Interpretation* (Frankfurt am Main: Campus Verlag, 1994); Shane Hamilton, «The economies and conveniences of modern-day living: Frozen food and mass marketing, 1945-1965», *Business history review* 77, no. 1 (2003): 33-60; Shane Hamilton, «Cold capitalism. The political ecology of frozen concentrated orange juice», *Agricultural history* 77, no. 4 (2003): 557-581; Paul Josephson, «The ocean’s hot dog. The development of the fish stick», *Technology and Culture* 49, no. 1 (2008): 41-61; Bjørn Petter Finstad, «Freezing Technology in the Norwegian Fish Processing Industry, 1930-1960», in *Technological Change in the North Atlantic Fisheries*, eds. Poul Holm and David J. Starkey, bd. 3, *Studia Atlantica* (Esbjerg: Fiskeri- og Sjøfartsmuseet, 1999), 89-113; Bjørn Petter Finstad, «The frozen fillet: The fish that changed North Norway?», *International Journal of Maritime History* XVI, no. 1 (June 2004): 27-41.

⁹ Sociologist Adrian Franklin has investigated why there has been a decline in fish consumption in Britain and links this to larger socioeconomic factors. A bit on the side of his main argument, he points to the fact that there is a

certain convergence between the consumption of frozen fish and the spread of home freezers. My goal is not to confirm this, but rather to investigate how technologies such as home freezers were utilized as tools for making frozen food minded consumers. See: Adrian Franklin, "An unpopular food? The distaste for fish and the decline of fish consumption in Britain," *Food and Foodways* 7, no. 4 (1997): 227-264.

¹⁰ Johs. A. Jacobsen, «Litt om frossenfisk-produksjon og omsetning gjennom 24 år», *Frionorbladet (trade journal of Norwegian Frozen Fish)* (July 1949): 10-17; Dag K. Andreassen, «Firkantet fisk : kjøle- og fryseteknologi blir fiskeindustri: ill.», Volund: Annual of the Norwegian Museum of Science and Technology (Oslo, 1996), p. 55-81.

¹¹ Bjørn-Petter Finstad, «The Norwegian fisheries during the German occupation: Change and continuity», in *Fish, war and politics in the North Atlantic fisheries, 1300-2003*, eds. D.J. Starkey, F.R. Loomeijer, and R. Robinson (Den Haag: Instituut voor Maritieme Historie, 2004), pp. 113-119.

¹² The industrial committee, *Frysning* (New York: The Royal Norwegian Department of Provision and Rebuilding, 1945); Finstad, «Freezing Technology in the Norwegian Fish Processing Industry, 1930-1960»; Torvald Tande, *Norsk Fiskeripolitikk. En analyse av fiskerinæringens utvikling siden 1920* (Oslo: Studieselskapet Samfunn og Næringsliv, 1957); Leiv Nordstrand, *Fiskeridirektøren melder. Fiskeridirektoratet 1900-1975*. (Bergen, 2000).

¹³ Letter from Gustav Lorentzen on behalf of the department for construction and machine engineering to the director of fisheries, Sept. 1, 1949. Department of Fisheries Research Department, series 43.3, box 43.3/4, folder 82, the Regional State Archive in Bergen; Letter from the director of fisheries to the department of construction and machine engineering, June 4, 1949, Department of Fisheries Research Department, series 43.3, box 43.3/4, folder 82, the Regional State Archive in Bergen.

¹⁴ Anders Frihagen., *Norsk frossen fisk til De Forente Stater: beretning* (Oslo: Department of Commerce, 1946); Frionor, *Frionor 1946-1971* (Oslo, 1976); Frionor, *Pionerinnsats gjennom 50 år* (Oslo, 1996). One notable exception is the Findus plant in Hammerfest. This was owned by the chocolate producer Freia, and sold its products under their own brand "Findus." Alf R. Jacobsen, *Fra Brent Jord til Klondyke. Historien om Findus i Hammerfest og norsk fiskeripolitikk elendighet* (Oslo: Universitetsforlaget, 1996); Alf R. Jacobsen and Per J. Hellevik, *100 år i norsk mat. Nestlé* (Oslo: Nestlé Norge, 1998).

¹⁵ Tande, *Norsk Fiskeripolitikk. En analyse av fiskerinæringens utvikling siden 1920*; Nils L.S. Jacobsen, «Innlandet», *Norsk Fryserinæring* (trade journal of the Norwegian freezing industry), no. 6 (July 1949): 1-2; Frionor, *Frionor 1946-1971; Marketing and consumption of frozen fish in OEEC countries. Report presented at a*

meeting of experts on deep frozen foods held in Verona from the 6th to 12th October 1959 (Verona: European Productivity Agency of the Organisation for European Economic Co-operation, 1959).

¹⁶ Fredrik Grøn, «Om kostholdet i Norge. Fra omkring 1500-tallet og op til vår tid» (Det Norske Vitenskapsakademi, Oslo, 1941). For a history of fresh food consumption, see: Susanne Freidberg, *Fresh. A perishable history* (London: The Belknap Press of Harvard University Press, 2009).

¹⁷ Tande, *Norsk Fiskeripolitikk. En analyse av fiskerinæringens utvikling siden 1920*.

¹⁸ Mark Kurlansky, *Cod. A biography of the fish that changed the world* (London: Vintage, 1999).

¹⁹ Charles Robertson, «Kvalitetskravet i produksjon og omsetning», *Frionorbladet*, no. 2 (1949): 3-5; Max Schmid, «Sveits», *Frionorbladet*, no. 1 (August 1949): 4; Frihagen m.fl., *Norsk frossen fisk til De Forente Stater*; Finstad, «The frozen fillet: The fish that changed North Norway?».

²⁰ The point made by Carole Adams about the material and metaphorical transformation of animal flesh into meat, is very interesting in this connection. It seems to have played into the marketing of frozen fish at a somewhat later stage when it was marketed as “fish that even children could like”. The point being that even people who did not like fish, would like frozen fish because it didn’t have bones or smell like fish. As such, the de-animalization of fish could also serve to attract new consumers: Carol J. Adams, *The sexual politics of meat: A feminist-vegetarian critical theory* (Continuum, 2010, Kindle edition).

²¹ The number might seem low, but it placed Norway at the top five in Europe at the time. This is explored in: Terje Finstad, “Cool alliances. Freezers, frozen fish and the shaping of industry-retail relations in Norway, 1950-1960,” in *Transformations of Retailing in Europe After 1945*, eds. Ralph Jessen and Lydia Nembach-Langer (Aldershot: Ashgate, 2012). The introduction of self-service was also quite rapid. While there were only 30 self-service stores in 1950, the number had increased to 1,300 in 1957, meaning that 10% of Norwegian stores were self-serviced. «Vindusutstillinger», *Frionorbladet*, no. 1 (1952): 38; Per W. Bistrup, *Markedsføring av frossen fisk på det innenlandske marked*, (Bergen: Norwegian School of Economics, 1952); J. Trondsen, «Litt om Norsk Frossenfisk A/L’s innenlandsavdeling», *Frionorbladet*, no. 1 (1951): 32; «Frionor innenlandsavdelingen», *Frionorbladet*, no. 2-3 (June 1951): 33-37; «Skal jeg velge FRIONOR eller...», *Frionorbladet*, no. 3 (1952): 43; «Frysediskenes plassering», *Frionorbladet* 4, no. 1 (1952): 39; «Regelmessige besøk - distribusjon av reklamemateriell», *Frionorbladet*, no. 1 (1952): 39; Kjøpmannskreditt A/L (Merchants Credit inc.), *5 år i utviklingens tegn* (Oslo, 1958); Kjøpmannskreditt A/L, *10 år i utviklingens tegn* (Oslo, 1963).

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- ²² Gerd Benneche og Ruth Thomsen, eds., *Husmorens leksikon*, bd. 1 (Stavanger: Åsmund Lærdals Forlag, 1947).
- ²³ Thomas Hine, *The Total Package. The Secret History and Hidden Meanings of Boxes, Bottles, Cans and Other Persuasive Containers* (New York: Back Bay Books, 1995).
- ²⁴ «Snobberi å ikke like frossenfisk», *Verdens Gang* (newspaper), July 11, 1951.
- ²⁵ Ibid.
- ²⁶ «Ikke håp om større matrasjoner», *Verdens Gang*, June 22, 1948.
- ²⁷ «Snobberi å ikke like frossenfisk». In 1950 more than 50% of Norwegian grown women were registered as housewives; in 1960 the number was more than 55%. Some had part-time work, while others worked full time in the household. Anna Jorunn Avdem, *Husmorparadiset* (Oslo: Samlaget, 2001); Anna Jorunn Avdem and Kari Melby, *Oppe først og sist i seng. Husarbeid i Norge frå 1850 til i dag* (Oslo: Universitetsforlaget, 1985); Kari Melby, *Kvinnelighetens strategier. Norges husmorforbund 1915-1940 og Norges lærerinneforbund 1912-1940* (Norwegian University of Science and Technology: PhD-Thesis, 1995).
- ²⁸ «Eksportutvalget overtar ansvaret for innlandets ferskfisk-forsyning», *Aftenposten* (newspaper) (Oslo, December 15, 1948); «Fersk fisk året rundt, hvis fisken fryses, renses på pakkestedet», *Aftenposten* (Oslo, May 10, 1951); «Ferskfisktilførselen til Oslo opp til diskusjon på stort møte i morgen. Statsråd Carlsen: 'Forlang ikke ferskfisk hver dag'», *Aftenposten* (Oslo, November 5, 1951); «Skal det aldri bli orden på fiskeomsetningen?», *Aftenposten* (Oslo, May 17, 1953).
- ²⁹ Christine Myrvang, Sissel Myklebust, og Brita Brenna, *Temmet eller uhemmet: historiske perspektiver på konsum, kultur og dannelse* (Oslo: Pax, 2004); Furre, *Norsk historie 1914-2000*; Francis Sejersted, *Sosialdemokratiets tidsalder. Norge og Sverige i det 20. århundre*, Norge og Sverige gjennom 200 år 2 (Oslo: Pax Forlag, 2005).
- ³⁰ Finstad, «Freezing Technology in the Norwegian Fish Processing Industry, 1930-1960»; Finstad, «The Norwegian fisheries during the German occupation».
- ³¹ «Fru Erken demonstrerer frossenfisk», *Frionorbladet*, no. 3 (September 1951): 38-39.
- ³² «Frossenfisk fra frysedisk», *Husmorbladet* (Housewives Magazine), May 16, 1951.
- ³³ Britt-Marie Andersson, *Dyppfrysing* (Oslo: J.W. Cappelens forlag, 1969). This means that every Norwegian ate about 5 kilos of frozen food a year.
- ³⁴ Zachmann and Østby (2011).

³⁵ Alexander Holst og Olav Notevarp, *Om frysning av fisk og fiskefilet. En oversikt*, Annual report about the Norwegian fisheries IV (Bergen: The Director General of Fisheries, 1932); Olav Notevarp og Eirik Heen, *Virkingen av frysehastighet, lagringstemperatur og råstoffets friskhet på kvaliteten av frossen fisk* (Bergen: The State Institute for Fisheries Research, 1938); Olav Notevarp, «Grunnlaget for konservering med kulde», i *Foredrag ved kjøleteknisk kurs ved Statens Fiskeriforsøksstasjon 20-24 oktober 1941* (Bergen: The Director General of Fisheries, 1942), 38-64.

³⁶ «P.M. Samling av kvalitets- og emballasjelovene for fisk og fiskeprodukter i én lov» (The Directorate of Fisheries, 1957); «Plan for Fiskeridirektoratets Kjemisk-Tekniske Forskningsinstitutt 'Fiskerilaboratoriet'» (The Director General of Fisheries, not dated); Olav Notevarp, *Kvalitetsbedømmelse av rundfrossen torsk fra D/S Thorland, Ørnes, samt steinbitfilet fra B. Heide, Kristiansund, 1950*, Department of Fisheries Research Department, Chemical-Technical Department box 125.15 Fresh fish control, the Regional State Archive in Bergen; State fresh fish control, «Smaksbedømmelse og analyse av frossen fisk og filet», December 21, 1949, Department of Fisheries Research Department, Chemical-Technical Department box 125.15 Fresh fish control, the Regional State Archive in Bergen.

³⁷ Heen, «Norsk Frossenfisk A/L. Teknisk avdeling.»

³⁸ Zachmann, «Atoms for peace and radiation for safety - how to build trust in irradiated foods in Cold War Europe and beyond»; Zachmann and Østby, «Food, technology and trust: an introduction».

³⁹ Frionor, *Frionor 1946-1971*.

⁴⁰ For more on the concept of co-production, see: Oudshoorn and Pinch (eds.), *How users matter* (Cambridge MA.: MIT Press, 2005).

⁴¹ Hine, *The Total Package. The Secret History and Hidden Meanings of Boxes, Bottles, Cans and Other Persuasive Containers*; Martha Lampland and Susan Leigh Star, *Standards and their stories: How quantifying, classifying, and formalizing practices shape everyday life* (New York: Cornell University Press, 2009); Geoffrey C. Bowker and Susan Leigh Star, *Sorting things out: classification and its consequences* (Cambridge, Mass. MIT Press, 1999).

⁴² Fakta. Institute for market research, *Husmoren og matvaredistribusjonen. Innkjøpsvaner og meninger. En undersøkelse gjennomført i Norge i Februar/Mars 1956* (Oslo: European Productivity Agency/Norwegian Productivity Agency, 1956).

⁴³ «Frossenfisk fra frysedisk».

⁴⁴ Per Borgersen, «Fisken over alle grenser», *Frionorbladet*, no. 1 (February 1950): 10-15.

⁴⁵ For more on the relation between “objective” knowledge and trust, see for instance: Theodore M. Porter, *Trust in numbers. The pursuit of objectivity in science and public life* (New Jersey: Princeton University Press, 1995).

⁴⁶ Dag O. Dvergsten, «Freiafisk og Freiaspråk», *Norsk Fryserinæring*, no. 4 (April 1952): 81; «Det norske språk fra uke til uke», *Frionorbladet*, no. 2 (1952): 43; «Språkekvilibrisme», *Frionorbladet*, no. 3 (1952): 42.

⁴⁷ In comparison, only 2.6% of UK stores had introduced the self-service system. Actually, this meant that Norway was one of the countries in Europe with the highest density of self-service stores. For more on Norwegian retail, see: Espen Ekberg, «Consumer co-operatives and the transformation of modern food retailing. A comparative study of Norwegian and British consumer co-operatives 1950-2002» (PhD, UiO, 2008).

⁴⁸ *Detaljhandel i USA. Rapport fra en norsk studiegruppe* (Oslo: Norwegian Productivity Agency, 1953); Svein Dalen, *Selvbetjening. Et nødvendig ledd i handelens rasjonalisering*, Kooperativ småskrifter (Oslo: NKL, 1954); Sverre Nilsen, *Selvbetjeningsbutikker og kjeder i USA. Beretning fra en studiereise i USA* (Oslo: Norwegian Productivity Agency, 1955); White Paper, no. 87 (1958), «Recommendations on the rationalization of Norwegian retail, part III»; «Recommendations on the rationalization of the distribution of fish on the inland market, part II»; «Outline of the retail trade in Norway, part I».

⁴⁹ Kjøpmannskreditt A/L, *5 år i utviklingens tegn*; Kjøpmannskreditt A/L, *10 år i utviklingens tegn*; Leif Throne-Holst, *Fiske og fiskeindustri i Nord-Norge*. (Oslo: Dreyers forlag, 1966).

⁵⁰ Nilsen, *Selvbetjeningsbutikker og kjeder i USA. Beretning fra en studiereise i USA (January-February 1953)*; Arne L. Dahl og Arnulf Johansen, «Om en reise til USA høsten 1952. 3. artikkel», *Frionorbladet* 4, no. 3 (1952): 34-40; Arne L. Dahl og Arnulf Johansen, «Om en reise til USA høsten 1952. 1. artikkel», *Frionorbladet* 4, no. 1 (1952): 29-36.

⁵¹ Nils W. Pettersen-Hagh, «Dypfrysing og markedsføring av fiskefileter, del 1», *Norsk Fryserinæring*, no. 1 (1959): 19-20; Nils W. Pettersen-Hagh, «Dypfrysing og markedsføring av fiskefileter, del 2», *Norsk Fryserinæring*, no. 2 (1959): 12-20.

⁵² «Regelmessige besøk - distribusjon av reklamemateriell»; «Hvilke krav stilles til produksjons- og distribusjonsleddene for å framstille dypfrossen fiskefilet av høy kvalitet?», *Frionorbladet* (June 1960): 6; «Avriming av frysediskene», *Frionorbladet* 4, no. 1 (1952): 39; «Frysediskenes plassering»; Aanonsen Fabrikker, «80 % av salget på ‘impuls’!», *Alt om Kaldt* (trade magazine), 1964.

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- ⁵³ «Folk i kyststrøk spiser mest frossenfisk. En velordnet frysedisk tegn på gode varer», *Verdens Gang*, 1964; Anonsen Fabrikker, «Dypfrysingskontoret i aktivitet», *Alt om Kaldt*, 1959.
- ⁵⁴ Franck Cochoy, «Calculation, qualculation, calculation: Shopping cart arithmetic, equipped cognition and the clustered consumer», *Marketing theory* 8, no. 1 (2008): 15-44.
- ⁵⁵ Bowker and Star, *Sorting things out*; Lampland and Star, *Standards and their stories: How quantifying, classifying, and formalizing practices shape everyday life*.
- ⁵⁶ «Norsk Kjøleteknisk Årsmøte 1961. 16.-18. januar.», *Norsk Fryserinæring*, no. 1 (February 1961): 7-8; «Norsk Kjøleteknisk Årsmøte 1961. 16.-18. januar.», *Norsk Fryserinæring*, no. 1 (February 1961): 7-8; Nils W. Pettersen-Hagh, «Litt om AFDOUS-koden og T-T-T programmet. Erfaringer fra USA.», *Kjøleteknikk og Fryserinæring*, no. 3 (June 1961): 68; Rolf Kirkvaag, «Behovet for faste temperaturregler i frysekjeden i Norge. Innlegg på Norsk Kjøleteknisk Forenings møte», *Kjøleteknikk og Fryserinæring*, no. 3 (June 1961): 69-72; The Directorate of Health in the Department of Social Affairs, «Frysedisker og frysebokser i utsalg for nærings- og nytelsesmidler», *Norsk Fryserinæring*, no. 3 (June 1960): 33.
- ⁵⁷ Nils W. Pettersen-Hagh, *Frysing og frysing i USA. Rapport fra studietur 48-23-p2-1-50004 arrangert og beskyttet av Foreign Operations Administration 15. april til 15. juni 1955* (Oslo: Norwegian Association of Freezing Plants/The Norwegian Productivity Agency, 1956); Nils W. Pettersen-Hagh, *Dypfrysing i Sverige. Rapport fra en studiereise 3.-18. august 1957*. (Oslo: The Norwegian Productivity Agency, 1958); Report from meeting regarding the Deep Freezing Office, August 28, 1958, S-1623 The Norwegian Productivity Agency. The National Archive; Statutes for the Deep Freezing Office, the Norwegian Productivity Agency. The National Archive; Gunnar Birch, Invitation to meeting, the Norwegian Productivity Agency. The National Archive; Egil Arneberg, «Report from a conference about deep freezing 24.02.1958», the Norwegian Productivity Agency. The National Archive.
- ⁵⁸ «Kirkvaag om dypfrost fremtid på forbrukerdagene på Kongsberg. Utenbys foreninger har alt anmeldt sin ankomst», *Verdens Gang*, February 3, 1959; «Nyheter i frysedisken - risotto, fårikål og lutefisk. Og mer skal komme lover Kirkvaag», *Verdens Gang*, 1961; «Kirkvaag åpner dypfrysings-sentrum. Hvem som helst kan lære om FRYSE-MAT», *Verdens Gang*, 1962; «Vi får Europas første dypfrysingsskole med Kirkvaag som lærer!», *Verdens Gang*, October 6, 1965.
- ⁵⁹ Bjørg Eliassen, *Vi Dypfryser* (Oslo: Johan Grundt Tanum Forlag, 1965).

⁶⁰ Bergliot Qviller Werenskiold, «Kjøling og frysing av matvarer», *Tidsskrift for husstell-lærerinner* (Journal for Home Economics Teachers) 24, no. 10 (October 1942): 81-90; *Frysing av matvarer* (Oslo: State Office for Research in Home Economics, 1951); *Frysing av matvarer* (Oslo: State Office for Research in Home Economics, 1953); «Frysing av kjøtt», *Hus og heim* (Oslo: The Norwegian Broadcasting Corporation, December 3, 1951); *Frysing av matvarer* (Oslo: State Office for Research in Home Economics, 1961); *Frysing av matvarer* (Oslo: State Office for Research in Home Economics, 1962); *Frysing av matvarer* (Oslo: National Institute for Consumer Research, 1974); *Frysing av matvarer* (Oslo: National Institute for Consumer Research, 1981); Ingunn Børke, «Løst og fast om dypfrysing», *Husmorbladet*; Ellen Offergaard, «Lønner det seg å fryse matvarer selv?», *Husmorbladet*, June 7, 1956; «Hjemmefryser i slaktetid», *Husmorbladet*, November 21, 1959.

⁶¹ Lillemor Erken, *Morgendagens mat. Isol dypfrysing* (Oslo, 1957); Lillemor Erken, *Morgendagens mat. Isol dypfrysing* (Oslo, 1962); Ingunn Børke, *Dypfrysing i hjemmet* (Oslo, 1960); Ingunn Børke, *Frysebok* (Oslo, 1960); Britt Marie Anderson, *Dypfrysing* (Oslo, 1969); Ruth Blegen, *Hjemmefrysing* (Oslo, 1963); Lillemor Erken, *Tidens Syltebok. Sylting-Safting, Hermetisering, Frysing* (Oslo, 1950).

⁶² *Frysing av matvarer*. (Oslo: 1951, 1953, 1961, 1962, 1974, 1981).

⁶³ Martin Bruegel, "How the French learned to eat canned food, 1809-1930s", in Warren Belasco and Philip Scranton (eds.), *Food Nations. Selling Taste in Consumer Societies* (New York: Routledge, 2002): 113-130

⁶⁴ Jacobsen, «Innlandet»; Nils L.S. Jacobsen, «Litt om frysebokser», *Norsk Fryserinæring* 2, no. 1 (1950): 1-5.

⁶⁵ Pettersen-Hagh (1956).

⁶⁶ *Marketing and consumption of frozen fish in OEEC countries. Report presented at a meeting of experts on deep frozen foods held in Verona from the 6th to 12th October 1959; Report on the meeting of experts on the marketing of deep-frozen products in Europe* (European Productivity Agency of the Organisation for European Economic Co-operation, 1959).

⁶⁷ This strategy is also explored by Ruth Schwartz Cowan, which shows how electricity plants promoted electrical refrigerators in order to turn households into electricity consumers. See: Ruth Schwartz Cowan, «How the refrigerator got its hum», in *The social shaping of technology*, eds. Donald MacKenzie and Judy Wajcman (Maidenhead: Open University Press, 1985).

⁶⁸ Today, more than 90% of Norwegian households have a freezer. Statistics Norway: *Statistiske analyser no. 28. Beholdning og anskaffelse av varige forbruksvarer i private husholdninger* (Oslo: 1976); Statistics Norway:

Statistikkbanken, Tabell: 05066: Husholdninger med utvalgte varige forbruksvarer,

<http://statbank.ssb.no/statistikkbanken>

⁶⁹ Pettersen-Hagh, Dypfrysing i Sverige. Rapport fra en studiereise (Oslo: Norwegian Productivity Agency, 1958);

Pettersen-Hagh (1956); *Marketing and consumption of frozen fish in OEEC countries* (1959).

⁷⁰ Rolf Kirkvaag, «Dypfrysingens fremtidsmuligheter» in *Kjøleteknikk og fryserinæring* no. 6 (Dec. 1962), 150-154.

⁷¹ Aanonsen Fabrikker, «Dypfrysingskontoret i aktivitet».

⁷² For more on the idea of technological determinism, see: Merrit Roe Smith and Leo Marx (eds.), *Does technology drive history? The dilemma of technological determinism* (London, MIT-Press: 1994)

⁷³ Andersson, (1969); Statistics Norway: Statistikkbanken.

http://statbank.ssb.no/statistikkbanken/Default_FR.asp?PXSid=0&nvl=true&PLanguage=-0&tilside=selectvarval/define.asp&Tabellid=06376

⁷⁴ This is a theme more explored in: Terje Finstad, *Varme visjoner og frosne fremskritt. Om fryseteknologi i Norge, ca. 1920-1965* (Norwegian University of Science and Technology: PhD-Thesis, 2011). (On the introduction of freezing technologies and frozen food in Norway).

⁷⁵ For instance: Bruegel (2002); Merete Lie and Knut H. Sørensen (eds.), *Making technology our own? Domesticating technology into everyday life* (Oslo: Scandinavian University Press, 1996).